"THE REPEATER"

Thursday Oct 16th
Vol 7 2025

HOW TO SWAPTOBERFEST

EVENTS and DATES

Swaptoberfest 2025
Oct 18th
9a.m.-3p.m.
Rickreall, OR
Polk County Fairgrounds

Jankfest 2025
2meter Antenna shootout/Antenna workshop
Scheduled for Maud Williamson Park
November 15th 10am-???

Upcoming Contest
-NY QSO Party Oct 18th
-Illinois QSO Party Oct 19th
-CQ Worldwide DX SSB Oct 24th
-ARRL Sweepstakes CW Nov 2nd
-ARRL Sweepstakes SSB Nov 16th
-North America SSB Sprint Nov 22nd

SWAPTOBERFEST 2025
Polk County Fairgrounds – Rickreall, Oregon
Doors open at 9:00 a.m. | Admission: $10 (at the door only)

It happens twice a year, and every amateur radio operator in Oregon looks forward to it — Swaptoberfest!
Join us this October at the Polk County Fairgrounds in Rickreall for a day filled with radio gear, great deals, and even better company.

There are no pre-sales, so plan to grab your ticket at the door. If you've got extra gear collecting dust in your shack, why not turn it into cash? Vendor tables are available but limited — $20 without electricity, or $22 with power. Keep this in mind for next years event because tables are most likley all sold out for the 2025 session.

Traveling from out of town? Bring your RV and stay right at the fairgrounds! Sites with water and electricity are available for just $25 per night, so you can wake up right where the action is. Visit swaptoberfest.com for all the details.

Radios, Deals, and Ham-Spirit Camaraderie

Everyone experiences Swaptoberfest a little differently. Some hams come for the social buzz, catching up with friends they've only heard over the airwaves. Others are there for the hunt — digging through tables for that rare mic, a clean HF rig, or a bargain Bird meter.

However you "Swaptoberfest," it's the place to see and be seen. Many attendees gather at the nearby restaurant before the doors open to swap stories over a hot cup of coffee and a plate of biscuits and gravy — fueling up for a full day of ham radio treasure hunting!

Whether you're there to shop, sell, or simply soak up the atmosphere, Swaptoberfest is the ham-radio event of the year.

Grab your gear, round up your friends, and make your way to Rickreall — the airwaves won't be the only thing buzzing!

WA7ABU 145.290 Repeater Net Schedule

Monday
Technical Discussion Net: 1000-1100, TBD
Lunch Bunch: 1200-1230, Kirk K1RKS
Technical Discussion Net: 1900-2000, TBD
Learning Linux : 20:30 N0TIF Mike

Tuesday
Technical Discussion Net: 1000-1100, Scott KF7GGN
Lunch Bunch: 1200-1230, Darrel W7DDE
**Project Net: 1900-2000, Brett KG7GDB
**Homesteading Net : 19:00-20:00 KK7NZG Phil & K9CAN Kris

Wednesday
Technical Discussion Net: 1000-1100, Brett KG7GDB
Lunch Bunch: 1200-1230, Russell KE7QXR
Slow Scan TV Net: 1900-2000, Dan WA7ABU (picture swapping using SSTV mode).

** The Tuesday Net at 19:00 alternates every week its topic as seen to the right and Above

Thursday
Technical Discussion Net: 1000-1100, Gary K7VBY
Lunch Bunch: 1200-1230, Tim KI7KPF
Mesh Network Discussion Net: 1900-2000, Brett KG7GDB

Friday
Technical Discussion Net: 1000-1100, Joe KC7ZZX / Daniel K7CGO
Lunch Bunch: 1200-1230, Rita KM7BEA
Space Net/Above Ground Net: 1900-2000, Kris K9CAN

Saturday
Ham Shopping Club Swap Net: 1900-2000, Dan WA7ABU

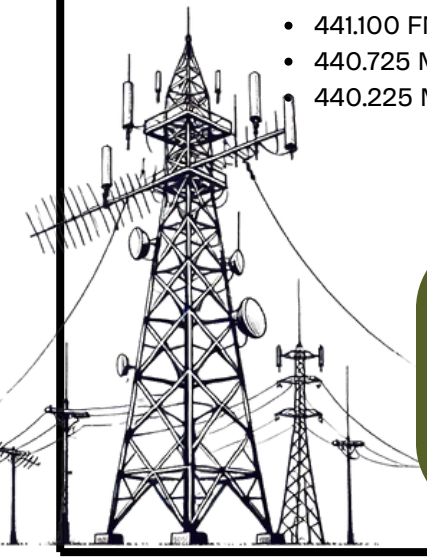
Sunday
LDS Emergency Net, Lebanon: 1800-1830, Rotating Net Control

S.A.R.G REPEATERS

- 145.290 MHz FM ~ 930 feet -AllStar & Echolink 54326 - Silverton Hills
- 145.190 w/100 Hz tone - WA7ABU Repeater Site ~4000' near Gates
- 444.950 MHz Yaesu Fusion , Wires-X, & FM w/ 100 Hz tone - Newburg
- 444.600 MHz Yaesu Fusion & FM w/ 100 Hz tone - McCully Mtn, Lyons (no I-5 or Portland coverage) (Active & Under Development)
- 147.060 MHz FM -1720 Feet - Mc Cully Mtn, Lyons (Active & Under Development)

Other Repeaters in our area worth mentioning

- 441.100 FM w/100Hz tone - Yaesu Fusion c4FM -480 feet - Shaw K7GIB
- 440.725 MHz FM no tone - Yaesu Fusion FM -700 Feet- Salem KB7PPM
- 440.225 MHz FM 100Hz Tone - Junction City - 350ft K9CAN



DID YOU KNOW?

SIGNAL REPORTER APP

You can now contribute to the S.A.R.G network of repeaters by completing signal reports for each repeater in the system. We want to know how your signal is based on your location. We suggest when you make your reports, it is based on signals from a 50 watt mobile transceiver. HT's are not preferable but if that all you have, that is OK.
https://wa7abu.com/reports/

What's right/wrong with "HAM RADIO" today? Musings of an OM

By: Mark Holt W7EAZ

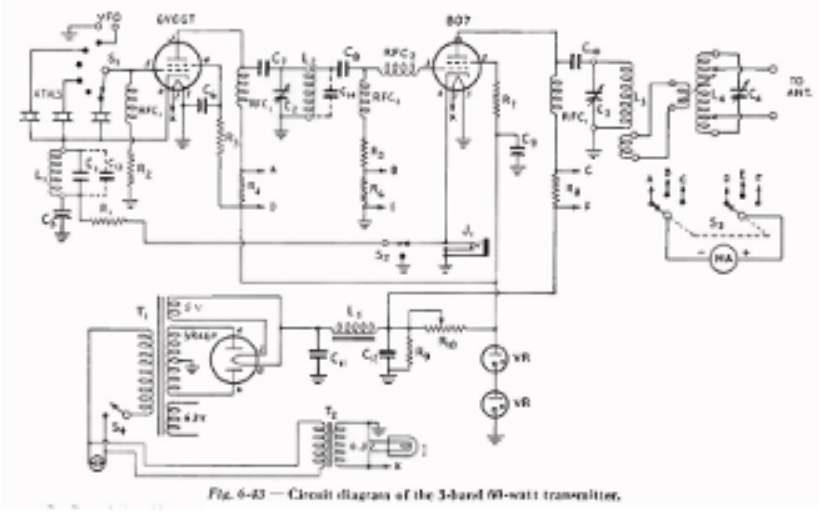
DISCLAIMER: The opinions expressed here are mine alone!

