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Keylines

I'm writing this while on a cruise on the Danube – no radio this time, though. But I was interested in a conversation I had with a fellow passenger who had been in the Royal Marines. I mentioned that I was a radio amateur and his reaction was an interesting one. He said that over the years he had met a number of hams and had always been struck by their enthusiasm for the hobby. He cited an example of being in the middle of the Arabian Desert and some of his military colleagues stringing up an antenna and starting to make contacts around the world. I wonder whether our current generation of radio amateurs are equally enthusiastic about the hobby? Hopefully so.

Staying on the Air

But this brings me to a related subject, to do with staying on the air come what may. If, for example, we have enjoyed a big station over the years and now find ourselves unable to put up big antennas, run high power or whatever. **Steve Telenius-Lowe G4JVG** has written an article, which will appear next month, about how he has addressed this challenge in his own life but I'm sure it's something that many *PW* readers must have had to face (and, indeed, which I am currently facing having had to take down the antennas at my son's house). Do we throw in the towel, try new bands or modes, try portable operation, remote operation or what? The good news is that our hobby has many facets and if one no longer offers the same opportunities as before, maybe something else can take its place. The QO-100 satellite, or indeed satellite operation generally, are other possibilities, requiring modest real estate or even lending themselves to portable operation.

Whatever our circumstances, we can hopefully continue to pursue our hobby and, yes, I do realise that flat dwelling, modern houses with tiny gardens, being confined to a nursing home or whatever do place major constraints on us, but this is surely where our ingenuity can come to the fore. Sadly, fewer clubs nowadays seem to have permanent stations of their own, although I know some still do.

I'd love to hear your stories of dealing with such adversity and still being able to enjoy the hobby.

Ladies in Amateur Radio

Ladies are often forgotten in our hobby despite making a significant contribution over the years. BYLARA, the British Young Ladies Amateur Radio Association, founded in 1979, does a good job and they are represented at

many events through the year such as the recent Blackpool (NARSA) Rally and the RSGB Annual Convention. I am also on the mailing list for the Ladies Radio yl.beam email newsletter edited by **Heather ZS6YE**, containing YL news from around the world. And plenty of news there is too – the recent issue reported YL activity from the USA, Japan, the Netherlands, Indonesia, South Africa, Belgium, Belize and Peru among others. Well done to all – keep up the good work. I recall a newly licensed YL in my early days in the Northampton area who would join our Sunday lunchtime AM nets on 160m while her husband cooked Sunday lunch. How refreshing!

Again, I'd be more than happy to feature news of YL-specific activity, particularly here in the UK.

Carried over

Yet again, I have to apologise for failing to include some of the articles promised in *Coming Next Month*. Rest assured, most if not all will appear next time, but this month I received several items that I felt were particularly timely – the GMDX Convention report and one on the Blackpool Rally, for example. And we have quite a bit of *News* again and a good selection of *Letters*, of which I am always grateful – I consider a busy Letters page a sign of a healthy magazine. Thank you one and all.

As for other articles this time, I hope you find them of interest. There is the usual selection of reviews, band reports, technical and historical articles and more – hopefully something to appeal to one and all!

Don Field G3XTT
Editor, *Practical Wireless* Magazine

Contents

Newsdesk

Have you got something to tell our readers about? If so, then email **practicalwireless@warnersgroup.co.uk**

TROPHIES GALORE: Members of Torbay Amateur Radio Society (TARS) recently celebrated the 80th anniversary of the founding of the society. First came the Annual General Meeting, notably at which, the appointment of a new society President was made; **John G4VUD** being selected from a short list of highly regarded, long standing members. More recently, the much anticipated annual 'Presentations Evening' was held.

Normally, the Presentations are made on the last Friday in March. This year things were a little different. Two members of the society; **Eddie M8EVM** and **Alex M7DPA** have been selected to join the national contesting team based at the Royal Signals Headquarters in Dorset. The Royal Signals team will be participating in various events throughout the year; including one that falls at the end of the month. With this in mind, the society's committee decided that the Presentations Evening should be moved back a week to allow Eddie & Alex to attend.

Numerous awards and trophies are available annually for members of the society to compete for – all on a very friendly basis of course! Having said that, some trophies are very sought after, depending on members spheres of interest within the hobby.

This year saw two members dominate the awards, after some very prolific operating:

- Tony G6GLP earned six trophies.
- Eddie M8EVM earned five trophies.
- Paul G4RRA earned two trophies.
- Jeff M0WSZ earned two trophies.
- Alex M7DPA earned one trophy
- Andrew G8UUG earned one trophy.
- Paul M7EXV earned one trophy

Runners' Up certificates were also handed out to those in certain categories whom the judges deem worthy.

The awards are based on the log books which club members submit (electronically) to a computerised adjudication system called the TARS Robot, which was designed & built by society member **Tony G6GLP**. The committee, and society as a whole wish to thank him for his ongoing commitment to its maintenance and operation. The awards offered during the evening are available to all members to compete for regardless of licence level, although some of them are specific to new, or younger members of the society. Everybody is welcome at TARS, and we are pleased to offer help and support to anyone with an interest in communications, as well as individuals wishing to gain an amateur radio licence.

Torbay ARS meets every Friday at the Teignbridge District Scout Headquarters, Woolborough Street, Newton Abbot. The Scout HQ has excellent access and there is ample parking, as the building is located in the corner of the Woolborough St. car park!

Further information regarding future events can be found on the society's website at: **www.tars.org.uk**

LINHT-HW: LinHT is an open-source handheld software-defined radio (SDR) transceiver built around a modern Linux System-on-Module and a true IQ RF front-end. It is the successor of the OpenHT project, with focus on:

- simpler and more maintainable hardware,
- no FPGA in the signal path,
- tight integration with Linux, GNU Radio, and modern SDR tooling,
- long-term openness and hackability.

LinHT is developed by members of the M17 community and is intended primarily for radio amateurs, SDR experimenters, and developers.

https://linux-radio.eu

PEBBLE HF: Amateur radio is a fantastic hobby for learning, connection, and adventure. Small and portable radios are perfect for learning HF radio, connecting with people, and outdoor radio adventures (POTA and SOTA).

Pebble HF is an ultra-affordable, ultra-portable HF radio kit for anyone to get into HF amateur radio. Pebble HF was created to get more people into the wonderful hobby, encourage people to upgrade their licence to have fun with HF, or simply encourage more people to have fun with outdoor radio!

