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DECEMBER 2025

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Examining radio's role in the Shipping Forecast



## Back to the FTX-1

We return to take a close look at the rest of the Optima range



## BUDGET An interesting low-cost transceiver project

A step by step account of the construction of a dedicated single channel 60m transceiver

## REVIEW The life and times of a true radio legend

A look at a biography recounting the amazing life of Rowley Shears G8KW



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# Keylines

**N**ot a lot of radio this month, although I enjoyed my annual visit to the RSGB Convention (see my write-up in this issue). I did, though manage to get back on the 80m band in the hope of chasing E51MWA (North Cook Islands) on the band (no luck unfortunately, and they closed down when the power station on the island was damaged by fire). However, on the first morning after putting my antenna back up, I worked ZL7IO (Chatham Island) on FT8. The wonders of antipodal propagation. I remember when I was on ZL7 along with some friends for a DXpedition and UK stations were coming in very loud indeed on most bands, whereas intermediate distances were not necessarily as strong. One explanation is that propagation over these long-haul paths is by chordal hop, missing out intermediate reflections (and hence losses) off the surface of the earth.

## Early pioneers

We have carried several articles of late about pioneers of radio and have more to come next year (including one on **Oliver Heaviside**, hopefully in the January issue. Heaviside is a good example of someone who has been immortalised – in the Heaviside layer, albeit better known these days as the ionosphere. But he actually achieved a whole lot more, as you will read).

I am currently reading a biography of **Nikola Tesla**, whose name is also immortalised nowadays, albeit as the name of a car brand! He was a real polymath (into all sorts) and knew all the great and the good of his day. My son and I recently visited Boston and in the Science Museum there is a working demonstration of an enormous Tesla coil – quite a display of sparks! But, again, he achieved a whole lot more in his lifetime.

And I came across another name recently, one that was entirely new to me – **Basil Shonland**. In a 13-page article in the latest issue of *Signal*, the excellent magazine of VMARS (the Vintage and Military Amateur Radio Society), **Brian Austin GOGSF** relates the life story of someone who was clearly someone to be reckoned with and yet someone I had never come across before. He was involved over the years with radio, mainly in connection with the military, the development of radar and much else. Of German origin, he grew up in South Africa but spent much time in the UK, including attending Cambridge University where he was a prizeman in the mathematical tripos, having previously gained a degree in Physics at Rhodes University in South Africa.

I find these histories absolutely fascinating – I also read a biography of **Albert Einstein** recently. What I also find fascinating is how many of these well-known names, many of them to become Nobel



Prize winners, crossed paths with one another and also how recently many of them lived – just a few generations ago. And, of course, there's **Marconi** himself – I read the monumental biography by **Marc Raboy** some time ago. He, of course, was a great self-publicist and did much to turn wireless into a commercial proposition, but drew heavily on work that had been done by others, including, to complete the circle, Nikola Tesla.

## Christmas quiz

I was planning on running our annual Christmas Quiz in this issue but it turned out to be a packed issue even without that, so it will appear next month. But for most of you, it will indeed appear in good time for the Christmas holidays!

## Annual index

As always, this issue includes our Annual Index. I was delighted, in putting this together, to see how many practical articles we have featured this year ranging from simple modifications to full-blown constructional projects. And no fewer than 17 reviews, ranging from test equipment to the latest high-end transceivers from Icom and Yaesu.

## Seasons greetings

While this issue will appear in mid-November, it is headed the December issue as it will remain on sale into December. So I'd like to take this opportunity of thanking all readers for your support during the year. May you have every joy over the holiday season. When I took on the role of PW editor, I imagined I might manage five years at most but with 12 years now under my belt I continue to enjoy the job and it's because the magazine continues to be appreciated by its readers – you. Thank you all so much!

**Don Field G3XTT**

Editor, *Practical Wireless Magazine*

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Locate a rally or event near you; we have our usual comprehensive list.

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# Newsdesk

Have you got something to tell our readers about? If so, then email [practicalwireless@warnersgroup.co.uk](mailto:practicalwireless@warnersgroup.co.uk)

## News from Martin Lynch & Sons

The Famous Martin Lynch & Sons Open Day is on Saturday 29 November with doors opening at 8.30am (see the advert on the facing page). A chance to see the many new products available. Here are some of them:

### DX Patrol – Precision Satellite and HF Accessories, Exclusive to ML&S

The DX Patrol range has become a respected name among satellite and microwave enthusiasts, offering compact, well-engineered equipment tailored to modern amateur radio needs. Now exclusive to Martin Lynch & Sons (ML&S), the line presents a complete toolkit for operating through the popular QO-100 geostationary satellite and beyond. From up- and down-converters to GPS-disciplined oscillators and full-duplex ground-station kits, DX Patrol provides a practical upgrade path for anyone wishing to explore the higher bands with precision and reliability.

### Kiwi Protection Circuit for Any SDR – Protecting Your Receiver Investment

For many amateur radio users of software-defined radios (SDRs) such as the KiwiSDR platform, one of the less well-publicised risks is damage from excessive RF exposure, near-field transmitter coupling, or nearby lightning events. Martin Lynch & Sons now offer the Kiwi Protection Circuit for Any SDR. It is a compact inline safeguard aimed at mitigating some of these hazards.

### Red Pitaya – A Premium SDR Platform for the Serious Experimenter

The Red Pitaya SDRLab 122-16 (External Clock) stands out as a professional-grade software-defined radio and digitiser platform aimed at advanced amateurs, RF engineers and experimenters. Listed via the UK specialist outlet Martin Lynch & Sons (ML&S), this unit combines high-performance ADC/DAC hardware with flexible clocking and processing capabilities.

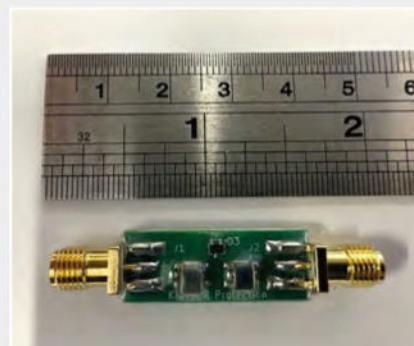


### Protective Case for FT-891 - Waterproof & Perfect for POTA/SOTA (in stock soon)

When heading out for a wilderness POTA or a high altitude SOTA activation, the last thing you want is to worry about your radio's safety. The JCASE 891 looks to end that anxiety. Designed specifically for the Yaesu FT-891 HF transceiver, this rugged case combines weatherproofing, smart ergonomics, and field-ready storage in one tidy package.

### JHEX-6, 2000-WATT 6-BAND HEXBEAM HF ANTENNA, 20/17/15/12/10/6. (in Stock Soon)

For those serious about DX, contesting or portable setups, antennas that deliver both broad coverage and resilience are essential. The JHEX 6 steps into this space with full-size performance across six popular HF bands - 20m, 17m, 15m, 12m, 10m, and 6m - and a



hefty 2000W PEP rating. It positions itself as a formidable tool for demanding operating events and harsh environments.

### Yaesu FTX-1F Base Mount With Mic Holder (In Stock)

For operators using Yaesu's surprisingly compact FTX-1F Field transceiver, ease of use and mounting stability are critical - especially in mobile or portable settings. The Yaesu FTX-1F Base Mount with Mic Holder delivers just that: a no-frills, solid desk solution to keep your radio upright, accessible, and tidy.

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This year, Martin has re-introduced Bacon Butties for the early birds, sponsored by JVC-Kenwood. The 'Best Burgers in Town' catering is sponsored by Icom UK

and FlexRadio USA are providing refreshments, nibbles and cakes throughout the day.

As usual, a raffle will be held at the end of the day, in aid of the Alzheimer's Society, with lots of prizes to be won including a new Icom ID-50 Dual-band D-Star Handie, kindly donated by Icom UK and a G90 20W HF SDR Transceiver, kindly donated by Xieigo.

Also, Martin welcomes visitors by car to hold their own Car Boot. Out of your boot only please so don't bring a table as there's not enough space! Get there early - the road gets rammed!

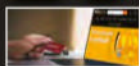
All this is FREE to the many hundreds of visitors who make their pilgrimage but donations to Martin's chosen charity, the Alzheimer's Society, are very welcome.



The Open Day is sponsored by Icom UK, JVC-Kenwood and many more.

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**KLINGENFUSS PUBLICATIONS:** Klingenfuss are now working on their new products:

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- 2026 Super Frequency List on CD
- 2026 Frequency Database for the Perseus SDR
- Supplement January 2026 to the 2025/2026 Guide to Utility Radio Stations

to be published on 10 December 2025.

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#### LINCOLN SHORT WAVE CLUB TAKES PART IN RAILWAYS ON THE AIR FROM LUDBOROUGH STATION:

The Lincoln Short Wave Club proudly participated in this year's Railways on the Air event from the Lincolnshire Wolds Railway in Ludborough, operating under the special event callsign GB0LWR.

They logged over 500 contacts, operating primarily on 40m phone, with some FT8 thrown in to give the operators a well-earned break during busy periods.

They were also delighted to host **Barry G4DBS**, Chairman of the British Railways Amateur Radio Society, who visited as their special guest.

A big thank you goes out to **Les G1LQB** for his vital help with setting up and packing away the station.

The next big event will be the Winter Rally, taking place on Sunday 25 January 2026, at the Festival Hall in Market Rasen.



## FA-VA6 1 GHz Vector Antenna Analyzer 99% Kit

**Jan G5BBL** reports: We are pleased to announce that SDR-Kits have been appointed an official supplier of the newly launched FA-VA6 1 GHz Vector Antenna Analyzer 99% Kit. The designer, **Michael Knitter DG5MK**, has carried out a complete hardware and software re-design of the popular VA-FA5 model, which according to Michael is "keeping FA-VA5 good things and

introducing exciting new things!"

The FA-VA6 was reviewed in the last issue of *PW* and also features in this month's Antennas column.

Available to buy from:

[www.sdr-kits.net](http://www.sdr-kits.net)

UK orders £291.60 incl VAT, + shipping.

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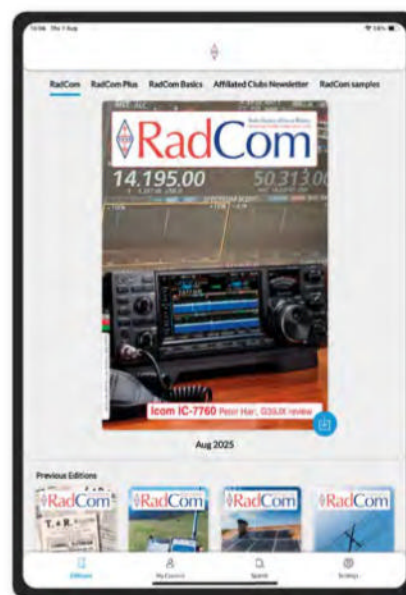
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[rsgb.org/radcom](http://rsgb.org/radcom)







#### RIVIERA AMATEUR RADIO CLUB:

September was a very busy month for the Riviera Amateur Radio Club. As well as the AGM they had Railways on the Air using the callsign GB4BCR (Babacombe Cliff Railway) and the special event commiserating the Battle of Britain GB1BOB. They ran the callsigns for over a week and we made over 300 QSOs using both SSB, FM and FT8. They also took part in the 145 Alive, which they co-ran with Railways on the Air. The photo shows G1VTK operating GB1BOB.

#### DISTANCE LEARNING FOR THE

**INTERMEDIATE LICENCE EXAM:** The Bath Based Distance Learning team (BBDL) have been running courses since 2011. Student feedback is always very positive and the pass rate continues to be well over the national average. The last Intermediate course had a 100% pass rate, without any re-sits. The BBDL team are now planning another Intermediate course. The course will run from January to May 2026, aiming for exams in June. Students will receive weekly work packages via an on-line classroom and have access to weekly on-line tutorials. Each student is allocated to one of the remote tutors who provide feedback and additional guidance. There are weekly quizzes to check on progress and at

the end of the course there are a number of mock exams. There are also crossword puzzles and practical exercises to help with learning. There are no charges for the training but applicants must work through some pre-course material and complete a quiz before Christmas to be eligible for a place. This work focuses on the 'new' Foundation topics that have been introduced to the exam since September 2019. The pre-course classroom aims to make sure applicants can use the BBDL systems, and

to ensure that they are ready for the current Intermediate training syllabus. Each student will need to provide their own RSGB Intermediate Licence textbook and arrange their own exam at the end of the course. Advice will be provided as part of the training. The deadline for course applications is Friday 5 December. For full details and an application form, please e-mail BBDL Team Leader, **Steve G0FUW**, via [g0fuw@bbdl.org.uk](mailto:g0fuw@bbdl.org.uk)



## TX Factor videos available

The latest videos from TX Factor are now available, featuring Hamfest 25. The popular online TV show spent two days capturing the action at the UK's premiere ham radio event. The show's presenter **Bob McCreadie G0FGX** says: "There was so much going on this year that we have produced two episodes featuring the latest equipment news from Icom and Yaesu as well as the smaller companies and individuals bringing exciting amateur radio technology to our shacks, plus the latest updates from our sponsors the Radio Society of Great Britain. If you couldn't be there this year, we will bring the atmosphere of this unique event to your screens, meeting the people and organisations at the heart of our amazing hobby and showing off some fascinating tech." The latest episodes are available to view for free at the website below along with all their previous episodes covering a massive range of ham radio topics.

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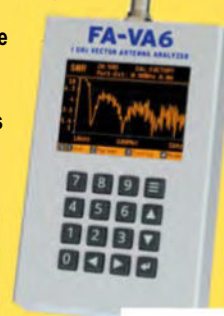
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**Richard Constantine G3UGF**  
richard@norcomm.co.uk

**L**ast month I took a dive into of the FTX-1 QRP transceiver. Perhaps not so much a new radio as the opening gambit of a suite of possibilities designed to lock operators into the Yaesu brand. It includes a full range of complementary equipment intended lock out many of the new breed of would-be competitors.

This month I'm taking a closer look at the rest of the range and there is a lot of choice on offer.

Most obvious is the 'Optima', a combined 100-watt linear amplifier with inbuilt auto-matching tuner unit. Buyers have the immediate choice to purchase the FTX-1 as a standalone QRP radio and perhaps add the 100-watt PA later if that's on the wish list. Alternatively, the complete package is available from the outset. Thankfully, the 6400mAh Li-ion battery pack and two DC leads for use as and when required are included.

Without its battery pack the FTX-1 locates on two lugs on the amplifier case and secures by a central spring-loaded clip at the top. Of course, it's necessary to electrically couple the radio section to the PA and this is achieved by means of five connectors: DC, Data, Speaker and two

# FTX-1 Optima Game Changer? (Pt II)

**Richard Constantine G3UGF** completes his in-depth look at the new Yaesu FTX-1.

BNC's, see photo.

This sounds complicated but isn't really once you've done it a couple of times. The cables and connectors fit neatly into a recess in the rear case. The two push-fit BNC antenna connectors are pre-mounted into a housing, fitting as one and held in place by flexible side clips.

The overall package is now secure and is at least 15% smaller overall than, say, the FTdx10. Total package weighs in at around 1.8kg less.

The PA has two flip-out feet at the front to increase the viewing angle. At around 15° it's not quite as good as the stand-alone QRP unit that rests back at around 45° when the battery is in place. To get a decent viewing angle with the Optima I raised the front legs by 2cm.

Another small niggle is that the radio is promoted as a 'Field Radio' suggesting that users will want to transport it. Yaesu include four screw-on feet for the right-hand side so that the radio can be stood on its side. However, to carry it with one hand owners have to buy the left-hand side handle separately. To my mind and at this price point, not including a £7.99 handle is just a little mean.

On the plus side, with facilities now extended to the rear of the amplifier you have the added bonus of a second internal speaker to balance the audio. There's an external speaker socket at the rear. The data port is also extended allowing connection to an external matching unit or computer. There's more... now you have not one

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**Photo 1:** The FTX-1 along with its range of accessories. **Photo 2:** Inter connections between FTX-1 and PA. **Photo 3:** Internal view of the top side.

but two independent LF and HF antenna sockets, assignable from the front panel menu, in addition to the VHF/UHF socket. A feature normally found in higher end radios and not available on either the 710 or dx10 models.

Internally, Yaesu engineering and quality is excellent. A cast alloy frame doubles as a large heatsink with circuit boards above and below. Air is sucked through the case and out at the back via the rear mounted fan, keeping the whole thing moderately cool. The auto-matching device is on the top side. The tuner employs 24 relays, nine band inductors and 32 capacitors.

On the underside the PA uses two centrally mounted balanced Mitsubishi RD100HHF MOSFETs. I couldn't find the exact item on Mitsubishi's website but typically in this range each device is capable of 100 watts at 30MHz with a high tolerance and very high temperature limit. Therefore, it's highly likely that the amplifier is operating well within its safety limit providing a very clean linear output.

Manufacturers seem to be more closely guarding their technical specifications and innovations these days. It's been hard to get any detailed circuit or accurate block diagram information, even from the advanced user manual (available online). Closer inspection reveals unused parts of the circuit boards. Clearly this indicates other or potential other, applications within the Yaesu stable of radios. No need to re-invent the wheel.

It also makes me think that the time is fast coming when extended warranty insurance will be a strong consideration for these increasingly complex radios, just like for other hi-tech products.

I showed the unit to a good friend and experienced electronic and mechanical engineer. His comment: "How do they do it for the money?" I think he said it better than me and it's really all you need to know, it is very nicely engineered and performs very well.

### Auto'tuners'

Long gone are the days of dip-and-load, the manual matching of a valve radio's output that required a certain skill to be learned before attempting to couple a radio to an antenna. On the plus side the antenna load could have a wide impedance range, anything up to 2k $\Omega$  and beyond. Semiconductors simply won't take the strain of huge mismatches, expiring near instantly with runaway heat exhaustion! Thankfully automatic microprocessor controlled auto-matching devices now solve the problem.

FTX-1 QRP version like its competitors has no internal matching unit but has a choice of two options.



**FC-80:** 1.8-54MHz suitable for loads up to around 150 $\Omega$  is designed to fit neatly to the rear of the transceiver. It needs to cater for the battery plus antenna input to the tuner and band control data. This is achieved by a vented cover that clips over the battery. Once in place the FC-80 slides onto the rear of this housing and is locked in place by a flexible catch. It comes with pre-made short leads for both data and RF input to the tuner. The FC-80 is compatible with coaxially fed antennas such as single/multiband near resonant dipoles, low impedance verticals or the increasingly common end-fed

half waves using a high ratio UNUN. The VHF/UHF antenna socket on the rear of the radio is unaffected. This option makes the FC-80 a very convenient choice. It's now quite a chunky little beast. Unfortunately, the former excellent 45° viewing angle of the stand-alone radio is a little compromised

**FC-90:** 1.8MHz -54MHz wire antenna tuner. When I first saw a photograph, it looked almost identical to the similar Icom unit that I have. It is similar in size and significantly slimmer as it's powered from the radio and has no internal batteries. A separate earth terminal

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is provided. The antenna socket is SO239 and comes with an optional use PL259 connector fitted with a 4mm push fit/screw terminal for single wire attachment. While it has a neoprene case grommet, nylon type washers on the case screws and is IP54 dust and splash proof, I wouldn't consider it suitable for outdoor mounting without additional protection (a sandwich box?).

The rear of the housing is interesting. There's a central 1/4in fixing with a screw adapter allowing the ATU to fix to a photo mount, horizontal/ vertical bar or 18mm diameter mast. The same moulding has a facility to thread a hook and loop strap through it to make temporary fixing to a pole possible. This idea is identical to the Icom version but for some reason yet to be fathomed there was no strap in the package supplied ...?

It did arrive with coax and control leads but they are only some 2.5m in length. This precludes realistically remoting the box at the feedpoint of say a vertical or outdoor end-fed without additional cables. No maximum impedance is specified but Yaesu state matching from 80m-6m is possible with as little as 7m of wire. For 160m it requires a minimum of 30m. It's not designed for true resonant quarter wave or half-wave antennas on any band. Of course, verticals and wires require good grounding or counterpoise wires and half waves need an additional UNUN in line.

## FC80-FC90 thoughts

Dependent on what you're looking to achieve either model may be appropriate for your modus operandi. Both are similar in weight at around 350 grams. The FC-80 makes for a neat one box solution for coaxially fed antennas and is currently some £40.00 cheaper than the FC-90. Both devices are for use with the stand alone QRP radio. The 100 watt Optima version has its own on-board ATU and for Yaesu's remote wire antennas the current QRO, FC-40 is compatible.

Although a little bulkier to transport, the higher priced FC-90 offers more flexibility and more options across a wide range of possible antenna setups, despite the short connecting cables.

## SPG-1

Sticking with the QRP version, the factory SPG-1 protection guard had me confused for quite a while. It's moulded from rugged pre-moulded synthetic material not metal, presumably for weight reasons. It's simple to fit or remove, it grips the radio on either side and is secured in place by two thumbwheel screws underneath the front panel. The side handles are quite large and splayed outwards allowing comfortable access to the controls. The amount of side



4



5



6

protection is a bit limited but it's really the front panel you need to protect in the event of an accident.

As for the confusion, while the guard secures by two screws, as said when connected to the amplifier the underside fixing holes disappear inside the amplifier housing. The guard can now only be held in place by the single central fitting normally used for tripod installations.

Unless very tight the guard isn't stable when lifted by a side handle. As it stands I can see a potential issue when using the Optima version.

Were the top side push-fit locking catch to fail or not be correctly engaged it would allow the back half to drop away when carried. Why didn't Yaesu make the two units compatible with matching holes in the amplifier case when designing the system.?

## SCF-1

In Part one I commented that the FTX-1 top panel gets a little warm but nothing to be concerned about. However, if you want to run FT8 or any constant duty cycle mode or place it

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Photo 4: FC-80 clip-on ATU. Photo 5: FC-90 Remote ATU. Photo 6: Bluetooth module and headset.  
Photo 7: The GPS module connected. Photo 8: ATAS-120A mobile antenna mounted on the reviewer's camper van.



on a car dashboard the radio is definitely going to need some extra help. The SC-1 clip on rear fan is strongly advised and a worthwhile low-cost investment.

### SCU66 cables

Remote cables, vital for installation in modern vehicles or those that want a tidy desk were not immediately available. Now as an option they are available as a pack of four separate cables in two lengths, SCU-66 5 foot or, SCU-66L 10 foot. Like the USA, Japan still uses imperial measurement not metric. A clip to secure the BNCs is included but an additional speaker extension cable is not essential as there is a speaker in the transceiver body.

### BU-6

I love Bluetooth. It's great for both portable and home use, no more trailing wires and it makes mobile safer, more relaxed and a pleasure. Rather than have you open up the radio to fit the BU-6 option there's a recess behind a removable panel on the right-hand side of the FTX-1. The module comes with easy-to-follow instructions and includes a slightly raised replacement side panel cover. I believe that the BU-6 will pair with a number of different headsets. Yaesu strongly recommend using their Vertex model and I agree.

### SSM-BT20

It's noise cancelling, discreet, not expensive and gets good audio reports. While it is compatible with VOX operation I much prefer to use the side mount latching press-to-talk button. It avoids embarrassing expletives caused by the action of other road users...or me.

### FGPS-5

There's a lot going on inside the FTX-1 transceiver and not much spare room. Although it's prepared for the APRS location and messaging system it doesn't have an on-board GPS receiver engine. The solution is the tiny plug-in FGPS-5 module. About the size of the latest first-class stamp it has a 2.5mm 4-pole connector. It simply plugs in to a socket on the left-hand side of the FTX-1 and can be removed when not required. While APRS is perhaps not the first thing you might consider when choosing a radio, it has great applications for clubs, groups of friends, Raynet or just keeping in touch worldwide.

### ATAS-120A

This screwdriver style unit has been around for few years and an ideal partner for mobile operation with a Yaesu radio. Unlike its competitors this dedicated design makes for a very simple installation. It doesn't require hard-wired power or switching to operate the tuning motor when attached to a Yaesu radio. As such it's easily removable for storage or when parked, etc.

All the clever stuff is RF driven and taken care of inside the antenna housing itself, sensing band changes, etc. Ideal for impromptu portable or mobile and despite its near 1kg weight, it's very stable when mated to a substantial S0239 base - most important. An add-on counterpoise ring for VHF/UHF static use is available as an option.

From experience I agree with Yaesu that Diamond's K400 tailgate mount is a good choice. Don't be tempted to use a look-alike cheaper alternative.

**Tip:** Unlike VHF/UHF collinears, HF mobile antennas need a good vehicle earth connection. I use a short wire soldered to an earth tag and locking nut on the base liberated from a single hole chassis S0239 socket.

While base-loaded whips and verticals are not the most efficient they can be quite effective. I have far too large a collection of mobile antennas hoarded over many years. They include a Tarheel screwdriver equivalent and single banders with higher *Q* loading coils, great for comparison. ATAS-120A stands up well and is the most convenient multi-bander for a Yaesu radio.

**Note:** When used with the FTX-1 10-watt version the radio needs to be powered externally and not from its battery.

### Impressions

If you never leave the home station, perhaps this radio is not a first choice for you. There are some excellent alternatives for the money out there both, new and pre-loved.

Perhaps you are a dedicated QRP enthusiast that has forsworn the evil use of power for life but yet want a do it all (or nearly) with a compact, hi-tech multiband modern SDR radio that will happily play all day on its battery. The FTX-1 is a very strong contender.

Maybe you already have a substantial main station that's not easily moved around but could benefit from having a multipurpose standby / portable setup that can be either low or higher power output. The FTX-1 system makes this and most everything else possible and practical to a relatively high standard.

You don't have to own everything; just select the bits you need for what you want to do. It's a pick-and-mix radio, built on a solid foundation that's definitely a cut above most lower cost alternatives that can't be upscaled.

Yaesu is apparently attempting to cover many bases and doing it quite well. I wouldn't be surprised to see a system compatible FTX-2 or even FTX-3 sometime. There might even be more accessory choices added to the range.

Given the flexibility it offers and having hands-on for some time I can now see FTX-1 justifies its price and place in the market and worth 4.5 stars. Like many, my activity and interests are wide, varied and fluid. There's always so much to experience, learn and do. That's why I've always loved amateur radio. I think this is very much the ethos that Yaesu is tapping in to. For this reason and on balance here's my answer to the question I posed at the start ...

*"I don't think the FTX-1 is a game-changer so much as a game enhancer."* **PW**

**Erratum:** My apologies for an error last month. Yaesu FTX-1 battery capacity is 6400mAh, Icom BP-307 HD battery is 3150mAh. An attack of the decimal points!

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Georg Wiessala  
wiessala@hotmail.com

A few months ago, my wife, who is ex-Royal Navy, treated me to a show at the *Grand Theatre* in Lancaster. **Charlie Connelly's** one-man show *Attention All Shipping* was on to promote his 2005 book of the same title. The performance was enjoyable, anecdotal, funny and informative in equal measure. Charlie is a great nosophile (a lover of islands), and *shiver my timbers*, what an evening it was!

[www.shippingshow.co.uk/the-show](http://www.shippingshow.co.uk/the-show)

By the end of this year, the nation will be celebrating not *101 Dalmatians* but the 101 years of a venerable British radio institution: on 11 December 1924, the first ever Shipping Forecast (SC) was broadcast. As I write, it is still on every day on BBC Radio 4 and Long Wave (198kHz, **Figs 1 and 2**). However, BBC LW is slated to be discontinued by 26 September 2026. In what follows, I am aiming to focus on the *Shipping Forecast* as a radio phenomenon, a broadcast event, and a UK institution. Let's begin with some naval background:

In the UK, we are defined by the sea and ships, as historian **Jerry Brotton** has argued (*Archive on 4*). As every child knows, no one in the British Isles lives more than 70 miles away from the coast. For some, the sea constitutes a defensive 'moat'; others see it as a gateway or 'portal', out to the wider world. From the first English poem (*The Seafarer*) and the Sutton Hoo Ship Burial, from Tudor naval maps and the Armada to Shakespeare and Trafalgar, and from Merchant Traders, the Slave Trade and the Industrial Revolution, to our modern Legal System, Insurance and relations with Europe, the sea and its weather is ingrained in how we see ourselves as a nation surrounded by water. And for radio enthusiasts, weather and radio are natural bedfellows.

### It's in our blood: a British cultural signifier

Arguably, what 'weather radio' is in the USA, the Shipping Forecast (SF, **Fig. 3**) is over here in the UK. There is no doubt that this broadcast is a legend. On New Year's Day 2025, BBC Radio 4 devoted an entire day to its various aspects. The SF is a model of continuity, conciseness and clarity, for it is always between 350 and 370 words long. But more than that, it is also a vital part of British maritime history, culture, literature and art, whether you are a sailor or not. It forms an essential part of national identity.

So much so that composer **Cecilia McDowall** (b. 1951) has created a piece of classical music about it (**Fig. 4**). And, for many, the tune *Sailing By*, by the Derby composer **Ronald Binge**



## A Ship-Shape Nation

**Georg Wiessala** takes a look at the history of the venerable shipping forecast, with an emphasis on radio aspects.

(1910-1979), has become the natural theme tune of the SF. Speaking of music, just think of *Rule Britannia*, still sung at the end of every *Last Night of the Proms*. Plus, one enthusiastic group of English campanologists have devised a bell-ringing sequence inspired by the SF. Lastly, even pop bands, like *Radiohead*, *Blur* or *The Prodigy* have referenced this iconic transmission in their music.

There are many programmes and recordings online, riffing on aspects of this famous broadcast. In 1996, a volume of photographs by **Mark Powers** depicted all the areas mentioned in the SF. *Shipping Forecast: A Liminal Odyssey* is a beautiful full-feature film on the SF Areas:

<https://tinyurl.com/vwjtybjj>

More recently, there are now *SF Appreciation Societies* on Facebook and elsewhere – it had to come. Check out the BBC's long-running *Today* programme for starters:

<https://tinyurl.com/5n9by4ek>

In addition, some great books are now charting the history of the Shipping Forecast. Those in **Table 1** come highly recommended. Moreover, the SF influenced radio broadcasts, films, poetry, novels, theatre, exhibitions, documentaries, fashions, wallpapers, tea towels, and much more. I find that the broadcast's very language and delivery is poetry in itself. Its phrases, cadences, rhythms and nuances are wonderful to listen to; they save lives, and they lull many an armchair-sailor

to sleep each night at 00:48. More on that later.

