

HOT IRON #131: November 30, 2025

THE JOURNAL OF THE CONSTRUCTOR'S CLUB

Technical Editor: Please send technical questions and suggestions [to Peter, G6NGR](#)

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Our wonderful hobby includes those with a great deal of electronic knowledge as well as those just beginning their journey. Some prefer digital modes and projects, others prefer analog projects and devices that glow in the dark. Our quarterly newsletter, begun by [G3PCJ of Walford Electronics](#), tries to publish something for each, while trying to keep the focus on construction of various devices!

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Miscellaneous News Items:



If you haven't visited the [Internet Archive](#), do so soon! It contains a huge DLARC library – just enter DLARC in the website's search box and you can find copies of almost all ham radio magazines. [Amateur Radio Weekly #365](#) contains a link to [Zero Retries #184](#) where Kay Savetz, K6KJN, has an informative write-up that lists some of the additions made to the Internet Archive DLARC library. Check it out!

* The Internet Archive has all copies of [Electronics Australia and these can be read here!](#)

* [Have a look at Zero Retries issue 0219](#), which has a summary of the 2025 GNU Radio Conference. GNU differs from the old, traditional analog radio technology we old-timers grew up with. It's a free and open-source software development toolkit for creating Software-Defined Radios. It provides signal processing “blocks” that users can connect to design and implement complex radio systems, acting as a bridge between hardware and software for applications ranging from academic research to commercial products and hobbyist projects. GNU Radio includes graphical tools like *GNU Radio Companion* for visual flowgraph design, enabling users to build, test, and deploy radio applications with or without external hardware.

[And look at issue #0217 for some interesting information about technological goings-on.](#)

* Communicate with morse code over the internet! If you want to use the world's oldest digital communications “app” on the world's newest digital system, [try Morsepower](#). An interesting concept.

* Most of us have heard of “Hot Spots” which allow the use of cell phones to connect a PC to the internet, but did you know that there is a second type of “Hot Spot;” for Ham Radio? Issue 158 of Tom

Salzar's [Random Wire newsletter](#) explains the two. Scroll down to read the article and, as usual, there is much more in issue #158.

- * Need to find a net? [Try the Netfinder website!](#)
- * [Visit the RF Cafe for many articles of interest](#); there will be something for everyone there; it's a rather amazing website.
- * Here's another ham radio news site to link to and monitor: [Amateur Radio Newsline](#). It reports lots of goings-on not found anywhere else.
- * [Random Wire #154](#) has an article about using a special Ham Radio Debian Blend on your Linux PC. Scroll down in issue #154 to find the article. Frank's shop/ham PC runs on Linux, so this is definitely something to look into.
- * [Zero Retries #229](#) is chock-full of interesting articles.

PROJECT & CONSTRUCTION SECTION:

- * ***Shocking News:*** A recent comment from W0DVN, about receiving a 730 volt shock when connecting a dummy load to the antenna terminal of an older transmitter resulted in VE7RF explaining the importance of having a safety RF choke from the "cold" end of the transmitter tank circuit HV blocking capacitor to ground. His comments are quoted here:

"Even with an intact plate blocking cap, without the safety choke, you will still have full B+ on the cold side of the block cap.

Reason is.... due to leakage of the block cap. The cap only blocks if it's DC grounded on the cold end of the cap.

You will see that on Ameritron amps, and a lot of other amps, where the safety choke has gone open. The narrow spaced load cap will arc, and then 30 secs later arc again, and the process just repeats. Typ load caps have .032" plate spacing, which is good for 1100 volts..... which won't arc with a 6146 TX..... but will arc on an amp with higher B+.

Watch out, a lot of pie wound safety chokes will not handle the current if the block cap fails shortened. Many of the 2.5 mh pie wound chokes have way too high a dc resistance. The safety choke then explodes. And you don't require a 2.5 mh value for a safety choke either. The choke is wired across the load cap, which is at a 50 ohm point. 70 uh is ample...even for 160m. A simple solenoid 70 uh choke, wound with 22-24 ga magnet wire is ample. Another method used is to wind magnet wire on a small toroid. Both methods work.

The safety choke also insures all the tank components are at DC chassis ground potential. That includes the tune and load caps, and also the tank coils and bandswitch."

Hot Iron says this is excellent advice! The Johnson Valiant and Pacemaker transmitters are known to omit this safety choke. If you have one of these transmitters, install a choke!

This makes Frank wonder if there is a simple circuit that will indicate if the safety choke has opened, but which does not interfere with the RF present at that point. Ideas? Maybe a red LED on the front panel, triggered by some simple circuit?