What makes Pebble HF different?

- Ultra-affordable, easy to build kit
- ~ 5W output with 12V input
- ~ 1W output powered by USB-C 5V
- Built in CW key and microphone

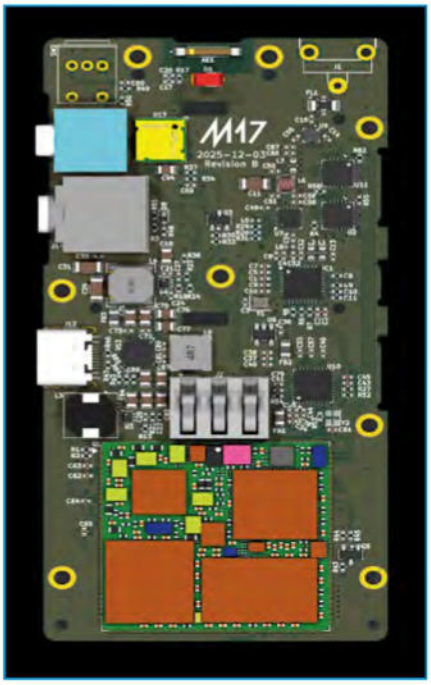
Pebble HF was born from the idea of how to make a capable QRP radio ultra-affordable and easy to build. It is ultra-affordable by being a single-band radio with minimal parts and almost all pre-populated surface mount parts, which makes it easy to build. It uses a well proven design, the uSDX, which suits these goals.

Pebble HF is a low power QRP radio for Morse code (CW), voice, and digital modes (these require an external adapter). Pebble HF can output ~5W on battery power but can also output ~1W powered by USB, so that you can get started even without investing in a special battery. At less than 0.5lbs (8oz), it is a great option for trying out portable radio.

https://pebblehf.com

OT NEWS SPRING 2026 ISSUE: The spring issue of *OT News* is now available. As usual the magazine opens with the President's comment page, followed by the editor's page, and then the News & Comments section. The wide-ranging content includes an article about decoding & displaying images from weather satellites, and the Apollo 11 moon landing. The piece about the 1964 RSGB 2m field day contest provides an interesting insight into the 'state of the art' back then. How things have changed. Contrary to what some believe, there is no '25 yrs licensed' requirement to be eligible for membership of the Radio Amateur Old Timers' Association. For full details about membership visit the website at:

www.raota.org



RAFARS AIRFIELDS ON THE AIR EVENT : Once again, the Huntingdonshire Amateur Radio Society (HARS) Special Event Station Team assembled to set up the Special Event Station (SES) GB0WYT for the Annual RAFARS Airfields on the Air event from Royal Air Force Wyton in Cambridgeshire. Our venue for the event was Glebe Farm which sits just West of the RAF Wyton Main Runway 08/26 and South of 07/25 main runway at old RAF Warboys. The Owners of Glebe Farm kindly agreed to host us again to operate under canvas on the Camp site for this year's event. We set up on Friday 11 April after lunch and soon had the tent and various masts and antennas erected ready to crack on with some radio testing. All proceeded like a well-oiled machine with no hitches, then onto a mug of tea and biscuits for everyone and some reflection on the slight changes we made this year to our antenna farm from previous SES's that we had put on.

The Saturday we had an early start at 8:00am for some of the Team with the CQ calls on our HF radio soon ringing out. The rest of the Team arriving by 10:00am with a staggered start it meant the mid-morning Team could take over the operating and logging from the early session operators and they could have a decent break. During the day we had to work hard to get any contacts due to the propagation being awful.

Contacts were coming in from the UK and eastern Europe with various other countries following as the day slowly progressed.

The Sunday start was later at 9am and we were soon trying to get into plenty of radio activity but unfortunately it was slow progress with only UK callsigns answering our CQ calls. Then from 12:00hrs local someone turned the propagation switch on and away we went with pile-ups working 41 QSO's in 1 hour and 15 minutes. We experienced a very quiet weekend radio wise until the Sunday lunchtime onwards.

Nevertheless, the weekend contained plenty of banter around the station and a regular changeover of operators and loggers on the radios meant it was an enjoyable event. We operated a few callsigns with CW with some good contacts into Poland and Croatia. Overall, we worked some 75 contacts during the operating period which included six Airfield callsigns including Florennes Air Base in Belgium on the Sunday.

HARS is a friendly radio Club with a wealth of radio and cyber knowledge among its members who are willing to share with fellow amateurs. It has a face-to-face meeting at the end of each month at Buckden Village Hall. Further information can be found at:

https://hunts-hams.weebly.com
www.kingsriptonfarm.co.uk

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New from ML&S

1. The **TYT UVL-15W** is a dual-band FM handheld covering the 2m and 70cm amateur bands, with a claimed RF output of up to 15W. This places it above the typical 5W handheld class and positions it as a higher-power option for portable and field use.

In addition to standard analogue FM operation (136–174MHz and 400–480MHz), the receiver includes extended coverage such as Airband, making it suitable for general listening as well as amateur use. A notable feature at this price point is the inclusion of built-in GPS and APRS capability, allowing position reporting without external hardware. Bluetooth support is also provided for use with wireless audio accessories. The set is supplied with two antennas of differing lengths, allowing a choice between compactness and improved performance.

The headline 15W output provides a measurable advantage under marginal conditions, particularly on simplex, although, as expected, this comes with increased current consumption. Power is supplied by a 3600mAh Li-ion battery, which offers reasonable operating time depending on duty cycle and power setting. Charging is via USB-C, alongside a supplied desktop charger.

Physically, the UVL-15W follows a conventional handheld format. The unit has an IPX4 rating, which provides protection against light splashes, though it is not intended for full outdoor exposure in adverse conditions.

The integrated APRS and GPS functionality adds useful capability, particularly for event support, tracking, and portable operating such as SOTA or POTA activations. These features, combined with the higher RF output, give the radio a practical advantage in certain operating scenarios.

This is a capable handheld suited to operators who value increased output power and integrated tracking features, particularly for portable and field use.

Price is £109.96. A programming cable is available for £12.95.