The SF has also spawned a lot of kitsch and tat, from tote bags and crockery to T-shirts and wall clocks. I used to have a Shipping Forecast mug and a T-shirt that said "smooth, occasionally rough, becoming variable", but both have been, well, *lost at sea*, I guess, some time ago in a house move. I am really surprised nobody has manufactured a themed *Shipping Forecast* radio as yet. For us radio enthusiasts and hams, when you hear 'BBC Long Wave 198kHz' mentioned, this is all but synonymous with the famous forecast.

### Fitzroy, Morse, and a short history of forecasting

It has often been pointed out that, on account of being an island, being able to forecast the elements was always of pivotal importance for us. In *The Shipping Forecast: Celebrating 100 Years*, **Meg Clothier** makes this clear (2024: 59): "Julius Caesar, William the Conqueror, Philip of Spain, William of Orange, Napoleon Bonaparte, Adolf Hitler, they'd all have given their eye-teeth for a Shipping Forecast. For they all knew – despite their military might – that, when it came to crossing the Channel, it was the West Wind who held the balance of power." In his book *The Weather Factor*, **Eric Durschmied** emphasises similar points: weather does indeed make history. The recent celebrations of the 80th Anniversary of VE Day and the



**Fig. 1: The traditional way: Listening to the Shipping Forecast on BBC Radio 4 Long Wave (198kHz) with a Palstar R30 HF Receiver. The box on top is the (now discontinued) Weather Info Box WIB2D from Mörer Schiffselektronik (<https://moerer.de>) for NAVTEX.**

**Fig. 2: This is when listening to Long Wave becomes real fun: The R108 vintage maritime radio receiver from – what else? – Sailor.**

**Fig. 3: You can follow the SF each day by using the handy logging cards by British maker Cockpit Cards (<https://cockpitcards.co.uk>).**

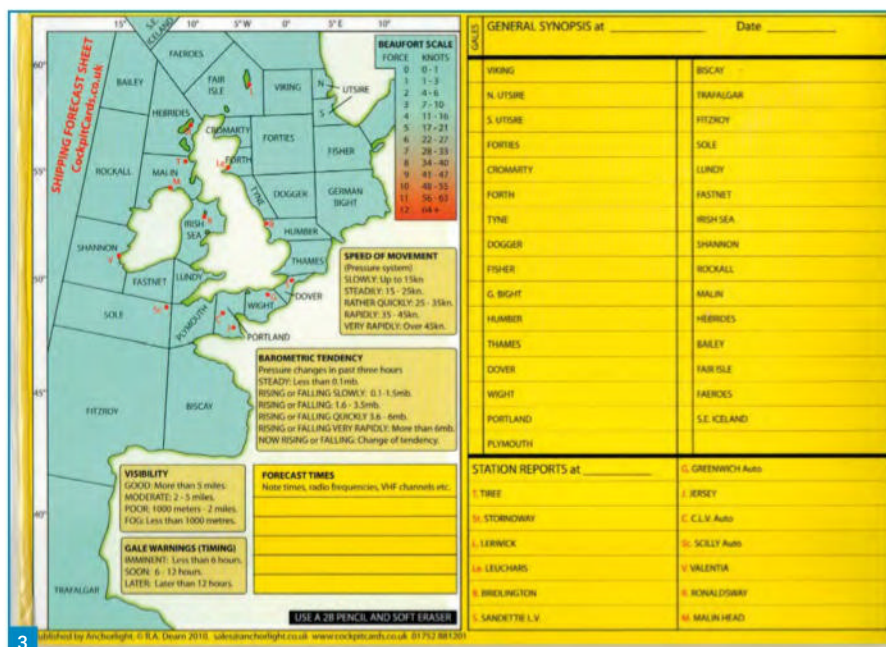
D-Day Landings have, once again, emphasised how much, as a nation, Britain relies on the SF. Especially when you think that more than 90% of goods now arrive here in containers, by sea.

In terms of a potted history, things have to begin with **Vice-Admiral Robert FitzRoy FRS** (1805-1865, **Fig. 5**), who, by all accounts, was a determined, hard-working scientist. He distributed weather watching kits and measuring instruments to the Coast Guards all around Britain and was instrumental in the establishment of a rudimentary network of electric telegraphs sending early forecasts in Morse code – very much the bleeding-edge technology of the day; you might call this the '19th Century Internet' (Kiewe, 1973). Admiral Fitzroy, the second Governor of New Zealand, was a productive character. However, it is said that he had issues with his mental health all of his life. It is now believed that he probably suffered from bipolar disorder and depression.

## An incipient international cooperation

The Brussels Conference on Weather Forecasting (1853) was the first international meteorological gathering. Delegates from ten European nations and the USA participated, and this summit marked an incipient international collaboration in meteorology. The event focused on establishing a standardised system for weather observations at sea and on promoting the exchange of records and statistics. The UK participated very much at the last minute, and it is often remarked that its representatives signed everything put before them. In doing so, they – perhaps inadvertently – committed the country to a binding framework of regular and reliable marine weather observation.

Throughout the 20th century, the responsibility for the dissemination of weather prognostication shifted a few times. It migrated from the Air Ministry to the Board of Trade and other Government Departments, finally landing with what we know today as the Meteorological (Met) Office. Few know that the first official weather forecast actually went out on New Year's Day 1924, broadcast by the Air Ministry, under the callsign **123JHG**. Some great



historical maps show the imagined shapes of the early forecast areas on the website of the Met Office:

<https://tinyurl.com/5ctspwa2>

I am talking about maps and radio again, aren't I? But be that as it may, of such importance was the meteorological broadcast for Britain that, when **Kings George V** (r. 1910-1936) and **VI** (r. 1936-1952) died (in 1936 and 1952 respectively) all BBC broadcasting fell completely silent for a day, as a mark of respect; *all except the weather bulletin*, which went out on the airwaves before everything was closed down again afterwards.

## Radio tales from the forecast areas

Today, everyone in the UK is familiar with the format: There are 31 Forecast Areas (FA) circling the British Isles (**Fig. 6**). Some of them

are just stretches of water, while others border a coastline. While each of the areas may have an abundance of stories to tell, I have no room here to tell them all. However, a few of them stand out through their connections with radio and amateur radio:

<https://tinyurl.com/5n8xkwvp>

First of all, it should be noted that there is a strong link between some of the areas, for example *Thames*, and the colourful history of UK Pirate Radio. The best example is, perhaps, Radio Caroline. The famous station once broadcast from ships in the *Irish Sea*. It is now a licensed internet and digital service, and it is still on Medium Wave here (648kHz, weekends on Manx Radio, 1368kHz). There were many others, and the history of pirate radio, by its very nature, intersects with weather information.



Fig. 4: Cecilia McDowall beautifully expresses the essential atmosphere of the Shipping Forecast in Music. Fig. 5: Vice-Admiral Robert FitzRoy FRS is the original force behind the Shipping Forecast. Fig. 6: A Map of the contemporary regional UK Shipping Forecast areas. Fig. 7: Some Shipping Forecast merchandise still shows older names for the forecast areas.

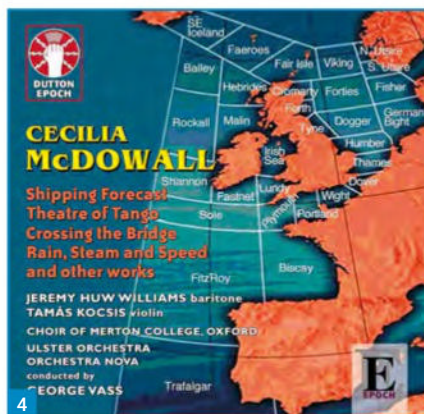
Fig. 8: The flag of the Principality of Sealand, in the Shipping Forecast Area Dover (The Flag Institute, by kind permission of Dr Craig Hughes).

Fig. 9: The Mörer Weather Info Box WIB2D stand-alone NAVTEX Receiver makes for a good complement to the Shipping Forecast.

Elsewhere, *Rockall* is a tiny spit of bare rock, 240 miles West of the Irish Mainland. It became strategically important during the First World War (1914-1918), and there is the wonderful story of the British marines, complete with sentry box, setting up a photo shoot on the rock, to symbolically lay claim to it for Britain, then faced with sceptical European governments. Two weather-hardened lads were bravely standing guard amongst the bird guano until the picture was taken, and before they were safely air-lifted out again. The rock was later claimed for Britain by an Act of Parliament. In more recent times, *Rockall* was in the news again, when British radio 'DXpeditioner' **Nobby Styles GOVJG** attempted to operate from the tiny speck of land ('Destination Rockall': *PW*, August 2023: 46-48).

And here is another Shipping Forecast radio story: In 2002, the name of the area *Finisterre* (literally: *finis terrae* – the end of the world) was actually changed, following a request by the Spanish Meteorological Service. *Finisterre* was now renamed *Fitzroy*, in honour of the Admiral (see above) and a belated recognition of his life's work in wireless telegraphy and meteorology. *Fitzroy* remains the only SF Area named after an individual – a useful pub quiz or *Pointless* answer, this. The image of the decorative plate (Fig. 7) kindly sent me by former *RadioUser* editor **Andy Thomsett** is rare, in that it shows the old name for the area (bottom left).

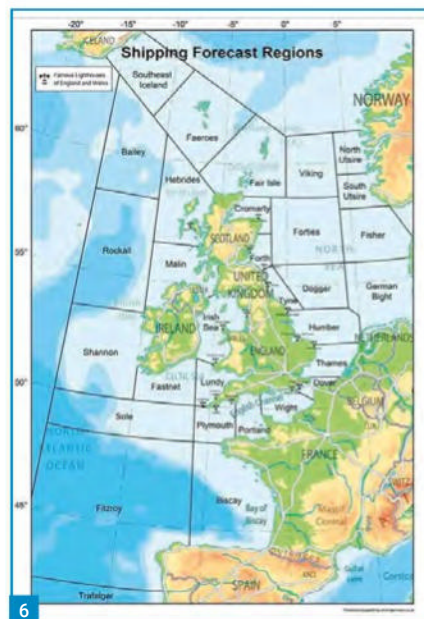
Finally, for this section, here's a question for you: what is the *nearest international state* the UK borders on? You might be tempted to say France, Belgium, the Netherlands, Germany or the Republic of Ireland. But you would be quite wrong. The answer is something that you may never have heard about: The *Principality of Sealand*, OK, it's self-declared and just a former defence platform in Sea Area Dover. The UK Government recognises the state – albeit no one else does (Fig. 8). The story of Sealand is one of amazing skulduggery, international crime and some tricky diplomacy. And, of course, radio communications.



### Seascapes in words: Listening to the shipping forecast on the radio

In our time, the 'Weather Bulletins for Shipping' – as the SF is officially known – are broadcast daily on BBC Radio 4 at 0048 and 0520 (Long Wave and FM), and at 1201 and 1754 (LW only, Table 2). The transmission covers the gale warnings, sea-area forecasts and coastal station reports. In addition, gale warnings are broadcast at the first available programme break after the reception. If this does not coincide with a news bulletin, the warning will be repeated after the next available one.

In addition, some of the meteorological news bulletins include a forecast for all UK *inshore* waters, as distinct from the *coastal* waters. This can be heard on BBC Radio 4 at the end of programmes (approximately 0048) and on BBC Radio 3 at 0535. The forecast covers the area up to 12 miles offshore and is for the period up to 1800 the next day. It includes a general synopsis, the forecast of wind direction and force, visibility and the general state of the weather. The Radio 4 broadcast also includes the latest available reports of wind direction and force, visibility, sea-level pressure and tendency, for approximately 20 stations around the UK. A NAVTEX receiver (Figs 1 and 9) will usefully supplement this information. Or you could go to *BBC Sounds*, DAB digital radio or internet/ online radio to listen in.



Speaking of listening: the aural component of the SF broadcast is one of its most pertinent aspects, as far as radio is concerned. Let me explain: Many of the continuity announcers who broadcast the Shipping Forecast are highly idiosyncratic and really make the programme their own. They do this by using their radio voices to paint a scene, using nothing but words. The resulting variety and voice-modulation are, arguably, the most attractive aspects of listening to the Shipping Forecast on the radio. The SF thus almost becomes an audio performance of the highest class, soothing and informative, evocative and inspiring. Surely, this is the very essence of radio, distilled into the forecast.

### A weatherproof conclusion?

The *Shipping Forecast* is an impressive achievement, by any standard, and it has strong links with radio. It has grown from our islands' histories to become a part of the warp and weft of our cultural fabric. Consider that, at any time, day or night, there are between 45,000 and 50,000 people on the seas around Britain: cruise



passengers, fishermen, ferry captains, leisure sailors, the Navy and Merchant Navy, and more. That's a lot of people in a month, let alone in a whole year. Yes, there are now many other ways to stay informed about maritime weather, including VHF and UHF. But I think it is fair to say that the Shipping Forecast constitutes the glue that holds together the work of modern maritime agencies, such as the Maritime and Coastguard Agency (MCA), the Royal National Lifeboat Institution (RNLI), and the UK Coast Guard.

Long live the Shipping Forecast. I would be sunk without it.

See you next month. **PW**



## Broadcast Schedule

(Source: Maritime & Coastguard Agency: Leaflet – Advice Note 1033)

### WEEKDAYS (Monday to Friday)

- 00:48 (local time) Gale Warnings, Shipping Forecast, weather reports from coastal stations & Inshore Waters Forecast.
- 05:34 (local time) Gale Warnings, Shipping Forecast, weather reports from coastal stations & Inshore Waters Forecast.

### WEEKENDS (Saturday and Sunday)

- 00:48 (local time) Gale Warnings, Shipping Forecast, weather reports from coastal stations & Inshore Waters Forecast.
- 05:34 (local time) Gale Warnings, Shipping Forecast, weather reports from coastal stations & Inshore Waters Forecast.
- 17:54 (local time) Gale Warnings and Shipping Forecast.

Table 1: The Shipping Forecast Broadcast Schedule.

## Selection of Resources on the Shipping Forecast

- BBC Archive on 4: *The Shipping Forecast at 100: Shipshaped*: [www.bbc.co.uk/programmes/m0026rpq](http://www.bbc.co.uk/programmes/m0026rpq)
- BBC Radio 4: Shipping Forecast Day (1 January 2025): [www.youtube.com/watch?v=zxCGwbY5enc](https://www.youtube.com/watch?v=zxCGwbY5enc)
- BBC Rewind: *Shipping Forecast @ 100*: <https://canvas-story.bbcwind.co.uk/ships100>
- BBC News: [www.bbc.co.uk/news/articles/c4gp620lj81o](http://www.bbc.co.uk/news/articles/c4gp620lj81o)
- BBC Radio 4: <https://tinyurl.com/547td3ds>
- BBR Radio 4: *Today Programme*: <https://tinyurl.com/525budm5>
- Carr, K. (2023): *Moderate Becoming Good Later: Sea Kayaking the Shipping Forecast* (Summersdale)
- Clothier, M. (2025) *The Shipping Forecast* (London: BBC Books) (Review: *Daily Telegraph*, 7 December 2024: 17)
- Compton, N. (2016) *The Shipping Forecast: A Miscellany* (BBC Books)
- Connelly, C. (2011) *Attention All Shipping: A Journey Round the Shipping Forecast* (Abacus)
- Conor, A. (2020) *The Shipping Forecast Puzzle Book* (London: BBC Books)
- Deutscher Wetterdienst (Seewetter/ Weather at Sea): <https://tinyurl.com/399cm7k2>
- Durschmied, E. (2001) *The Weather Factor: How Weather Has Changed History* (Coronet Books/ Hodder and Stoughton)
- Gardiner, K. (2017) 'Why a Maritime Forecast Is So Beloved in the United Kingdom' (Atlas Obscura): <https://tinyurl.com/3n7x3sed>
- Halford, P. (2004) *Storm Warning: The Origins of the Weather Forecast* (Stroud: Sutton Publishing)
- Jefferson, P. (2011) *And Now The Shipping Forecast* (UIT Cambridge Ltd.)
- Keep Long Wave (Campaign): <https://keeplongwave.co.uk>
- Kiewe, J.L. (1973) *Electric Telegraph: A Social and Economic History* (David & Charles)
- Met Office (UK): 'Tragedy & Warnings: The Origins of the Shipping Forecast': <https://tinyurl.com/5ctspwa2>
- Nancollas, T. (2019) *Seashaken Houses: A Lighthouse History from Eddystone to Fastnet* (London: Penguin)
- Royal Meteorological Society: Shipping Forecast Workshop: <https://tinyurl.com/9hww9jca>
- Royal Yachting Association: How to Interpret a Shipping Forecast: <https://tinyurl.com/4yemy4p3>
- Shipping Forecast 'Superfans': <https://tinyurl.com/4zkryfsx>
- Styles, N. and Dowling, R. (2023) 'Destination Rockall 2023' (*Practical Wireless*, August 2023)

Table 2: Shipping Forecast resources.

## NEWS EXTRA

**LICENSING NEWS:** Ofcom have now implemented Phases 2 and 3 of the licence changes. Among other things, this opens the door to changing your callsign, particularly useful perhaps if you currently hold an Intermediate licence with a 2x0 or 2x1 callsign. Check out the Amateur Radio Guidance document on the Ofcom website for how to apply.

**D-STAR QSO PARTY:** Icom have announced the 2025 D-STAR QSO Party, which takes place from 0000 on 27 December to 2359 on 5 January. Details at the URL below: [https://lnkd.in/eb9\\_wfMB](https://lnkd.in/eb9_wfMB)

**CELEBRATING MARCONI'S 'LITTLE MIRACLE':** On the anniversary of Marconi's groundbreaking achievement in wireless communication, communities around the world gather to honour the remarkable leap that connected continents. The invention, often called Marconi's 'little miracle', revolutionised the way information travelled and paved the way for today's global communications network. In August 1900 Marconi came to Cornwall looking for a suitable site to break the distance record, which previously was documented at 83 miles. He came to Bass Point located on the coast close to the most southerly point of mainland UK. He had also surveyed a site on the Isle of Wight at St Catherines Point where a spark transmitter had been installed. On 23 January 1901 Marconi received signals at Bass Point using a Coherer Detector receiver. There is no record of what was actually sent. The distance was 187 miles (300km), DX! The antenna in use at Bass Point was held up by a 150ft ex-ship's mast which had been transported from Harwich by road. Over the next few days signals were received from Poole, Portsmouth, Portland, Plymouth and France, the age of wireless telegraphy had arrived. By the end of the year signals had been exchanged with Crookhaven at 228 miles. At the end of 1901 signals were received at St Johns Newfoundland sent from Poldhu just down the coast from Bass Point. The team at the Lizard Wireless Station and The Cornwall Radio Club will be celebrating the achievement by putting GB125LWS on the air during January. They are also hoping for a station to be operating adjacent to St Catherines Point during the period as well. All modes will be active including QO100... what would Marconi have thought about that?

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# The Legend



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Rear view showing the improved, range of connection options to be found on the exciting new IC-7300MK2..

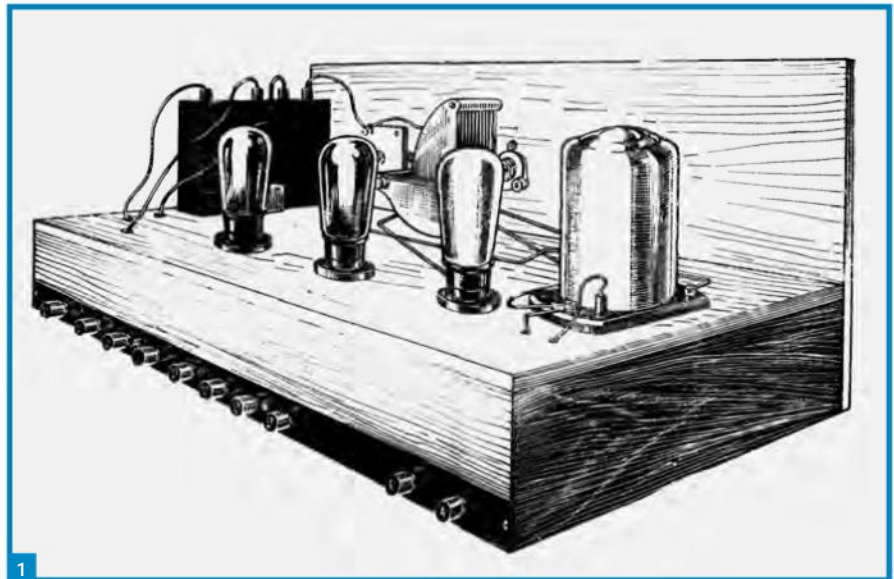
**Don Field G3XTT**

practicalwireless@warnersgroup.co.uk

**B**efore passing on the constructional details I would like to ask you to glance over the circuit diagram with me and to study it in conjunction with the sketches and photographs. If you cannot understand a circuit diagram please do not skip the next few paragraphs because I hope they might at least give you some idea of the usefulness of diagrams of this kind. We see that the aerial can be connected (by means of a wander plug) to a number of tapings on the untuned aerial coil; the lower the tapping is moved down the coil the greater is the degree of selectivity. The secondary winding is tuned by a .0005 mfd. condenser and the 'top' end is connected to the grid of the detector valve through a .0002 mfd. fixed condenser. A 3 megohm grid-leak is employed, it being found that this higher value gives rather greater selectivity and smoother reaction control. Reaction is obtained by means of a differential condenser connected from the anode of the detector valve to a reaction winding on the tuner.

A differential reaction condenser is employed so that tuning is not affected by reaction control. The usual H. F. choke is wired in the plate circuit of the detector valve, and connects the latter to the resistance-fed transformer (a 'Transfeeda' is its trade name). As the Cossor '210 Det.' valve used for detector has an impedance of 13,000 ohms the 30,000 ohm portion of the 'Transfeeda' resistance is sufficient for coupling purposes, and so the other part is used to decouple the anode circuit, by connecting a 2 mfd. condenser between the tapping 'H.T.11' and earth.

A radio-gram switch is wired in the grid circuit of the second valve, and thus the two last valves can be used as a gramophone amplifier. A separate grid bias connection is provided for the pick-up, for whilst this is not strictly necessary it does enable one to make the very best of gramophone records. Signals are passed on to the power output valve through a special tone control transformer which is used in conjunction with a 5,000 ohm variable resistance to provide the required variations in tone. The 'Rectatone' transformer is so designed that it gives proportionately less amplification to low notes than to high



## The Selectone (Pt II)

We go back in time to the early days of Practical Wireless for the second part of this vintage constructional project.

as the resistance value in the tuner gives emphasis to the low notes it is possible to effect a 'balance', or to exaggerate low or high notes at will. The last valve is not fitted with an output transformer since that is provided in the speaker itself.

### Making the Chassis

And now to get to work. I assume that you have obtained all the components of which a list was given last time.

First of all the chassis must be made, and for this you will require an 8in. by 14in. plywood panel, a baseboard consisting of a 14in. by 8in. piece of 5-ply, two pieces of hardwood, each measuring 7 $\frac{3}{4}$ ins. by 3ins., a 14in. by 2in. strip of 3-ply and a 14in. by 1 $\frac{1}{2}$ in. ebonite terminal strip. If you have bought a 'Vibranti' panel as specified it will be already polished, but if you prefer to use a sheet of ordinary oak-faced plywood you will have to polish it before going any further.

Next set out the positions of the panel holes as shown in the sketch of **Fig. 2**. This should be done on the back of the panel with a pencil. Having located all the holes run a small drill or bradawl through each centre, and then make the holes full size by means of a

brace and centre bit. All holes excepting that for the tuning condenser are 3/8in. diameter whilst the latter is 1/2in. The terminal strip can be marked out and drilled as shown in **Fig. 3**, making the holes 9-64 in. diameter with a twist drill. I need not explain how the chassis is assembled for that will be quite clear from **Figs. 1 and 6**. All joints butt together and 7/8in. screws are used for fixing purposes. After assembly, make the 1in. holes in the baseboard to receive the valve holders - for positions see **Fig. 5**.

And now all the components can be mounted in the positions shown in the wiring plans, taking care to duplicate the lay-out as accurately as possible. Round head brass screws size 5/8in. by 4 are most suitable for attaching the parts to the baseboard, and you will require about two dozen. If you find any difficulty in working on the under side of the baseboard, you can remove it whilst attaching the components. Personally I experienced no difficulty in this respect if the screws were given an easy start by first holes with a bradawl.

**Fig. 1: A three-quarter rear view of the receiver.**

**The second part of this feature (from January 1933) describes the construction of the receiver, designed and written up for the magazine by Frank Preston.**



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Fig. 2: The panel drilling dimensions.

Fig. 3: Details for drilling the terminal strip.

Fig. 4 (top): Below baseboard wiring details.

Fig. 5: Top plan, showing dimensions for marking out valve-holder holes.

## The Wiring

Everything is now ready for the wiring, and you will not find this a difficult task, even if you have never made a set before. Each wire is clearly shown in figures 4 and 5, whilst most of them can be traced in the photographs. Seven wires are taken through the baseboard and they have been numbered on the wiring plans so that you can follow them with ease.

Be careful that you get the wires to the radio-gram switch on the proper terminals; to prevent any chance of error the switch terminals have been numbered on all the drawings.

The switch itself is not numbered, but the terminal I have called number 2 is in the centre and the contact spring with which it is associated has a larger loop than have the other two. You will see that one terminal on the 5,000 ohm potentiometer is not required in this case and is left free.

## Wiring Hints

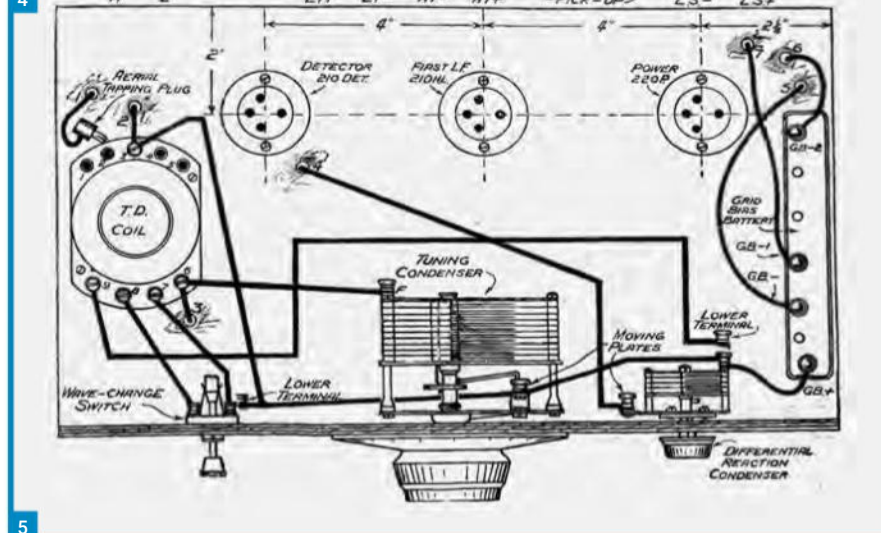
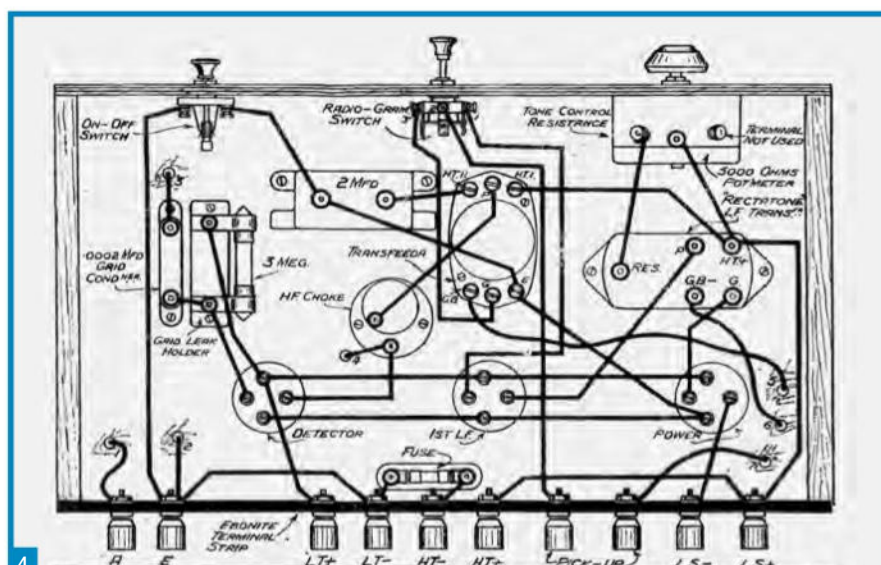
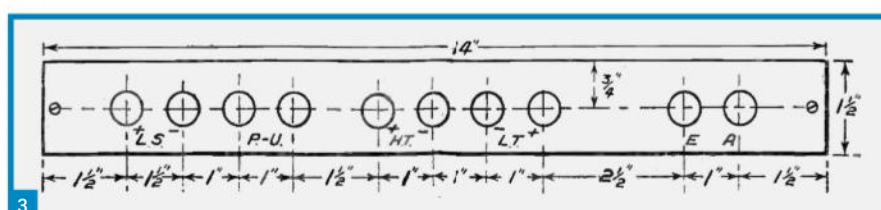
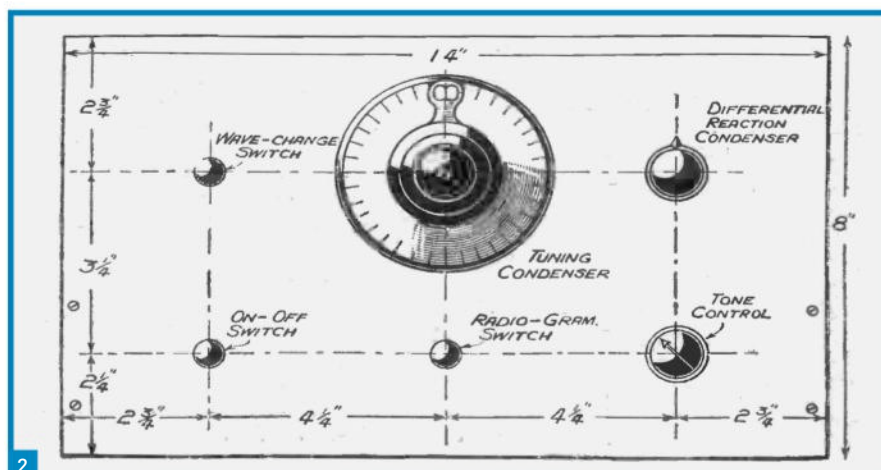
For the benefit of the less experienced, a few hints in regard to the easiest way to wire up will not be out of place. I advise you to commence by doing as much wiring as possible on the panel and upper side of baseboard. Then put on as many wires as you can on the under side, leaving until last those wires which pass through the baseboard.