More Shocking News: K9SQG provides this warning - “And a similar warning applies to the Valiant where there is over 100 vdc on the **mic connector**. If your body is grounded, and you're holding a D-104 (or similar) by the throat, thus pressing the PTT circuit, you'll get a pretty good jolt. Oh and by the way, those line bypass ceramic disks are likely to be shorted to ground thus creating yet another hazard. Don't ask me how I know about these...”

Quite a bit of safety information of this general type is available so we will try to compile as much as we can into a single document that might be of help to some, and we'll print that in the next edition.

* **When restoring equipment**, replacement of an old two-wire line cord with a three-wire modern AC cable is often desired. Sometimes it is easy to enlarge the line cord hole and install a three-conductor socket taken from a defunct piece of computer equipment. But often we need to use the original round hole and install a Heyco Gland. WB4GRA has good advice as to the best way to do this: Quoting Dan: “The trick is to use 18/3 cable with an SVT jacket. Do not use 18/3 with an SJT jacket (very common) unless you go to one size larger Heyco. The SJT cable is considerably thicker and bulkier than SVT for no greater current capability – it's still 18/3. SVT cable diameter is 0.25” +/- .0050, or so. Find an existing 0.5” hole or start with a tap with a straight bit and use a step bit to get 0.5”. Perfect.” Known sources include:

<https://www.mouser.com/c/industrial-automation/electrical-products/cable-glands-strain-reliefs-cord-grips/?q=gland>

<https://www.homedepot.com/s/gland?NCNI=5>

<https://www.digikey.com/en/products/filter/cable-and-cord-grips/492>

<https://www.heyco.com/products/strain-relief-bushings/>

* Need an FM receiver for the shop? [Here's a design that performs well](#) and is about as simple as it is possible to find. It uses a single 6C4 triode to do the job.

* Some comments from Tim Walford, G3PCJ, about building VFO's are below. I had not thought about feedback from the PA to the VFO components – another reason to keep it running constantly. His comments on the NPO film trimmer capacitors are quite interesting.

“Buffer stages after a VFO are certainly desirable but another often overlooked aspect in home designs, is feedback from the PA's output circuit currents/fields into the RF zone surrounding the VFOs inductors. i.e. build large and leave the VFO always running as you mention!!

This feedback is often the root cause of chirp in CW analogue rigs or FMing in DSB rigs.

After that we are into the thermal characteristics of Ls and Cs if the construction is good mechanically. The luxury of avoiding a 'ground-planed' PCB board is not always needed and (I suspect) is not as troublesome until the wanderings due to individual parts has been well controlled. Frequency doubling or trebling is often the cure to avoid this chirp/FMing aspect for direct conversion designs.

As mentioned to Frank yesterday, I was messing about with an open build where I could blow on individual parts and see how quickly they reacted. It shocked me how awful film trimmers were and how good TOKO style canned inductors were! I had previously used N150 capacitors routinely with nearly all my recent VFO designs but found it better to use so called Class 1 caps which are/used to have the older COG/NPO designation (with black flashes as opposed to the red flash of N150 or purple of the dangerous N750 types!). My trial showed that a small positive tempcoefficient might help if you could get them (I think they were red+violet for P100 and dark grey for P33 according to some web data), but I have failed to find any mention/source of them in any of the regulars suppliers that I use. I suspect there are also huge tempco variations in what different types/forms of inductors are used. I recall that the man at Spectrum in Dorchester (whose devices we often have to use in UK) also maintained that age/mild temp cycling (I suspect after core adjustment) seriously improved them too! If we could find/devise some modern capacitive trimming approach to go with toroids (where there is tempco data available) that would be a great help."

- * Building a Transmitter? [Go to the right-hand column of this "Construction" web page](#) to find a link to a very comprehensive book on the subject, ranging from simple analog solid-state construction to PLL and other very sophisticated designs. There is also a link to an old Eimac publication about building a transmitter using tubes.
- * It's Winter. It's cold. You need an indoor project. Here's one: [A 12AT7 all band regen. found on page 23 of Practical Electronics magazine](#). Easy to build and fun to use. Build a small xmtr to pair with it! Also, it's easy to make an antenna T/R switch for these tube-based units and the next issue will have a compendium of designs for you.
- * With the sunspot cycle having reached maximum and beginning to wane, we might see more geomagnetic activity and six meter opportunities. [Here's a very simple ARRL article about a six meter receiver to take advantage of openings](#).
- * **Heat Sinks.** A solid state component might need a heat sink to prevent it from failing. *Elektor Magazine* [has an article explaining the different types of sinks](#), in non-technical terms.
- * **Ripple Reduction:** For those building an older-style power supply using a choke input scheme, [the table found at this link can provide ripple reduction information](#). [The entire subject is well covered at this link](#).