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2. The **MYDEL S60** is a compact, multifunction portable power unit designed for emergency use, outdoor activities, and general backup power applications. Combining a lithium-ion battery pack with multiple charging methods, including a manual hand crank, offers versatility that will appeal to portable operators and those preparing for off-grid scenarios.

At its core, the S60 features a battery capacity of approximately 22,500mAh (83Wh), providing sufficient energy to charge handheld radios, smartphones, and other low-power devices multiple times. The unit supports both USB-A and USB-C outputs, including Quick Charge 3.0 and Power Delivery up to 18W, enabling relatively fast and efficient charging for modern electronics.

One of the more distinctive features is the integrated hand-crank generator. While not intended as a primary charging method, it provides a useful emergency option when no other power sources are available. In practical terms, the output from the crank is modest, requiring sustained effort to generate a meaningful charge, but it could prove valuable in critical situations where maintaining communication is essential.

The S60 can also be charged via USB input, supporting both Micro USB and USB-C, making it compatible with a wide range of common charging sources. This flexibility allows the unit to be topped up from mains adapters, vehicle chargers, or portable solar panels where appropriate.

In addition to its power functions, the unit incorporates built-in lighting, including a torch and a larger LED panel. These features enhance its usefulness as part of an emergency or field kit, providing illumination during power outages or nighttime operation. The overall design is compact and lightweight, making it easy to transport in a rucksack or equipment case.

From a radio amateur perspective, the S60 is best suited to supporting low-power equipment or accessories like mobile phones and tablets used for logging or digital modes. Its capacity is not sufficient for extended operation of higher-power HF transceivers, but it could serve as a useful backup or supplementary supply during portable activations.

Currently on sale at £49.99.

3. The **QRO RXABOX** is a compact receive preamplifier designed to enhance weak-signal reception across the HF spectrum. Intended primarily for use between the antenna and receiver, it aims to improve signal readability in situations where signals are marginal or antenna efficiency is limited.

Covering a wide frequency range from longwave through to approximately 30MHz, the RXABOX is suitable for general HF operation, including amateur bands, shortwave listening and utility monitoring.

The unit provides adjustable gain, allowing the operator to optimise performance according to band conditions and local noise environment. The unit is designed for 50Ω systems and integrates easily into a typical station setup, being inserted inline between the antenna and receiver.

Current consumption is modest, making it suitable for both fixed and portable operation when paired with a suitable DC source.

Physically, the RXABOX is housed in a compact enclosure, allowing it to be conveniently incorporated into a station layout or portable kit. Its straightforward design reflects its intended role as a practical signal enhancement tool rather than a complex accessory.

Overall, the QRO RXABOX provides a simple and effective means of improving HF receive performance.

Price £102.95.

hamradio.co.uk

CHIPPENHAM & DISTRICT ARC 60TH ANNIVERSARY: We are pleased to advise you that Chippenham and District Amateur Radio Club are celebrating our 60th Anniversary throughout 2026 and have many events planned throughout the year. We have monthly portable activations planned with our Club GX3VRE callsign, a visit to the National Radio Centre in Bletchley Park and the hosting of our now well established Wiltshire Radio Rally which takes place on Saturday 25 July 2026 at Kington Langley Village Hall and Playing Fields from 9am. We'd be thrilled if you could share our celebrations with your readership. We meet every Tuesday from 7.30pm at Kington Langley Village Hall near Chippenham and welcome everyone. For more details about our rally or more information about our 60th Anniversary special events, our website is: **www.chippenhamradio.club**

NEW MICROWAVE CAPABILITIES FOR THE NRC: Icom UK is proud to equip the National Radio Centre (NRC) with the IC-905 All-Mode Transceiver as part of its ongoing support for the RSGB and the amateur radio community. This latest addition ensures that volunteers and visitors at the prestigious Bletchley Park facility have access to the latest VHF, UHF and SHF technology.

The IC-905 is an industry-first providing seamless

multimode coverage across the 144, 430, 1200, 2400, 5600MHz, and 10GHz bands. The arrival of the IC-905 opens up new avenues for the centre, from linking local repeaters to monitoring radio beacons for the study of microwave propagation. The IC-905 was officially handed over to **Steve Thomas M1ACB**, RSGB General Manager, at the Martin Lynch & Sons Open Day earlier this year. It has now found its home on the radio bench at the NRC joining a formidable fleet of Icom equipment that includes the IC-9700, IC-7300 and the portable IC-705. **Martyn Baker G0GMB**, NRC Coordinator commented, *"A long-time supporter of the RSGB National Radio Centre, Icom UK have kindly made available an IC-905 for demonstration purposes. NRC Volunteers were keen to see first-hand the IC-905 and operate the industry-first multimode VHF / UHF / SHF transceiver. With no previous microwave-capable transceiver at the NRC, volunteers are particularly interested to see how the radio functions and what is possible. Our thanks go to Icom UK for their generous support to the NRC where we now have four Icom radios…an IC-905, IC-9700, IC-7300, and IC-705…all operational"*. This support highlights Icom's ongoing mission to support the amateur radio hobby and the educational work carried out by the RSGB. By supplying cutting-edge hardware, Icom UK helps ensure the NRC remains a world-class hub for radio enthusiasts and newcomers alike. **Bob Stockley**, Managing Director of Icom UK, added, *"The National Radio Centre is a vital shop window for amateur radio, showcasing the evolution of communication to thousands of visitors every year. We are delighted to continue our support of the centre with the IC-905. It's important to us that the hobby stays at the forefront of technology and we're excited to see how the NRC volunteers and visitors use these new bands to explore the frontiers of radio science"*.

HAM DASHBOARD BY G0LIW

This handy dashboard, showing a vast amount of radio-related information, including propagation, DX spots, solar activity, contest calendar and more is available at: **https://hamdash.com**

Northern Radio: The NARSA Blackpool Rally 2026

Georg Wiessala revisits the epic Norbreck Castle Hotel in Blackpool to take a closer look at a signature event on the annual radio rallies calendar, recognised for its local flavour and unhurried atmosphere.

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I can't believe it's three years ago that I last reported here from the Blackpool Radio Rally, or the annual show of the Northern Amateur Radio Societies Association (NARSA) to give it its real name (*PW* July 2023: 48). I have not attended for a few years, owing to conflicting commitments and family events, but I was determined not to miss this show again this time, even though it clashed with the Golborne Rally of the British Vintage Wireless Society (BVWS).