To start with, there isn't an entire industry feeding into ham radio like there was during the 50's-early 70's. Television was the springboard of innovation into ham radio. You could get everything from a TV set, including enough to build a pretty decent transmitter AND receiver. The Radio Amateur's Handbook of that early era (which I'll never stop calling it that) was just jammed packed with all kinds of methods to 'roll your own' equipment salvaged from TVs.

TV Chasis

TV Chasis

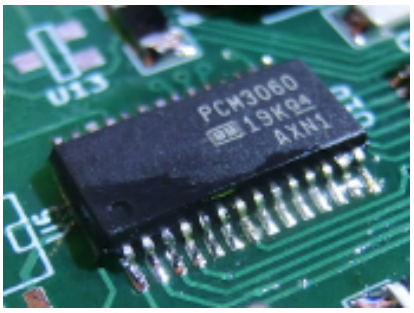
I did actually build a 60-watt crystal-controlled transmitter from the 1953 Amateur Radio Handbook salvaged from old TVs like those above: (My brother had the '807' tube)



60Watt_XMTR

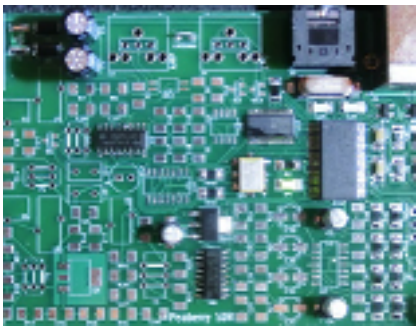
Quite a contrast from today. Resistors, capacitors don't even have markings on them anymore. I found out the hard way. Surface mount technology has made salvaging obsolete and impossible.

Musings of an OM Continued..

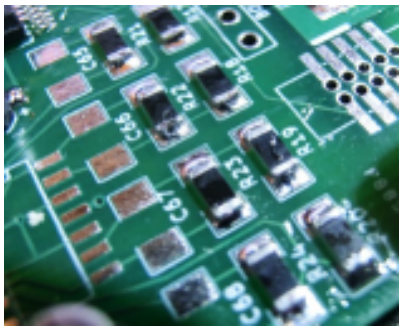


I plunged headlong into surface mount kit building. SDR radios were just making their debut about 15 years ago and I wanted to learn what these advances in radio technology were going to provide in the realms of amateur radio. See my QRZ.com page (W7EAZ) for some other descriptions of these kit SDRs. This chip is what is called PSOC, Programmable System-on-Chip.

It contains ALL the IO needed to run this SDR radio, including digital sampling for I/Q demodulation, sound card interface, band switching and transmitting modulating.
This was a project not for the faint of heart. It IS VERY DELICATE work. I employed an almost needle point soldering iron and a dual-eye head-worn magnifier to be able to even see these tiny parts.
The integrated circuit parts hardly had any room between their legs.

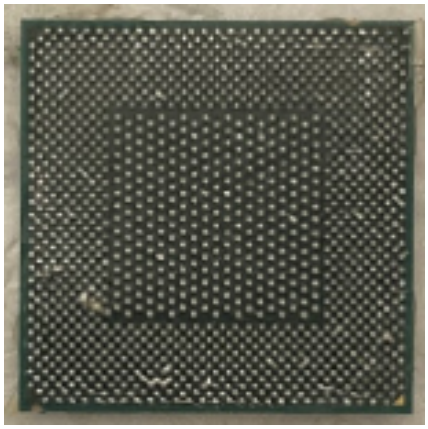


SDR Board



SDR Board

There is NO WAY I could have soldered this Microprocessor:



This is a very specialized soldering process. Each DOT is a solder blob that is pre-tinned then just heated and makes connection to the circuit board. The 10x16 matrix in the middle is the connection for the CPU. The rest of the solder blobs around the perimeter are used for heat-sinking. This was from my dead netbook.

So, why learn the color code?

The shrinking, by integration, complexity and functional specialization, has pretty much sealed the fate of “home brew” anymore.

The only reason I can do any Home Brewing is from what I have left over from my early salvaging days when I still could (late 70’s to mid 80’s).

You have to find some real old junque box (good-junk box) treasures from those estate sales where someone had hoarded tubes, chassis and even bunches of transformers with just the right windings to power some of the old tubes. These troves of home brew boxes are becoming scarcer at every swap meet year.

Musings of an OM Continued..

So, what do you do besides buy radio-appliances?

There is an ever-increasing barrage of 'appliance' type radios. The culmination of integration by miniaturization has spawned a plethora of radios of every conceivable shape, size, function and features. Many of which are so inexpensive that getting into the first level of Technician class license will only cost about as much as you paid to acquire your amateur radio license- $35. Just recently I purchased one of these 'inexpensive' hand held radios. The most unfortunate part was I found that it would transmit on the NOAA weather channel frequencies. WOW! How could something like this pass any FCC scrutiny?
The user's manual is very limited in explanation of any of the particular menu functions which were a stack of 54 menu options and sub-selection menus in the radio accessible by a special combination of button presses. Luckily, the programming software CHIRP was able to read/write to the radio. I really didn't like the idea of loading a foreign piece of software on my phone. I had an old android 'bricked' phone I loaded it to. It is my testbed for strange software. It wanted so much access that I was careful on which function I gave it access to. I don't know why it asked for access to my photo library or contacts. Not going there!
I will stick with my original handheld radio from one of the BIG THREE radio manufacturers who put some thought into the design and not kludge together a serious knock-off radio which has spurious radiation of harmonics seen on a spectrum analyzer. My caution: Watch out what you buy. If it's cheap, it probably is.

Then, what is there to keep my interest?

I have always been a listener to the entire spectrum of radio. In the late 60's-70's, you could actually hear multiple channels of Short-Wave radio broadcasts from foreign countries with just a long length of wire out your window dangling into a tree. OK- those broadcasts have diminished greatly. An internet tunable radio has pretty much replaced those types of 100 KW stations. Gone are the requirements of HUGE antennas transmitting towers and acres of real estate to accommodate such transmitters. VOA is one of those that is still on the air. Searching VOA frequencies has about 30 different frequencies listed to be used based upon daily propagation.

VOA

See https://alcpress.org/comm/voa-dixon/index.html for a very interesting article of the VOA relay station in California. A friend of mine has an internet radio station that fits into the hall closet in his house. With the accessibility to high-speed internet, it's pretty to host your own internet radio station.

If you have a full range radio that covers 30KHz-30MHz the entire spectrum is your playground. You can even decode NOAA weather satellites with nothing more than the sound card interface in FLDIGI. Search "NOAA Weather Map Frequencies" and you'll find some that are on every band that has good propagation any time of the day. Load the FLDIGI SW and sync to the WEFAX transmissions. I've done this for many years.

Musings of an OM Continued..