To avoid possible confusion, tick off each wire on the wiring plan as you put it in place. I have not numbered all the wires because I think that would complicate, rather than simplify, matters.

Most of the wiring is carried out in 'Glazite' insulated conductor and as this is supplied in a coil it should be straightened out as required. After straightening fit it roughly into position, add about an inch and a quarter to the length actually required and cut off; this will leave five eighths of an inch at each end for making contact.

The insulation can be removed very easily and neatly by laying the end of the wire on a flat surface, pressing the edge of a knife against the insulation and slowly rolling the wire over.

After cutting through the insulation the waste piece can be drawn off with the thumb nail. Next make a good loop with a pair of round nose pliers, bending the wire in a clockwise direction so that it will be gripped firmly as the terminal nut is screwed down.



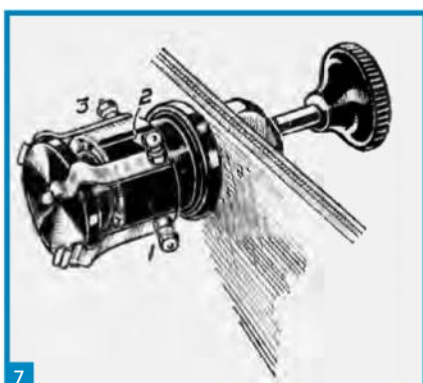
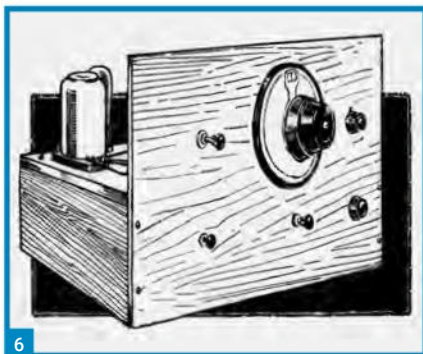


Fig. 6: A view of the finished receiver.

Fig. 7: The wave-change switch which is employed in this receiver.

It is best to make the loop a good fit on the terminal shank.

If you feel like making a rather better job you can flatten the looped part of the wire by laying it on a hard surface and giving it a light blow with a hammer. The holes in the baseboard through which the wires pass are most easily made with a 5-32in. twist drill, but can be made with a large bradawl if a suitable hand drill is not available. There are four flexible wires passing through the baseboard - three to the grid bias battery and one to the aerial tuner. The easiest way to deal with these is to 'split' a length of twin flex, scrape the insulation away from one end for a distance of 1in. or so, twist the strands of bare wire tightly together and then form a loop. Now attach the loop to the appropriate terminal underneath the baseboard and by trial find the proper length of wire required. Cut off and strip the insulation from the other end; bend the bare end of wire back and bind it round the end of the insulation. It can then be gripped in the wander plug by pushing it in the side hole of the insulated knob, and screwing up the brass split pin.

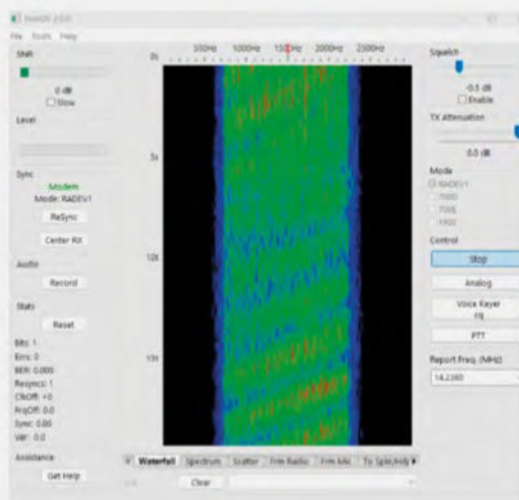
When all the wiring is complete carefully check it over in conjunction with the wiring plans; make sure that it is quite correct, and that all the terminals are tightly screwed down. Next time I will give full particulars as to how the Selectone should be connected up and how to obtain the best results from it. **PW**

## FREEDV

Open Source HF Digital Voice for Amateur Radio

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### INTRODUCTION



1

# Digital Voice for HF

Eric Edwards GW8LJJ asks "Why Digital Voice on HF?"

Eric Edwards GW8LJJ  
ericgw8ljj@outlook.com

Communications on the HF bands using SSB (and AM) is challenging when competing with QRM (man-made noise). The QRM referred to is either mains-borne from items plugged into the household mains such as switched mode power supplies, charging units and outdoor lights as an example, at home or from local (neighbours) mains.

Noise is also airborne, transmitted by overhead cables of various types. Listening to an SSB station one has to put up with the sound of 'bacon and eggs' frying in the background or in some cases in the foreground.

Fading (QSB) is another problem, with the audio disappearing into the noise as the signal goes to a low 'S' reading on the receiver's meter. Digital Voice ignores this as the audio is always at the same level. When a signal is received there is no noise in the background,

even when there is no modulation (person stops speaking) there is no noise.

If the received signal shows 'S9' on the receiver's meter and due to propagation the signal drops to a much lower 'S' reading, the voice amplitude is the same. The signal strength will not be realised unless a note is taken of the 'S' meter readings. Of course, if the received signal is below the noise (floor) level of the receiver, then the signal will be lost as with all digital systems.

However, there is more resilience with Digital Voice and it will 'get through' where SSB reception will be struggling. Digital Voice is the natural progression from SSB and will be the same as the transition from AM to SSB. All modes are still used and will be even when digital voice is in the majority as AM and CW are still used with SSB in the majority.

Fig. 1: The home page of FreeDV.

Fig. 2: Check for the latest version.

Fig. 3: The FreeDV reporter page.

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## FM quality audio using Digital Voice on the HF bands

The audio (speech) quality is excellent but to achieve this, the usual (commercial) digital voice modes have wide bandwidths and are too wide for the HF bands. D-STAR has a bandwidth of 6.25kHz, whereas Fusion and DMR is 12.5kHz. The radio amateur using these digital voice modes on the HF bands would not be popular! But there is a Digital Voice mode that is allowed on the HF bands and even on 5MHz!

How is this possible? It is because the transmitted bandwidth is narrower than an analogue SSB transmission. The decoder / encoder is FreeDV, **Fig. 1**, and as the name suggests it is free! No charge for using it and no special transceiver is needed.

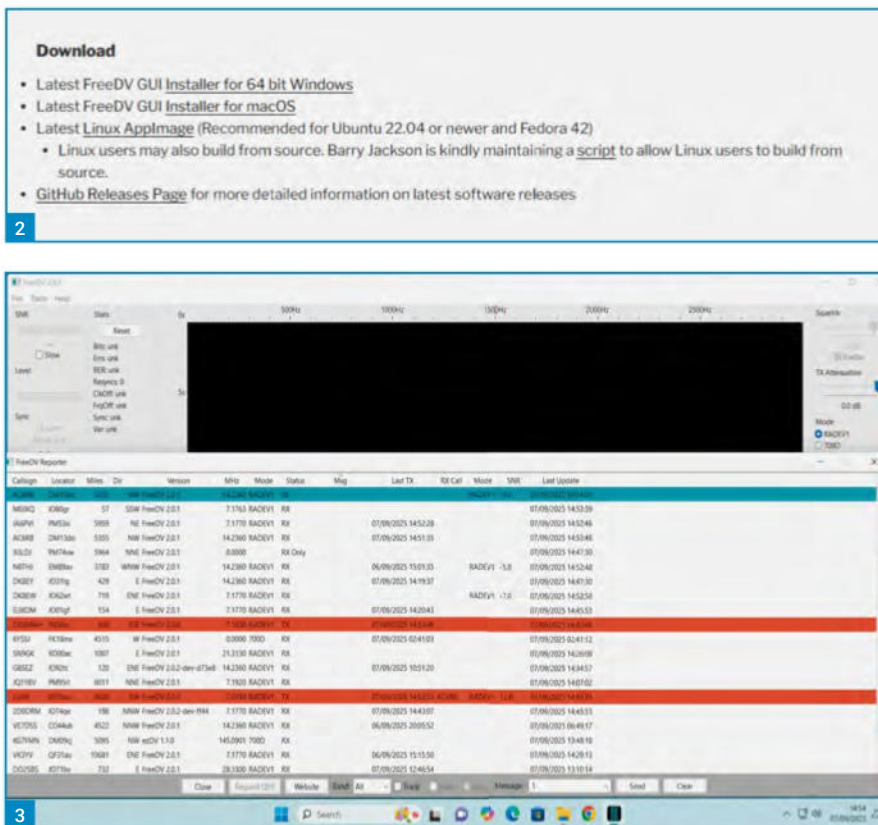
### How wide is it?

The speech signal has an audio bandwidth of 8kHz, but the RADE V2.0.1 ('Radio Autoencoder') (latest FreeDV version at the time) signal requires just 1500Hz of RF bandwidth. The audio is centred at 1.5kHz with a low frequency limit of 700Hz and a high frequency limit of 2.2kHz. Even with this narrow setting the audio is equal to amateur radio FM quality.

This is much narrower than a standard SSB transmission. Another interesting fact is that there are no opposite sideband spurious signals because the lowest audio frequency is 700Hz from the CIO (Carrier Insertion Oscillator). If the CIO was not fully or greatly attenuated as would be the requirement for normal SSB practice, it would make no difference at all to the FreeDV reception as it is out of range of the audio signal. Tests have been carried out using both sidebands at the same time (duplex) with two stations, one on lower sideband and the other on upper sideband on the same frequency. There was perfect reception of both stations with no interference or overlap of the sideband modulations.

### What equipment is needed?

All that is required for receiving FreeDV is an SSB receiver and for transmitting as well, a transceiver is required. Yes, SSB is the transmitting mode as it is the audio that is digital. There is software to download so a PC, a laptop or Raspberry Pi etc can be used. When discussing the display unit, the term computer is used in this document, which represents any other type of display, laptop etc. The software is free to use and is evolving so that improvements are made all along the way. If SSB equipment is not available, FreeDV can be received on the internet via one of the Web SDRs and a virtual sound card.



### Downloading the software

The FreeDV software is an encoder/decoder and converts normal analogue speech to digital for transmitting with a standard SSB transmitter. It converts the digital audio to analogue on receive to enable the speech to be heard in analogue mode. The signal being encoded and decoded is normal speech so AM or even FM can be used for FreeDV. While AM can be used on most HF bands, FM can only be used on 28MHz and higher bands. There is a manual (PDF) available from me on request via an email that deals with using FreeDV on the HF bands using SSB and following the sideband convention. I want to make it clear that FreeDV is transmission 'over the air' and not via the internet. The software on the PC is used only for the encoding and decoding of the speech. It can be considered as a software 'black box' fitted between the microphone and the transmitter, and the phone or speaker output of the receiver to a set of headphones or speaker.

There is software button on the FreeDV screen that allows a change to analogue from digital for receiving and transmitting so there is no need to disconnect or re-route any connections.

To download the FreeDV software it is best to go to FreeDV.org for the latest release, and select the Downloads tab, **Fig. 2**.

Click on [gui/releases/download/v2.0.2/](http://gui/releases/download/v2.0.2/) FreeDV-2.0.2-windows-x86\_64.exe (or

equivalents for Mac or Linux). (v.2.0.2 is the current release at press time)

Full details are on the site and also a full, complete guide to the installation and setting up (straightforward) is available in the manual (PDF).

The setting up and using FreeDV is also on the FreeDV.org site.

While it is the intention to be able to use the software for transmitting as well as receiving, it will be prudent to start with a receive-only setup to get to know the operation and also only a computer's internal sound system is needed. To use it for transmitting, a second sound card is required and a low-cost USB type is normally used. FreeDV can also be resolved from a Web SDR with a virtual card installed used for the decoding of the speech.

There is a very useful facility in FreeDV called 'FreeDV reporter', which can be monitored in 'Tools' FreeDV reporter. It shows as list of stations on all of the HF bands. Any band can be selected and monitored, which removes the need to search for stations. The computer needs to be connected to the internet to activate this mode. The reporter contains lots of information as seen at **Fig. 3**.

### Reference

FreeDV.org Information about the software Manual PDF GW8LJJ: A complete guide to setting up and using with all the features. **PW**

Richard Constantine G3UGF

richard@norcomm.co.uk

In the annals of amateur radio history, the charismatic figure of **Rowley Shears G8KW** is a legend. In January 1956 he founded KW Electronics Ltd. A company that was destined to become the largest amateur radio manufacturing organisation the UK has ever seen

Its Dartford factory designed, manufactured and exported a complete range of amateur products and later commercial equipment worldwide.

KW was the company that popularised the use of affordable SSB. Its transmitters, award winning receivers and transceivers are legendary, gracing the covers of radio magazines throughout the 1960's and 70's. Equipment that's still collected, used and much prized almost 70 years later.

### But there's another story,...

Told for the first time thanks to a three-year labour of love by his eldest son **Richard**, wider family and with recourse to an unfinished autobiography, military records, facts and testimony of those that knew him. It's a definitive account of one man's war.

As a teenager from New Barnet with a burning passion for electronics and the hi-tech developing wireless communications technology and broadcasting of his day, he could not have imagined where fate would take him in 1939.

From a Private to a ranking commissioned officer during WW2 is in itself unusual. It was a series of coincidences and recognition of knowhow that he first learned as a young, licensed radio amateur.

Like so many of his generation Rowland George Shears, known to all simply as 'Rowley', was somewhat reluctant to talk of his war. As time passed he gave small hints and recounted some amazing and often amusing anecdotes to his close friends and family. Sometimes hard to believe and sometimes seemingly incredible.

How does a British officer come to be mentioned in despatches and awarded both the British Empire Medal and a Nazi Iron Cross?

This book tells the true story of intrigue, mystery and deception over the airwaves. All this alongside his innovative use of broadcasting to bring morale boosting music to troops in the Western desert far from home. There is undoubtedly more that we may never know but what the author gives us is remarkable.

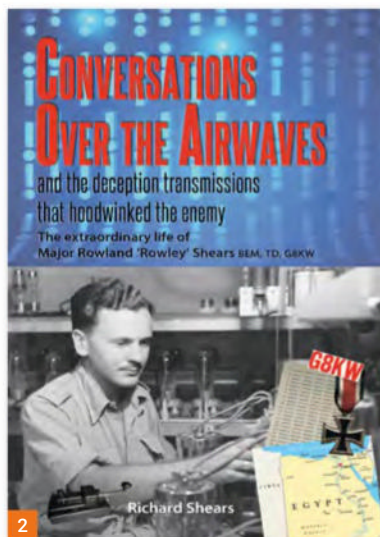
Recruited by British Intelligence in 1941, Rowley becomes the key player in the famous 'Operation Cheese' and other evolving major events in both the Middle Eastern and Mediterranean theatres of war. Under the watchful eye of **Colonel Dudley Clarke**, he is present at high level meetings based on his skill and ability to innovate both as a wireless operator and technical engineer.

Immediately after the fall of the Nazi regime and still a serving member of the Royal Corps of



# Conversations over the Airwaves

**Richard Constantine G3UGF** takes a look at a book about the colourful life of Rowley Shears G8KW.



Signals, he took on the mammoth task of restoring public broadcasting, to the people of Western Germany. Alongside this work and as member number 1, he was instrumental in the founding of DARC, the German national amateur radio society, currently celebrating its 75th anniversary.

This book will not only be of interest to readers of wartime exploits and radio enthusiasts of all kinds, it will add significant fact and colour to the historical record of WW2. It's really good read. A unique and fascinating story of an extraordinary man.

Photo 1: Rowley Shears demonstrating his range of kit at a 1970 amateur radio exhibition (photo from October 1970 Short Wave Magazine). Photo 2: Front cover. Photo 3: A recreation of Rowley's mid 70's station, later donated to the RSGB. Photo 4: One of the first and the last - a KW160 Top band Tx & a KW Atlanta transceiver.

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[www.richardshears.net](http://www.richardshears.net)  
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(1 connector = 1 black shell + 1 red shell + 2 contacts)

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£48.50



Fibreglass telescopic pole

Extended length 6 metres

Packed length 56cm

Weight approx 750g

Strong and compact

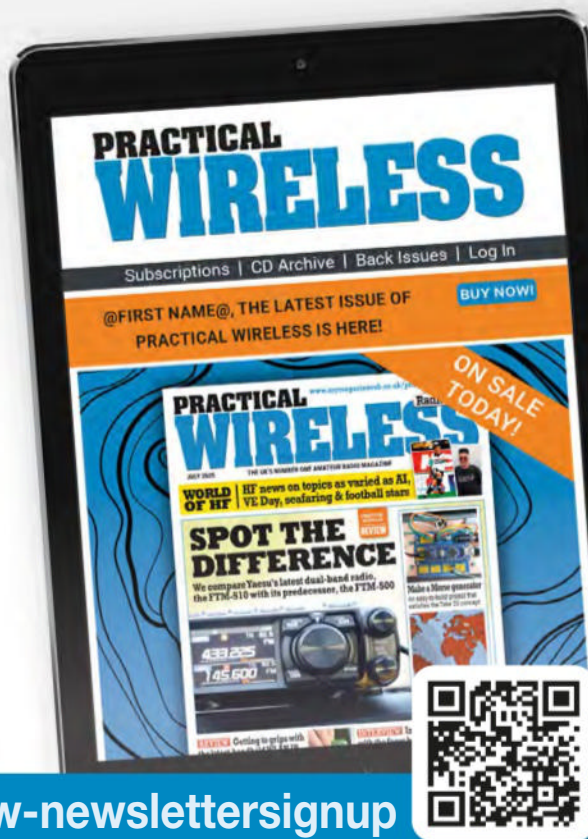
Supplied with camo bag

Built-in base shock absorber

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# Broadcasting history

Once again, **Keith** and **Garry** invite you to gallivant through their archives.

**Keith Hamer**

Keith405625.kh1@gmail.com

**Garry Smith**

Garry405625.gs@gmail.com

## BBC Broadcasting House, London: Part IV

The *Control Cubicles* at *Broadcasting House* in May 1932 worked in conjunction with *Continuity Suites*, where the programme services were, and still are, coordinated and presented. Some cubicles were equipped with special technical apparatus to broadcast music with much-enhanced audio quality.

A *Central Control Room* was devoted almost entirely to the operation of the network of transmitters, the testing and equalisation of the *General Post Office (GPO)* cables between studio centres and transmitting stations, and the handling of all the complicated technical infrastructure.

This method proved so successful that future developments were based on the same principle, except that a dialling system, similar to that used in early automatic *Strowger Telephone Exchanges* employing uniselectors, replaced the 1930's plug-and-socket arrangements for programme selection and distribution.

The *Central Control Room* was obviously an extremely important, and vulnerable, facility. With the outbreak of *World War II*, a new *Central Control Room* was built in a former *Variety Studio* in the sub-basement of *Broadcasting House* to replace the original, which was far too susceptible from enemy attacks.

The true reality of war came home to the BBC on 15 October 1940, when a German bomb made a direct hit on *Broadcasting House* during the 'live' 9 o'clock evening news bulletin resulting in seven fatalities. After a momentary pause, the newsreader calmly continued reading the news as if nothing had happened, even though the explosion was loud enough for all to hear. On 8 December 1940, *Broadcasting House* was attacked again by a land-mine, resulting in serious damage.

## Vintage Christmas speaker-amplifier advertisement

This month's roam through vintage copies of cobwebby newspapers and magazines has procured a Christmas advertisement by

*Celestion Limited* for their 'Class B' *Speaker-Amplifier and Loudspeakers*, **Fig. 1**. The advertisement dates from 2 December 1933.

The text has been left in its original format to reflect the spelling, grammar and punctuation of the time.

More volume sounds a good idea, but maybe neighbours weren't too impressed during the Christmas festivities!

The *Celestion* company was formed in *Hampton Wick, London*, in 1924. **Cyril French** and his three brothers had taken over a plating works and established *The Electrical Manufacturing and Plating Company*.

They were noted as *electrical instrument manufacturers*. **Eric Mackintosh** approached Cyril French for assistance with improving a new loudspeaker for which he had filed a UK patent in 1925.

When radio began in November 1922, listeners had to connect either earphones or gramophone horns to the receivers. Messrs. French and Mackintosh perfected a loudspeaker design where its conical paper diaphragm was strengthened with strips of Chinese bamboo.

## 100 years ago: December 1925

This series spotlights some of the events, technical achievements and personalities associated with the world of broadcasting from exactly 100 years ago this month.

*Colombo Radio* was launched in Ceylon on 16 December. The station subsequently became known as *Radio Ceylon*.

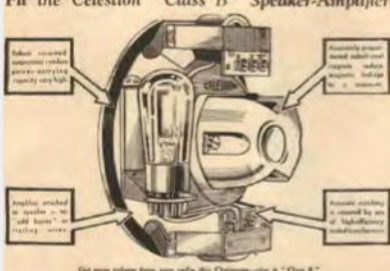
In 1925, BBC engineers experimented with studio acoustics to obtain, what was then termed, a *stereoscopic effect*. This was achieved by placing the microphone in a hole in the studio wall to obtain the correct distribution of sound.

The first public broadcast in stereoscopic sound was from the *Shaftesbury Theatre* in London with a performance of the musical, *Dear Little Billie*. The acoustic effect was satisfactory and any objectionable echo, due to the reflection of sound from the theatre's flies, was eliminated.

A 2kW transmitter was installed on the roof of *Selfridge's Department Store* in Oxford Street on 6 April 1925. This, and similar transmitters in large towns such as Bournemouth, radiated local programmes on medium-wave.

**MORE VOLUME for your Christmas Radio**

Fit the Celestion "Class B" Speaker-Amplifier



Robust six-armed suspension renders power-carrying capacity very high. Accurately proportioned cobalt-steel magnets reduce magnetic leakage to a minimum. Amplifier attached to speaker – no "odd boxes" or trailing wires. Accurate matching is ensured by use of high-efficiency tested transformers.

Get more volume from your radio this Christmas – give it Class "B" Output by substituting the Celestion Combined Class "B" Unit and Moving-coil speaker for your present loud-speaker. It is connected as easily as an ordinary speaker – the amplifying apparatus is attached to the speaker chassis – you have no untidy "odd boxes" or trailing wires. You get "Mains" quality and volume at no extra cost. Ask your dealer to demonstrate Class "B" Speaker Amplifiers, either in chassis or cabinet form.

"B" Stage 9 Chassis £2 15 0  
"B" Stage 19 Chassis £3 7 6  
**CELESTION LOUD-SPEAKERS.**  
P.P.M. 9 ... £1 15 00  
P.P.M. 19 ... £2 7 6  
Celestion Ltd., London Road, Kinston-on-Thames,  
Showrooms: 106, Victoria St., S.W. 1.  
**CELESTION**  
*The Very Soul of Music*  
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## The rise and fall of 198kHz: Part XXV

The final switch-off of BBC long-wave broadcasts from the Droitwich, Westerglen and Burchhead transmitters was due to take place on 31 March 2024. Announcements were aired on *BBC Radio 4 LW* advising listeners about the forthcoming closure of the service on 198kHz. An announcement in May 2022 stated that long-wave transmissions would end because LW was, quote, "coming to the end of its life as a technology".

Unfortunately, no-one at the BBC seemed to realise that they were under contract to *Energy Networks Association (ENA)* to continue long-wave broadcasts until 2025 to prevent the *Radio Teleswitch Service (RTS)* from being switched off. The RTS was a system allowing



energy suppliers to switch large numbers of electricity meters between different tariffs, such as *Economy 7*. The RTS signal was carried alongside Radio 4 programmes.

All programmes previously on Radio 4 LW, including the *Shipping Forecast*, *Daily Service*, *Yesterday in Parliament* and *Test Match Special*, were shipped off to other platforms.

The BBC's long-wave transmitters relied on specially crafted glass valves, each measuring about one metre in length. A very rare view of such a valve being installed at the Droitwich transmitter is shown in **Fig. 2**. If a valve failed, the station would suddenly, and permanently, go off the air. The three LW transmitters each used a pair of valves which are no longer manufactured. Some years ago, engineers estimated that there were fewer than ten of these extremely rare valves left in the world, so the BBC purchased the entire global supply. Prior to the switch-off, the BBC estimated that LW was used by about 90,000 households in Britain to receive Radio 4 due to weak FM and poor internet signals.

The BBC did not believe it would be possible to manufacture new valves because slightly faulty replacements could cause a catastrophic failure of the other parts of the transmitter. If the valves failed, a dangerous arc of power would surge through the 700ft Droitwich transmission masts.

Despite reception of the LW signal in Northern Ireland always being difficult, it was strong enough to be audible in parts of the Netherlands, Éire, France, and Germany.

The transmitter in Warwickshire was constructed under the leadership of **Sir John Reith**. His last act as the BBC's *Director-General*, after being forced to resign in 1938, was to personally close down the *National Programme* at Droitwich before signing the visitors' book, and leaving!

And now we are leaving the epic story about BBC Long-Wave transmissions with this concluding episode. The historic BBC Droitwich Long-Wave Transmitter was due to be permanently switched off on 30 June 2025. However, Radio 4 broadcasts will continue to grace the airwaves until an RTS 'impact assessment' has been finalised which, on past performance, could take some time!

We would like to thank **Pat Bracken 2M1CKE** for suggesting this topic which began in the December 2023 column.

## 60 years of BBC-2: Part XXI

When BBC-2 opened in April 1964, a special programme was aired on Sundays at 7.00pm called *News Review Of The Week* for the deaf and hard-of-hearing. Special permission had been granted to do this in the 6.15pm to 7.25pm closed period when traditionally,



**Fig. 1: A Christmas advertisement placed on 2 December 1933, by Celestion Limited for their 'Class B' Speaker-Amplifier and Loudspeakers.**

**Fig. 2: An extremely rare photo showing a transmitting valve being installed at the Droitwich transmitter.**

**Fig. 3: The Swiss Rigi Kulm television transmitter, photographed by the authors in August 2013.**

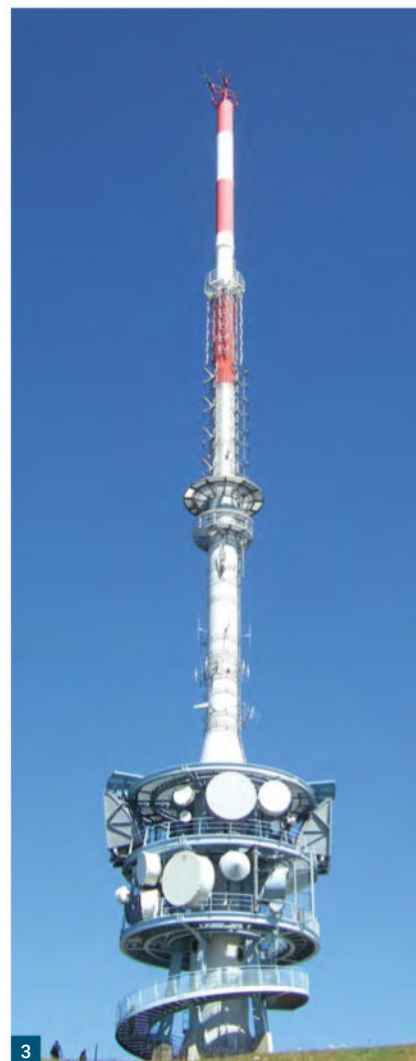
only religious programmes were transmitted on BBC-1 and ITA stations. The programme was presented by BBC Newsreader, **Robert Dougall**.

The main programmes commenced at 7.30pm under the general titles of *Theatre 625*, *Cinema 625* and *Music 625*. On the first Sunday evening of BBC-2, *Music 625* presented the *Requiem Mass* by **Giuseppe Verdi**, 'live' from the *Royal Festival Hall*. The programme was introduced by **Richard Baker**.

## Service information, Switzerland: Part XXXIV

On 3 June 2019, the Swiss public broadcaster, SRG-SSR, switched off all their digital terrestrial television transmitters due to cost-cutting measures. Viewers can now only receive programmes via satellite, cable, or the internet.

And now it's time for us to 'switch off' this topic as we conclude our in-depth coverage of the development of Swiss radio and television since 1922. For over 50 years, the authors have visited Switzerland on an annual basis.