Blackpool is a mere 30-minute drive for me, along the M55, and parking at the site or along the often stormy seafront is never a problem. This year, I had an added impetus for going because I wanted to sell some gear at the bring-and-buy, run by the Central Radio Amateur Circle (CRAC). I was also keen to revisit the RSGB stand, which is always a treat, on account of the interesting radio books and other resources to be found there.

NARSA 2026 is the largest show in the Northwest, and this was the 62nd iteration of this event. It took place from 10:30 on Sunday, 12 April, at the Exhibition Centre of the once-imposing Norbreck Castle Hotel. The latter was erected as a private country residence in 1869. It later expanded into a grand hotel, the Norbreck Hydro, with ballrooms, a pool and leisure facilities. During World War II, it was used by the Government, then returned to hotel use after 1951. Admission was £8 this year, and card payments were accepted.

The Blackpool Show does not tend to attract the 'big' names in radio trading, and many bemoan this and stay away. However, this can also be seen as an advantage because it leaves room for local talent, special advocacy groups and brilliant regional clubs to shine. Having said that, ICOM UK were present there this year, as well as LAMCO.

The photographs on this page are meant to provide just a flavour of this year's show, which was obviously enjoyed by both clubs and attendees. Next year's NARSA Rally is scheduled for Sunday, 4 April 2027 (TBC).

Additional Information

NARSA 2026:
https://narsa.org.uk
Norbreck Castle Hotel Drone Footage:
https://narsa.org.uk/?page_id=4478
Pictures from 2025:
https://tinyurl.com/fs4y74u9
Previous Coverage: *PW* July 2023; *The Spectrum Monitor*, June 2023. **PW**

1

A Hit from Malahit? The LITEMALADSP MLite-880

Georg Wiessala takes a closer look at the LITEMALADSP MLite-880 portable HF SDR radio, which offers SSB reception, Airband, Bluetooth, and a monochrome spectrum display.

Georg Wiessala
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If the acronym 'LITEMALADSP' were an anagram, how many other words can you make from it? Go on, have a go – answers on a QSL card to the editor please!

Seriously though, this month, I have come across a radio that seems as versatile as a good anagram. This is the MLite-880 (**Fig. 1**), designed in Russia and manufactured in China. I came across it online, via some early reviews, and I wrote to the team at *elecevolve* to see whether they might send me a review unit. They did, and, in the interest of full disclosure, I was sent this radio for free and to keep after the review.

What follows is from the perspective of the kind of user whom I feel the MLite-880 was designed for: casual radio listeners, who are looking for a simple mobile or travel radio with bonus features, such as Airband coverage, and who enjoy occasional forays into HF and the Amateur Radio Bands, including SSB.

At the moment, the closest competitors of the MLite-880 are small portable radios, such as the XHDATA D808 and the various chip-based 'ATS' incarnations, perhaps also the new Choyong WT2 (*The Spectrum Monitor*, Feb 26: 110. The MLite-880 seems like the natural successor of the Malahit DSP SDR (*RadioUser*, May 2022: 28) and the DSP 2, which have a dedicated following among SDR experimenters and DXers.

The support team at *elecevolve* describe the market position of the MLite-880 as follows: *"It [the MLite-880] is conceived as a streamlined version of the Malahit DSP2. It is offered at a more accessible price point while maintaining solid performance. The operation is also more user-friendly compared to the DSP2, making it an appealing choice for a broader range of radio enthusiasts."*

The MLite-880 was designed by **Georgy Yatsuk RX9CIM** and **Vadim Burlakov R6DCY**.

Unboxing, installation and software update

The MLite-880 safely landed in my shack after a fortnight in transit, which was good, given the current global situation affecting deliveries. The radio has a small form factor, measuring 156 x 105 x 32mm (L-W-H), including the tuning knob, and weighs in at 414g, with the battery in.

The radio comes with a basic instruction leaflet (*Version v2.1.0*), which is also available online. This is in a mainly visual format and clear English. Some additional information on the MLite-880 can be found online, on the *elecevolve* homepage, plus on various Facebook user groups and other sites (**Table 1**).

This compact receiver covers 130kHz to 30MHz, plus FM, OIRT (Eastern European FM, 65.8-74MHz VHF FM) and Airband (118-137MHz VHF AM). The receiver comes with a slightly 'ruggedised' paint covering the lower part of the device and a monochrome screen in the top right half. The screen can be disabled during longer-term listening, using the No. 9 key, to save battery. The casing is made of plastic and has 16 front buttons, a rotary knob, a USB-3 (5V/1A) charging port and a headphone socket on the right, and a connector for an external aerial on the left-hand side. The battery is a rechargeable 21700 Li-ion, 3.7V, 5000mAh unit. Don't forget to remove the plastic strip from inside the battery compartment before

Fig. 1: The Malahiteam MLite-880 with the supplied accessories and short manual.

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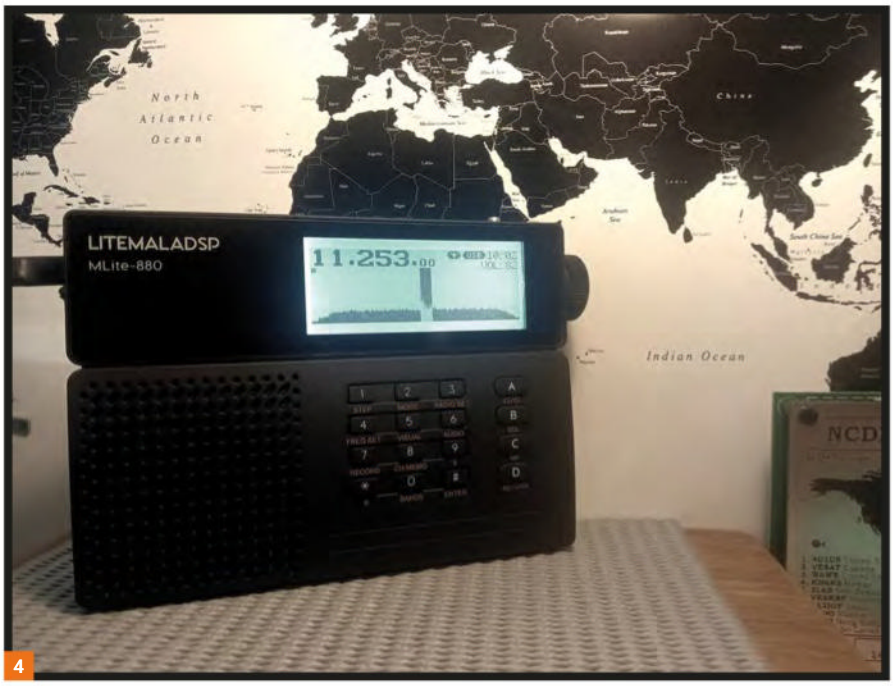