Transistor is King

I believe if the transistor hadn't come along when it did then tube advances would have improved to the sensitivity of the radios we have today to the low-level noise figures we have in the transistor receivers. However, it was inevitable the transistor would be king over tube technology because the power consumption is the main factor that drove tube technology into oblivion.

Digital modes

One of the latest marvels of the transistor and super miniaturization is the horsepower of microcomputers making low level signal analysis only dreamt of when I started in ham radio. The digital modes we now take for granted which can decode signals you cannot see in a waterfall had their roots in the Voyager space exploration. The methodology using Fast Fourier Transform (FFT) which can make Frequency Shift Keying (FSK) jump out of the noise.

There are over 100 different digital modulation techniques just in FLDIGI alone. Now since the FCC has changed the definition of symbol rates and removed the 300 baud (bits of audio data) which hampered some of the digital explorations, you can bet that higher modulation speeds will be on their way.

The silly part is, I remember when PACTOR 1 was released with the original Terminal Node Controller (TNC) by Tucson Amateur Packet Radio (TAPR) and Advanced Electronics Applications (AEA) and their PK-232. I built the Heathkit HK-232 (copy of PK-232 with Heathkit's name) because I wanted to understand the methodology that went into Packet radio. It still used first level logic chips and discrete analog filters. I understood these techniques. However, miniaturization and software with DSP (Digital Signal Processing) some very sophisticated signaling devices began showing up on the scene of digital communications.

I found it very peculiar that our friends to the north (Canada) could use PACTOR 4 and yet we were stuck with PACTOR 3 limit. When the FCC changed the bit rate a while back I can finally use my P4 Dragon modem in PACTOR 4. Boy does it scream on HF. It easily matches the VARA sound card modem when the signals have reasonably good Signal/Noise (S/N) ratios. PACTOR 4 wins out when the signals are less than ideal.

My historical paradigm

Most of my own experiences through 55 years of amateur radio drive my interests. There have been some advances I've seen come along that make me wish I had some of them when I started out as a novice. For instance, PSK Reporter which website (https://pskreporter.info/pskmap.html) shows all the stations you hear and can hear you when you are transmitting a digital mode. Even CW. Incredible technology to see your radiation pattern from your antennas.

Within the past 10 years, being able to view a portion of frequency spectrum on a waterfall was unheard off when I began. It's now point and click with a mouse and your zeroed in what you want to hear.

What will the next 50 years bring? You won't see advertisements like this anymore.

Thank you Mark W7EAZ, this is a great addition to the Newsletter/Magazine!
This content is exactly what makes this publication SPECIAL!
Fantastic Job!


TV happiness shared by all the family!
Whether it's a party for friends or just a quiet evening at home . . . your Motorola TV will add plenty of pleasure with its variety of entertainment. Drama, music, sports and educational programs . . . all these are yours on Motorola's big-screen, photo-perfect television! Hear your favorite recorded music faithfully reproduced with Motorola's dependable and easy-to-operate "Multi-Play" record changer. And for the best in both FM and AM radio, there is nothing finer than Motorola's famous "Golden Voice" tone that's as rich and true as the original sound itself.
Motorola TV
LEADER TODAY BECAUSE OF 25 YEARS OF PIONEERING IN THE ELECTRONICS INDUSTRY
ONLY MOTOROLA GIVES YOU THESE EXCLUSIVE FEATURES . . . IN FASHION AWARD CABINETS!
GLARE GUARD
NEWEST TV IMPROVEMENT. The curved surface of the Motorola Glare-Guard screen directs reflections down—out of the viewer's eyes . . . cuts annoying room-light reflection glare as much as 58%
TWO SIMPLE CONTROLS.
THREE-SPEED RECORD CHANGER.
"GOLDEN VOICE" AM AND FM RADIO.
LONG LIFE "DEPENDA-SILT" CHASSIS.
SEE YOUR CLASSIFIED DIRECTORY FOR THE NAME OF YOUR NEAREST MOTOROLA DEALER • Specifications subject to change without notice.

ARORA BOREALIS VS PROPOGATION

The aurora borealis can severely degrade communication on all bands but more specifically on HF bands, especially at high latitudes, by increasing absorption of radio waves in the ionosphere. Instead of the stable, predictable ionospheric reflection needed for long-distance communication, an aurora causes absorption, rapid signal fading, and severe distortion.

Increased signal absorption

- More signal loss: The same charged particles from the sun that create the visible aurora increase the ionization in the D-layer of the ionosphere, particularly in polar regions.
- Daytime effects intensified: While the 80 m band is always prone to daytime absorption from the D-layer, auroral activity can intensify and extend this effect, often causing complete radio blackouts on the band.
- Degraded polar paths: For amateur radio operators in the mid-latitudes, this translates to severe disruption of any communication paths that travel over the Earth's polar regions.

Distorted and unstable signals

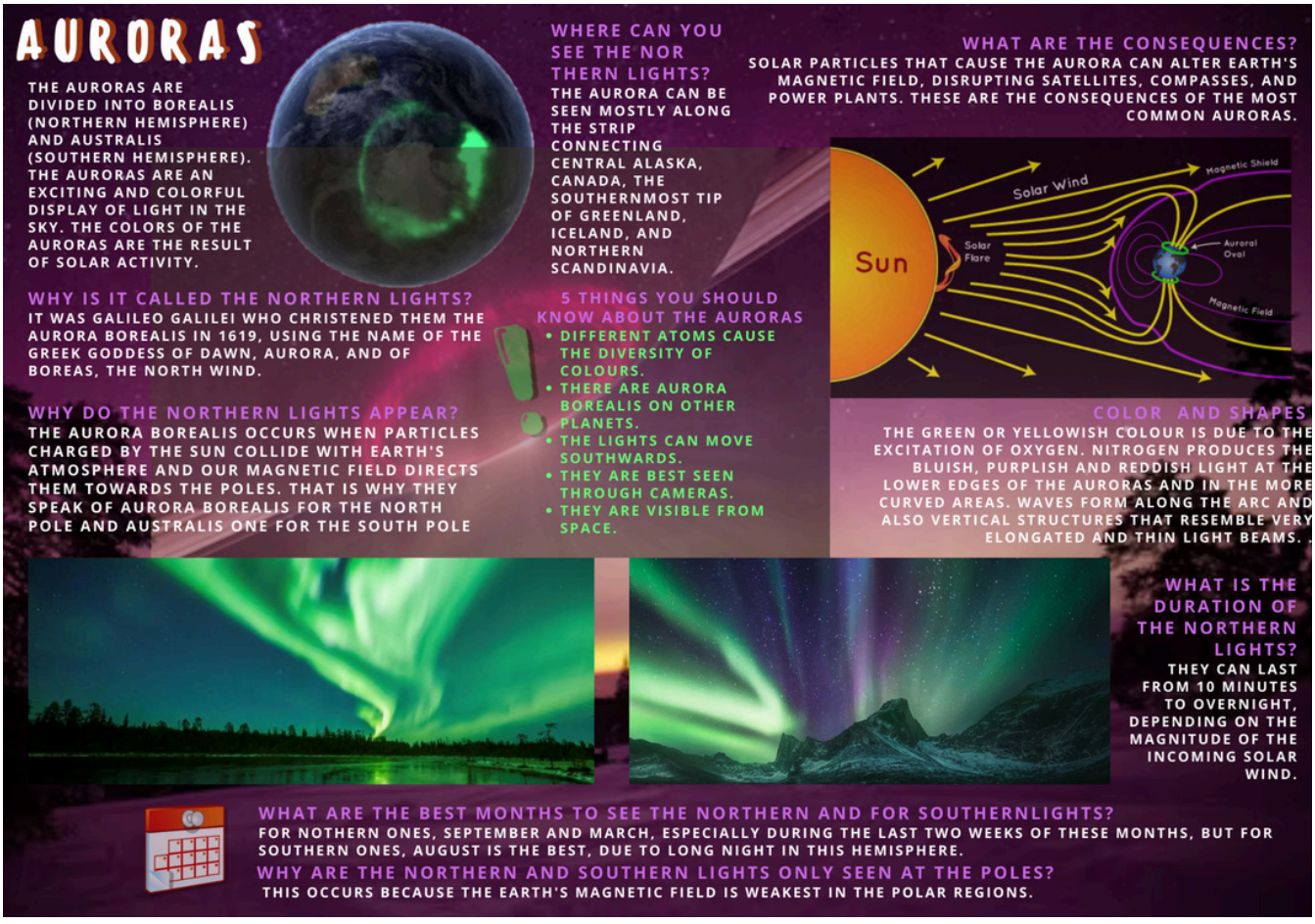
- Rapid fading: The energetic particles creating the aurora are in constant, unstable motion. This movement causes signals to fluctuate wildly and fade in and out rapidly, a phenomenon sometimes called "fluttering".
- Warped audio: The signal distortion produces a characteristic "auroral buzz," a harsh, raspy tone superimposed on signals. This distortion makes standard voice communication (SSB) difficult or impossible to copy.
- Morse code is challenging: Even though Morse code (CW) is generally more resilient to distortion, auroral flutter can degrade signals enough to make copying difficult.