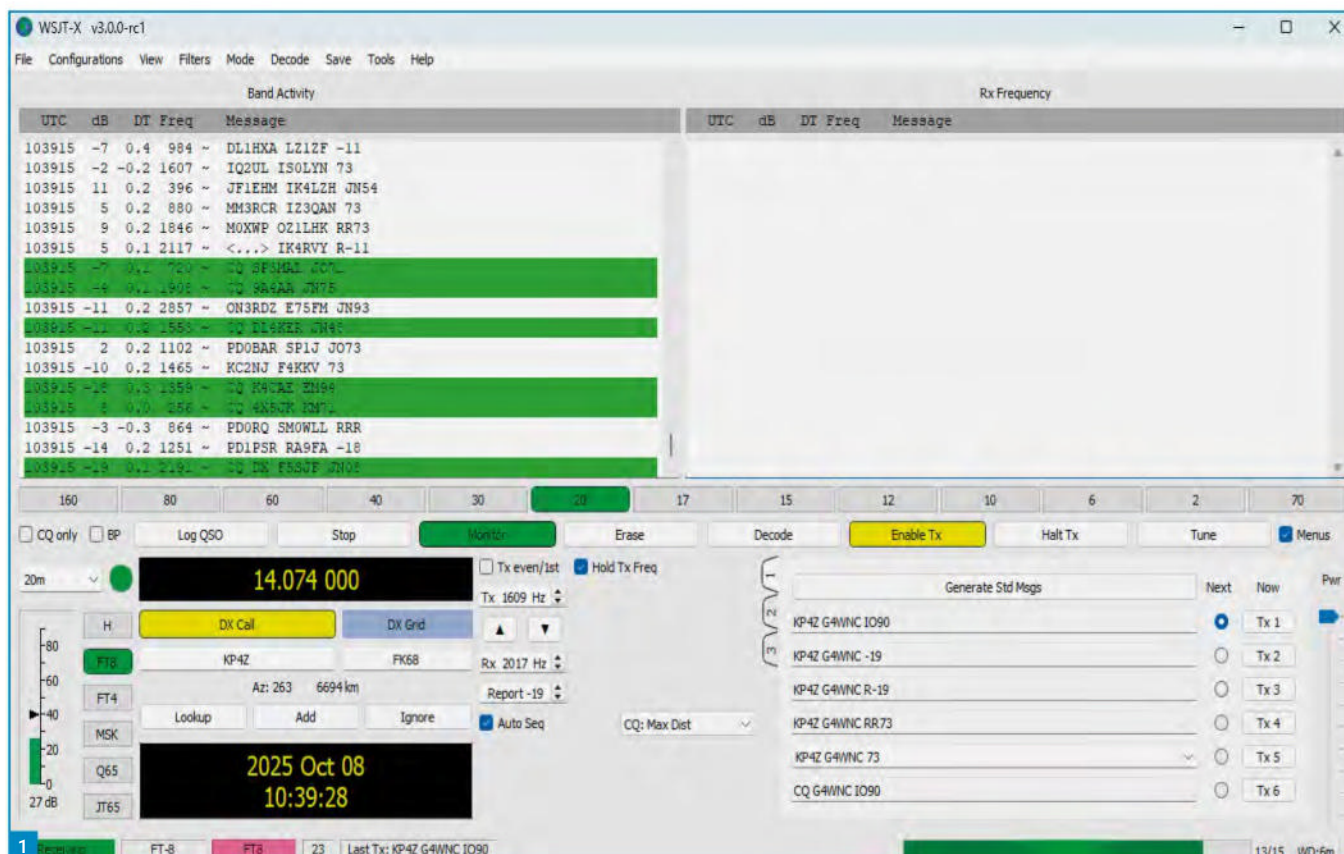
Over those years, they have been to virtually every main high-power Swiss television transmitter and even partially climbed up several of them!

Although all the transmitters are still there for other types of communication purposes, the authors lament the fact that these aesthetic structures no longer radiate television signals, some of which they began receiving from 1969 via *Sporadic-E*, *Meteor-Shower*, and *Enhanced Tropospheric* propagation in the good old days of analogue DX-TV!

One of the transmitters, called *Rigi Kulm*, which they still often visit by way of a vintage cog-wheel railway, overlooks the city of Luzern and the beautiful *Vierwaldstättersee*, **Fig. 3**.

## Stay tuned!

Please send archive photographs, information or suggestions for future topics via the email addresses shown at the top of this column. The photos this month are once again from Keith and Garry. **PW**



Mike Richards G4WNC

practicalwireless@warnersgroup.co.uk

**J**oe Taylor's WSJT-X suite of weak-signal software has transformed many aspects of today's amateur radio. WSPR has become the standard mode for propagation and antenna analysis, and can't fail to impress with its ability to record microscopic signals from around the globe. Likewise, FT8 completely dominates the world of HF data communications. On the VHF and UHF bands, the specialist WSJT-X modes have transformed EME and other challenging propagation modes.

Why mention this now? Well, WSJT-X is undergoing a major new release to version 3.0, which is packed with new features that bring the suite up to date by adding many user-requested refinements. As is usual with WSJT-X releases, the process is carefully managed, with enhancements made available to public beta testers first to facilitate refinement of the features and help eliminate bugs. These beta releases are available for public download, with the request that you report any bugs or operational issues to the development team. You can download WSJT-X 3.0-r1 from the main WSJT-X page here:

<https://wsjt.sourceforge.io/wsjsx.html>

I thought it appropriate to run through some of the headline changes here. I also noted improvements in decoding performance

## More on WSJT-X

With a new version of WSJT-X available for testing, **Mike** examines the improvements for FT8 operators.

for FT8 operators, so I carried out some FT8 performance comparisons between the current v2.7.0 and the new v3.0.0-rc1.

### Band buttons

Many of the changes add convenience features to ease FT8 operations. One obvious example is the inclusion of band buttons, as shown in **Fig. 1**. These buttons can be activated via the View menu and provide a more convenient way to change bands. There are two sets of band buttons available, one covers 160m to 70cm, while the alternative set is intended for VHF/UHF operators using the 8m (40MHz) to 24GHz bands.

### Wait Reply, Call & Pounce

These handy tools offer a convenient solution to several common operating problems. We have all encountered the situation where you're trying to work a popular station, but several other stations are stronger than you and beating you to it. With the existing system, you have to keep trying to break through. In most cases, the receiving station will have logged that you're calling and will likely call you back later when

the other stations have finished.

When you activate **Wait & Reply**, you can leave WSJT-X to manage the process. It will monitor the received calls, and when it spots the station calling you, it will automatically respond and complete the QSO with the target station. To activate this feature, you must first enable the WSJT-X wait features. To do this, choose the File menu – Settings – General – Additional features and tick the box titled 'Enable Wait features'. Next, enter the target station call into the DX Call box. You can do this by double-clicking on the 'Call' in the Activity window. As soon as the target station calls you, WSJT-X will automatically respond and complete the QSO.

**Wait & Call** is different and helps with situations where a station has temporarily disappeared. To activate this, first ensure the target call is in the DX Call box. Then, left-click the DX Call box, and it will turn red. This signals that Wait and Call is activated. As soon as WSJT-X detects the target station sending CQ, RR73, RRR or 73, it will take over and call the station up to three times.

Finally, **Wait & Pounce** will automatically answer the first Call that meets your chosen

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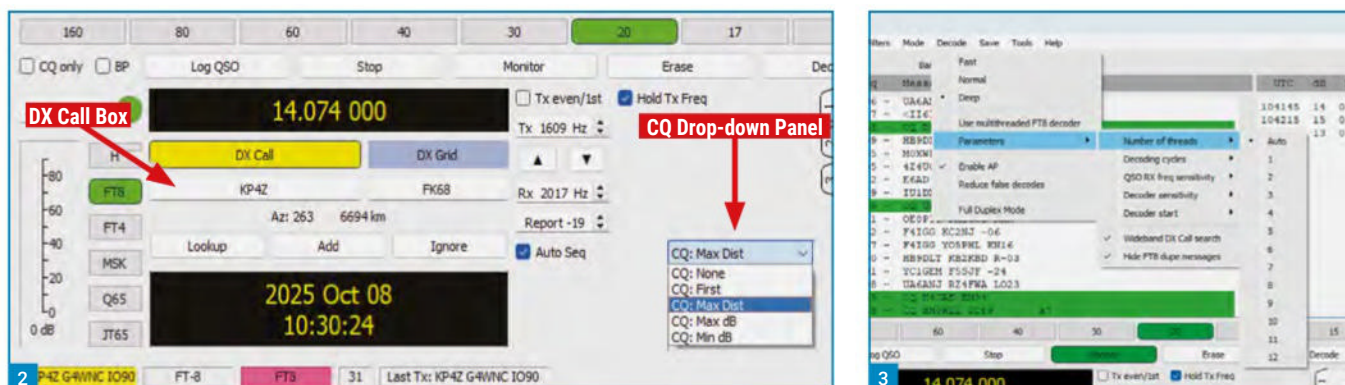


Fig. 1: WSJT-X v3.0.0-rc1 - Band buttons.

Fig. 2: WSJT-X v3.0.0-rc1 - Call Box and CQ

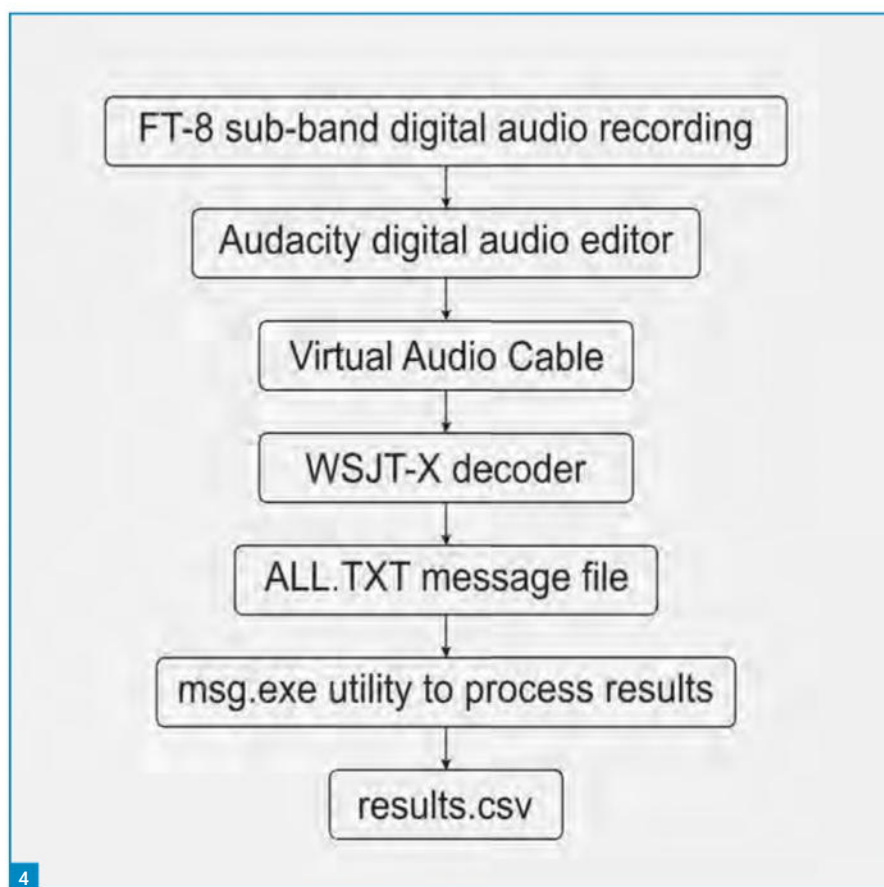
drop-down. Fig. 3: WSJT-X v3.0.0-rc1 - electing decoding threads. Fig. 4: Block diagram of FT8 performance testing.

parameters. The primary choices are selected using the drop-down CQ menu, i.e. Max Dist, Max dB, or Min dB, **Fig. 2**. This feature also works in conjunction with the Filters menu to further refine the selection. To enable Wait & Pounce, ensure the DX Call box is empty (right-click) and then right-click on the Enable TX button. This button will turn orange to indicate that Wait & Pounce is active. Duplicate contacts are avoided by automatically checking the wsjtx.log.

### FT8 performance enhancement

Version 3 has introduced several performance improvements for FT8 users. In addition to some under-the-bonnet tweaks and refinements, WSJT-X now includes a multi-thread decoder option. This feature is activated from the Decode menu and enables the use of up to 12 concurrent processing threads to improve decoding performance, as shown in **Fig. 3**. The number of processing threads depends on the capability of your computer; however, I suspect most modern PCs will be able to handle the full 12 threads. You can set the number of threads from the menu as follows. Select - Decode - Parameters - Number of threads. Here you can set the number of threads between 1 and 12. Alternatively, you can select the Auto option, and WSJT-X will decide, based on the current processor load.

I've not seen any details of the expected performance improvement, so I set about testing it for myself. Performance measurement can be a contentious subject, so it's essential to plan the test carefully and provide as much information as possible, allowing others to attempt to replicate and verify the results. Having successfully carried out decoder tests before, I employed a similar testing technique for this occasion, as shown



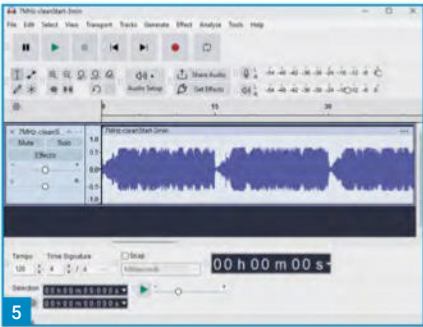
in **Fig. 4**. With any measurement, it's vital to have a high-quality signal source. It is also important to have controlled test conditions so the measurement can be repeated. For the FT8 decoder tests, I first collected some digital recordings of live signals. This was done in two sessions. The first was a set of recordings I made a couple of years ago during a digital contest. These were made using the 7MHz and 21MHz bands with a Hermes Lite 2 SDR receiver and **Simon Brown's** SDR Console. The antenna was my Butternut HF9V vertical.

For the second batch, I recorded the FT8 band segment of the 10MHz and 14MHz bands on a busy Saturday afternoon in October of this year. I used my Web888 SDR receiver fed by a Wellbrook ALA1530 active loop antenna,

mounted in the clear at about 3m above ground. The Web888 was set to USB with a bandwidth of 300Hz to 3kHz. This receiver can make direct digital audio recordings, so I used that facility.

For each recording session, I began with a five-minute digital recording. These recordings were then edited in the free audio editor Audacity. During the editing process, I trimmed the beginning of the file so that the recording started in the gap between FT8 slots, as shown in **Fig. 5**. I also edited the file length to end at the end of the three-minute FT8 slot.

I wanted to keep the audio signal in digital format, all the way through to the decoder, to maintain the integrity of the original recordings. To achieve this, I utilised the



|    | A      | B      | C                     |
|----|--------|--------|-----------------------|
| 1  | Slot   | SNR    | Message               |
| 2  | Slot 1 | 3 dB   | <II7IARU> I1RJ JN45   |
| 3  | Slot 1 | -10 dB | R3RAQ EG1FAP -11      |
| 4  | Slot 1 | 0 dB   | II5GG IK2ULS JN45     |
| 5  | Slot 1 | -6 dB  | CQ IZ6SCG JN62        |
| 6  | Slot 1 | 14 dB  | DJ0MAB <SB100SSA> +10 |
| 7  | Slot 1 | -8 dB  | EU3LA DL2FX R-13      |
| 8  | Slot 1 | -5 dB  | BA4ITX YO3FFE R-15    |
| 9  | Slot 1 | -2 dB  | HB9DET EA4DFE IM89    |
| 10 | Slot 1 | -3 dB  | CQ DD4U JO64          |
| 11 | Slot 1 | -1 dB  | GM3RTG R3LDK KO64     |
| 7  | Slot 1 | 1 dB   | EW6EW <7S100SSA> R+08 |

Fig. 5: Using Audacity to trim the recording start point. Fig. 6: WSJT-X Wide Graph settings for test. Fig. 7: ALL.TXT file processed by msg.exe.

excellent Virtual Audio Cable (VAC) developed by Eugene Muzychenko. This is a superb utility that works flawlessly and always gets called into action for any digital audio routing. You can find out more here:

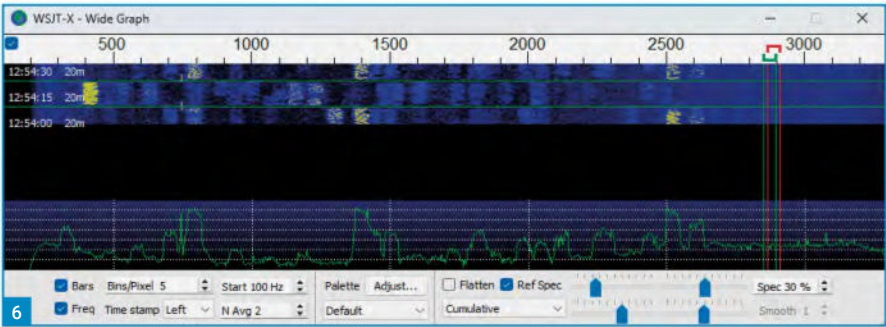
<https://vac.muzychenko.net/en>

To use this VAC from within WSJT-X, set both the audio input and output devices to 'Line 1 (Virtual Audio Cable)'.

With the recordings captured and edited, the next stage was to set the decoder parameters. It is obviously critically important to maintain consistent settings for each test. I decided to compare the current public release of WSJT-X, version 2.7.0, with the latest beta release, v3.0.0-rc1. Both programs were operated using their default settings. The only change was to force the beta release to use multithreading with 12 active threads. This was necessary to measure the performance improvement. The other crucial setting is the width of the Wide Graph. This width determines the FT8 decoder search bandwidth, so these must be the same for both versions. Mine were both set for 100Hz to 3.3kHz.

WSJT-X-widegraph is critical

Experienced operators will be well aware of the importance of the Wide Graph settings, Fig. 6, but many new operators to FT8 may not. The critical and often misunderstood aspect is that setting the bandwidth of the Wide Graph determines the search range of



the FT8 decoder. Therefore, if you have this set to less than the bandwidth of your receiver, you may miss potential contacts. The WSJT-X instructions recommend setting this bandwidth, and thus the search range, to 100Hz to 3.3kHz. You can do this by using the recommended settings as follows:

- 1. Set **Start to 100Hz**
- 2. Set **Bins/Pixel to 5**. NB: You can safely use this value to adjust the display width, with higher values allowing the Wide Display to occupy less screen space. This is particularly helpful for those using smaller displays.
- 3. **Drag the left or right edge** of the display to ensure the spectrum between 100Hz and 3.3kHz is displayed. This is critical as it determines the FT8 decoder's search range.
- 4. **Set N Avg to 2**. This doesn't affect the decoder, but larger values can make weak signals easier to spot.
- 5. **Palette**: These settings control the display only and do not affect the decoder performance, so these can be adjusted to your taste.

Running the measurement

With the recordings trimmed to three minutes and the decoder parameters set, it was time to start measuring performance. In the past, I've found the simplest technique is to count the number of message decodes recorded in the ALL.TXT file. WSJT-X automatically stores all decoded messages in this file, located in the Logs folder. Before starting a measurement run, I first deleted the existing ALL.TXT file. There's an option to do this in the File menu.

For the recorded signal to work, it has to synchronise with the FT8 timeslots. To achieve synchronisation, I queued the recording in Audacity so that a press of the spacebar would start the playback. I then watched the FT8 timeslot indicator at the bottom of WSJT-X

and hit the spacebar as the indicator moved between 14 and 15 seconds. At the end of the playback, the ALL.TXT file will contain all the decodes for that session.

I repeated this process for each recording and both versions of WSJT-X. To aid in sorting the data, I used ChatGPT to create a Python script that would process the ALL.TXT file and produce an Excel or CSV file showing only the FT8 slot, SNR, and the received message, Fig. 7. I then converted the script into a Windows executable (exe). A simple count of received messages showed an improved decoding performance for each of the four frequency bands. I've shown the result in Table 1. As you can see, for all but the 7MHz recording, V3 showed a worthwhile improvement of approximately 15%. A quick review of the results showed that most of the additional decodes had an SNR of -15dB or lower, indicating a higher decoder sensitivity.

For those who may want to take a closer look at the data, I've made a zip file available on my website here:

<https://photobyte.org>

The zip file contains the digital recordings, the CSV results file for each frequency and decoder, plus the executable file I used to process the ALL.TXT files.

To use the msg.exe utility file, simply put your ALL.TXT file in the same folder as msg.exe and double-click the executable. This will create a new file called results.csv. You should then rename the results file and delete the ALL.TXT file.

That's all I have room for this time, but next month I'll have more to report, plus some FT8 operating tips to make the most of v3.0.0-rc1. Please note that if you use v3, you should report any bugs or performance issues to the development team. This will help ensure swift progress to the full release version. **PW**

| FT8 Band segment | Message Count |            | % Improvement |
|------------------|---------------|------------|---------------|
|                  | V2.7.0        | V3.0.0-rc1 |               |
| 7MHz             | 258           | 274        | 6%            |
| 10MHz            | 259           | 293        | 12%           |
| 14MHz            | 401           | 462        | 15%           |
| 21MHz            | 334           | 397        | 18%           |

Table 1: WSJT-X FT8 decoding comparison



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FlexRadio Aurora AU-510 (Without Screen) ..... £6199.00

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The Topbytes Morse Trainer is a thoughtfully designed CW learning aid that blends traditional practice with modern convenience. Its feature set supports a wide range of users, from absolute beginners to those chasing 30+ WPM. The addition of Wi-Fi, games, and a vibrant touchscreen makes it stand out from many of the more spartan alternatives on the market. With its portability, ease of use, and real-world keying options, this is a trainer that doesn't just teach Morse—it encourages you to enjoy it.

See: [www.HamRadio.co.uk/topbytes](http://www.HamRadio.co.uk/topbytes)

## DigiRig Mobile Tiny new digital modes interface. Only £119.99



- Combines audio codec, serial CAT interface and PTT switch
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| Acom 2100 1.8-54MHz Linear Amplifier .....           | £3499.00 |
| Acom 2020S 1.5kW 160m-6m Solid-state .....           | £6779.00 |
| Acom 1010 160-10m Linear Amplifier .....             | £2059.99 |
| Acom 1000 1kW 1kW PEP/CW 1.8-55MHz .....             | £2449.00 |
| Acom 2000A 1500-2kW output auto with 2x4CX800A ..... | £5300.00 |
| Acom 700S 700 Watts PEP or Carrier output .....      | £2549.00 |
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**SPE Expert 1.5K-FA Taurus**  
Solid-state linear amplifier at the forefront of RF engineering. It provides a solid 1.5kW of output with exceptional linearity, efficiency, and robustness. Integrated with a built-in power supply and a highly capable automatic antenna tuner.....£4499.95

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Digital Display SWR/Power Meter. This digital SWR & Watt meter is highly accurate for measuring Forward Power, Reflected Power, & VSWR .....£129.95

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|------------------------------------------------------|--------------|
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| DG-503 Digital Power Meter .....                     | Only £99.00  |
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| mAT-705 Plus                                                                                |         |
| Auto ATU for Icom IC-705 with Internal Li-Ion battery .....                                 | £169.95 |
| mAT Y-200 160-6m High Speed Auto Tuner for Yaesu .....                                      | £129.95 |
| mAT-10 Automatic Tuner For QRP Transceivers .....                                           | £169.99 |
| mAT-30 Automatic Tuner For YAESU Transceivers .....                                         | £125.00 |
| mAT-180H Automatic Tuner For ICOM Transceivers .....                                        | £139.95 |
| mAT-125E General Automatic Antenna Tuner .....                                              | £129.95 |
| mAT-40 Automatic Antenna Tuner.....                                                         | £219.95 |

## HackRF Pro SDR Platform: A Next-Gen Open-Source Transceiver

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Pre-order on our website, see [HamRadio.co.uk/hackrfpro](http://HamRadio.co.uk/hackrfpro)



### Anyone AT-588

4m Transceiver 70MHz.

£149.99



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10m Mobile Transceiver AM FM SSB 10m Radio 28-29.700MHz 80W.

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New NES10-2MK4 amplified DSP noise cancelling speaker. ....£128.95

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- Combines audio codec and PTT switch
- Supports PTT by GPIO3 of CM108 audio codec
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Compact Desktop Power Supply sets the new standard for high quality.....£399.00



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| Pro-Set Elite IC Headphones..... | £189.95      |
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Offers ideal suppression of external noise in any situation. Thus, thanks to ANC (active noise cancelling), you can perfectly concentrate on quiet and weak signals even in noisy environments and are less distracted. In hectic contest operations, this can be a clear advantage!.....£279.95



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| EFHW KIT 200W 49:1 Unun for making your own end-fed half wave antenna. .... | £85.00  |
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| Aziloop DF-72 Antenna System .....                                          | £625.00 |
| Triple base magnetic mag mount SO 239 .....                                 | £45.95  |

**Steve Telenius-Lowe G4JVG**  
teleniuslowe@gmail.com

**W**elcome to the December *HF Highlights*, a very Merry Christmas and / or a Happy Hanukkah to those who celebrate. Appropriately enough, we have a story about Bethlehem this month and also welcome a new contributor to the column. Thanks to *PW* editor **Don Field G3XTT** for finding an extra page for what is once again a very full column.

## Why I like CW

After last month's 'Why I like SSB' feature, here is **Tim Kirby GW4VXE** explaining why CW is his favourite mode of transmission. Tim wrote: "Soon after I passed my Morse test and became G4VXE, I realised that with modest aerals, CW was my friend. I hadn't particularly enjoyed learning Morse but, at the time, it was something that we all had to do to get on the HF bands. With 100W to a G5RV, typically, DX stations did not come back to an SSB call, whereas on CW sometimes they did! So, I made myself make at least one CW QSO every day.

"I moved quickly from a straight key to a paddle and a keyer (once I had learned iambic keying, this made sending vastly more enjoyable). I like the simplicity of CW – I've occasionally had to key a rig with bare wires, or whistled Morse code – it still works! I like its effectiveness and I like the fact that it's easy to work stations whose first language may not be English. Although I might have to repeat my callsign a couple of times on CW sometimes, I find it's much less prone to error than phonetics on phone – which to me is just frustrating when people can't get your call (I accept this is probably down to my voice as well as propagation).

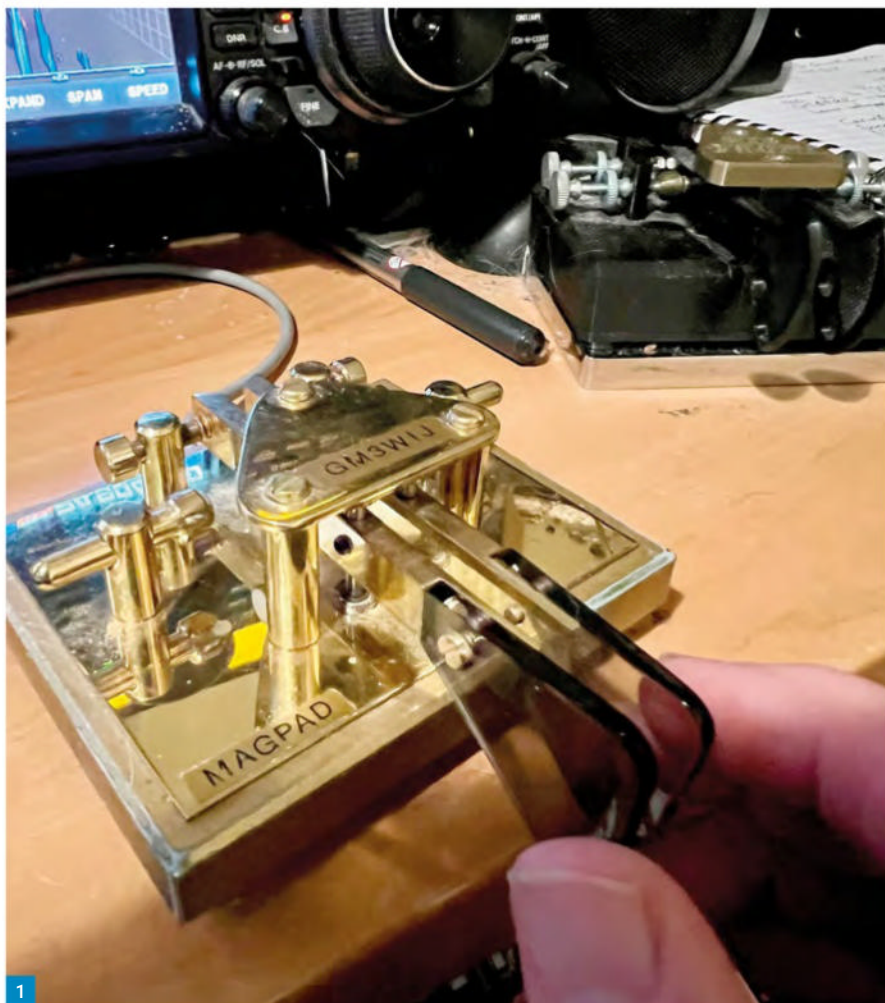
"Do I, like some, find CW musical to listen to? No! It's nice to listen to well-sent and spaced CW but, for me, that's where it ends! Another attraction, when sharing living space with others, is that CW can be a quiet mode. With headphones on, no-one will be annoyed by my sending or receiving. Contrast that with having to bellow into a microphone at 2.00am to work some DX on SSB (of course, voice keyers help here!). More recently, I have come to realise that I find a satisfaction in learning a language and using it, and this is some of the pleasure I find in using CW."

**Fig. 1** shows Tim using a Magpad iambic paddle with his Yaesu FTdx10 transceiver. Next month another contributor with 'why I like FT8'.

## QSL from yesteryear

With the news that, on 21 September this year, the UK government formally recognised the state of Palestine, I thought it would be interesting to look at an old QSL from there – and it's one that is particularly appropriate as we approach Christmas.

A quarter of a century ago, **Peter McKay G3WQU** operated from Bethlehem on the West Bank as E4/G3WQU (**Fig. 2**). Peter worked for the United



# A busy month

**Steve Telenius-Lowe G4JVG** has a packed column, with lots to look back on and also to look forward to.

Nations Interim Force in Lebanon (UNIFIL), though he had apparently been active previously from Bethlehem for around 25 years.

My contact with E4/G3WQU took place on 26 March 2000 on 21MHz SSB and it was my first contact with Palestine for DXCC purposes: the ARRL had only added Palestine to the DXCC list the year before, on 1 February 1999. I was operating /P although now, more than 25 years later, I no longer recall exactly where I was operating from! Interestingly, Peter's QSL states "Please QSL Direct" (rather than "Thanks QSL") – unusual for what was (and indeed still is) quite a rare DXCC entity: why should he have originated the QSL and want one from me?!

The 425 *DX News* bulletin number 412, dated 27 March 1999, reported that: "Peter, G3WQU has been operated [sic] as 4X/G3WQU from Bethlehem since 1975. He has now been issued a licence by the Deputy Minister of Posts and Telecommunications

in Gaza, Palestine, with callsign E4/G3WQU... Peter expects to be in Bethlehem at least two years..."

After eventually leaving Bethlehem Peter lived in Tyre, Lebanon, where he continued his work as a Senior Telecommunications Engineer with UNIFIL. He became a Silent Key on 28 January 2007.