4


5a

5b

Fig. 2: BBC Radio 3 with RDS provided the soundtrack to this review. Fig. 3: The Voice of Turkey on 15350kHz came in loud and clear. Fig. 4: The MLite-880 enables you to monitor VOLMET transmissions. This one is the RAF on 11253kHz. Fig. 5: DDH 47 from Germany on 147.3kHz, providing the *Finnish Ice Report* on LW (decoded externally and with external loop). The presence of the *RNLI Coastguard* is optional.

you first use the MLite-880. Alternatively, you can use a suitable power adapter (5V/1A); the USB-C port serves as both the power supply and charging interface. Or use a power pack when you're out and about.

On top of the MLite-880, you find the main on/off slide switch, as well as an SD card slot. I inserted my largest (32GB) SD card (use your fingernails) to be able to access the playback and recording functions. Finally, at the back of the radio, there is a nearly 90° angled fold-out stand that helps to bring the device into a comfortable semi-upright position on your desktop. This is very useful, but the inbuilt telescopic aerial does not go to full vertical when the flap is out, if you see what I mean. Not a big deal, though.

Version 1.3 of the firmware (FW) for the MLite-880 came out around mid-March 2026. The software, as well as the Windows app made available, can be downloaded from the *elecevolve* website (Table 1). The update offers, among other things, a brightness mode for nighttime display and separate frequency correction features for <27 and >108MHz. The microSD card format is now 'exFAT' (Extended File Allocation Table). The S-meter has gained a dBm display option, and a spectrum gain feature has been added to the menu. Full instructions on how to install the setup programme (*Setup MLite Version 1.0*) and the most recent firmware, *FW 1.3*, can be found here:

https://tinyurl.com/4ddecyns
https://tinyurl.com/4wzretpw

The MLite-880 in Use

I began my explorations – as I always do – with UK FM broadcast radio reception (**88-108MHz**). This worked well, including the RDS (Radio Data System) scrolling text (**Fig. 2**). The speaker is small enough for desktop and in-car operation. For a fuller, more room-filling sound, you might want to connect a passive or active external speaker. Plugging this in and pressing the A key will route the sound output to the speaker you have chosen, or to your PC, via a suitable audio cable (see below). I connected a medium-sized passive speaker from bhi first, and this produced a pleasant, sufficiently distortion-free sound, even at full volume.

Linking up my Sony SPS-XB12 active Bluetooth speaker and pairing it with the MLite-880 via the No. 3 key resulted in a sound loud enough for a house party – *not that I go to many of those anymore*. Tuning around on 'FMB' (the FM Broadcast Band) can be done by either direct frequency entry or scanning via the tuning wheel. With the telescopic aerial, the MLite-88 brought in all of my favourite FM stations, and then more. It's sensitive enough for normal or travel use. I tried some secondary frequencies that are 'borderline' here in the Northwest (e.g. 91.5 instead of 90.8MHz for BBC Radio 3), and this worked well.

HF reception: from LW to MW

Having an external antenna socket enables you to make this receiver fly higher, in terms of reception quality. The supplied adapter is audio (male) 3.5mm stereo to SMA (female). Invest in an extra

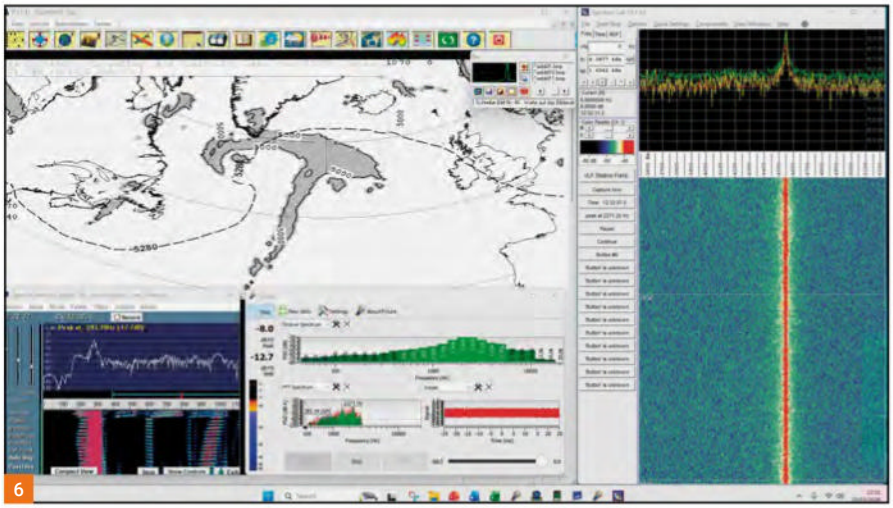

Fig. 6: The DWD WEFAX broadcasts also came in clear enough to be decoded and illustrated.
Fig. 7: Decode of an RTTY transmission from the German Weather Service, received on the MLite-880.

quality adapter if you wish. During my tests, I first used the built-in telescopic antenna, which extends to 71cm. The radio offers a switchable Bias-T option for active antennas. I also used my Deshibo WT-61 small passive loop antenna for the MLite-880, and this resulted in a significant step up in S-Meter strength.

Important for LW and MW fans: the MLite-880 does *not* have an internal ferrite rod bar aerial. For these frequency sections, you must connect an external antenna which does not rely on the induction-loop principle, such as (at varying price points) the You Loop, Reuter RLA4 (*RadioUser*, May 2020: 18), BAZ LFM/300-2000, Grahn (GS5SE/ ML1/2 or MW1/2), Deshibo GA-800, PK Loop, and Palstar AA30/ LA-30.

Remember, if you choose to connect an external aerial, you can select the type you are using (Hi-Z or 50Ω) in the antenna menu (No. 3 key/ option 1). Remember, when using the radio's built-in telescopic antenna for MW and SW reception, you can select the Hi-Z high-impedance function for even better reception.