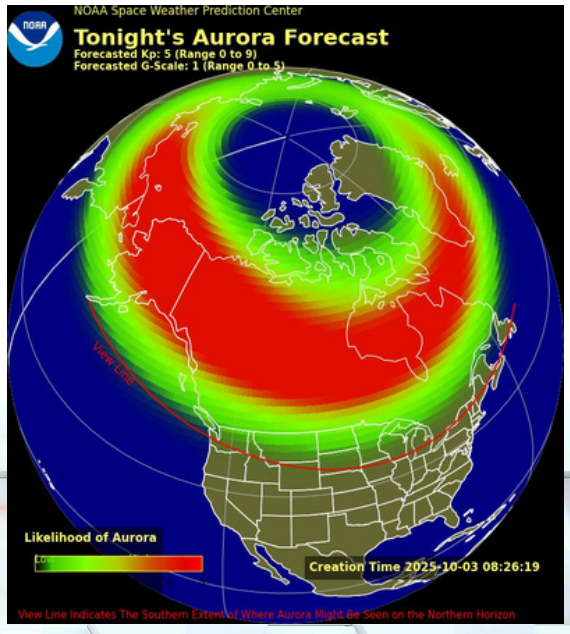
Minimal useful propagation

- Limited "backscatter" effect: While higher-frequency bands like 6 m can sometimes achieve long-distance contacts by bouncing or "backscattering" signals off the aurora, the effect is not useful on the 80 m band.
- Not a propagation enhancement: Unlike the higher frequency bands, which can sometimes see enhanced propagation during an aurora, the 80 m band is almost exclusively harmed by this phenomenon.

Exception: Auroral E-mode propagation

While the general effect on 80 m is negative, research has noted complex auroral effects. During an auroral event, the enhanced ionization can create alternative propagation modes at higher frequencies (VHF), such as auroral backscatter. For the low frequencies of the 80 m band, however, this typically does not improve long-distance communication because the absorption is too strong. One study found that aurora can potentially create "ducting" between the E and F regions, but this primarily benefits long-range coverage for specific military radar applications and does not represent a reliable, usable mode for typical 80 m amateur communication.





The End-Fed Half-Wave Antenna:
Old Ideas, New Life

For a piece of wire that looks so simple, the End-Fed Half-Wave antenna has sparked more debate, experimentation, and enthusiasm than almost any other antenna in amateur radio. To some operators it's the ultimate field antenna—light, versatile, and easy to deploy. To others it's a compromise design that trades efficiency for convenience. The truth, as usual in ham radio, lies somewhere in between.

A Brief History of the EFHW

The concept of the end-fed wire dates back to the early 1900s, long before amateur radio existed as we know it. Early experimenters like Marconi and Fessenden used vertical or sloping wires fed from one end, often against a ground or counterpoise, because they were easy to hoist from a mast or ship's rigging. In those days, the lack of coaxial feedline and impedance-matching components made center feeding impractical.

By the 1920s and 1930s, the half-wave end-fed wire—today's EFHW—was appearing in military and maritime communications. Operators liked that a single wire could be tuned for multiple harmonically related bands. During World War II, portable "whip and wire" systems often relied on the same principle: feed from one end, make it resonate, and get the message out.

Fast-forward to the 21st century and the EFHW is enjoying a major comeback. With today's ferrite materials, compact toroids, and lightweight tuners, hams can build or buy matching transformers small enough to fit in a shirt pocket. Combine that with the popularity of Parks on the Air (POTA), Summits on the Air (SOTA), and other portable operations, and the EFHW has become the antenna of choice for countless QRP and field operators worldwide.

How It Works

A half-wave wire resonates naturally at the desired operating frequency. If it's a half wavelength long—about 33 feet on 20 meters or 66 feet on 40 meters—the current and voltage along the wire form standing-wave patterns. The voltage peaks at the ends, while the current is highest at the center.

Feeding a wire at its end rather than the center means the feedpoint sits at a very high impedance—anywhere from 1,500 Ω to 5,000 Ω depending on height, ground conditions, and surroundings. That's far from the 50 Ω that most radios expect, so the trick is to transform that impedance down to a manageable level.

End-Fed Half-Wave Continued

Modern EFHW antennas usually employ a 49:1 or 64:1 transformer, wound on a ferrite toroid, to match the antenna's feedpoint to coax. Some designs use an autotransformer where the primary and secondary share a few turns; others use separate windings for better isolation. A small counterpoise or the coax shield often provides the return path for current, though opinions differ on whether one is absolutely necessary.
Because the voltage and current patterns repeat at even multiples of a half wave, an EFHW cut for 40 meters will also resonate on 20 m, 15 m, and 10 m—making it naturally multiband without traps or switches.

Practical Uses in the Field

Few antennas offer the flexibility of an EFHW. For portable work, it's hard to beat a single lightweight wire, a small transformer, and a length of coax.

- Portable and QRP Operation: Backpackers and POTA activators love the EFHW because it can be deployed in minutes as a sloper, inverted-V, vertical, or horizontal wire. With a telescoping pole or a convenient tree branch, it's easy to get the far end high and clear.
- Multiband Capability: A 66-foot EFHW for 40 meters will also cover 20, 15, and 10 meters harmonically. Add a small loading coil and tail wire and it can even stretch to 80 m.
- Limited-Space Installations: At home, the EFHW can zigzag along a fence, roofline, or attic, offering a workable solution where center support for a dipole isn't possible.
- Emergency Communications: In disaster or field-day scenarios, a single end-fed wire and a throw line can establish communications quickly without towers or complex supports.