## Anniversary events

More and more radio anniversaries are being marked by special event stations and their accompanying award schemes, often provided by 'Hamaward', an innovative award management system hosted in the cloud:

<https://hamaward.cloud>

Here are some anniversary events that have been active during the month in review:

The Swedish national amateur radio society, *Sveriges Sändareamatörer (SSA)*, is 100 years old and special event stations using callsigns including 7S100SSA, SD100SSA and SF100SSA were active



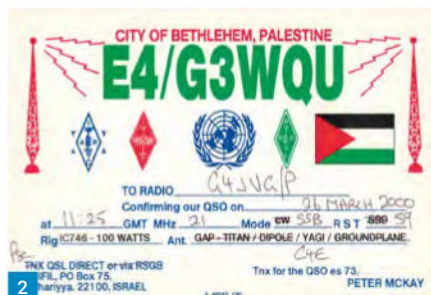


Fig. 1: Tim GW4VXE operating his favourite mode, CW. Fig. 2: 25-year old QSL from E4/G3WQU in Bethlehem. Fig. 3: Italian award commemorating the 100th anniversary of the IARU and 130th anniversary of radio itself. Fig. 4: Just some of the antennas at the PJ4G / PJ4A station.



between 10 September and 12 October.

[www.ssa.se](http://www.ssa.se)

Members of the Italian society *Associazione Radioamatori Italiani* (ARI) commemorated the 100th anniversary of the International Amateur Radio Union, IARU, and the 130th anniversary of radio itself with a series of special event stations on the air for a month from 15 September. 32 stations, mainly with the II prefix and IARU suffix (e.g. IIOIARU) and IQ prefixes, were active on all HF bands and modes. The award, Fig. 3, is available for working various numbers of these stations.

[www.ari.it](http://www.ari.it)

Meanwhile, the Estonian society, *Festi Raadioamatööride Ühing* (ERAU), celebrated its 90th anniversary with ES90ERAU on the air from 20 to 30 September and its own award scheme.

[www.erau.ee/en](http://www.erau.ee/en)

## The month on the air

A team from Slovakia operated as E440M from the West Bank of Palestine from 13 to 22 September, making over 54,000 contacts (see 'QSL from yesteryear' above).

A group from Czechia and Slovakia was active as PJ7K from Sint Maarten from 12 to 23 September making over 93,000 QSOs, according to Club Log.

Chris VK3QB, Luke VK3HJ and Alan VK6CQ were active as VK9NT from Norfolk Island from 14 to 27 September on the 7 to 50MHz bands, with an emphasis on CW and FT8.

The French F6KOP club and guest operators

activated FP5KE from St Pierre and Miquelon for 10 days from 16 September, making over 131,000 contacts.

Three Finnish operators were signing OJ0W while Anne OH2YL signed OJ0YL from Market Reef between 19 and 27 September. OJ0W made nearly 17,000 contacts while Anne added about 7000 more.

This is the December issue, so it is appropriate to report that Janusz SP9FIH went to Christmas Island to operate as VK9/SP9FIH. Between 19 September and 3 October he made over 26,000 QSOs. There are plenty of photos on Janusz's website at:

<https://vk9.dxpeditons.org>

From Chuuk in Micronesia, a German group started operating as V6D from 22 September. Shortly after, team member Werner DJ9KH posted on the CDXC members' reflector: "We are on the air! Still missing our beam which is somewhere between Helsinki and Tokyo..." but several European operators reported good signals from V6D even with their temporary dipoles. Serendipitously a peak in propagation caused by more sunspots and higher solar flux coincided with the start of the V6D activity. The beam eventually arrived several days later and the team went on to make over 93,000 contacts before going QRT on 6 October.

## What to look for in November-December

A multinational team plans activity as 3G0YR from Easter Island between 26 November and 3 December. During the CQWW CW contest they will use the contest callsign CEOY. They say there will be a "strong focus on low-band performance".

CW operator Axel DL6KVA will be PJ4KV from Bonaire between 20 November and 3 December. For the CQWWW CW contest he will join three US

operators at the PJ4A contest station, Fig. 4.

OZ0J will be QRV as PZ5OZ from Suriname from 21 December to 2 January on bands from 1.8 to 50MHz.

<https://pz5oz.oz0j.dk>

## Sources of DX information

The *DX-World* website run by Col MMONDX is a great source of upcoming DX information, often complemented by unique photos of the locations and DXpeditions.

[www.dx-world.net](http://www.dx-world.net)

The 425 DX News is a weekly bulletin available online and by email. It is edited (in English) by Mauro and Valeria Pregliasco, I1JQJ and IK1ADH, and is free of charge.

[www.425dxn.org](http://www.425dxn.org)

Club Log is a massive database of logs submitted by users, including major DXpeditions, small 'holiday' operations, and day-to-day 'home' operators. There are now around 87,000 users with an incredible 1.3 billion QSOs stored. This allows users to download masses of data about current and previous operations. You need to subscribe but, once again, it is free of charge.

<https://clublog.org>

## Readers' news

This month Carl Gorse 2E0HPI was the first to send in his report along with the excellent photo shown in Fig. 5. He had a short holiday in Blackpool and took his rig and antenna along. "We managed to get out portable a few times along the Lancashire Coast near Fleetwood / Blackpool, running the Yaesu FT-891 at 75W and the MFJ-1979 1/4-wave whip with four radials, also the Mad Dog Coil antenna. I worked Jonathan VK7JON/M on three bands, 20m, 17m and 15m SSB from his mobile." Carl said he also activated Crimdon Dene Beach and made

**Fig. 5: Working the greyline: a vertical by the sea at sunset (or sunrise) can produce excellent DX results. Here Carl 2E0HPI/P operates from near Blackpool.**

around 100 contacts on 21MHz FT4. "Our next trip will be to Southport in November and I hope to take the radio with us again," he added.

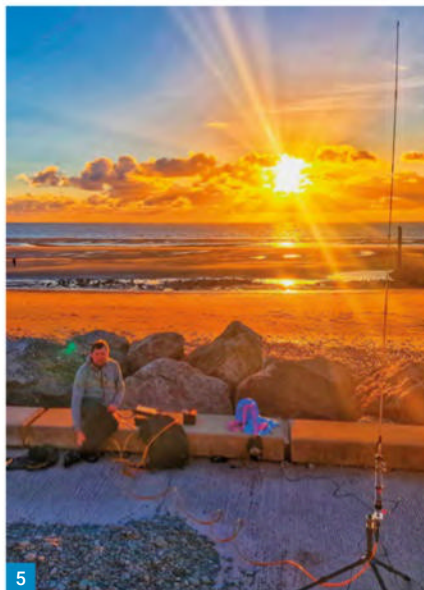
**Reg Williams G0OOF** said he "was looking forward to KH7AL returning to Wake Island KH9 during September but it was not to be. While he was on leave he decided to accept a job in the United States. It has been a good month, though, on the HF bands, a time of year when HF conditions generally improve. Some nice DXpeditions to work. T30TTT Western Kiribati had been operating for a long time, coming up to almost three months, mostly with a one-man operation. I worked them at the beginning of the month on 10MHz FT4 and 18MHz FT4. I was happy with that as I could not resolve their signal on any band or mode prior to that time. The station was very active for long periods of time.

"Two other DXpeditions were somewhat closer to home, just 'across the pond', so to speak. FP5KE St Pierre and Miquelon, a French entity off the south coast of Newfoundland, which unfortunately **Pat** and I did not have time to visit when on holiday in Newfoundland in 2024. The DXpedition was fairly easy to work on FT8 and SSB. Three bands worked SSB, and six bands FT8. Excellent operation by the team, who appeared to operate 24 hours a day. St Maarten PJ7K was another DXpedition which was a little more difficult to work. Five bands worked on FT8 for this one.

"The final DXpedition I worked on FT8 was 3C3W, a two-man team, YL2GM and EA5EL, operating from Equatorial Guinea. Not too easy to work but I managed to work them on four bands. They were also hoping to work as 3C0W from Annobon but could not obtain the local permit. All four DXpeditions were new countries worked on any of the bands or modes, plus some more new countries worked on FT8 with regular operating."

**Simon Davis-Crane G7WKX** recently returned from a trip to California: "As W6/G7WKX I made just under 300 SSB and FT4/8 contacts across the two weeks of being active in between our holiday activities. I managed to activate 13 POTA parks, and three SOTA summits, albeit I attempted to activate more – we found a number of summits were blocked to public access, which scuppered our plans somewhat. Activating beaches alongside Highway 1 (**Fig. 6**) heading north from Los Angeles was very enjoyable, especially late in the evening watching sunset and sitting in the warmth. Being beside the sea seemed to help with DX contacts, the best being SSB contacts with S57S, F5PYI, VP6MC on 20m and then Japan, Mexico, Argentina and Chile on digital modes (20m again). No contacts back to the UK but I think I worked most, if not all, of the US states during my visit.

"The most interesting POTA activation was



Alcatraz, US-7888, as I needed to obtain a permit to use radio on the island. With assistance from the National Park Service, I was able to set up in a quiet part of the site and make a number of contacts on 40 / 20 / 17m SSB and FT4. It was a great opportunity to demonstrate amateur radio to the NPS Rangers and visiting tourists alike." Simon added that his next trip is to Spain in December and January, when he will be signing EA3/G7WKX and his wife **Nic EA3/2E0NYQ**. With help from the European Radio Amateurs' Organization (EURAO) and the Spanish licensing authority they were able to obtain a licence for Nic to operate using her UK Intermediate callsign in Spain. They will be active on HF and 2m from a number of SOTA summits and POTA parks.

[www.eurao.org](http://www.eurao.org)

It is always good to hear from new contributors to the column, so a warm welcome to **Andy Elford G0JZW**, who wrote: "Suffering from small garden, QRM noise and having a love of cycling, I decided to combine both my hobbies. Using a Slidewinder antenna fixed to the bike rack, tracer battery pack and Lab 599 Discovery radio [at 10 watts], **Fig. 7**, I manage to find areas in the New Forest to operate QRM free. All can be deployed and packed away in five minutes." Thanks Andy, and we hope to hear from you again.

From man-powered bike to motorbike and **Etienne Vrebos OS8D**, who wrote that he "had beautiful activities this month on my motorcycle in the most inaccessible places (by car!)... the motorcycle is the ultimate way to reach places that you wouldn't be able to do by car." An example is shown in **Fig. 8**. Etienne says that he always makes an announcement on Facebook and the POTA, Fauna / Flora, BOTA etc sites before the event, in order to reach as many chasers / hunters as possible because "it's difficult to cancel an activity when you know that a lot of Europeans (mostly) are expecting to work you; some people even stay home

to get that activity in the log."

Etienne added: "I'm surprised how easy it is to reach 100 people with 70W from the Yaesu FT-891 and a dipole antenna for 40m... When you are at the 'good' side of the activation, that is being the activator, that's a powerful feeling of directing the operation and the pile-up. Mostly, on a good propagation day, I'm able to get 100 QSOs in an hour..."

"I did not work some DXpeditions [from home – **Ed**] this month as I'm not very patient especially when they work split; with 5kHz up only I try five times to reach them but, when 5 to 20 up, no thank you, even if the Icom 7610 allows quick finding them with the second receiver and dual watch on."

After a poor summer on the HF bands, **Tim Kirby GW4VXE / GW4MM** has finally found some improvement in conditions. He said that perhaps the biggest surprise was one evening around 2000UTC, when he was in the shack doing something else and the receiver was just running quietly on 24.900MHz. To his surprise, he heard ZL1BMW send his callsign once – not a CQ – just his callsign. Tim called him quickly, and thinks the ZL was as surprised as Tim was to have a QSO!

**Owen Williams G0PHY** also reckoned that "Things picked up this month with a couple of contests and the DXpedition to St Pierre and Miquelon to chase... It was good to hear FP5KE on St Pierre and Miquelon spending a lot of time on SSB. I managed five band-slots but a QSO on 28MHz eluded me... Conditions were good for the Worked All Europe phone contest with contacts on 7, 14 and 21MHz in Africa, Asia and North and South America. Conditions took a dive for the Oceania SSB contest and I only managed to work VK stations."

The Oceania DX Contest is one in which, from this part of the world, it can be quite difficult to find much activity because the rest of the world only works stations in Oceania (VK, ZL, but also including Indonesia, the Philippines, Hawaii, etc). So it was interesting to get an Australian perspective from **Martin Burch VK4CG** who wrote from near Brisbane: "Just a bit about the conditions for the Oceania DX Contest which kicked off on Saturday 4 October. The conditions were good on 10 and 15 metres for the first 30+ minutes then white noise [perhaps solar noise caused by a storm on the sun? – **Ed**] cut in, wiping out those bands mentioned. The other HF bands had poor conditions over that weekend. When conditions are good, as in past competitions, the stations are coming thick and fast but it was very challenging this time around with the atmospherics not being conducive."

The Oceania DX Contest has a great website for anyone interested in finding out more about, or participating in, this challenging contest:

[www.oceaniadxcontest.com](http://www.oceaniadxcontest.com)

## 28MHz beacons

**Neil Clarke G0CAS** brings us his 28MHz beacon report for September. He says that overall it was





*"a rather strange month for the 28MHz beacons."* Despite the end of the summer Sporadic E season theoretically occurring at the end of August there were numerous openings on most days throughout September. Granted, the openings were in general short-lived and very localised and, secondly, the number of beacons from beyond Europe was well down. However, in South America LU2DT 28193 and PY4MAB 28270 were heard on 29 and 17 days respectively, while LU4AA 28200 was logged on 23 days. From South Africa ZS6DN and 5Z4B, both also on 28200, were both heard on 18 days.

From North America it took until the 18th before beacons were heard on consecutive days. USA call areas from 1 to 5 and 8 to 0 were logged every day from the 18th, while the W6 call area was only heard on the 25th, 27th and 28th. Further north, VE3TEN 28175 was heard on eight days. VE1VDM 28174 was heard on the first two days of the month but not since.

Returning to Europe, OE3XAC 28188, DL0IGI 28205, OY6BEC 28235, LA5TEN 28237, OZ1IGY 28271 and, to a lesser extent, some others were all heard via Sporadic E on some days. Beacons heard via the F2 layer were SV5TEN 28189, which was heard on 20 days and SV6DBG 28267, logged on six days. 5B4CY 28219 and YM7TEN 28225 were logged on 19 and 20 days respectively. Finally, 4X6TU 28200 was also heard on 20 days.

### Band highlights

**Key:** Q = <20W, M = 20 – 100W, H = >100W, S = Single-element antenna, B = Beam (see January HF Highlights for a more detailed explanation).

**Carl 2E0HPI/P (MS):** 14MHz SSB: KL10Q, OA4CHA, VK3AUX, VK4IM, VK7JON/M. 18MHz SSB: KT4ZG, NC4PO. 21MHz SSB: VK3VBC, VK5VR, VI8POL. 21MHz FT4: JF6TLZ, JH1PCE, PY2EJ, VA3GHB, VK3AXI, YF2AVP.

**Fig. 6:** At Morro Bay Beach just off Highway 1 in California, Simon W6/G7WKX operated from the edge of the Pacific using a JPC-12 vertical.

**Fig. 7:** The recumbent tricycle operating station of Andy G0JZW. A Slidewinder antenna is fixed to the rear of the bike. **Fig. 8:** Etienne OS8D likes to operate from locations inaccessible by cars.

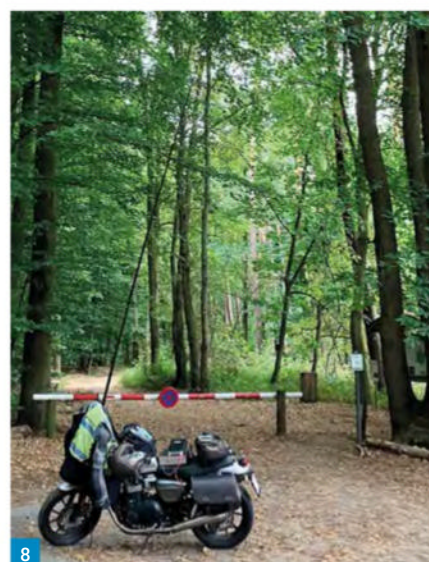
**Reg G000F (MS):** 7MHz FT8: 9M25MY, A71UN, BG0DLA, FP5KE, JY5IB, PJ7K. 10MHz FT8: 3C3W, 5H8HZ, 5W1SA, EP5TJS, FP5KE, PJ7K, T30TTT. 14MHz SSB: FP5KE. 14MHz FT8: FP5KE, K6VHF/HR9. 18MHz SSB: FP5KE. 18MHz FT8: 3C3W, FP5KE, T30TTT, T15KLH, ZL3TX. 21MHz SSB: FP5KE. 21MHz FT8: 3C3W, 9M2MAD, FP5KE, K6VHF/HR9, YB9JIP. 24MHz FT8: 3C3W, JG1GFU, K6VHF/HR9. 28MHz FT8: FP5KE, KP2B, PJ7K.

**Etienne OS8D (HB):** 14MHz SSB: FP5KE, JW6VDA, KH6ML, UN8LWZ, VI8POL, VP9/WA2DE, VP9NT. 18MHz SSB: 9M2/SP5APW, FP5KE, HL5KY, JL8PZO, KH0/KCOW. 21MHz SSB: 4G0G, E2M, FP5KE, PJ7K, TI2OY, YB1SCY. 28MHz SSB: 4L4W, 5X4E, 7L4LKK, 9Y49R, CA3HHE, CD6LHE, DP0GVN, FP5KE, HR9/AK2G, J88IH, LU1AW, PJ7K, UK8LX, YC0IRH, ZF200.

**Tim GW4MM (HS):** 7MHz CW: VK2GR. 10MHz CW: JW0RZ, V26K, VK2GR. 18MHz CW: FP5KE. 21MHz CW: OJ0W, PJ2/AG3I, PJ7K, V26K, VK6T, ZA1RR. 24MHz CW: FP5KE, PJ7K, TZ4AM, VE6BMX. 28MHz CW: 3B8/5B4AQN, 5R8AL, FP5KE, PJ7K, XQ6CF, ZF200, ZS1C.

**Owen G0PHY (HS):** 7MHz SSB: 8P5A, CR3W, EX7CQ, FP5KE, P3CR. 14MHz SSB: CE3CLF, FP5KE, FY5KE, K6JO, VK7ACE, VL3E, VL4A. 18MHz SSB: FP5KE. 21MHz SSB: A60A, EX7CQ, FP5KE, FY5KE, NN7CW, PT5J. 24MHz SSB: FP5KE.

**Martin VK4CG (MS):** 7MHz SSB: RW1F. 14MHz SSB: CE2LE, F4DSK, HA3NU, LZ5R, N800, W3LL, ZL1XS. 21MHz SSB: DX6EVM. 28MHz SSB: 7K4VPV, KE6TZ, JA7NVF, JH4UTP.



### Signing off

Thanks to all contributors. Please send all input for this column to [teleniuslowe@gmail.com](mailto:teleniuslowe@gmail.com) by the 11th of each month. For the February 2026 issue the deadline is 11 December. 73, Steve G4JVG. **PW**



**Daimon Tilley G4USI** builds an interesting low-cost transceiver.

practicalwireless@warnersgroup.co.uk

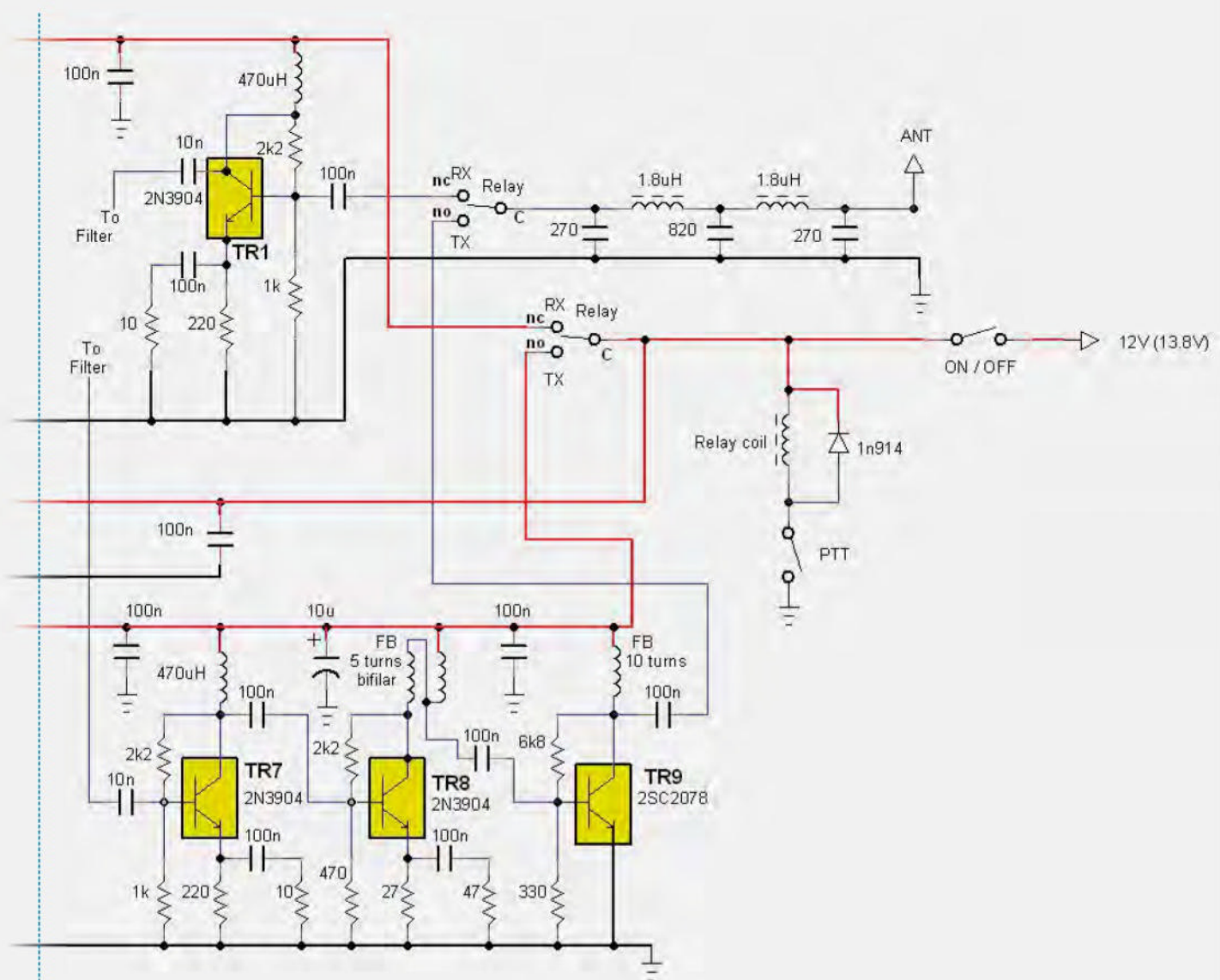
Thankfully, Eric himself is author of another article this month explaining FreeDV and how

Shortly after becoming aware of RADE a friend at the local club suggested I check out the QRZ.com page of Eric, and there I saw a description of this kit. Contacting Eric revealed he was awaiting some new PCB's and a few days later money changed hands with the kit arriving soon thereafter. The project was conceived by **Julien G6FLH**, **Cess GW30AJ** and Eric GW8LJJ and

This project has been modified for a set frequency (5.3685MHz USB) on the 60m band, which is a commonly used RADE frequency, and is designed as a stand-alone, single channel transceiver operating on 5.3685MHz USB. There is a weekday net on this frequency at around 1530 local time.

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**Fig. 1: FreeDV transceiver schematic.**

The kit cost me £45 and came with a professionally made PCB and all components required for completion. The schematic is shown in **Fig. 1**. The only things you need to add are a case, and external interface sockets such as an antenna connector, 3.5mm audio jacks, power jack, switches, etc. It is also recommended to fit a small computer fan for cooling (not provided) as modulation is similar to FT8, with a full duty-cycle transmission – i.e. there are no peaks and troughs of power output following peaks and troughs of your voice, as in traditional SSB modes.

Also included is a pre-built and aligned crystal ladder filter, which acts as the main tuned circuit of the kit. The transceiver is capable of about 5 watts of output which sits within the 10 watts normally recognised as the QRP SSB limit. Detailed printed instructions are provided and support is available from Eric via email.

It took me about three hours or so to build mine and my completed board is shown in **Fig. 2** with the crystal ladder filter being clearly visible as the dark green plug-in PCB in the centre. Applying 13.8V DC and a dummy load, the 'smoke test' was passed with about 5 watts of output.

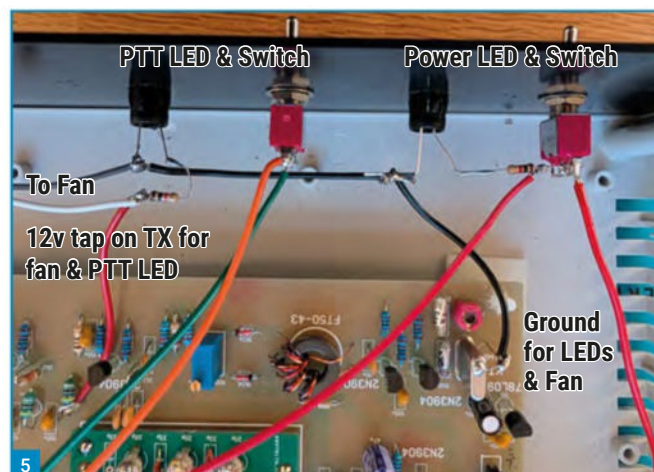
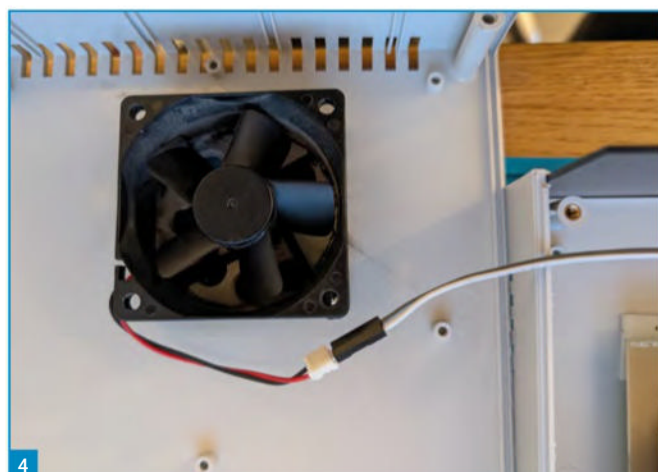
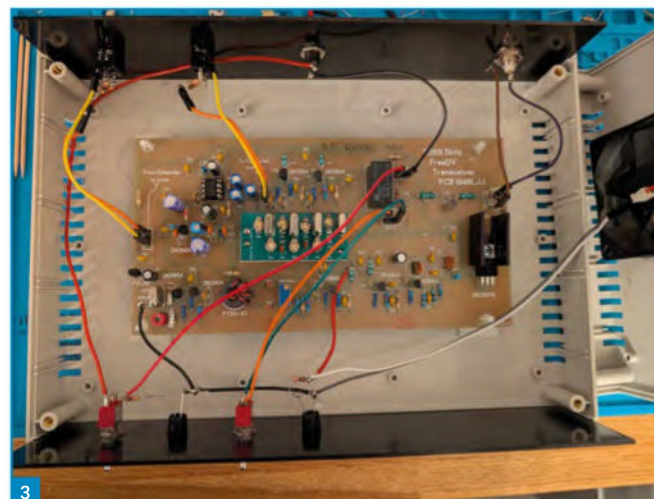
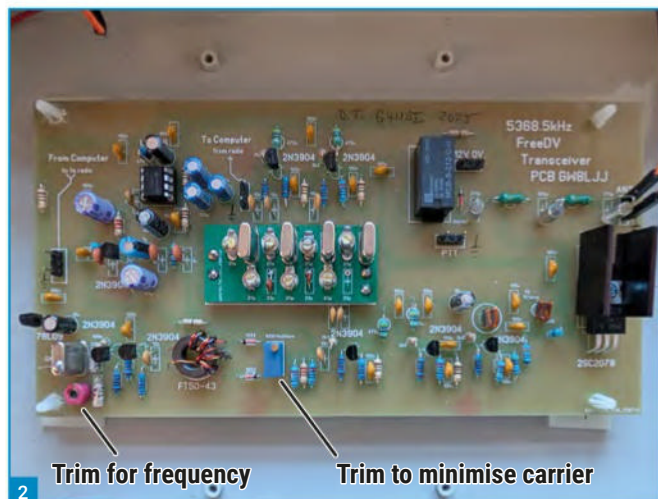
There are only two alignment steps required. The first is to trim a small variable capacitor so that the oscillator output is exactly on 5.6835MHz. I used my frequency counter, but you could use a receiver instead. The second step is to trim a potentiometer to remove the carrier of the transmitted signal. These components are shown in **Fig. 2** and the potentiometer trimming will be covered later.

Next, I installed the PCB in a nice case I bought at a rally a year or two ago, and laid out and drilled holes for things such as power, antenna, computer connections, switches, LEDs and the

like. You can see the internal wiring details in **Figs 3 to 6** and the completed front and rear panels in **Figs 7 & 8**. Note that in **Fig. 6** I have connected the tip and ring of the stereo sockets together via a 1kΩ resistor in each line to prevent any possible damage to the sound cards – good practice when using stereo outputs in a mono fashion.

There are a few things to note here. In **Fig. 5** I show how I added power and PTT switches, along with LED's and fan wiring. The text on the image should be self-explanatory.

The PTT switch is required because, as you will see later, I am using a computer headset for the microphone and listening to the received and decoded audio. There is no PTT on these headsets that can directly operate the PTT control on the transceiver. In addition there is a



software PTT button in the FreeDV software that we need to use, so we need to operate two PTT switches. If you were using RADE with a modern rig, then the software PTT would key the rig for you, but as a simple QRP rig we don't have that luxury. We could actually interface things to get over that, but to keep it simple, I will use two PTT's and that is why I have a red LED next to the PTT switch on the rig – to indicate the rig is in TX so I don't forget! I have shown where I have taken a feed for that LED from the top of one of the inductors in the TX chain that is only at 12V on TX (via the relay.)

## Connecting to a computer

First of all, there are downloads of FreeDV available for PC, Mac and Linux. A Raspberry Pi version is also available. Initially, as I have several Pi's currently inactive, I intended to use one and make a stand-alone transceiver all in the one box, but that has not been possible for me at the moment. The reason is because mine are Raspberry Pi 3b's and 4's, but currently RADE v1 is written with a combination of C++ and Python. This means it really needs the power of a Raspberry Pi 5 on which to operate, and at £75, I didn't really want to buy one just for this project.