On my *Deshibo WV-601* passive loop, the MLite-880 received many strong MW stations, as well as some weaker ones. Here in the Northwest, Manx Radio (**1368kHz**) is my 'lynchpin'; the station came in fine at all times. It did not appear on some of my other radios during this test. Evenings and nights yielded more MW broadcasters, some of them transatlantic. The noise-reduction feature (C key) proved useful here. On LW (from 130kHz), BBC (LW) on **198kHz** was still there, strongly and reliably (until September 2026). I tried the non-directional beacon (NDB) band and was surprised to hear Warton BAE (WTN, **337kHz**, **.-- - -.**).

On the short waves

Moving on to SW, the MLite-880 captured some of the more powerful broadcasters that still remain in this band segment during daytime, such as China Radio International (**17650kHz**) and The Voice of Turkey (**15350kHz**; **Fig. 3**) with both the telescopic and my external antenna. Aeronautical VOLMET, like the RAF on **11253kHz** USB (**Fig. 4**), was not a problem either. The radio's adjustable noise reduction and audio filters were very handy here. Other aero voice transmissions, from Gander and Shannon on **6547** and **8879kHz** USB, also came through a little stronger than expected, with a usable signal at my location.

On the amateur radio bands, I did hear several operators in many languages, mostly on the 20m band (e.g. **14247kHz** USB). Many of them came from stations on the Continent, for example, Germany talking to Spain. The noise reduction function, once again, was very useful here, when judiciously applied.

So, if you listen to amateurs occasionally, as I do, for example, to learn about the weather or news from different regions of Europe, the MLite-880 will be right for you.

While it is certainly not a 'DX machine', its performance on HF was always more than acceptable, and at times it was very good. If you are into HF broadcast listening, the MLite-88 makes for a good travel companion or secondary shack or monitoring radio. But you must experiment with several aerials to get the best match. I found that using external ones makes for generally quieter and stronger reception of signals.

Data and utility transmissions

The MLite-880 has no internal decoders for utility signals, but there is an easy workaround: users can channel signals to a PC and/or sound card, via the audio connection to the radio's headphone socket, below the tuning wheel. I did this to try to go on the hunt for some data signals. LF Time signals, like those on **60 (MSF)** and **77.5kHz (DCF77)**, are outside the range of this radio, since coverage begins at 130kHz.

However, **DDH 47** from Germany on **147.3kHz** (148.3, LSB) was at first visible as a trace on my PC decoder. On some days, I could also

resolve the transmission during the day, with the narrow filter option, LSB, volume at 80 and noise reduction off. Using the MLite-880 to read LW weather data transmissions from the German Weather Service (*Deutscher Wetterdienst, DWD*) in German was great – a remarkable feat for such a compact receiver (**Fig. 5**). I still use the ancient *Zorns-Lemma 11.42* to decode. If you have more contemporary software, do try 147.3kHz; you can leave it running all day on one MLite-880 charge.

Take the weather with you

I then moved on to signals I am keenly interested in: the clear-text and synoptic **Radio Teletype (RTTY)** weather transmissions, also from the DWD in Pinneberg, near Hamburg. Some daytime frequencies, e.g. **10100.8** (10099.5 USB) and **11.039kHz** (11037.5 USB), brought in strong signals, which my software duly resolved and decoded. I was also able to receive illustrated weather reports from stations in Greenland on the MLite-880. For this, it helped to have the *Peak Level Meter* by *Darkwood Designs* on screen, as well as the *Windows Friture* tool, as shown in the margins of **Figs 6** and **7**.

This setup worked well with the MLite-880 – a result that I did not expect. With older software like *Zorns-Lemma 11.42*, the benchmark is whether the software decoder displays images of the ships and buoys from which the transmissions originate. If it does, the receiver in question is good. Well, reader, it did, and it is great to know you can take this radio on your boat and receive weather data without much effort, using an external antenna and your laptop.

What I was even more amazed about is that this little radio could also receive **Radio Facsimile (Fax, WEFAX)** transmissions from DWD and JOMOC. I tried the daytime frequencies of **7880** (7878.2kHz) and **8040kHz** (8038.1 USB), and maps soon began to build up on my screen. The image quality beat some of my dongles into a cocked hat, and I have experienced much more degraded Fax imagery from some much more expensive gear in the past. A very decent performance, indeed.

As you can see, it was a stormy day in Lancashire. Mode was USB, and I left the volume on the MLite-880 once again at around a value of 80.

Overall, the unexpected ability of the MLite-880 to pull in weather data was impressive and required only the smallest of efforts, with the right accessories and software. I let the receiver run all day, which used about one-third of a full charge. Good stuff and doesn't break the budget.

VHF airband and 'texting for planes'

The MLite-880 includes Civil Airband coverage from **108-136MHz**, which seems to have become something of a trend with new portables of this kind. I live underneath one of the biggest aerial 'crossroads' of the UK and always have one scanner or another running in the background. The MLite-880 is not a dedicated Airband scanner, so you ought to connect a suitable Airband aerial first. I plugged in my Moonraker Skanking Discone 25-1300MHz outdoors wave-catcher, and the MLite-880 made friends with it straight away.

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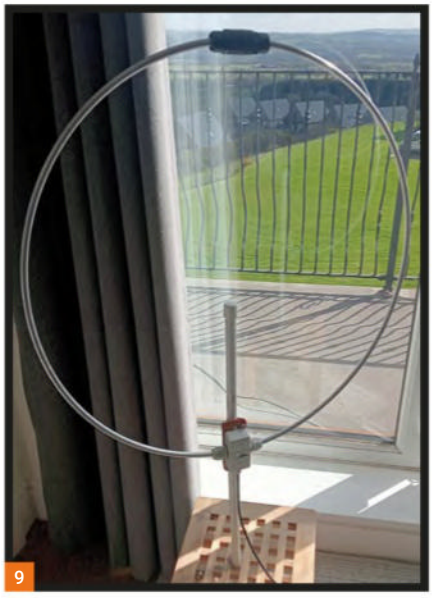
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You can set the MLite-880 to scanning, but I could not find a way for it to scan *just the Airband*, for example. However, for occasional forays into this area, this will do.