Because the EFHW is fed from one end, the operator can keep the feedpoint—and the radio—safely on the ground, eliminating the need for a center-fed feedline strung through trees. That's one of its biggest advantages in field work.

Advantages

1. Easy Deployment-
The end-fed design means only one high support is needed. Toss the far end over a branch, connect the transformer at ground level, and you're ready to go.

2. Multiband Operation-
When cut for a half-wave on the lowest band, the EFHW naturally resonates on its harmonics. A 40 m version, for example, covers 40, 20, 15, and 10 m without traps.

3. Lightweight and Portable-
Even with a small enclosure and toroid, the entire setup often weighs less than 200 grams—perfect for backpack or park use.

End-Fed Half-Wave Continued

4. Flexible Orientation-
The wire can be set up horizontally, vertically, or as a sloper to favor certain directions. It's also easy to adjust height or length in the field.

5. Low Noise Reception-
Many users report that EFHWs can be quieter than verticals, particularly when installed away from buildings or noise sources.

6. Works with Low Power-
The high-impedance feedpoint results in high voltage but low current, making it efficient for QRP operation where every milliwatt counts.

Disadvantages

1. High Feedpoint Voltage-
The voltage at the wire's end can exceed several hundred volts even at 5 W, and thousands at higher power. That's enough to bite—or arc—if the wire end is within reach of people or pets.

2. Dependence on the Transformer-
Performance depends heavily on the quality of the ferrite core and winding. Poor transformers can saturate or overheat, introducing losses or distortion.

3. Common-Mode Currents-
Because the coax shield often acts as the counterpoise, unwanted RF can travel back into the shack, causing interference or distorted audio. A common-mode choke at the feedpoint or radio end helps.

4. Variable Impedance-
The actual feedpoint impedance changes with installation height, angle, and nearby objects. A design that works perfectly in the backyard may behave differently in the field.

5. Efficiency on Harmonics-
Although the EFHW radiates on harmonic bands, the current distribution becomes complex, leading to irregular lobes and nulls. On higher bands it may not favor the directions you expect.

6. Narrow Bandwidth on Lower Bands-
Especially on 80 m, a full-size EFHW is long (130 ft) and can have a narrow bandwidth. Using a loading coil to shorten it introduces additional losses and tuning sensitivity.

End-Fed Half-Wave Continued

Getting the Most from an EFHW

For best performance, keep the transformer close to ground and provide at least a short counterpoise—six to ten feet of wire is enough for most portable setups. Add a common-mode choke (5–7 turns of coax through a ferrite core or a few ferrite beads) to keep RF off the coax braid.

Experiment with wire height and configuration: a sloper offers a nice low-angle radiation pattern for DX, while an inverted-L can combine both vertical and horizontal components for good all-around coverage.

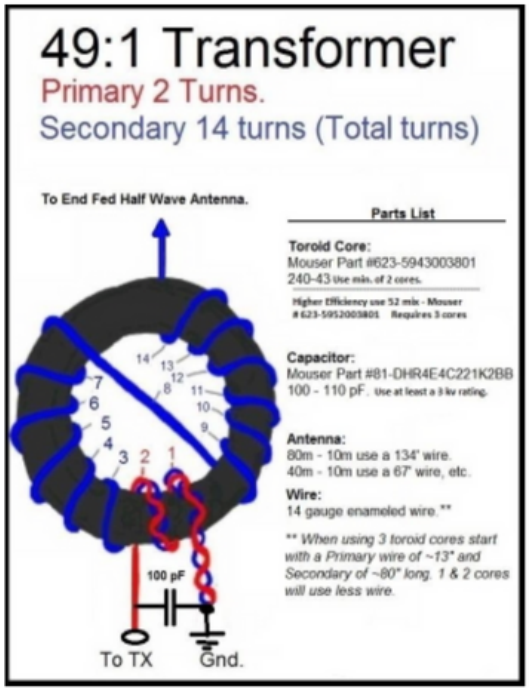
If you're running more than 50 W, use a larger ferrite core such as a stacked pair of FT240-43 or FT240-52 toroids to handle the voltage stress. Enclose the transformer if you plan to leave it outdoors, but for temporary field setups, an open-air design is fine.

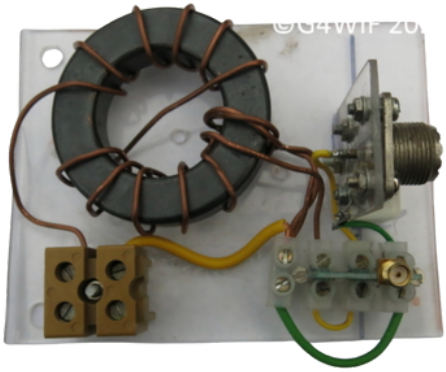
Antenna for the Adventurous

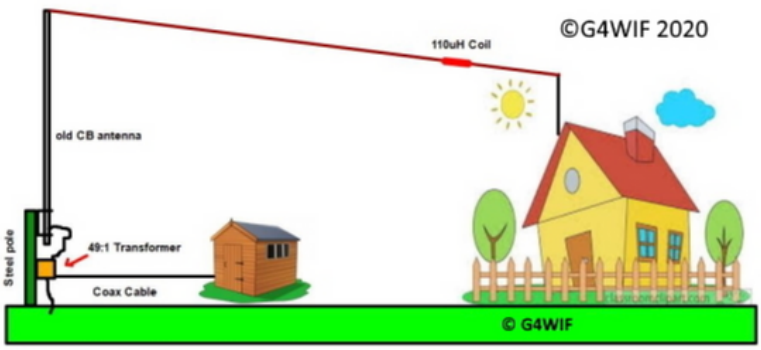
The End-Fed Half-Wave's charm lies in its simplicity. It's not the perfect antenna—nothing is—but it delivers a satisfying mix of performance, portability, and flexibility. Whether you're chasing POTA contacts, testing a new ferrite mix, or just want to squeeze a multiband wire into a small suburban lot, the EFHW deserves a spot in your toolkit.

It also captures the true spirit of amateur radio: curiosity, experimentation, and the willingness to make something work with whatever you've got.

So the next time someone tells you the EFHW is "just a compromise," smile and nod—then head out to the park, toss a wire into a tree, and prove that a little compromise can still reach around the world.







Lightning Resistors and Grounding: Protecting Your Ham Radio Station

Every ham who's operated through a summer thunderstorm knows the uneasy feeling that comes when the sky darkens and the static starts to crash through the speaker. Lightning is one of nature's most powerful and unpredictable forces — capable of vaporizing equipment, burning feedlines, and even endangering operators.

While no system can offer 100% protection against a direct strike, careful station design — including lightning resistors, grounding, bonding, and surge protection — can greatly reduce damage from nearby strikes and induced surges.

What Are "Lightning Resistors"?