My limited understanding is that there is a path to migrate the code to 100% C++ at which point it is suggested it will run on older, less powerful Pi's. As and when that happens I will give it a go. For now, the shack PC was the computer of choice.

I downloaded FreeDV to my PC without issues and followed the instructions provided. This is where my brain got a bit fuddled! There is a need (for transceive) to use two sound cards. Most computers only have one internally, so a second (cheap) USB sound card is required. I had a couple kicking around from Raspberry Pi projects and in **Fig. 9** you can see my son's computer gaming headset connected to it. This headset terminated in a four-pole audio socket, so a Y-lead was purchased to split this into separate microphone and headphone stereo connectors, which then plug into my USB soundcard.

Eric helped me to understand how this works, and in the hope it helps you, I have drawn a diagram (**Fig. 10**) as to how I connected things. It is possible to share one sound card for the whole process by building a separate relay-controlled interface, as illustrated here:

[www.qsl.net/wa6nut/legacyhard.html](http://www.qsl.net/wa6nut/legacyhard.html)

but in the cause of just getting on the air, I used two in the configuration shown.

It can look complex to start with, but all you really need to remember is this. **On transmit**, you need a sound card to pass your analogue microphone input into the PC. There the software encodes that analogue signal into a RADE digital one, passing it through another sound card into what would be the microphone input of your analogue rig. **On receive**, a sound card takes the output of your radio (a digitally encoded RADE signal) into the software where it is decoded and passed through another sound card as an analogue signal to your headphones or loudspeaker. Simple!!

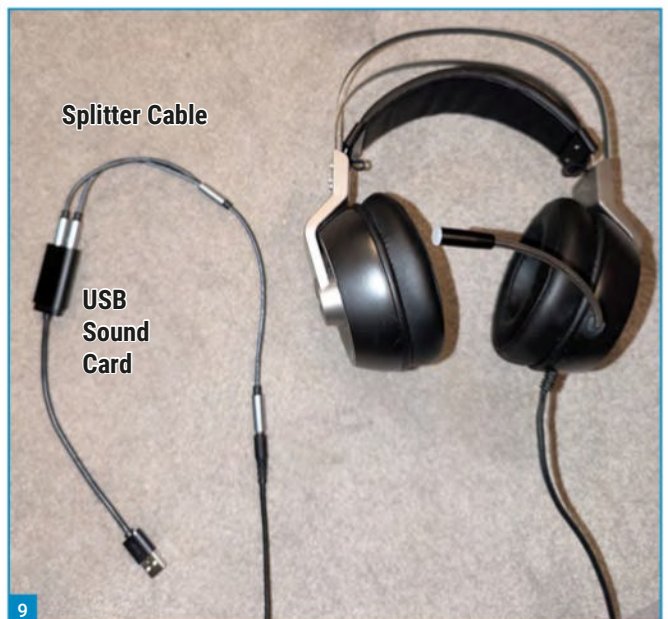
Once configured from a wiring perspective, you must then configure the software to understand what to expect from each sound card. Start FreeDV and, before starting the Modem, go to Tools – Audio Config. A pop-up window appears and at the bottom there are two tabs. One for transmit and one for receive. Within these two tabs you tell the software which sound card is being used for which purpose, as per my diagram example.

Depending on your setup this can be a bit complicated too, as I had a large number of devices shown, but with some experimentation I worked out what was what.





Fig. 2: Completed PCB kit. Fig. 3: All wired up to external switches and sockets. Fig. 4: Fan mounted above PA. Fig. 5: Detail of switch and LED wiring. Fig. 6: Detail of stereo socket wiring. Fig. 7: Front panel. Fig. 8: Rear panel. Fig. 9: Headset and sound card.



## Final alignment

Now for the final step of alignment. In this step you have to trim the small potentiometer in order to reduce the carrier of the signal. To do this you need to put the rig into TX, so using a dummy load you need to press the rig PTT. Then, while monitoring the signal, you trim the potentiometer to minimise the carrier. This is easiest done by laying a wire from an SDR receiver antenna socket near to the PA stage of the rig. **Figs 11 and 12** show my 'before' and 'after' trimming. Eric does point out that in his trials this is not really critical. **Fig. 13** shows the RADE signal after alignment.

## Time to get on air

This was actually very easy: 1. Power on the rig. 2. Start FreeDV and click 'Start Modem'. 3. You are now in RX mode – there is ZERO noise until a RADE signal is received, so it can be disconcerting. If you want to check things are working, you can click on 'Switch to Analogue' and hear the comforting background noise – just remember to switch back to digital after! 4. To TX – first operate the rig PTT, then the software one. 5. At the end of your transmission, deactivate the

software PTT and then the rig PTT. The only other important note is NOT to overdrive your audio output from the computer into the rig, effectively the microphone input, so start with the slider quite low and work your way up on air in a test with a fellow user.

Having got this far, it was time for my first attempt at a QSO. I fired up the radio and software, put out a test call and made immediate contact with GW3AOJ in Gwent! The audio quality has to be heard to be believed! This has to be at least part of the answer to the QRM many hams suffer. There was some QSB but I was able to hear him perfectly clearly down to 0dB SNR and at times even down to -2dB! I could also hear **John G3VHH** in Berkshire, but could not be heard by him.

The rig was putting out a healthy 6 watts or so of RF, but I had a few hiccups however. If the switching of the software and rig PTT's was too close together in time, my entire PC lost power and crashed! This happened a few times so I put ferrites on the audio leads into the computer, but it did not help. After some experimentation it appears I can avoid this by 'counting to two'

between the two switching operations! I will try and fix that over time.

I took an hour or two out for lunch and joined the afternoon net at 1530 local time. This was a pleasure, and I was able to work Eric GW8LJJ and thank him for his support, along with Julien G6FLH, Cess GW3OAJ, and **Barry G4MKT** up near Manchester. I was getting about 90% of the signals from most people, as there was some QSB, but with zero noise, and 100% of Barry's overs. It is just like having the person in the (absolutely silent) room with you.

During this net I learnt that from within the software you can open another window called 'FreeDV Reporter'. This shows who is listening on what frequency, as well as who is transmitting. A clip of that window is in **Fig. 14**. In this example, Julien G6FLH is shown in red as the transmitting station. The last column shown is an area where you can post a message. You can see that Julien is '2 Julien 2 watts'. The first number indicates his position in the net, with myself shown as number 4. This really helps to know who to pass the microphone to after your over!

It is also possible to search on PSK Reporter for

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## Conclusion

As to the mode itself, well it must surely be part of the future – I think this will be the same sort of leap in technology in radio as SSB was to AM. That is not to say that AM and SSB will die as a result – plenty of people will keep them going in the same way I love and use CW. Although FreeDV has been around for a long time, the new RADE mode is amazing in its ability to receive right down to, and just below, the noise floor.

Until next time! **PW**



**Fig. 10: Config setup. Fig. 11: Before carrier adjustment. Fig. 12: After carrier adjustment.**



Geoff Theasby G8BMI  
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**B**y CRT device I mean a Yaesu YO-100, a Leader LBO-310 or a Heathkit SB-610 Station Monitor, each of which I have. All these items have in common a Cathode Ray Tube or CRT, which requires in excess of 1000 volts to operate. These voltages are **LETHAL!** Do not take on this work unless you are confident that you are capable of keeping yourself and any subsequent users, safe.

I shall list the safety precautions, and the special equipment to be made or acquired, the 'must do' items before all else, and the routine tests for faulty conditions. Before we start, if the transformer is bad, or damaged, there is little point in going on. They are very rare in the open market and to have one made specially, would be very expensive.

### Making a start

To begin, as with all valved equipment whose history is in doubt, especially those using high voltages, check the mains input circuitry, the fuse in the mains plug, the voltage setting on the power input panel, and any fuses inside the equipment. Check with the manual for details of the voltages used in the equipment. Many of these units of 20-30 years ago may be transistorised, but there may still be an inverter or SMPS to run the CRT, so do not assume there are no dangerous hazards inside the case.

To take as an example, the Heathkit SB-610. This is interesting because it uses special valves, known as Compactrons. These are 'modern' valves containing three sets of electrodes in one envelope, and can still be obtained for about £15 each. This product covers the HF bands and 6m will accept up to 1kW of RF. It may go higher but the calibration will be unreliable. The compactrons are the 6C10 and 6J11, plus a 6BN8 pentode and a 6EW6 double diode triode. It also has a two-tone generator for checking SSB signals. At the time of writing (March 2025) there are several of these monitors by different manufacturers offered online. All are in excess of £500, so a working model is worth a lot of money in the second-hand market.

### Time to switch on

After the initial checks as above, switch on using a 240 volt filament lamp in series. If it lights brightly, then there is a short. If it glows dimly and the valves light up, then we can move on, the mains input and the heater line circuit seems OK.

Then, as we are dealing with an old piece of equipment, and using up to 1500 volts as well, the next step should be to renew all the electrolytic capacitors, using the same value,



1

# Repair or Refurbish a CRT device

Geoff Theasby G8BMI offers advice on bringing an elderly oscilloscope back to life.



2

and the same voltage rating or higher. Then, even though seemingly working, I suggest replacing the EHT rectifier diodes. There are two ways of doing this, by replacing like for like, or better, and using one microwave oven rectifier diode. These are rated at 12kV or more, cost about £1 each and can be regarded as 'fit and forget' items as they are very conservatively rated in this position. A CRT also requires other voltages to set it up with the correct conditions for the task in hand.

If you wish to test the EHT and the other higher voltages, then an EHT probe for your test meter

will be useful. This can be bought from the usual suspects or DIY, using an insulated tube and well-rated wire, in a ball pen tube. The clear polystyrene type. This material copes well with high voltages (and RF). To make a 10:1 EHT probe a 9 x 1 Megohm resistor will give a rough and ready means of checking. Alternatively, a chain of resistors hung from a convenient point, and fed with EHT at the top, and the multimeter across the bottom one. A simple calculation will give the EHT voltage. BE CAREFUL, having EHT and mains voltages floating about the workshop is risky.

In this example, some of the front panel controls have several hundred volts on them, notably the focus, intensity and the Hor/Vert positioning of the trace on the screen. The controls used may be only marginally rated for these high voltages, so if you need to replace any, choose one that is capable of handling such voltages.

Finally, the above notes also cover other oscilloscopes of a similar vintage. **PW**

Photo 1: The YO-100.

Photo 2: The Heathkit front panel.

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# Licence Schedule & Band Plans

Colin Redwood G6MXL

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This month Colin looks at the licence schedule and band plans.

**W**ith the changes to the UK amateur radio licences in early 2024, came a significant change to the power that amateurs can use on many bands that they are licensed to use, but not all. For many bands the maximum peak envelope power permitted by the Foundation licence increased to 25 Watts (was 10W). Intermediate licence holders can now use 100W (was 25W). For Full licence holders the maximum power on many bands is now 1kW (was 400W). There are, however, many exceptions with even different maximum power permitted in different parts of the same band.

## Licence Schedule

The Licence Schedule, which is a part of the *Amateur Radio Wireless Telegraphy Licence Conditions Booklet (OFW611)* issued by Ofcom, **Fig. 1**, is the definitive document for the UK, Jersey, Guernsey and the Isle of Man. It has separate tables for each of the three licence classes, which list what frequencies can be used and what constraints on power, geographic location etc. there are for each class of licence and band/sub-band. It also clearly states whether a band or sub-band is a primary or secondary allocation.

<https://tinyurl.com/bdeps66d>

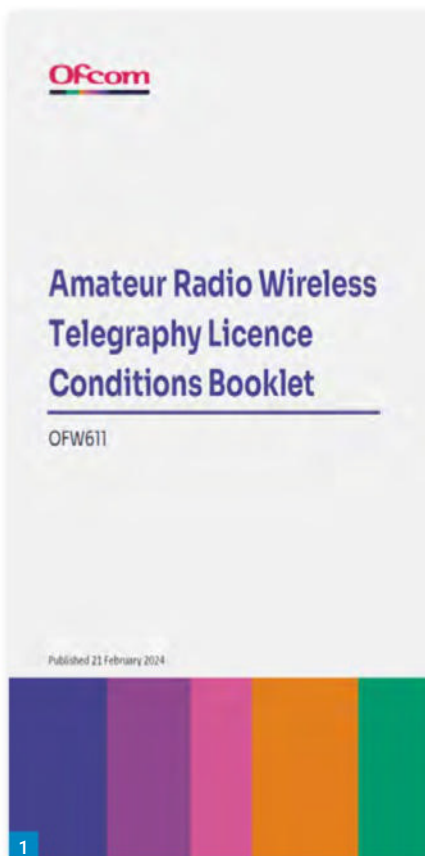
I'm not going to look at every band and licence class in the current schedule as it would take far too much space in *PW*. I strongly recommend readers to download the licence terms and conditions booklet which include the licence schedule from the Ofcom website. I will however look at a few examples, particularly where the maximum power permitted is not the 'standard' 25W, 100W, 1kW at the antenna feedpoint for Foundation, Intermediate and Full licences respectively.

## Services

The radio spectrum is assigned by international and national regulators to various services (users) of the spectrum. Services include broadcasters, the military, air navigation, police, mobile telephone companies and radio amateurs. Radio amateurs have two services, one for terrestrial transmissions and one for satellites.

## Primary and Secondary

The radio spectrum is split into various bands of frequencies. These bands are allocated internationally to the various services. The



allocation is accompanied with a status, either primary or secondary. In the case of primary allocations, the service is considered to claim 'priority' over any other services that are granted a secondary status to the same allocation of frequencies. There are many popular bands where the amateur service in the UK has secondary status, including the 60m, 30m, 4m, 70cm and all the microwave bands below 3cm (10GHz). While the primary/secondary status is largely determined internationally, individual countries' regulators, Ofcom in the case of the UK, have the final say.

## Power

The licence schedule specifies the maximum power permitted to be used in several ways. In all cases the power is based on the power supplied to the antenna (at the antenna feedpoint), which may be less than next to the transceiver due to feeder loss.

## Peak Envelope Power (PEP)

PEP is the average power supplied to the antenna feedpoint by a transmitter and its

feeder during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions. This can be readily measured using a conventional power meter when using FM or CW. For SSB, you'll need a strong whistle into the microphone. You can deduct a reasonable amount to take into account feeder loss. Except for really long runs of particularly lossy feeder, the feeder loss will generally be insignificant on the HF bands.

## Effective Radiated Power (ERP)

ERP is the power supplied to an antenna feedpoint multiplied by the antenna's gain (measured in dBd) in a given direction relative to a half-wave dipole. Note that many manufacturers quote antenna gain in dBi (decibels isotropic) and not dBd (decibels related to a dipole). dBi is dBd +2.15, so an antenna with 6dBd gain has the same gain as an antenna with 8.15dBi gain. Again, you can deduct a reasonable amount to take into account feeder loss which will generally be insignificant on the HF bands.

## Equivalent Isotropic Radiated Power (EIRP)

EIRP is the total power radiated by an antenna, taking into account the power delivered to the antenna feedpoint and the antenna gain in a given direction relative to an isotropic antenna. Yet again, you can deduct a reasonable amount to take into account feeder loss. EIRP is another way of talking about the effective power from an antenna. EIRP is expressed as gain (dBi) relative to a 'theoretical' antenna that radiates equally in all directions. dBi is sometimes quoted by antenna manufacturers for the gain of their antennas as it is a bigger number than dBd. For example, an antenna that produces 6.1W ERP produces 10W EIRP.

## Maximum power

The 2024 licence revisions brought in new maximum peak envelope power (PEP) permitted on the 80m, 40m, 20m, 17m, 15m, 12m, 10m and 2m bands increased to 1kW (Full), 100W (Intermediate), 25W (Foundation) – all measured at the feedpoint to the antenna. On many other bands there are generally lower power limits and in many cases constraints. For example, on the 30m band, while Foundation and Intermediate can use 25W and 100W respectively, Full licence holders are limited to 400W. All licence types are limited to just 1W ERP on the 136kHz band.

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Fig. 1: Ofcom's 'Amateur Radio Wireless Telegraphy Licence Conditions' booklet contains the licence schedules. Fig. 2: A low power 10GHz (3cm) station running 200mW PEP (approximately 2W ERP). Fig. 3: The approximate extent of the 100km exclusion zone of the 431-432MHz band from Charing Cross.

## Microwave bands

The 2024 licence revisions permitted Foundation licence holders to use several more microwave bands. On the 13cm and 6cm allocations, power is limited to 2W PEP, while the 3cm allocation is limited to 1W PEP. Directional antenna gains of 10dBd or more are common on microwave bands, which makes these powers quite viable. As an example, I was able to make a contact running 200mW PEP into a dish of approximately 10dBd gain from the Purbeck Hills in Dorset with **Eric F1GHB/P** across the English Channel at a distance of about 240km, Fig. 2.

## Geographic Limitations

In addition to power constraints, for some bands and sub-bands, there are geographic limitations on where the band or sub-band can be used. An example of this is the 431-432MHz sub-band which cannot be used within 100km of Charing Cross in London, Fig. 3.

## Interference

Several bands are available on the basis that amateurs do not cause interference to other non-amateur services. These include the popular 6m and 4m bands. For many of the microwave bands where the amateur service is secondary status, amateurs must accept interference from industrial, scientific and medical applications (ISM) users.

## Band Plans

In addition to the licence schedule from Ofcom, there are band plans produced by the International Amateur Radio Union. The Region 1 version applies to Europe and Africa. These split the various bands into parts for CW, Phone, Data etc. It is these band plans that request no contests be organised on the 60m, 30m, 17m and 12m bands and request no phone activity on the 30m band. You can find full details of the current band plans on the RSGB website where you can see the band plans in various formats. On the VHF/UHF bands these now include parts of the bands for digital voice modes:

<https://rsgb.org/main/operating/band-plans>

I find the RSGB band plans a little complex for my purposes, so I prepared the summarised version covering the main HF bands (Table 1). I have a copy of this in front of me at my operating position. If I need to check something specific or for other bands, then I refer to the RSGB website.

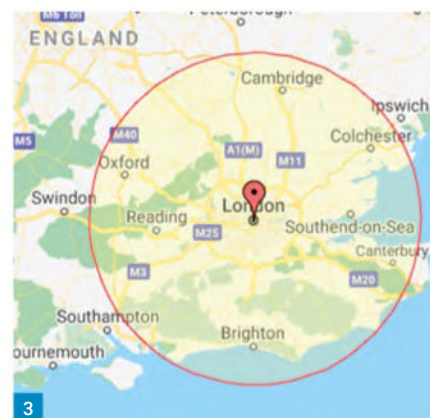


## Recommendation

Before using a band for the first time, I'd suggest readers have a look at the licence schedule to remind themselves of the 'rules of the road' for the band in question and then the band plan to check where in the band to operate CW, data modes and phone etc.

## Season's greetings

As this is the last *What Next* for 2025, I'll take this opportunity to wish readers the very best for Christmas and the New Year. I hope that Santa brings whatever you wished for and that you manage to work plenty of DX in 2026. **PW**



| CW     |        | Mainly data modes |        |        |        |        |         | Mainly Phone<br>(italic = LSB) |        |
|--------|--------|-------------------|--------|--------|--------|--------|---------|--------------------------------|--------|
|        |        |                   | PSK31  | FT8    | FT4    |        |         |                                |        |
| 1.810  | 1.838  | 1.838             | 1.838  | 1.840  |        | 1.843  |         | 1.843                          | 2.000  |
| 3.500  | 3.580  | 3.580             | 3.580  | 3.573  | 3.575  | 3.600  |         | 3.600                          | 3.800  |
| 7.000  | 7.040  | 7.040             | 7.070  | 7.074  | 7.048  | 7.053  |         | 7.053                          | 7.200  |
| 10.100 | 10.140 | 10.140            | 10.142 | 10.136 | 10.140 | 10.150 |         | (none)                         | (none) |
| 14.000 | 14.070 | 14.070            | 14.070 | 14.074 | 14.080 | 14.099 |         | 14.101                         | 14.350 |
| 18.068 | 18.095 | 18.095            | 18.097 | 18.100 | 18.104 | 18.109 |         | 18.111                         | 18.168 |
| 21.000 | 21.070 | 21.070            | 21.070 | 21.074 | 21.140 | 21.149 | Beacons | 21.151                         | 21.450 |
| 24.890 | 24.915 | 24.915            | 24.920 | 24.915 | 24.919 | 24.929 |         | 24.931                         | 24.990 |
| 28.000 | 28.070 | 28.070            | 28.120 | 28.074 | 28.180 | 28.190 |         | 28.225                         | 29.300 |

Table 1: Summary band plans for the main HF bands – for more detail refer to RSGB band plans.

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Keith Rawlings G4MIU  
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In the November issue I reviewed the new FA-VA6 Single Port Vector Antenna Analyser. I was able to get an early look at the analyser thanks to Jan G5BBL from SDR-Kits sending me his own model, which was one of the first in the country.

The VA6 comes as a kit, although assembly is minimal, but being Jan's own model, the unit I received for evaluation was already assembled so it was not possible to describe the build experience. However, this did mean that I was able to dive directly into the evaluation and, after I had finished it, being suitably impressed wanted to have my own VA6 to replace my earlier VA5!

At the time of the review they were not yet available in the UK, which was OK for me as I needed to put some money aside to buy a new office PC because the one I am using is not suitable to upgrade to Windows 11. However, this is being put on hold for month or so and SDR-Kits now have stocks of the analyser!

Consequently, I diverted funds and placed an order for one on the Thursday evening and early Saturday morning a ring at the doorbell saw the FA-VA6 delivered to my door! This means I can now bring you the 'missing' part of my earlier evaluation, which is the assembly and commissioning process.

The analyser turned up in a sturdy cardboard box with all the parts stored within the attractive

## FA-VA6 Follow Up

Keith Rawlings G4MIU builds his own FA-VA6 and has news of a forthcoming book from the home of AN-SOF.

presentation case which was itself wrapped with bubble wrap. In a pocket cut into the foam in the case was a battery and three Amphenol crimp BNC connectors in sealed bags. Tucked away under the foam on the lid were the USB C cable, plastic bags containing screws, a T10 bit for the screws, nut and washer for the BNC socket on the main PCB, four rubber feet, and a 49.9Ω resistor plus a piece of solid core wire to make up a basic Calibration Kit using the supplied BNC plugs.

The analyser case was sat in its own pocket also cut into the foam, and inside it, loosely fixed inside the case was the pre-assembled and fully tested circuit board, Fig. 1.

### Assembly

Tools needed will be a temperature-controlled soldering iron, solder, adjustable spanner (or spanner to suit the BNC nut), side cutters, flat nosed pliers and a driver to suit the Torx bit.

The case is in two parts and using the bit supplied the four screws securing the top of the case have to be removed, Fig. 2.

Then the four screws securing the circuit board

to the lower section of the case are removed and the board is carefully lifted out of the lower case teasing past the USB connector end of the board, Fig. 3.

Next the rubber feet are inserted into the four holes on the bottom of the case; use the pliers to pull these through.

We now need to fit the battery holder to the board. However, in my case this was already fitted so all I had to do was solder through the two holes on the board where the battery holder's tags were just poking through, Fig. 4.

Fitting the battery was the next task and this simply fits into the holder while observing the correct polarity (the analyser is protected against reverse polarity), Fig. 5.

It is now time to insert the board back into the case. Loosely re-fit the four screws holding the board. Once this is done the nut and washer are fitted to the input port BNC socket and moderately tightened and then the four screws on the board can be nipped up.

Fig. 1: The FA-VA6 kit.

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Fig. 2: The analyser with case separated.

Fig. 3: Main board removed from case.

Fig. 4: Note the two soldered holes either edge of the board for the battery holder. Fig. 5: Battery and holder on reverse side of board.

The protective screen over the display may now be removed and the top half of the case put into place. The four securing screws are now fitted and tightened. And that's it, the analyser is fully assembled, **Fig. 6!**

The next process is to charge the battery by plugging the supplied USB C lead into the bottom of the analyser and the other end into a suitable USB charger. (There are two LED's visible in the bottom of the case which will appear as blue while charging and green when charged.) Until this is done the analyser will not switch on as there is a protection circuit in place which locks the analyser for safety reasons.

The VA6 itself will now be ready for use.

## Cal Kit

The VA6 comes with a factory calibration having its reference plane at the input socket so it is basically ready for use. Like all VNA's, which is what the analyser is, accuracy can be increased by moving the reference plane to a more suitable point, for example at the end of a cable.

This may be done on the VA6 using what is called

a 'Current Calibration' that stays in place for the current measurement only.

This requires a Short, Open, Load (SOL) calibration kit of a suitable type and gender to suit what you are connecting it to. The three BNC plugs that are included with the VA6 are to make up such a kit using the supplied resistor and piece of wire. Instructions are included in the manual to do this but it is simply a matter of soldering one end of the resistor to the centre pin on the BNC plug and the other to the housing for the Load. The Short is the same process but using the piece of wire and the Open simply has the centre pin pushed into place with no other connection made.

The kit is quoted to be good to 100MHz.

My view would be that after purchasing such a good analyser it might be worthwhile to spend a little more on a better quality Cal Kit, the analyser having options to accommodate different Cal Standards.

If you want to stick with BNC, then SDR-Kits currently do a three and four piece kit good to 600MHz for £20.70 and £27.30 respectively. They also do SMA and Type N kits. The benefit of these kits is that they come with the kit's parameters and these may be entered into the analyser for maximum accuracy (and they may also be read and stored directly into the VNWA software).

If your main interest is HF, then the homemade kit should be fine.

## In use

I find that quite often one of the problems when undertaking reviews is that there is almost always something that has to be left out or not fully explained due to space reasons. I am lucky that I have the opportunity here to follow up and look at a couple features of the FA-VA6 in slightly more detail,

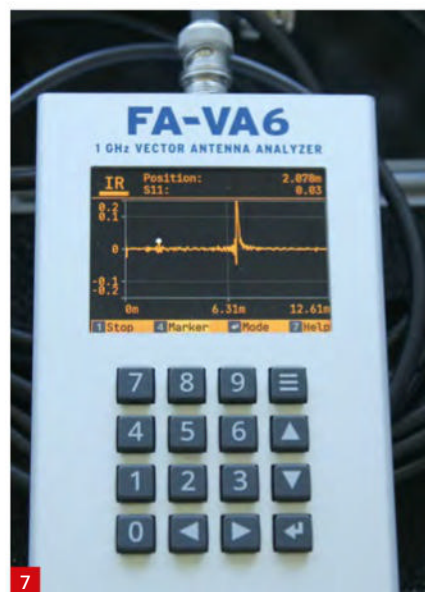
As described in the review the VA6 has features for checking out coaxial cables.

One of the images from the review came from Jan showing a TDR (Time Domain Reflectometry) trace of his Yagi, which had developed a bad VSWR and is a good example of how the VA6 can be used to find cable faults so I thought I might follow up on this with my own example.

Incidentally, while TDR mode can be used to assess cable faults it is also a way to assess cable length.

There are four TDR modes: Impulse Response (IR), IR 'Reflection' in dB, Step Response (SR) and SRZ 'Impedance'.

Consider **Fig. 7**. This is a screenshot of the analyser measuring a 7m length of RG58 in IR mode. In fact, the cable is made up of two BNC patch leads, one 2m long and the other 5m long with an inline connector to make up the 7m. Note the positive spike to the right, which is at 7m. This is the 'fault', in this case an open circuit at the end of the cable and as such also marks its length. If



**Fig. 6: Completed outfit. Fig. 7: TDR plot of 7m RG58 cable. Note cable end spike at 7m and disturbance of the connector by the marker at 2m.**

this were a short circuit the spike would be in the negative region below the line, so we can assess what the 'problem' with our cable may be.

But also note where I have placed the white marker at 2m. The sensitivity of the VA6 is such that we can see a disturbance in the trace, which is caused by the inline connector. In another case a disturbance such as this may indicate a problem on the line.

Under the Applications menu we can find functions to also measure Cable Length as well as Velocity Factor, Impedance and Cable Loss.

As with cable length there are a couple of ways to measure Cable Loss. To do this we select and run 'Cable Loss' leaving the far end of the cable open and then, when requested by the analyser, short the far end and we get the cable loss in dB on five pre-set frequencies that correspond to common specification data.

However, if we go back in the Main Menu and run a Multi Frequency sweep over the frequency range of interest, select S11 then select Marker 'ON' and move it to a frequency of interest, we can read Return Loss (RL) in dB on the screen. We then halve this figure, to allow for the round trip of the signal, and this will be the cable loss value at any frequency the marker is set to. It is also possible to press Key 5 'Detailed Information', which will also display the RL value along with other valuable data.

## Finally

Full assembly details and basic operation of the analyser are given in the supplied manual. Incidentally I used an antistatic wrist band during assembly just to be on the safe side.

Was it worth replacing my VA5 with a VA6? After being able to spend more time using the analyser I can say that from my point of view it certainly

was. The new analyser has greater capability, easier operation due to the menu system and proper keypad, it is faster, has a superior display and the convenience of an internal rechargeable battery, conveniently recharged by USB, and the increased battery life all made it a game changer. A drawback, possibly, is that it is not waterproof, but I found a layer of cling film around the case to be a work around for this.

In a future column I will describe the use of the VA6 using the VNWA software and no doubt it will appear in various projects appearing in the column as time goes on.

See the November issue for the full review of this great little analyser. Further information can be found here.

FA-VA6 Details:

[www.sdr-kits.net/FA-VA6-Kit-Info](http://www.sdr-kits.net/FA-VA6-Kit-Info)

Datasheet:

<https://tinyurl.com/mpeuwt79>

## L B Cebik W4RNL website archive

Readers may be aware of the work of **L B Cebik W4RNL**. Cebik was well known within the amateur radio community and he maintained a website with a huge collection of articles on antenna design and antenna modelling. He also wrote a vast number of articles about the same subjects in US amateur radio magazines and published over a dozen books. Sadly, Cebik passed away in April 2008.