I also enjoy receiving digital aircraft data via the ACARS (the Aircraft Communication Addressing and Reporting System); 'texting for planes', as it were. ACARS messages are transmitted on VHF, HF, and via satellite (e.g. Inmarsat), using minimum-shift keying (MSK) modulation. MSK is a type of continuous-phase frequency-shift keying invented in the 1950s by Collins Radio engineers **M L Doelz and E T Heald**.

In Europe, the primary VHF ACARS frequencies are **131.525**, **131.725**, and **131.825MHz**, and one or the other of those is nearly always active. I tuned the radio to 131.725MHz and linked it back to my laptop and the Black Cat ACARS decoder via the headphone socket, thus resolving signals without any difficulty, depending on plane traffic.

Fig. 8: The fast route to the various bands covered by this radio, including CB.
Fig. 9: Use an external aerial: my *Deshibo WV-601* turned out to be a good partner for the MLite-880.

Summary and conclusion

In conclusion, the LITEMALADSP MLite-880 is a versatile portable radio that will offer you many hours of exploration, fun and interest. The guys at *Malahiteam* are beginning to build a reputation in the radio world, and this can be no easy task in the current geopolitical landscape, with a radio 'designed in Russia and built in China'. But you should park any reservations right now: during my tests, the purchase experience, operation and customer service were flawless, and the MLIte-880 proved itself to be a great little performer, with a surprisingly large array of possibilities and functions.

Before I go, one of the nicest features of this radio was the recording function, accessible via key 7 and a micro-SD card (not included). It works on FM and AM and is very useful if you are mainly a broadcast programme-listener. SD card recordings can be saved, exported and processed via software like *Audacity*.

I did not find a way that would allow users to make automated (timed) recordings, for example, of a MSIB (Maritime Safety Information Broadcast) or a nighttime shortwave broadcast, for monitoring and future evaluation. That's one for the developers to consider, perhaps.

All in all, this radio is easy to access, with broadcast and ham bands readily available via one press of the '0' key (**Fig. 8**). The 500 editable memory channels are enough for the kind of use this radio is intended for. It is good value for money and comfortable to use, leaving you enough in the hobby kitty to acquire some meaningful accessories, such as external aerials for any frequency bands you may be more interested in.

If you are predominantly a casual listener, traveller and occasional utility monitor, you will find the MLite-880 a worthwhile addition to your shack, campervan, boat and elsewhere. You should definitely look at using more than the telescopic aerial with this radio (**Fig. 9**) to get the best out of it and unlock its full potential. And I hope that the developers will treat the MLite-880 to an internal ferrite bar aerial soon.

There are some small things that need improvement, in my view. The tuning knob needs attention: it will soon succumb to wear and tear, and I found that there is, at times, a brief delay between tuning and seeing the result on the display. In terms of ergonomics, there are currently no Braille keyboard markings for visually-impaired users. Moreover, I feel the radio might benefit from a well-shielded metal case.

Resources and Further Reading

Download and update tutorial:
https://tinyurl.com/4ffu8hec
Firmware update link and manuals:
https://tinyurl.com/yv73z83n
Fruugo (UK):
https://tinyurl.com/4eznxjaa
Ham Radio Therapy:
https://tinyurl.com/bdyab2r7
LiteMALADSP MLite-880 Facebook Group:
https://tinyurl.com/8vcnma33
Manual:
https://tinyurl.com/3nw2rm5k
Official elecevolve homepage:
www.elecevolve.com
Radio Bunker:
https://tinyurl.com/4wkvhvn5
Radiochief.ru (Review):
www.youtube.com/watch?v=ut6cY2jZv7Q
Shortwave Radio Listeners Club:
https://tinyurl.com/bdecxzsf
Support:
support@elecevolve.com
SWLing Post (Review):
https://tinyurl.com/3nj8t8zk
https://tinyurl.com/4wzretpw
Techminds (Review):
www.youtube.com/watch?v=cmO8TIr_VFo

Table 1: MLite-880 Further Reading and Resources.

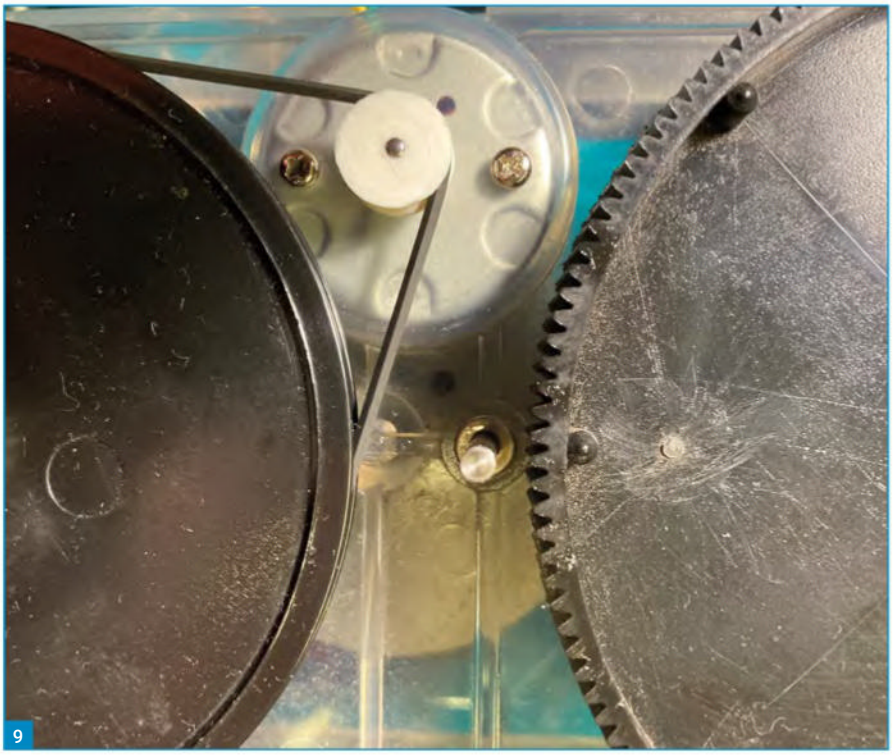
But these are mere niggles. Altogether, I think you will really like this versatile, useful and compact radio package for a very reasonable price. I shall take it on my travels with me now and explore it more.

In the UK, the MLite-880 can be purchased directly from the elecevolve website:
www.elecevolve.com

Alternatively, you can buy from outlets like Fruugo (website below) based in Cumbria, where at the time of writing the radio retailed from around £200.
www.Fruugo.co.uk

Table 1 contains links to some more background information and further resources regarding the LITEMALADSP MLite-880.