The term "lightning resistor" is sometimes used in ham radio circles to describe bleeder resistors or static drain resistors. These components don't stop lightning — instead, they dissipate static charge buildup on antennas and feedlines, helping to prevent dangerous voltage from forming before or after a storm.

Imagine your antenna wire high in the air on a dry, windy day. It acts like a static generator, building up a charge through wind friction or nearby thunderstorm activity. That charge can reach hundreds or even thousands of volts — easily enough to damage sensitive radio front ends or produce an unpleasant shock when you touch the coax connector.

A lightning resistor — typically a high-value resistor (100 kΩ – 1 MΩ) rated for high voltage — provides a safe, continuous discharge path to ground, bleeding off charge slowly without affecting normal RF performance.

Where to Install Them

Lightning or static drain resistors can be placed in several key points of the station:

1. Across the Antenna Feedpoint
For a dipole or end-fed wire, a high-value resistor across the feedpoint (from the center conductor to the shield) allows slow static bleed without impacting RF.

2. At the Base of Vertical Antennas
Install the resistor from the radiator to the grounded mounting base. This equalizes potential and minimizes charge accumulation on tall verticals and whips.

3. Inside a Lightning Arrestor Enclosure
Commercial lightning protectors (like PolyPhaser or Morgan) often include built-in static drain paths. If you build your own, add a ½-watt or higher resistor between the feedline and ground stud inside the enclosure.

Lightning Resistors and Grounding Continued

4. At the Coax Entry Panel
Place a lightning arrestor or coax surge protector where feedlines enter the shack. A static bleed resistor can be paralleled with the arrestor to maintain continuous discharge to ground even when the protector isn't actively conducting.

🛠️ Typical Values and Ratings

Parameter	Typical Range	Notes
Resistance	100 kΩ – 1 MΩ	Higher values reduce RF loading
Power Rating	½ – 2 W	Choose higher if large antennas or frequent storms
Voltage Rating	≥ 2 kV	Must handle induced static without arcing
Material	Carbon film or metal oxide	Avoid wire-wound (they're inductive)

A good general-purpose choice is a 470 kΩ 2 W metal oxide resistor, sealed inside a small waterproof box or PVC stub, tied between the feedpoint and station ground.

Beyond Resistors: The Big Picture

Bleeder resistors handle static buildup, but they are not a defense against a lightning strike. For full protection, every ham shack should follow a layered strategy:

1. Grounding and Bonding
- Drive multiple ground rods (8 ft or longer) connected with wide copper strap, not round wire.
- Bond all grounds — radio, tower, coax entry, power, and electrical service — into a single unified system to avoid dangerous potential differences.

2. Lightning Arrestors
- Install coax surge protectors (such as PolyPhaser, Alpha Delta, or Morgan) at the entry panel.
- Arrestors should connect directly to ground with short, heavy strap (6" or less) to minimize inductance.
- Protect control lines and rotor cables too — these are often overlooked lightning paths.

3. Station Disconnect
- During thunderstorms, physically disconnect antennas and ground all coax and equipment.
- Use a coax switch with a grounded "OFF" position, or better yet, a bulkhead ground plate where all cables can be removed or shorted to ground with a banana plug or ground bar.

4. Inside the Shack
- Use AC surge protectors or a whole-house surge suppressor to protect power lines feeding your rig, computers, and power supplies.
- Keep all gear bonded together with a common ground bus connected to the station ground rod network.

What Happens in a Strike?

Even if a direct hit occurs nearby, a properly designed system will give that massive current an easier path to earth than through your radio.

The resistor bleeds away slow static, while the arrestors and grounding network shunt high-current pulses safely to ground. The key is keeping every part of the station at the same electrical potential, so lightning energy doesn't have a reason to "jump" across your coax connectors or equipment cases.

Field Example: Static on End-Fed Wires

End-fed antennas (like EFHWs) are especially prone to static buildup because one side of the transformer is often isolated from ground. You can add a bleeder resistor (470 kΩ) from the antenna side of the transformer to ground. This keeps the wire's potential near earth level during storms and dry winds.

Some builders combine this resistor with a small gas discharge tube (GDT) that fires at 90–230 V to handle stronger surges. The GDT acts fast, while the resistor handles the continuous drain.

Building a Simple Static Drain

Parts Needed:

- 1 × 470 kΩ 2 W resistor (metal oxide or carbon film)
- 1 × small weatherproof enclosure or PVC cap
- 2 × ring terminals and stainless hardware
- Optional: 1 × 230 V gas discharge tube

Steps:

1. Solder the resistor between the antenna connection and ground terminal.
2. (Optional) Add the GDT in parallel with the resistor.
3. Seal in silicone or epoxy to prevent moisture intrusion.
4. Mount close to the antenna feedpoint and tie the ground terminal to your station or tower ground strap.

This little addition costs less than five dollars but can protect hundreds of dollars' worth of equipment.

Lightning Resistors and Grounding Continued

Typical Values and Ratings

Parameter	Typical Range	Notes
Resistance	100 kΩ – 1 MΩ	Higher values reduce RF loading
Power Rating	½ – 2 W	Choose higher if large antennas or frequent storms
Voltage Rating	≥ 2 kV	Must handle induced static without arcing
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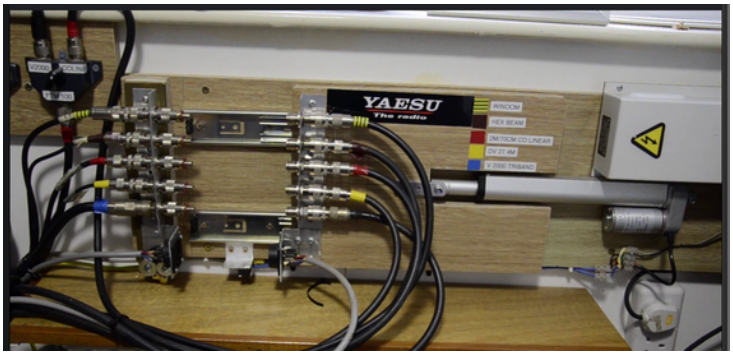
Final Thoughts

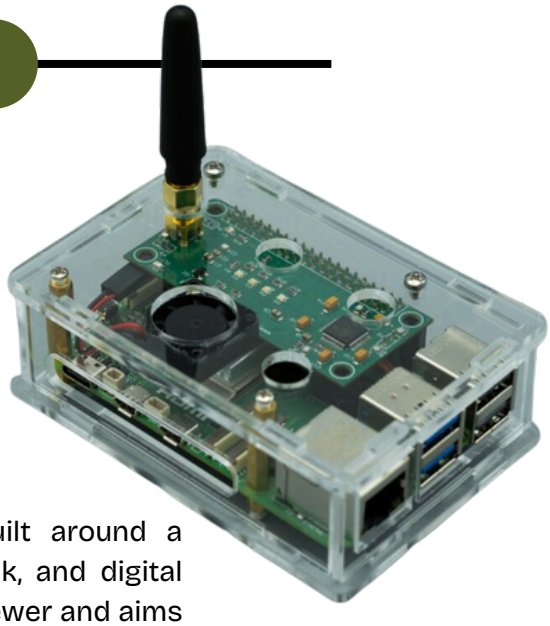
Lightning protection isn't about eliminating risk — it's about managing energy and controlling where it goes.