**Marcel De Canck ON5AU** who is also now sadly SK, used to have a copy of Cebik's website, magazine articles and books on his website at [on5au.be](http://on5au.be)

As Marcel also became Silent Key in October 2023 and not knowing what the future may hold with Marcel's website, **Lonny K1LH** made a snapshot of

the Cebik site and this copy can now be found at:

<https://antenna2.github.io/cebik>

This will hopefully ensure that Cebik's important work will be available to all for many years to come.

## Interactive antenna book

**Tony Golden** from AN-SOF Antenna Simulator has announced that he is writing a new interactive antenna book called *Learning Antennas Through Simulation: A Hands-On Guide with AN-SOF*.

The book is intended to be a deep dive into antenna theory and simulation, so it's not a beginner's guide or *antennas for dummies*. It will be packed with hands-on examples using AN-SOF and online calculators that make it easy to understand complex concepts and equations.

The book is based on 25+ years of experience in antenna modelling and teaching. It blends fundamental theory with hands-on simulation exercises using the AN-SOF Antenna Simulator, allowing students to visualize and explore antenna behaviour through computed results in real time. The book also includes online calculators for most equations and formulas, as well as Octave scripts for numerical computations.

So rather than passive reading, this guide promotes active learning: students simulate fields, patterns, impedance, and more, reinforcing concepts through immediate visual and numerical feedback. It's a modern pedagogy approach that even educators can adopt in the classroom or lab. The book is aimed at students, educators, and RF professionals who want to learn or teach antennas with a practical, simulation-driven approach! Here is a pre-order page link for anyone who is interested:

<https://tinyurl.com/3ucse5va>

That's it for another month. **PW**





**Tim Kirby GW4VXE**  
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I'm writing this the day after giving a presentation on 'What's so special about VHF/UHF' to the RSGB Convention at Milton Keynes. What makes things special for people tends to be a personal thing and it's likely that what I think is 'special' about something will be different to what makes something 'special' for you. Nothing wrong in that at all! There's no requirement for us to have to enjoy the hobby in exactly the same way as each other, although some common ground is undoubtedly helpful.

In my presentation, I reflected a little on what made VHF/UHF special for me, in the hope that it might strike a chord with other people. For me, I think the overriding interest on VHF/UHF is the variance in propagation and the fact that exceptional contacts can be made on one day whereas the next – they can't. How does all that work? I find it fascinating and that fascination keeps me coming back to the radio to see what is happening on a particular day or time of year.

For others, I know there's a pleasure in setting up a contest station and making as many contacts as possible over the greatest distance. Others enjoy constructing or modifying equipment and trying it out, some others simply use VHF/UHF as a means to talk to their friends in the club or in their locality.

I did emphasize in my presentation that I feel that simple 'FM chatting' is really important to the hobby. Why? For the casual listener, this is the sort of thing that they will hear on a scanner or a cheap handheld that they may be using to put a toe into the water of the hobby. It's important, therefore, that they can hear that

# What's so special about VHF/UHF?

**Tim Kirby GW4VXE** addresses this question as well as reporting on some exceptional VHF propagation.

something is going on.

And of course, this is why we get the 'drip-drip' of letters to the 'Your Letters' section declaiming that there is 'no VHF activity'. Well, a quick look at this column should reassure you that actually, there's plenty going on in this part of the spectrum – but it may not be apparent to the casual listener. So, getting on FM and chatting is perhaps more important than many of us have given it credit for! Looking at the mode breakdown in my log, I might be as guilty as the next person.

So, how about joining, or starting, a local net on VHF? It could be on simplex or on a repeater (with the repeater keeper's permission of course!). Do call CQ – and try to respond to CQ calls, when you can – even if you have only a minute or so to acknowledge the CQ. Maybe use **Ken G3LVP's** idea of calling CQ on the hour, or quarter hours. Or, you could set up a regular sked with a friend.

You might be surprised to find other people call you after the contact is finished. You probably have other ideas about how to generate activity. But the important thing is that it's up to each of us who care about activity to do something practical about it. It's not up to the RSGB or 'they' (as in 'they' should do

something about it!), it's up to us. I finished my presentation by quoting **Mahatma Gandhi**, 'You must be the change you wish to see in the world'.

## The 6m band

**Jef VanRaepenbusch ON8NT** (Aalter) worked G16ATZ (I074) on 1 September at a distance of 731km.

**Roger Laphorn G3XBM** (Cambridge) has been running 5W to his V2000 vertical and says he is spotted in continental Europe most days and that he has even been spotted by two stations in Brazil, presumably by TEP.

**Dave Edwards G7RAU** (The Lizard, Cornwall) says that there have been a few F2/TEP openings but by far the best was on 11 October (when Dave was at work!). During the opening, Dave heard PZ, PY, HC, YV, VP2, W, VE, KP4, P4, HI, TI and others and says that signals were very strong. Dave was late on, but still worked a few.

It was very good to hear once again from **Robert van der Zaal PA9RZ** (Sassenheim) who has had some serious health problems which meant that he could not get to his shack for almost two years. Robert's first QSO to get back on the air was on the band with G1JJZ (I070) while running 10W to his log periodic.

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**Fig. 1: Simon W6/G7WKK operated from Saddle Peak in California – what a view!**  
**Fig. 2: The new FTX-1F in Robert PA9RZ's shack.**

## The 4m band

**Steve Rawlings G4ALG** (Lydney, Gloucestershire) writes, "I continue to have fun with my prototype VXO QRP CW transmitter running 3 watts from four 2N3866 transistors in parallel. On 18 September, using a dipole antenna, I was delighted to work **Chris GU3TUX** (Alderney, 25 watts, HB9CV). At 228km, this is currently my best DX on the band".

**Brian Williams GW0GHF** (Penarth) wrote, wondering if he had a problem with his 4m aerial as he could not receive the GB3SWX beacon, listed on 70.007 nor the GB3MBD beacon on 70.050 at Ampthill. He says that he does receive stations much further afield, such as G4CLA, G3TBK, G0ODQ and GW4SHF all heard during the 4m contest on 18 September. I asked **Ken G3LVP** (Cheltenham) if he could hear GB3WSX and he could not, so I think it's likely that beacon is off air at the moment. As far as GB3MBD is concerned, which is looked after by **Dave G4FKI**, I imagine that Brian has an obstructed path in that direction, as I know that Dave has reported it on the air recently.

The Beaconsport website (below) is useful for queries like this as you can check when someone last heard a particular beacon.

<https://beaconsport.uk>

GB3WSX, for example, is not listed as 'active' on the site, whereas it is on the RSGB site at:

<https://ukrepeater.net/beaconlist.html>

## The 2m band

**Jef ON8NT** worked G0LTG/P (IO81) during the Activity Contest on 2 September and then during the IARU Region 1 contest on 6 and 7 September he worked F5JFU/P (JN17), G6WCG/P (IO93), DR9A (JN48), DA0FF (JO40), DD7PA (JN49), DL5NEN (JN59), HB9IAB/P (JN36), DR7C (JO50) and DR5T (JN47). On FT8 on 19 September, he worked G4ZAL (IO80), SM7WW (JO65), OZ1HDF (JO55), F1NZC (JN15), F8PKC (JN38) and HB9EFK (JN46).

**Andy Adams GW0KZG** (Letterston, Pembrokeshire) says that he has replaced his 11-element PowAbeam by a 9-element Innov LFA Yagi and increased the height of his mast by 2m. Andy says that this has been very worthwhile and he's now hearing stations that he has not heard before. Andy worked CT9ACF (IM12) on 18 September and EA1TW (IN83) on 19 September and 7 October. During the opening on 11 October, Andy worked PA0M (JO22), PA0LMD (JO22), EA1AAA (IN63), OZ5UF and DH8BQA (JO73) all on FT8 and also mentions hearing/seeing Poland, which is good going from West Wales.

**Ian Bontoft G4ELW** (Bridgwater) has had an



interesting month. Ian found 18 September a good day and worked F4FMB (IN96), F5PHW (IN87), F6KHM (IN78), F6IFX (JN08), F1UPT (IN98), CT9ACF (IM12), EA2XR (IN83) and F4JRI (IN98). Next day, the opening continued, with Ian working EA1U (IN83) and CT9ACF (IM12) once again. On 1 October, the band was open to Spain when Ian worked EA2XR (IN83) and then to the east, when Ian worked PD4HW (JO21) along with various other stations in JO01 and JO02. On 11 October, Ian worked DL1FBR (JO32), F4FET (JO00), DJ6AG (JO51), DD7DAC (JO31), DL5XJ (JO54), DL2KCK (JO31), SQ3GJS (JO82) and DH8BQA (JO73) – all while running 15W FT8 to a 5-element Yagi.

**Simon Davis-Crane G7WKK** writes, "As W6/G7WKK (**Fig. 1**), I activated a number of SOTA summits on 2m FM. I was made very welcome to the W6 Los Angeles area on Saddle Peak by K6STR and K6CPR, among others. 2m (and 70cm) was busy around Los Angeles, but as we moved north it became very difficult to raise anyone, even after placing alerts and spots. I tried 6m, but made no contacts, finding HF the most reliable option. We will be active in Spain in December & January, as EA3/G7WKK and EA3/2E0NYQ as we have obtained a licence from the Spanish authorities to allow **Nic** to operate using her intermediate callsign; thanks to EURAO ([www.eurao.org](http://www.eurao.org)) for their help with this process. We'll be activating SOTA and POTA on 2m & HF".

Dave G7RAU says he missed OY9JD (IP61) on the evening of 10 October and the OY9 beacon was 579 at one point. Dave worked SM6, SM7, OZ, GM and GI the same evening. On the evening of 11 October, Dave worked SP, SM, OZ

and DL hearing OK and SP3 as well.

Steve G4ALG says that he is enjoying taking part in the weekly Two Metre Tuesday CW events and often has QRP natters with local stations, including **Chris G0SDD** (Forest of Dean) and **Mike G8EJN** (Gloucestershire). Steve says that he continues to have some 'chance' QSOs and on 10 October, running 5W to a J-pole vertical, he worked **Jake M7XGV** (Thurrock) who was running 10W to a magmount vertical over a distance of 198km. Steve was pleased to discover that he was Jake's first 2m CW contact.

Robert PA9RZ is the proud owner of a new FTX-1F, **Fig. 2**, and used it during the September 2m contest running 10W to a 5-element at 50 feet. His best DX was TM5R (JN19) and G5B (IO92), both over 320km, along with PA and DL stations.

Here at **GW4VXE** (Goodwick, Pembrokeshire) I only had the vertical to play with during the October tropo, but I was heard by GM0HBK (IO77) and EA1UR (IN53) as well as working F4GWG (IN77) along with a number of UK and EI stations.

## The 70cm band

Ian G4ELW decided to try FT8 on the band, using his V2000 vertical during the opening on 11 October, and was pleased to work EI3EBB (IO52) and F5APQ (JO00). Ian says that at this point he wondered how his 2m Yagi would work on 70cm and found the match was good. He says he is not sure about the radiation pattern though, as he managed to work GI6ATZ (IO74) while beaming 'east'!

Dave G7RAU found the band in great shape



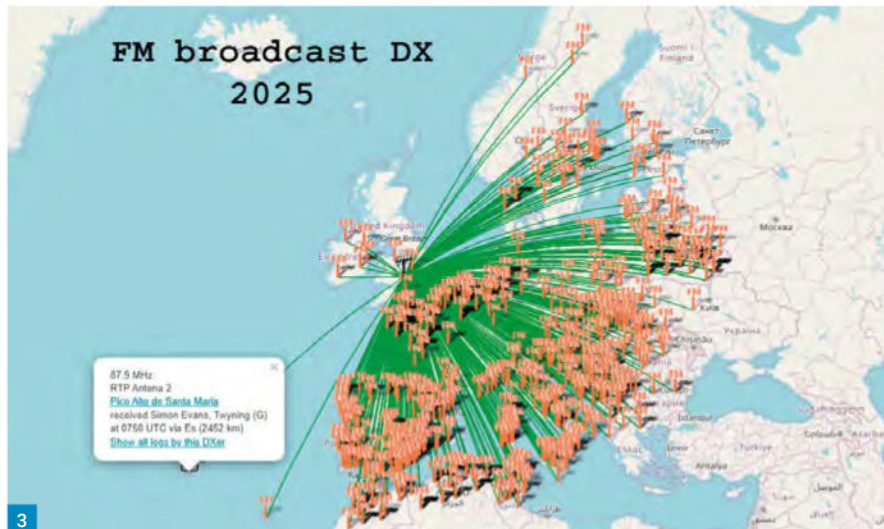
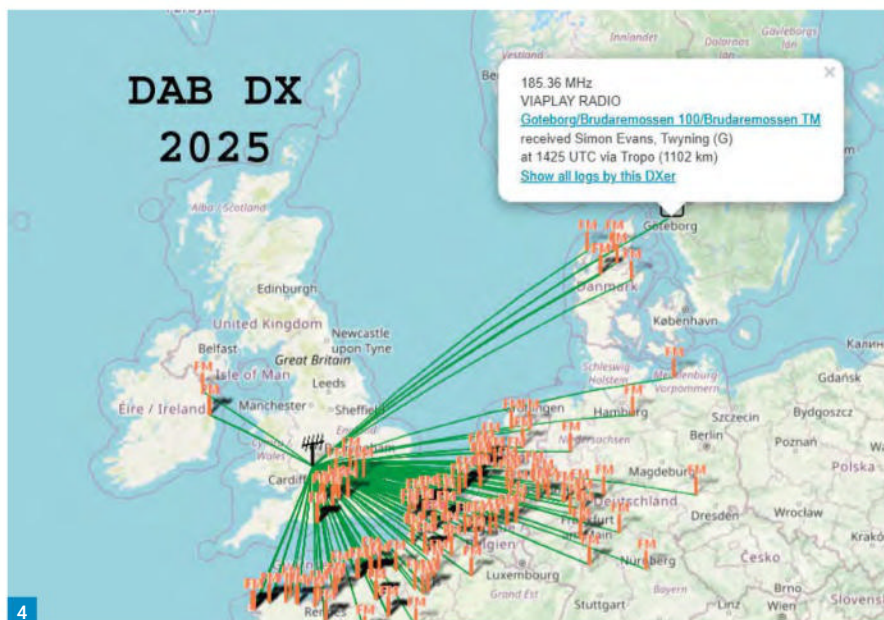


Fig. 3: Simon Evans' FM DX received during 2025.  
Fig. 4: Simon Evans' DAB DX received during 2025.



on the evening of 11 October, finding it was possible to work into Poland running no more than 40W. Dave is looking forward to working **Stevie CT9ACF** who is now active on the band (thanks too to **Reg G8VHI** for this news). Dave says he has worked Madeira on the band before, with a QRP station running a vertical, so he's hopeful that Stevie will be very loud.

Stevie worked **Mark EI3KD** and **Gordon G16ATZ** on 70cm on 10 October.

Steve G4ALG says that conditions were well above average for the Friday CW activity on 10 October. Running 5W to a home-made 12-element Yagi, Steve worked **Ken G4RHR** (JO02), and **John G3YPZ** (JO02). Steve says he needed to run 20W to his J-pole vertical to work **Ian G3YUE** in London (IO91) who was running 100W to a vertical.

During the October tropo, here at GW4VXE, I spent a little more time on the band, using FT8 – only on the vertical, but was pleased to

be heard at GM0HBK (IO77) with a number of QSOs around the UK and Eire, which was all very enjoyable.

### Satellites

Jef ON8NT writes, "On the 26th of September I followed a very interesting presentation from **Luc ON5SEL** on the reception of weather satellites in my local club TLS-ARCDP. That sparked an interest in the subject. So I got an RTL-SDR Blog Model V4 and an interesting book Raspberry Pi 5 for Radio Amateurs. Program and Build Raspberry Pi 5 Based Ham Stations Utilities with the RTL-SDR by **Dogan & Ahmet Ibrahim G7SCU** and **2E1GUC** from ELEKTOR. I want to explore if I can get the RTL-SDR working on my Android phone".

**Patrick Stoddard WD9EWK** (Phoenix) writes, "Summertime has moved into Fall, cooler weather, and more satellite activity before the winter snow and ice hits much of North America.

A few weeks ago, **Preston N5YIZ** had been roving around west Texas, activating a bunch of rarely-heard grids from that state. As I write this, he is now operating from Hawaii as **N5YIZ/KH6**. He has been making satellite operators across much of the continental USA happy, as well as Japanese satellite operators, with activity from grids BL10 and BL11.

"**Doug N6UA** made a long road trip west from his home in Wyoming to the northern California coast, activating the rare continental USA grid of CM79. Almost all of this grid is wet, with a little bit of land in the northeast corner of the grid. Unless approached by sea or air, hiking is required to get into this grid - and Doug hiked into the grid for some satellite operating. His brief activation helped two hams with the last of the 488 continental USA grids they needed - **JP KQ4DO** in Kentucky, and **Fletch' N1RCN** in Florida.

"**Endaf N6UTC/MW1BQO** recently visited Vancouver in western Canada. While in Vancouver, Endaf showed up on satellites from grid CN89 using the call VE7/M1BQO. I caught him on a Sunday morning SO-125 (HADES-ICM) pass, and he can be heard in this video:

<https://youtu.be/HX7LQTVgWj8>

**Phil Oakley G0BVD** (Great Torrington) has enjoyed the recent SSTV activity from the ISS with some good decodes.

### FM and DAB DX

**Simon Evans** (Twynning, Gloucestershire) wrote while the October tropo was still going on. He says that in the end he has received FM broadcast stations from 39 ITU countries so far this year and that the most notable new one was RTP ANT2 from Madeira, received by Sporadic E on 31 August, **Fig. 3**. Simon says that a noticeable absence this year was Iceland, although he did have Norway in his list which is quite unusual as all the NRK transmitters have been closed, leaving just local stations, which is what Simon received. On DAB, Simon has received ensembles from eight ITU countries during the year and says that the new Irish experiment on 5B and 7C appears with him occasionally. Simon's best DAB DX was Viaplay on 6C from Goteborg in Sweden at a distance of around 1100km. See **Fig. 4**.

That's all for this month. Thanks to everyone who's contributed to the column, it's much appreciated. If you've been thinking about emailing me with some news, but haven't yet got around to it, please do! It would be great to include your news in the column. See you next time. **PW**

Don Field G3XTT

Colin Redwood G6MXL

practicalwireless@warnersgroup.co.uk

**A**nother RSGB Convention, a must in my diary as I said last year in my write-up. It's a great opportunity to catch up with old friends, old being the operative word in many cases as many of them I remember from my first RSGB HF Convention in the mid-80s, some 40 years ago! That said, it was great this year to see a number of younger amateurs at the event, and the RSGB had sponsored a table for the Youth on the Air folks. Hopefully many of these youngsters will stick with the hobby and maybe bring in some of their friends too. Credit is due to **Ben Loyd GW4BML**, the RSGB's Youth Champion, for encouraging all this activity by young people.

One of my complaints last year was about the registration procedure but this year it had gone all high-tech with QR codes emailed to all pre-registered attendees beforehand, so that you could be scanned in very quickly and given a badge. Indeed, my only complaint about the booking system was that, unlike last year, you needed to book the weekend and the accommodation separately, no big deal of course.

I should mention here, as at least one acquaintance of mine seems to have been under a misapprehension, you absolutely don't have to be an RSGB member to attend.

### Trade stalls

As always, apart from the extensive RSGB bookstall, Martin Lynch & Sons were there as sponsors of the event, along with displays by Yaesu and Icom. Not surprisingly, Yaesu had the new FTX-1 on show, while Icom were featuring the new IC-7300 Mk2.

### Lectures & workshops

A rough count of the lectures tells me there were about 45 to choose from, covering a huge array of topics, including one stream specifically focused on AMSAT-UK satellite-related subjects. The keynote lecture was by **Professor Lucy Green**, a well-known expert on matters solar, who spoke about *Seeing Total Solar Eclipses from Space*.

Several of the presentations covered DXpeditions. These ranged from lightweight DXpeditions to St. Helena, Pitcairn and Mangerava Islands given by **Bill Rothwell G0VDE**, to using QO-100 from various locations by **Paulo Jorge F5VMJ / G0MUW**. PW was represented by **Colin Redwood G6MXL** who presented *A Holiday-Style DXpedition to Lanzarote* (Look out for a forthcoming write-up in PW!) and, by the magic of remote as he wasn't actually at the Convention, **Tim Kirby GW4VXE** on *What's so Special about VHF/UHF?* I perhaps should also mention **Paul Beaumont G7VAK**, who has written for PW in the past, who talked on *A Brief Look at Number*



## RSGB HF Convention

The editor reports on the recent RSGB Convention, held at Kents Hill Park, Milton Keynes.

*Stations: 1950 to the Present.* One of the most entertaining lectures was that by **Neil Smith G4DBN** about his TV Adventures with Hannah Fry – he has twice featured on her *Secret Genius of Modern Life* TV series.

Two presentations looked at techniques for engaging with young people and getting them interested in amateur radio. The first, entitled *Elmering in an online World* was given by **Kjetil Vinorum LB4FH**. The second, entitled *Each one, teach one* was given by **Ana Canizares EI5DXB**. Judging by the number of younger amateurs attending, their approaches seemed to be effective!

As well as lectures, Friday had a six-hour workshop covering *Direct Digital Synthesis for RF Generation*, Saturday featured an *Introduction to Microcontroller Unit Programming Workshop*, while Sunday had an *Antenna Building Workshop* run by **Mark Jones G0MGX** and his team. This was certainly popular, being fully booked ahead of the Convention. The cost of running the workshops was subsidised by RSGB Legacy Funds. And there were the usual trophy presentations and Contest Forums. And, as always, there was a chance to meet and question the RSGB Board.

### Streaming

Yet again the lectures were all video recorded, as well as live TV interviews from around the event,

all thanks to **David G7URP** and **Tammy M0TC** and their team (see *Face Behind the Call*, July 25).

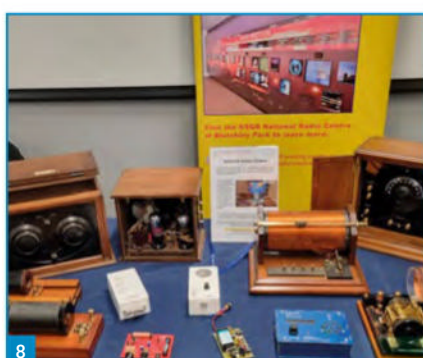
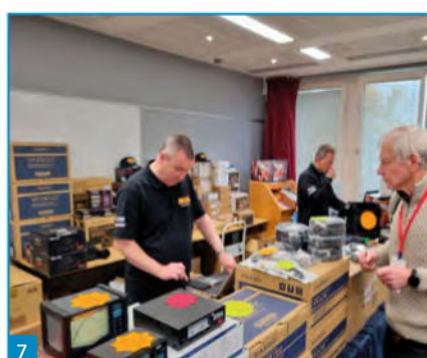
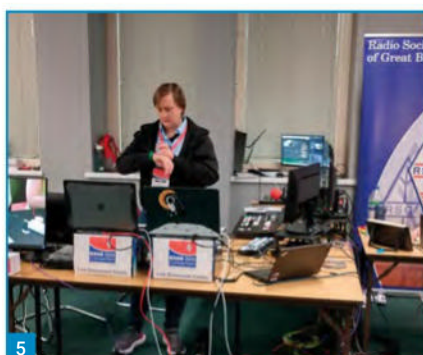
The technical arrangements to enable this to happen were quite impressive, and appeared to work seamlessly both from the delegates on-site, the speakers and viewers at home. The coffee and lunchtime breaks were filled with assorted interviews with delegates and coverage of QSOs being made from Flossie, the mobile shack outside the front entrance to the hotel with an impressive array of antennas. The lectures will eventually appear on the RSGB YouTube channel, which is just as well as with four streams running most of the time, no one could attend them all!

### Club stands

As always, there were plenty of club stands including BYLARA (British Young Ladies Amateur Radio Association), VMARS (Vintage and Military Amateur Radio Society), BATC (British Amateur TV Club), CDXC (the UK DX Foundation) and several others. These included this year the WRTC 2026 organisers (there was also a WRTC talk). WRTC is the World Radio Teamsport Championship which, next year, will be held in the UK for the first time. I hope to have more details here in PW in due course. This is a big event, attracting participants and observers from all over the world, and will require lots of help, particularly from amateurs living in East Anglia (where the

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event will be held), whether testers or not.

There was also an excellent display of early radio equipment put on by the National Radio Centre team, featuring donated equipment from the daughter of a Silent Key. Absolutely fascinating and in pristine condition.

### Other activities

Prior to the Convention, a private tour of Bletchley Park was available for attendees, as well as an informal talk at the National Radio Centre about how to get started using low earth orbiting satellites.

The formal Saturday evening dinner was well attended, the food good once again, and the after-dinner talk given by **Hans Summers G0UPL**, he of QRP Labs. Hans also gave one of the lectures, on Polar modulation, covering the more technical aspects of his work on this fascinating subject.

GB3HQ was once again active throughout the weekend, thanks to the Camb Hams and their mobile station, including participation on the Saturday afternoon in the 145 Alive Net.

I should also mention, as a final comment, that the preceding week had seen the launch of the RSGB App for iOS and Android. Talking to

**Photo 1:** Martin Lynch G4HKS drops by the CDXC stand, flanked by Don G3XTT and Chris G3SVL.

**Photo 2:** Colin G6MXL giving his presentation.

**Photo 3:** The YOTA stand. **Photo 4:** Keith G3WRO, Georgina M6YGL and Mark M0DXR Haynes man the WRTC stand. **Photo 5:** Tammy M0TC running the Livestream. **Photo 6:** The Convention centre and Flossie with her large antenna system!

**Photo 7:** The ML&S stand. **Photo 8:** Old equipment on loan from the NRC.

**Steve Thomas M1ACB**, RSGB General Manager, this has been quite a challenge to get working satisfactorily but I have already downloaded it and it looks good. Available to RSGB members only, of course. **PW**

Buy back issues and archive CDs at [www.mymagazinesub.co.uk/practical-wireless](http://www.mymagazinesub.co.uk/practical-wireless)

Roger J Cooke G3LDI  
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Following the October column which I aimed mainly at the youngsters coming into the hobby, I received a few emails saying how much this was needed and that I presented the case fairly well in order to influence as many as I could. Well, I am not sure how many youngsters read *PW* let alone my column, but I am a stubborn old man and don't give up easily. So, I am having a second bite at this cherry in order to stir the passion that I hope exists in the younger generation.

I shall attempt to wean you away from mindless scrolling, reading constant drivel that has little relevance to life. I might even lay down a challenge to you all! I need to see some responses from the younger amateur that I am aiming at!

### Why this 'Old Man's Game' is actually your secret weapon

An 86-year-old's challenge to the TikTok generation.

*"Dear Young People Who Think us oldies are irrelevant,*

*"You're probably right. At 86, I use words like 'wireless' and remember when phones had dials. I get excited about radio frequencies while you get excited about WiFi speeds. We're from different worlds.*

*"But here's the thing about being old - sometimes you spot patterns that young eyes miss. And I've spotted something huge that your generation is walking past without noticing.*

*"You're being played."*

### The setup

Every generation gets sold the same lie: "This new technology will make everything better and easier!" Your parents believed it about personal computers. You believed it about smartphones. Your younger siblings believe it about AI.

But here's what actually happens: The easier the technology gets, the more helpless you become when it breaks.

Right now, your entire social life depends on:

- Cell towers that fail in storms
- Internet connections that companies can cut off
- Apps that get banned or shut down
- Devices that brick with one bad update
- Platforms controlled by billionaires having midlife crises

You've been sold convenience, but what you actually got was 'digital dependency'.

### The rebellion you didn't know you needed

Want to know what real digital rebellion looks like? It's not another app or platform. It's learning something so fundamentally unbreakable that it

# Morse for the younger generation

Roger Cooke G3LDI continues the topic of encouraging young people to try learning Morse.

works the same way whether it's 1924 or 2024.

Morse code is punk rock for the digital age.

Think about it:

- No corporate overlords - Nobody can ban dots and dashes
- No planned obsolescence - A key from 1950 works exactly the same today
- No subscription fees - Learn it once, own it forever
- No privacy concerns - You control every bit that gets transmitted
- No infrastructure dependency - Works when everything else fails
- While your friends are panicking about TikTok bans and Instagram outages, you'll be tapping out messages that can reach across continents with equipment you can build in your bedroom.

### "But It's Too Hard!"

Really? You mastered:

- Multi-layered video game control schemes
- Complex social media algorithms
- Programming languages
- Guitar Hero on expert mode

And you think dots and dashes are beyond you?

Here's the secret old-timers won't tell you:

Young brains learn Morse code faster than old ones. Your pattern recognition is better. Your reflexes are quicker. Your neural plasticity is off the charts.

I've watched 19-year-old Jenna (blind, by the way) blow past operators with decades of experience. I've seen teenagers hit 40 words per minute in months while us old guys took years.

You're not at a disadvantage - you're at a massive advantage and don't know it.

### The real reason we want you to learn

Here's the honest truth: We old-timers are terrified that when we die, this knowledge dies with us.

But that's not your problem. Your problem is that while you're busy consuming content, you're not learning skills that give you actual power.

Morse code gives you power:

- Power to communicate when systems fail
- Power to send messages nobody else can intercept
- Power to build your own communication network
- Power to connect with interesting people worldwide
- Power to know something your peers don't

### The challenge

I'm 86. I learned this when the world was different. You live in a world I barely understand. But I bet you can't do what I can do.

I bet you can't tap out a message on a table that someone across the room can understand. I bet you can't build a transmitter with £20 worth of parts that reaches another continent. I bet you can't have a real-time conversation using nothing but light flashes.

Prove me wrong.

### How to actually do this

Stop reading articles about learning Morse code and just learn it:

- Download a free app (try 'Morse-It' or 'Koch Method')
- Start with 5 letters: E T I M S (most common)
- Practice 10 minutes daily (less than one TikTok session)
- Join r/morse on Reddit for community support
- Set a 30-day challenge to reach 10 WPM
- In 30 days, you'll have a skill that 99.9% of your generation lacks.

### The real prize

Here's what happens when you actually learn this:

You join a global community that spans every continent, every generation, and every background. The 70-year-old retired engineer in Japan treats you as an equal. The mountain climber in Switzerland becomes your regular contact. The teenager in Brazil becomes your practice partner.

You become part of something bigger than social media drama and algorithmic manipulation.