TROUBLE-SHOOTING SECTION:

How many of us have had a need to find the source of an equipment malfunction and repair it? I suspect most of us have had to do that, especially with older equipment or during a restoration project. [A series of articles related to troubleshooting](#) are found on this page, and are repeated below. This is very much a work in progress so please let Frank know of any good articles you have found, at

fbw4nnpn@gmail.com. I have been unable to find much info about troubleshooting digital circuits but I'll keep looking.

[A Universal Troubleshooting Guide](#)

[Troubleshooting Stage-by-Stage \(old tube radios\)](#)

[Riders Servicing Superheterodynes \(an old but still valid pub\)](#)

[Restoration of Valved Communications Receivers](#)

[The Duffer's Guide to Valve Set Fault-finding.](#)

[CHRS Hints and Kinks](#)

[ARRL Servicing Guide, Part 1](#)

[ARRL Servicing Guide, Part 2](#)

[ARRL Servicing Guide, Part 3](#)

[Trouble-shooting Analog Circuits](#)

Antenna Stuff:

Kurt, OZ7OU, reminds us that the free Arie Voors program 4NEC2 [4nec2 antenna modeler and optimizer](#) is a fantastic tool. Simply draw the antenna in a graphical editor and then simulate impedances across a frequency range, create circular and 3D color radiation patterns. Amazing stuff, really!

* [Go here for an extensive collection of antenna articles and information, courtesy of AC6LA.](#)

Ham Radio Clubs and Organizations:

[Burnley & District Amateur Radio Club - MX0STB](#) This club, in Lancashire, currently has 34 members and has recently acquired some surplus gear from another UK amateur.

[Raleigh Amateur Radio Society](#), located in Raleigh, NC, USA, is one of the larger U.S. clubs and holds one of the nation's largest "Hamfests" each Spring. It also holds licensing and training sessions and has a significant public service component.

[GORP low-power club](#) was formed in 1974 by Rev. George Dobbs G3RJV (SK). It is a non-profit organisation run entirely by volunteers to promote **Low Power Radio (QRP)**. Whether you have a ham license or not - everyone is welcome. The **SPRAT** quarterly magazine provides a fascinating read containing articles of varying complexity, from simple test equipment, to fully functioning radio transmitters and receivers. You can join the club from the website and have SPRAT mailed to you.

[GORP also has a YouTube Channel at this link.](#)

[Four States QRP club](#) has ideas and features focused on QRP operations and construction.

[The Michigan QRP club](#) has a simple DC Receiver kit which might still be available.

[Surrey Amateur Radio Communications](#) publishes a professional grade newsletter every two months. Put a link to it on your desktop!

(Let's get your club listed here - send the information to Frank at fbw4nnp@gmail.com!)

Tidbits and Odds and Ends:

* William R. Hepburn runs the [DX Info Centre Tropospheric Ducting Forecast](#) website which provides six-day tropospheric ducting information and forecasting for those interested in exploring VHF, UHF and Microwave DX through the use of these ducting channels. These have the necessary atmospheric conditions to produce tropospheric bending of the waves, which extends the range of stations well beyond normal limits.

**The Next section is a more-or-less “standard” section of the newsletter
which we hope to repeat repeat in each issue:**

* [AM Broadcast Coverage Night Patterns. for U.S. and Canadian MW stations](#) (created by NF8M). Pick any MW frequency and see the typical coverage areas. A unique service!

* **Antenna Headings:** VU2NSB provides a handy tool to show compass bearings to “everywhere” once your Maidenhead grid square is entered. [Here is the link to that website and service.](#)

* **QRPpppp and WSPR allows you to check your antenna's multi-band transmitting and receiving performance. This article by N2YCH discusses this using available software and common techniques.**

* **Searching for a Net?** This website by K4HCK helps you to find one in the locality you choose.

* [Andy's \(KB1OIQ\) Ham Radio Linux Distribution](#) seeks to gather many ham apps compatible with Linux into one location. This video explains what he has done and continues to do.

Go to this web page to see Hot Iron's list of known Ham Clubs, Ham Radio Publications and YouTube Channels. Please let us know of additional ones!

Check out the various sections of www.w4nnpn.org, the website where the *Hot Iron* newsletters are hosted. There is much more there! Another rabbit hole.

The [**Construction**](#) and [**Resources**](#) pages offer considerable information to those contemplating building a project.

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Please share ***Hot Iron*** with your friends and radio clubs, etc.! There is no cost and we do not share the address list with any other organization. [**This is the link to the Hot Iron homepage, which has a no-cost subscription form.**](#)