A few resistors, some copper strap, and a good grounding system can make the difference between a fried transceiver and a station that survives another season.

So before the next thunderstorm rolls through, take a walk around your station. Check your grounds, tighten connections, add a static drain or two, and give your rig a fighting chance against the raw power of the sky.



CLEARNODE UHF by NODE VENTURES



Overview & Purpose

The ClearNode is a ready-to-go ham radio node appliance built around a Raspberry Pi, made especially for analog FM, AllStarLink, EchoLink, and digital modes (DMR, P25, YSF, NXDN, etc.). The "Raspberry Pi 5" variant is newer and aims to provide more headroom and better performance for modern usage.
The idea is straightforward: you don't have to build and configure the software stack yourself. You unbox, power it, configure a few settings (Wi-Fi, callsign, etc.), and connect your radio. It also comes with a mobile app to help manage node settings from your phone.

In short: it's meant as a "plug-and-play node" for hams who want to get on the network without wrestling Linux installs, audio routing, or server setup.

What Works Well (Pros)

1. Ease of Use & Configuration
One of the top praises is that the ClearNode comes pre-configured for key services. You don't need to install AllStar, set up audio bridges, or build the software stack from scratch. Users report getting the node up and running in as little as 15 minutes under ideal conditions.

The mobile app is another plus, giving you a UI on your phone to configure Wi-Fi, connect/disconnect from nodes, manage settings, and more.

2. Integrated Transceiver Hardware
Because it includes an integrated low-power FM radio (UHF or VHF depending on version), you don't need to mate your own radio hardware in many use cases. This lowers the entry barrier: fewer parts, less wiring, fewer mistakes.

3. Support & Responsiveness
Users note that support from Node Ventures is quite responsive. The developer (Gerry Filby) is active, and updates (firmware, software) are ongoing. The ClearNode team seems to push new APIs, app updates, and feature enhancements regularly.

4. More Headroom with Pi 5
Switching to Raspberry Pi 5 offers more computing power to handle background tasks, digital modes, future features, and better thermal behavior under load. The Pi 5 version comes with a more capable power supply (27 W) and a new clear case to manage heat.

5. Advanced Features & Mode Support
The ClearNode supports not just AllStar and EchoLink, but also digital mode bridges (DMR, P25, YSF, NXDN), DVSwitch, Analog_Bridge, and more. For example, you can operate digital networks from a regular FM analog radio (due to bridging). Also, the software stack supports timed events, voice announcements, remote connections, and DTMF control.

Challenges & Limitations (Cons)

1. Power Supply Sensitivity & Noise
Because it is compact and includes RF components, clean power becomes more important. The FAQs warn that cheap switching supplies or unstable power may cause dropouts, undervoltage flags, or corruption in the SD card. A red LED blinking can indicate an under-voltage condition. So you'll want a good quality 5.2 V, 2.5 A or more PSU.

2. Thermal / Heat Management
Running the Pi 5 and the RF radio together will generate heat. The ClearNode includes a fan (which activates at 60 °C), but if ventilation is poor or ambient temps are high, it could reach a thermal limit. Exceeding ~80 °C may cause shutdowns to protect the device.

3. Configuration Hiccups
Though "plug-and-play" is a key selling point, several user reviews note that the Wi-Fi credential provisioning (via flashing light) can fail under bright ambient lighting or less-than-ideal alignment. Some also mention updates failing due to SSL certificate issues if updates are attempted out of order.

4. Dependency on Vendor Updates
Because much of the software and mobile app is proprietary or maintained by Node Ventures, your device's longevity and feature set depend heavily on the vendor's continued support. If updates or bug fixes slow down, you could be stuck waiting.

5. Cost vs DIY
Because ClearNode wraps hardware, software, and RF together, its cost is higher than building your own node from a Pi + radio + open software. For hams comfortable with Linux and audio routing, DIY may be cheaper and more flexible.

Some Reddit users compare the ClearNode to other node systems (e.g. Shari), sometimes preferring the flexibility and lower cost of DIY solutions.

Use Cases & Ideal Users

The ClearNode Raspberry Pi 5 is especially well suited for:

- Ham operators who want to deploy a node quickly without deep system configuration.
- Users who prefer a single device that includes both radio and software stack.
- Field or portable setups where compactness and integration matter.
- Operators who expect or hope for ongoing updates, mobile app control, and vendor support.
- Hams who want to experiment with bridging analog & digital modes without buying multiple radios.

However, it's less ideal for:

- Those who prefer full control of every software component (e.g. custom Linux builds).
- Users operating in high-temperature or harsh environments without good ventilation.
- Power-sensitive installations where every milliwatt counts and you might want lighter or lower-power hardware.
- Users wanting minimal reliance on a vendor for future updates or bug fixes.

Final Verdict

The ClearNode Raspberry Pi 5 by Node Ventures is a polished, modern, and powerful node appliance for amateur radio enthusiasts. Its seamless experience, strong support, and integrated RF hardware make it compelling for users who don't want to spend hours building a node from scratch. You trade off some flexibility, and you must use good power and cooling, but for many hams, especially those more interested in using than building, it's a great fit.

If I were buying one, I'd ensure I have a good quality power supply, ventilation around the case, and be ready to update firmware and app often. Also, when possible, I'd keep a backup or ability to re-image the SD in case of software corruption or failure.