You gain a skill that:

- Will never be obsolete
- Can't be taken away by corporate policy
- Works in emergencies when everything else fails
- Connects you to real people having real conversations
- Gives you actual stories worth telling

### My real message to you

I don't need you to validate my hobby. At 86, I'm way past caring what people think. You ask the locals here in Norfolk. I say it as it is and I don't pull punches!

But you need skills that make you more than

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just a consumer of other people's content. You need knowledge that gives you power rather than taking it away. You need to be part of communities that exist because people choose to be there, not because algorithms decided to connect you.

Morse code is waiting for you.

The question is: Are you brave enough to learn something that actually matters, or are you going to keep scrolling through content that disappears the moment you close the app?

The dots and dashes don't care how old you are. They only care if you're willing to learn.

I have been using Morse Code for over 70 years. I have watched technologies come and go, but the dots and dashes remain unchanged. If you take this challenge, email me at [roger@g3ldi.co.uk](mailto:roger@g3ldi.co.uk) – I would love to hear from you.

P.S. Still think it's just an 'old man's game'? Check out these young operators crushing it:

Jenna, N4JEH (19, blind, 40+ WPM): [YouTube channel QRQmaniacs]

High-speed CW competitions dominated by young women

SOTA/POTA operators using CW in wilderness locations worldwide

The challenge stands. Prove this old man wrong. The younger you start the easier it is.

Incidentally you are missing out on over 40% of our amateur allocations by ignoring the Morse end of the bands. Not only that, but there is a nasty rumour going around that the Morse end of 20m is being considered for investors / brokers using it for encoded data between themselves. We should not let this happen!

Chris NW6P has some YouTube videos that will help you get started and although I never advise anybody to learn how to send before they can receive, this video might help you with the actual mechanics of using a straight key.

[www.youtube.com/watch?v=iSVA8Og6GrM](http://www.youtube.com/watch?v=iSVA8Og6GrM)

Although most amateurs these days use a paddle of some sort, the technique of using a straight key is always a very useful one to master. Most CW Clubs have what is called 'SK night' when everybody is using a straight key. You can always tell those that have mastered this technique, with some users getting to a reasonable speed with accuracy too. I have four straight keys myself and my favourite is my model D that I have had for decades. Another very nice one with a long neck is the Swedish Key, Fig. 1.

The one in the picture does not have a skirt but mine does. I suspect it was an addition, but all straight keys should have a knob and skirt.

## Using a keyboard

When is it acceptable to use a keyboard instead of a Morse key? Well, I received this email from Bruce G4EUW and I think he is a case in question:

*"As you know that before joining the RN in early*

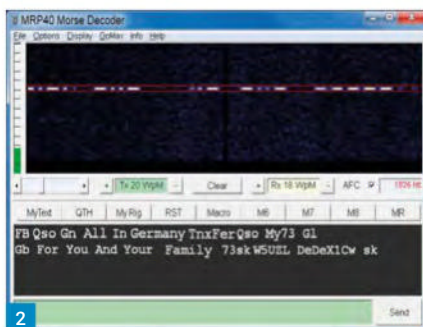


Fig. 1: The Swedish Key. Fig. 2: MRP40.

*1960 I already knew the Code, over the next nine months besides learning many other life at sea skills and reading CW, at the time still the main method of radio DX comms, was brought up to well above the pass mark of 25wpm 100% copy onto a sit up and beg typewriter. 18wpm sending.*

*"My problem at an older age (83) is that after two spinal operations high in the neck almost at the base of the skull I am having great difficulty with dexterity and mobility, signals brain to muscles being interrupted by spinal cord compression I am being told.*

*"My CW sending is appalling now so contests are about the only on-air activity I take part in and enjoy. My point is that us old uns battle on and somehow enjoy amateur radio. I would love to go out portable and am really envious of the reports of expeditions etc. As you say, practice makes perfect, my practice is 'head reading' now, which I never did at sea."*

Bruce should not feel guilty by using a keyboard. He was obviously trained that way in the first instance. I think it would be better than just taking part in the odd contest. I did find this however from someone in a similar situation:

*"Let me start out this post by saying that I am a huge fan of Morse code/CW. I love the fact that CW signals will 'get out there' when other modes will not, due to band conditions, power and equipment limitations, etc. CW just absolutely amazes me with how efficient it can be and I never cease to be impressed by how well it works for a technology that is over 180 years old.*

*"But, I have been studying and practising Morse code for the past three years and even after all that time, I still can barely hand send or copy/decode by ear. Something in my brain just refuses*

*to allow me to break through on this, no matter how hard I keep trying.*

*"Which brings me to the heart of this post: I have a CW keyer/decoder and keyboard rig that allows me to send CW simply by typing it in, just as if I was texting with someone on my cellphone. It works really well and it allows me to still experience the joy and fun of sending and receiving CW. I feel that this method is a nice alternative and a good modern improvement on the older technology.*

*"However, I have found through personal experience that the majority of the people who answer my Morse code CQs often will absolutely refuse to engage with me once they discover that I am not sending by hand, even though I do everything I can to be mindful that I still need to abbreviate as much as possible for the benefit of the person who is hand sending and copying by ear.*

*"Again, I love CW and I don't want to give it up. I totally appreciate how those CW hand-sending, ear-decoding 'purists' feel about this, and want to avoid creating any kind of conflict, while still being able to enjoy using the mode myself. So, I started wondering if there might be some kind of method of signalling in a CQ that would let others know that I am not hand-sending, so as to give them an option not to answer my CQ and avoid annoying anyone.*

*"My main question here is this: Would it be proper etiquette for me to send out a CQ that lets other hams know that the person calling for a contact is using a keyboard? (And if the answer is yes, that's perfectly OK, what would be a good, abbreviated way to phrase that in a CQ call?)*

*"Or, does everyone think that I will I still be persona non grata for attempting to do this?"*

*"In a perfect world, there would be a readily available community of other hams who are also sending Morse by computer and keyboard, and just waiting for me to call CQ so that we can chat keyboard to keyboard.*

*"I'd really like to hear the thoughts and opinions on this by others in the amateur community who, like me, love CW, but just can't get it going without 'cheating' by using computer technology. Thanks, W9SPY."*

As far as I am concerned it's the USE of the code that matters most. As we age we lose some abilities, speed, but Morse has a way of levelling the playing field. I am talking to somebody using Morse. Do I care really if he cannot manage a Morse key? NO!!! He is at least using Morse Code. Take a look at this:

[www.youtube.com/watch?v=C-rpDJKQoqY](http://www.youtube.com/watch?v=C-rpDJKQoqY)

See the Morse decoder, MRP40, Fig. 2. It might be the answer for both of you! Please send all your comments, offerings, information and especially pictures to: [roger@g3ldi.co.uk](mailto:roger@g3ldi.co.uk) 73 and May the Morse be with you! Roger G3LDI. **PW**

Chris Murphy MOHLS

practicalwireless@warnersgroup.co.uk

**W**hile browsing the internet I recently came across a two-metre handheld that also incorporated a general coverage receiver including airband. For around £30 it looked a bargain so I ordered one. When it arrived a couple of weeks later, I unpacked it and examined the contents of the package which included a battery charger. The first thing I noticed was that the charger wasn't fitted with a mains plug conforming to the UK standard BS1363, **Fig. 1**.

Part one of The Plugs and Sockets (Safety) Regulations 1994, which is an act of parliament and hence law, says that a Standard Plug for electrical equipment in the UK, and in particular domestic equipment, that operates at a voltage of 200V or more must be supplied with a plug that conforms to BS1363. It goes on to say that the plugs must be tested and approved by a notified body to ensure compliance to BS1363.

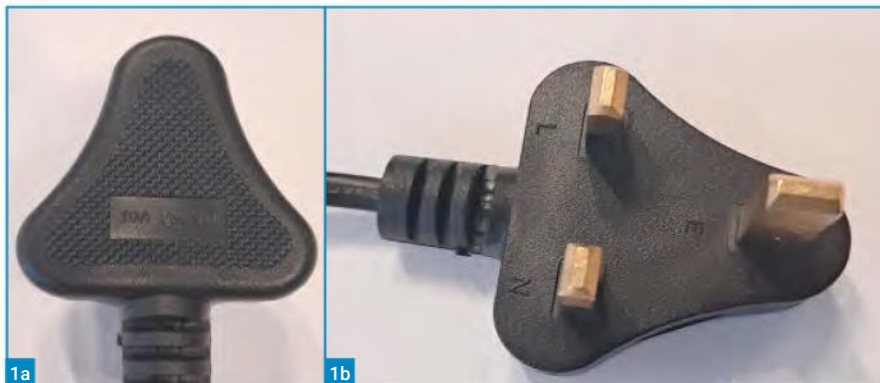
From various electrical forums it's becoming clear that there are quite a few electrical goods on the market, usually on the various online shopping sites, that are supplied with plugs that do not conform to BS1363. According to Trading Standards, around £30m of counterfeit electrical equipment enters the UK market every year. With a lot of amateur radio equipment, as well as accessories such as extension leads becoming available on the online shopping sites, I had the thought that it might be worth writing a short article for *Practical Wireless* pointing out the most common departures from BS1363 and the related dangers.

### History of BS1363

Before we look at counterfeit plugs, let's have a look at the history and some of the main requirements of BS1363. The origins of the 13A plugs and sockets as we know them today, along with the ring main wiring, go back to the Second World War, with the official specification, BS1363 being issued in 1947.

It is also worth explaining some terminology. When describing mains electrical plugs and sockets, the terms Live and Neutral are often used to describe the connections in the plugs and sockets and the conductors connected to them. This is not strictly correct as the term 'Live' describes any conductor that carries current, and this includes the neutral conductor. The correct term for the conductor that takes current to the equipment from the supply is 'Line'.

The BS1363 requirements for plugs are quite detailed, but less so for sockets. In this short article, we will only look at a few of the requirements, and specifically those that



## Fake Plugs

**Chris Murphy MOHLS** takes readers through the pitfalls of non-compliant plugs, sockets and fuses.

enable the end user to determine whether or not the plug is likely to be a counterfeit.

### Current Requirements

Firstly, markings. As stated above, the Plugs and Sockets act says that in order to demonstrate compliance to BS1363, they must be tested and approved by a notified body. In addition, they must have the approval marks and licence numbers of the approving body marked on them. The most common approving body is The British Standards, but there are others such as ASTA and Nemko. Their symbols are shown in **Fig. 2**. One mark that is NOT required on a standard plug however is the CE mark. Any plug bearing the CE mark should immediately set the alarm bells ringing as it will most likely be non-compliant to BS1363.

BS1363 is quite specific about the manufacture of the pins. All pins must be made from solid metal, usually brass, and the line and neutral pins must be sleeved in an insulating material for a length of 9.5mm from the base of the pin. The earth pin must never be sleeved. In order to open the shutters covering the line and neutral apertures in the socket, the earth pin must be longer than the line and neutral pins. BS1363 gives quite precise dimensions for the pins. Obviously without some form of accurate measuring equipment the dimensions of the pins are difficult to check, and there will be more obvious signs as to whether the plug is

|                          | Line & Neutral | Earth   |
|--------------------------|----------------|---------|
| Length                   | 17.7mm         | 22.73mm |
| Width                    | 4mm            | 7.93mm  |
| Distance between centres | 22.2mm         |         |

**Table 1: Correct pin dimensions.**

counterfeit or not. The dimensions are provided in **Table 1** just for completeness. The pins must be rectangular and of good surface finish and have a minimum distance of 9.5mm between the outer surface of the pin and the edge of the plug body.

Moulded plugs on equipment that doesn't need to be earthed may have an earth pin made of plastic. Rewireable plugs however must always have a metallic earth pin.

The plug must have provision for a fuse to be fitted. In the case of rewireable plugs the fuse will be fitted internally within the base of the plug. For moulded plugs it will be fitted by means of a fuse carrier usually accessed in the bottom of the plug between the line and neutral pins and the earth pin. For rewireable plugs, the screw that holds the top and bottom together must be retained in the bottom section of the plug when it is undone. Screws that can fall out tend to get lost leading to the temptation to hold the two halves of the plug together using Sellotape and suchlike.

There is often confusion about approval markings on equipment such as phone chargers where the plug forms a part of the



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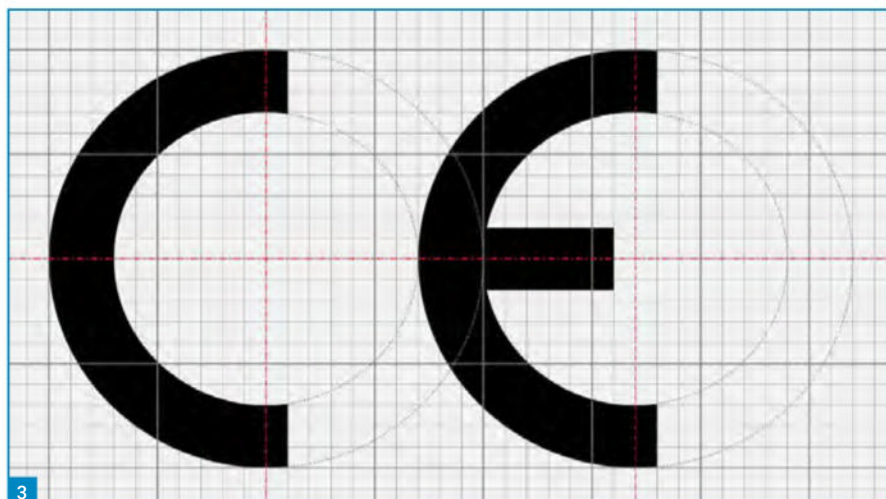
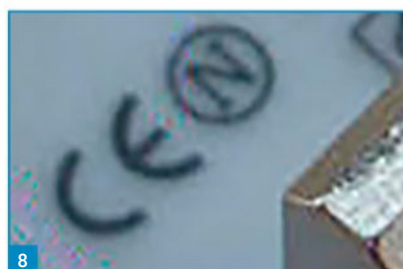


Fig. 1: Plug with no fuse or approval markings.

Fig. 2: Symbols of approval bodies.

Fig. 3: Correct CE mark. Fig. 4: Non-conformant – earth pin sleeved. Fig. 5: Non-conformant – line and neutral not sleeved. Fig. 6: Poor surface finish. Fig. 7: Rewireable plug with plastic earth pin. Figs 8 and 9: Examples of incorrect CE marking.



equipment housing. Such equipment does need to be CE marked on the basis that it contains electrical equipment such as electronics that perform functions over and above the components that form a basic plug. As such they must be compliant to regulations such as the Low Voltage Directive. The plug section however should still be compliant to BS1363 and attention should be paid to the CE mark to ensure that it is genuine. A CE mark, **Fig. 3** should consist of:

- The letters C and E formed of two semi circles
- The two letters must be proportional to each other
- In the E the centre line should be shorter than the ends of the semi-circle.
- The CE mark should be at least 5mm high.
- There should be a gap between the C and E.

### Checking for compliance

Most of the clues as to whether or not a plug is compliant to BS1363 can be made by visual inspection. A plug without both a fuse and approval markings is shown in Fig. 1. In addition, the distance between the pins and the

edge of the plug body is only 8mm.

Sleeving on the pins. **Figs 4 and 5** show two examples of non-conforming plugs. In Fig. 4, the earth pin is sleeved while in Fig. 5 neither the line nor neutral pins are sleeved. **Fig. 6** shows an example of a plug with a poor surface finish to the pins. This could potentially lead to damaging the socket, overheating and potentially fire. **Fig. 7** shows a rewireable plug with a plastic earth pin. Rewireable plugs must always have a metallic earth pin.

**Figs 8 and 9** show some examples of non-conforming chargers where the CE marking is wrong.

A careful inspection of the fuse should also be made. The fuses should be manufactured to BS1362. The main requirements of BS1362 are:

- The fuse should be 25.4mm (1 inch) long and 6.3mm (1/4 inch) in diameter with an end cap diameter of 6.25 to 6.5mm.
- They should have a ceramic body filled with quartz sand to control the fuse's rupture during operation

- The fuse should be marked with its current rating. It should also have the manufacturer's name and the BS1362 marking.
- The fuse should be colour coded. 3A fuses are red, 13A fuses are brown, and other ratings are typically black.

Many non-compliant fuses are difficult to detect to an untrained eye, but there are some fuses on the market that have quite obvious deviations from the requirements of BS1362. **Fig. 10** shows a pack of fuses that was bought online, claiming to be compliant to BS1362 and bearing the name Bussmann. Cooper Bussmann is a well known manufacturer of fuses. When the pack was opened it was noticed that the fuses had a bulge under the endcap. This was due to the fuse wire being trapped between the end cap and the ceramic body, **Fig. 11**. The internal connections of the fusewire should be made by an eyelet inside the fuse.

**Fig. 12** gives two more clues that the fuse isn't genuine. Firstly, the end cap is too shiny,

**Fig. 10:** Pack of supposedly conformant fuses.  
**Fig. 11:** But fuse wire trapped under cap.  
**Fig. 12:** Comparing a fake fuse with the genuine article. **Figs 13 to 15:** The results of testing a counterfeit fuse. **Fig. 16:** Incorrectly inserted plug opens access to line and neutral.  
**Fig. 17:** Similar to Fig. 16 but with a socket cover.  
**Fig. 18:** Flimsy socket cover, liable to the earth pin breaking off.



and it also has a dimple that is too big.  
**Figs 13 to 15** show the results of a test on a counterfeit fuse whereby a fake 3A fuse was tested by introducing a deliberate short circuit across the line and neutral connections on an IEC lead. Here you can see that the fuse has exploded, disintegrated and left a scorch mark on the socket.  
 So, as you can see it's not always easy to tell whether a fuse is a genuine BS1362 fuse or not. The best advice if you're buying online is to use a reputable supplier such as RS Components or CPC/Farnell.



## What to do

So what do you do if you find that something that you've purchased does have a counterfeit plug fitted? If you bought it from a shop in the UK, the first step should be to take it back and point out that they are selling equipment that is illegal for use in the UK. If you get no response to that, go to Trading Standards. If, however, you bought it from an online supplier, things get a bit more difficult. You could try complaining to the online site provider but good luck with that.



A counterfeit plug and or fuse is probably a good indicator that the piece of equipment that it's connected to won't comply with the required standards either. There's a good chance that the equipment won't have the components intended for filtering out electrical noise fitted. Examples of this have appeared in the EMC articles in *RadCom*. Another problem is that the equipment probably won't have the required clearance and creepage distance between the mains input and low voltage output.

A couple more tips. The triangular layout of the pins means that under normal circumstances the plug cannot be inserted into the socket the wrong way round, thus reversing the line and neutral connections. It is however possible in some cases to insert the plug upside down into one of those multi-socket extension leads. While it can be seen that the line and neutral pins have not been connected, the fact that the earth pin has been inserted means that the shutters on the line and neutral pins on the socket will have been opened exposing the live terminals inside. This could be fatal to an inquisitive mind and

small fingers.

A similar situation can be achieved with the socket safety shutters that are quite popular in households – especially those with young children. The British Electrotechnical and Allied Manufacturers Association (BEAMA) however advises against the use of them. Because:

- Socket contact damage - results in overheating and possible fire
- Socket shutter damage - the shutters will not be able to protect children
- Some socket covers make it possible to poke pins and paper clips into the live parts!
- Broken plastic pins stuck in the earth terminal - prevents shutters from closing
- Wrong size pins can make covers easy to remove, some even pop out by themselves!

Children like to play with socket covers - plugging them in upside down opens the shutter and exposes live contacts.

All houses in the UK should be fitted with electrical sockets that conform to BS1363 of which one requirement is that the line and neutral terminals must have shutters that mean that the line and neutral contacts cannot be touched. Why make it easy to defeat the safety measures your sockets already have?

**Fig. 17** shows an example of where a socket cover has been inserted upside down, opening the line and neutral shutters and exposing the terminals in the socket. **Fig. 18** shows the same cover. You can see the flimsy manufacture of



the earth pin which instead of being solid is in two parts. Should one of these break off while the cover is plugged in it could lead to the line and neutral terminals being exposed even after the cover has been unplugged.

In this article, we have only looked at a small number of examples, plugs, chargers, fuses, but it is worth being vigilant towards any electrical equipment that you own, whether for the shack or elsewhere around the home, extension leads etc. This is especially so for products bought from places such as online shopping sites and 'bargain' stores.

Finally, I am grateful to **Rob O'Callaghan** of Plugtest Ltd for reviewing the initial draft of this article and for permission to use some of their photographs for Figs 4 to 15. **PW**



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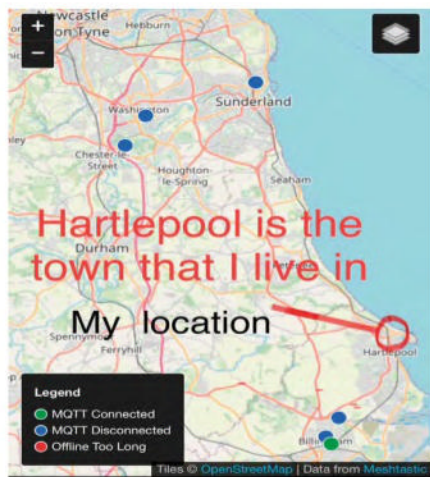
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## MESHNET

Dear Don,

I do not know if you have published anything to do with the Meshnet system. I know and have seen many videos on the internet about building a system for Meshnet. I know I can go out and buy all of the parts that I would need to make a setup and also do whatever you need to do with the programming of your Meshnet system.

But for me I am a plug and play sort of person, someone that can buy a cheap off the shelf system, as over the past few years, there has been big development with SDR, as I have seen VERY SMALL such systems.

Now I know the more Meshnet units that are active, the BETTER the system can be. I have included a map of the part of the UK that I am in, and you will see, NOT MUCH ACTION.

As if I had a unit that I can mount on my TV mast, the better the system should work. I also would save up to get what looks like the older style BlackBerry phone. I would buy two of them, one for me and one for my partner. Then as Christmas gifts, I would buy one for my brother-in-law, as my sister is still NOT able to use WhatsApp.

But all jokes aside, and do NOT take me for one of them conspiracy theorists, but I can see that something BAD is going to happen. I truly hope that I am wrong, but to cut and control what you hear or see is the beginning of the end.

That was why I became a radio HAM, as it will be very hard to cut 'FREE' communication

I know I am sounding all doom and gloom, but let's see what history brings.

**Knobby (John) M6KQJ**  
Hartlepool

*(Editor's comment: Thanks Knobby. I'm not really familiar with Meshnet and we haven't featured it in PW. I see that, in fact, it is shortly to be closed down. But what I believe you are talking about is MQTT (Message Queuing Telemetry Transport), part of the Internet of Things. I think, though, the point you are making is one we certainly have covered here on a number of occasions, which is that reliance on the internet or other third-party means of communication has its hazards, whereas amateur radio is essentially free of outside interference and resilient in times of infrastructure breakdowns.)*

## National Hamfest

Dear Don,

I was very pleased with this year's National Hamfest. I was able to buy just about everything that was on my shopping list and I had a very pleasant time on the BRARS stand chatting with visitors.

I was disappointed that PW did not have a stand. The PW stand used to be a popular place to meet other PW readers and columnists and take out or renew a subscription. I hope PW will be at next year's National Hamfest.

I was also disappointed that there wasn't a Bring & Buy at the National Hamfest. Bring & Buy stands are always on my 'must visit' list so I hope that space can be found for a Bring & Buy stand at next year's event.

**Ian Brothwell G4EAN**  
Nottingham

## Letter to the editor

Dear Don,

I don't normally take too much notice of what **Ray Howes** writes in his regular monthly letter but I must correct some of the misinformation he's trying to spread about electric vehicles (EV). Let's take it point by point:

"Most have huge lithium batteries which cannot be recycled". Incorrect I'm afraid. They can be recycled and every year more and more are being recycled.

"They are an impractical solution to a problem that doesn't exist". So you don't consider climate change caused by human emission of carbon dioxide to be a problem, Ray?

"They're not cheap to buy or run". They definitely aren't cheap to buy at the moment but are

continually getting cheaper and there's not much of a gap now between the smaller EV and a similar sized ICE (internal combustion engine) vehicle. As to running cost, my Tesla costs me about 2p/mile in fuel. Can you match that with your fossil-fuelled car Ray? The Tesla has no expensive routine servicing requirement either, other than checking brake fluid and changing pollen filters every couple of years. No oil changes needed!

An EV may indeed cost more CO<sub>2</sub> to make than a petrol or diesel car but over its life produces way less emissions.

So EV isn't a 'bandwagon' Ray and perhaps it isn't **Joe Chester** who needs to "do more homework on the subject of EV". As to the Ferrari comparison, when it comes to performance, my Tesla will get to 60mph from a standing start quicker than most Ferraris, at a fraction of the cost and almost silently.

Oh, and while we're talking facts rather than fiction, **Sting's** song was *Fields of Gold* not *Field of Dreams*.

Best wishes,  
**Tim Kearsley G4WTF**  
Rushden, Northants

## Various

Dear Don,

G8GTV's insightful comments about Hobby Radio as a learning exercise is, in a wider context, a progressive route to highlight what is in some ways, not only a back-stop to the ongoing infatuation with all things brand new ham-radio wise, but more importantly as **Barrie** points out, gaining a fundamental idea of how radio actually works. And definitely yes, the absolute thrill of having your signals received by someone else with equipment that you have put together from scratch is indescribable. That feeling rarely diminishes no matter how many times equipment you've built is used. Even an antenna.

Again, as Barrie rightly says, "the self-education aspects of our hobby" plus the "education" thereof, is of course a vital role. However, given the path that most of our fellow hams choose to take, be they old timers or young timers, mainly, as a result of the manufacturing process of amateur radio equipment (since the 1960's) and the monetisation of it, most hams worldwide buy their equipment. They don't build it. Luckily, some people have tweaked the trend - we should applaud them for doing so. As an aside, back

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in the early 60's, many of the 'grey-beards' and Luddites who'd gotten a sniff that commercially manufactured rigs were about to appear, were adamant that they would never ever buy into commercially made ham-radio gear. They'd lied. When commercial gear did finally appear on dealers' shelves, many of those who said they would never buy a rig ready to go out of the box, did so in droves. In the early sixties, I can still recall hearing some of their home-built HF rigs whilst an SWL. I'll just say that some of these rigs probably shouldn't have been demonstrated on-air.

Many people, like G8GTV, say that the hobby is being jeopardised as a result of the inexorable

march of technology that embraces amateur radio - I do understand his misgivings, but once it's out of the box, it can no longer be put back in. Fortunately, though, as mentioned, there is still a ground swell of tinkerers who both buy and continue to build this or that type of radio equipment. So at this moment in time, I don't think it is that important to over-exaggerate the idea that our hobby is in jeopardy. Besides, the promulgation of such worries only serves to sow the seeds of yet more angst and distraction. We can do with a lot less of that in our ranks. Such as the infighting between the FM'ers, the SSB'ers, the FT8'ers, the DX'ers, the contesters and the 'it's not 'real ham radio' gang and so on. As many others have stated, ham-radio has so many

varied disciplines to choose from, you'd think there would be no time left over to keep on 'kicking the dust up'.

Oh, it's probably no great surprise that **Don** (PW editor), is always banging the drum for more constructional articles. Unlike yesteryear - the spectre of commercial rigs had not yet hit the proverbial fan - when ham radio mags were chock full of construction articles, not full of ads for ready built stuff. Nowadays of course, it's the other way round. Notwithstanding various kits etc, those days are very unlikely to return. Sad, but true.

**Ray Howes G4OWY/G6AUW**  
Weymouth

# Rallies & Events

All information published here reflects the situation up to and including **22nd October 2025**. Readers are advised to always check with the organisers of any rally or event before setting out for a visit. To get your event on this list, email the full details, as early as possible, to: [practicalwireless@warnersgroup.co.uk](mailto:practicalwireless@warnersgroup.co.uk)

**15 November**

## THE ROCHDALE & DISTRICT AMATEUR RADIO WINTER RALLY:

St. Vincent de Paul's Hall, Norden, Rochdale, OL12 7QR. Doors open at 10am with entry still only £3. As well as our usual Traders we are pleased to announce that we have new caterers. Plenty of free parking. Contact Martin Shore (Treasurer and Rally Organiser) on 07587 709006

Email: [rally.radars@hotmail.com](mailto:rally.radars@hotmail.com)

**7 December**

## MID DEVON AMATEUR RADIO & ELECTRONICS FAIR:

The 2025 Mid Devon Amateur Radio & Computer Fair will be held on Sunday 7 December at Winkleigh Sports & Recreation Centre from 09:00 - 13:00. Entry £3 per person, no charge for partners & under 16s. Easy access from the A3124, free parking, free WiFi, hot food and refreshments available. A chance to pick up hard-to-find electronic components, two-way radio and computer hardware. Traders please book ASAP,

NOTE - this year a maximum 4 tables per booking, we may remove the 4 table pre trader restriction after 1 October if the rally is not fully booked. Tables are 6 foot frontage (tables supplied), Mains electricity available on request. Please pre-book ASAP with Phil G6DLJ 07990 563147 or email [wrg2024@hotmail.com](mailto:wrg2024@hotmail.com)

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**25 January 2026**

## LINCOLN SHORT WAVE CLUB WINTER RADIO RALLY:

The Festival Hall, Caistor Road, Market Rasen, LN8 3HT. Doors open at 10.00. Admission £3.00. Tables £10.00. Indoor event ample free car parking. Hot refreshments including our famous bacon butties. Card payments accepted. To Book Tables and Further Details: Please Contact Steve M5ZZZ, 07777699069

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- **A MORSE PRACTICE OSCILLATOR:** Eric Edwards GW8LJJ describes how to build a Morse practice oscillator with echo.
- **OLIVER HEAVISIDE:** Tony Jones G7ETW profiles an important scientist in the evolution of radio.
- **THE SELECTONE:** The final part of this historic project.
- **CABLE RACK:** Kevin Bilke G8VIV explains how to keep your cables neat and tidy.
- **ESR METER:** Philip Moss M0PBM shows how to build a capacitive ESR meter.

There are all your other regular columns too, including HF Highlights, World of VHF, Antennas, Vintage TV& Radio and Data Modes as well as your Letters, Rallies, the latest News and more.

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