OTHER NODE VENTURE DEVICES

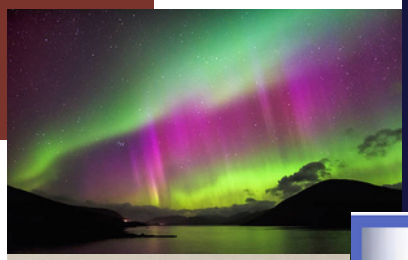
ClearRLS

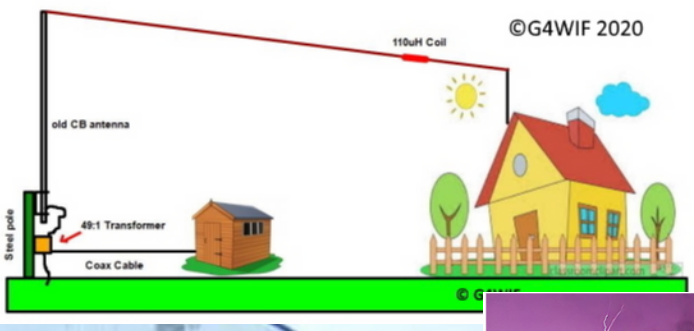
ClearRPT V2

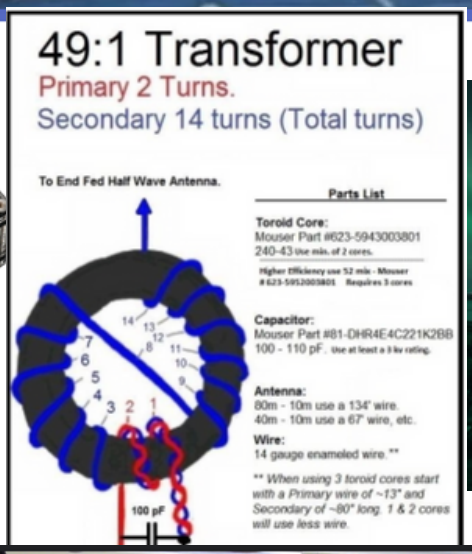
ClearNode Pi 4B UHF

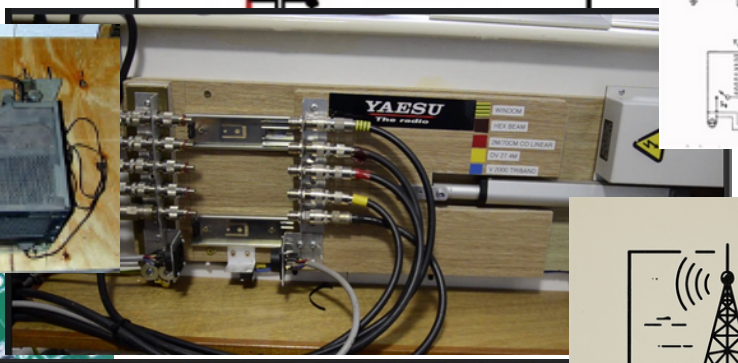
ClearNode Pi 5B UHF

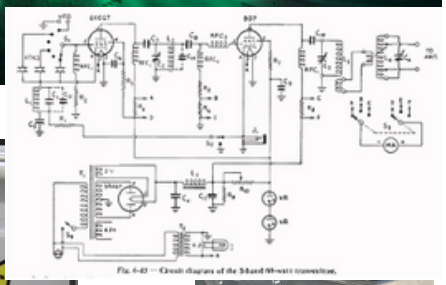
ClearRPT Breakout

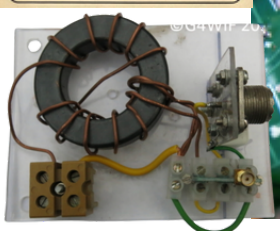












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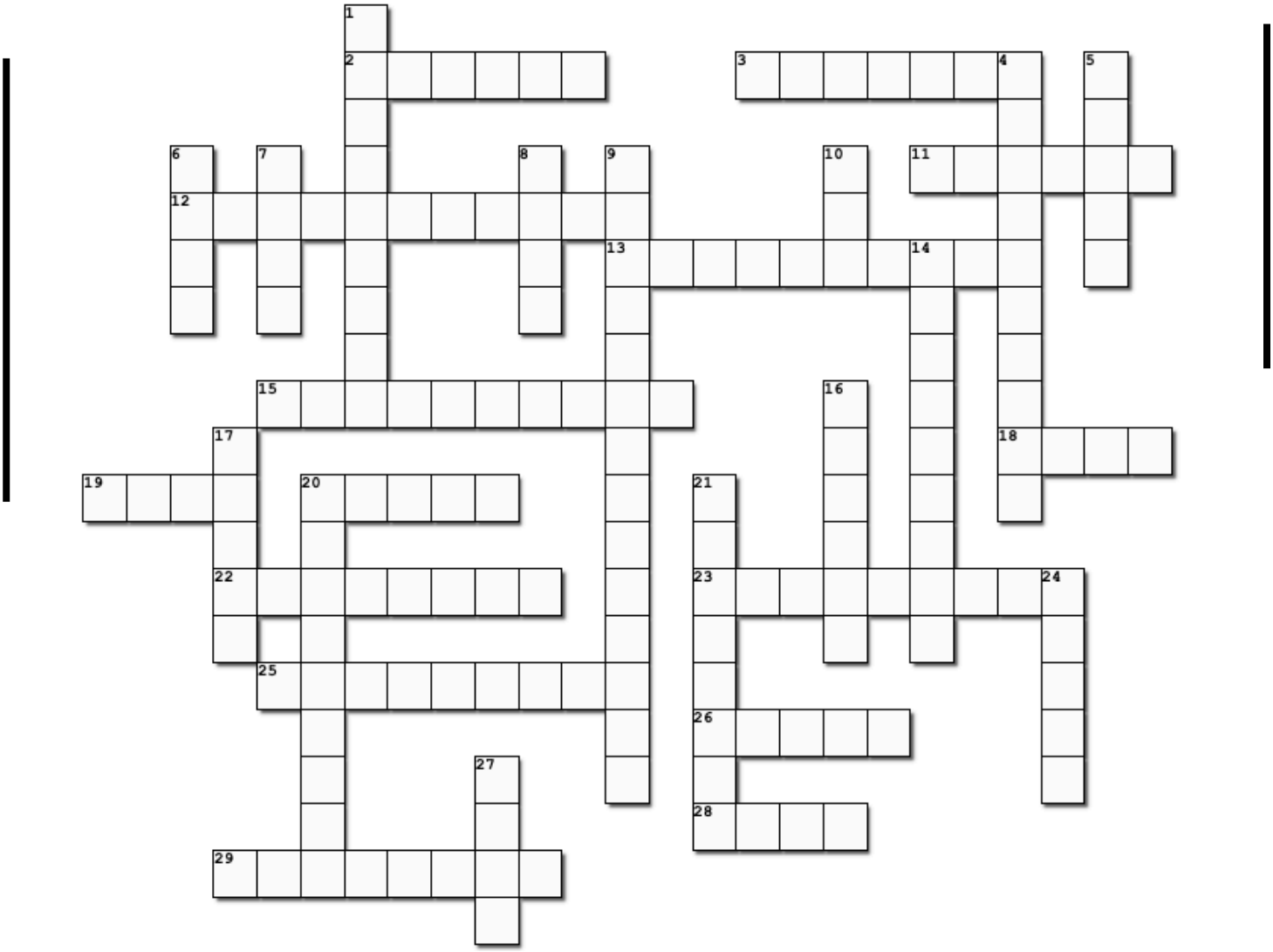
ANTENNAS AND COAX



Across

2. Antenna fed from one end instead of the center
3. Ground wires extending from base of vertical antennas
11. Outer conductor in coax that prevents interference
12. Vertical antenna using radials for return path
13. Open-wire transmission line with plastic spacers
15. Insulating material between conductors in coax cable
18. Common type of shielded feedline
19. Flexible rod antenna often used on mobile radios
20. Coil or ferrite used to reduce common-mode current
22. Simple antenna made from a single long conductor
23. Element in a Yagi that bounces signal energy forward
25. Location where transmission line connects to antenna
26. Device used to match antenna impedance to transmitter
28. Mid-size 50-ohm coax with good performance for HF
29. Common antenna type that radiates equally in all horizontal directions

Down

1. Condition where antenna naturally oscillates at operating frequency
4. RF current traveling mainly on conductor surface
5. Device that matches balanced and unbalanced feedlines
6. Thin 50-ohm coax often used for mobile setups
7. Antenna shaped as a continuous ring or square
8. Directional antenna using parasitic elements
9. Speed of RF signal through coax compared to light
10. Ratio indicating mismatch between antenna and feedline
14. Measure of opposition to current flow in AC circuits
16. Classic antenna made from two equal-length elements
17. End-fed antenna using a matching stub
20. Fitting used to attach coax to radio or antenna
21. Yagi element that focuses radiation pattern
24. Thick, low-loss coax used in base installations
27. Directional antenna that “points” toward a target station