My thanks go to the responsive *elecevolve* development and support team, who dispatched the radio rapidly and answered my queries professionally and without delay. **PW**



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Servicing BayGen / Freeplay spring-driven radios (Pt II)

Phil concludes this article with a description of some of the faults encountered and repair techniques used in his ten years of servicing and collecting Freeplay radios.

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Common faults and cures

Mechanical - All Freeplay sets employ a ratchet mechanism which permits the torque drum and spring to be wound up, with its characteristic 'clicking' sound, then as the spring unwinds the ratchet locks and transmits the rotation from the torque drum to the gear train.

The amount of torque is quite substantial at 1.88Nm (1.38 lb ft) and the only thing holding it all back is a flimsy-looking three-armed plastic ratchet! Failures are rare but do occur, making the set mechanically inoperative, and I suggest that repair is then nigh-on impossible other than by using parts salvaged from another donor set.

Freeplay gearboxes are otherwise fairly simple and robust, consisting of three step-up stages each of roughly 10:1 ratio. On the FPR2 the spindles are captive - but they can come loose - in the plastic sub-chassis, with the gears held in place by small C-clips, whereas on the S360 the spindles are supported at both ends by the back panel and sub-chassis, so be careful in case the spindles, C-clips and any small spacer washers drop out or go missing. Once the gears have been removed, clean away all traces of old lubricant – a pipe cleaner is useful here – and apply a smear of light grease rather than oil to the spindles when re-installing them.

Clean away any black rubber residue from the pulley grooves with methylated spirits before fitting a new drive belt. It is worth checking the alignment of the final drive pulley and the dynamo pulley, ensuring that any thin spacer washers are refitted in the right places. The dynamo pulley is a press-fit on the shaft and

may be moved gently forward or aft if required. A trace of light grease on the straight-cut gear teeth can often aid quiet running, although a faint 'growl' during unwinding is frequently a feature of these sets.

It is possible on rare occasions for the drive belt, **Fig. 9**, to break or slip off the pulleys and jam between the gearwheel teeth, preventing the spring from unwinding. *In this condition the set is inherently unsafe and should not be dismantled* until some means of restraining and subsequently releasing the spring tension in a controlled manner has been devised, e.g. by securely clamping the winding handle. That said, I have dismantled and repaired at least three dozen Freeplay sets of most types and have never personally encountered this condition, but it is nevertheless possible. A related fault in one set was due to a stray shard of plastic becoming jammed between two of the gears, but fortunately it was obvious and could be removed with tweezers.

Unusual and rare mechanical problems

While on the subject of 'mechanical' faults, I'll mention a couple of unusual ones that I've encountered which needed somewhat specialised repair techniques. On one example, the final gear/pulley had been drilled off-centre so it rotated in an egg-shaped manner, with much vibration. Using my watchmaker's lathe, I drilled out the centre hole 'true' and pressed in a brass sleeve to make the wheel run correctly on its axle. More recently, on an early model FPR2, the tuning indicator had snapped; this takes the form of a white flexible plastic rod of about 2mm square section which is driven in a push-pull manner from the main tuning capacitor drive drum, and follows a curved channel in a sub-chassis behind and along the dial, visible at the top of **Fig. 10**. It sounds crude, but I think it's a neat design and is mechanically self-aligning. I cut a length of 0.7mm diameter brass spring wire about 10mm long, and again using the miniature lathe, I carefully drilled a 0.7mm hole up inside the tuning indicator rod each side of the break, then pushed the two ends together over the brass spring wire. It was a tight fit requiring no adhesive, the joint remains flexible and it's still working!

Electrical & electronic faults

The battery packs in S360 sets are almost certain to have failed due to age, but can easily be replaced with a series-wired pair of tagged 2/3AA 750mAh or 800mAh NiMH cells. Space in the small battery compartment is limited, and I find it best simply to stick the cells together with a sliver of thin double-sided adhesive tape and insulate the ends of the pack, rather than shroud the whole thing in heatshrink sleeving or PVC tape which could make it too big to fit. On a number of these sets, I have seen corrosion from failed cells tracking along for several inches inside the black insulation of the negative lead – it's always the negative, for some reason - and attacking the PCB, **Fig. 11**, causing quite severe damage to the copper traces, as well as in one case spreading to the solar panel and destroying that too. I do have a couple of S360 sets in which the original NiMH rechargeable batteries are remarkably still functional, although after 25 years or so their capacity is understandably somewhat reduced. Occasionally one or both cells will go short-circuit, the result being that the spring unwinds very slowly as the dynamo struggles vainly to feed into the short.

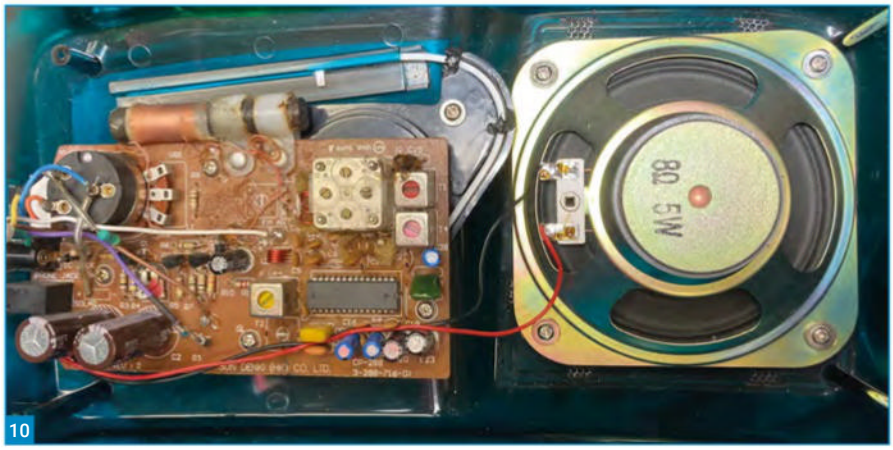

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Fig. 9: Close-up of FPR2 dynamo and drive belt [Author's collection]. Fig. 10: Interior of FPR2S showing 6,800uF capacitors and tuning dial [Author's collection]. Fig. 11: Corroded S360 PCB [Author's collection].

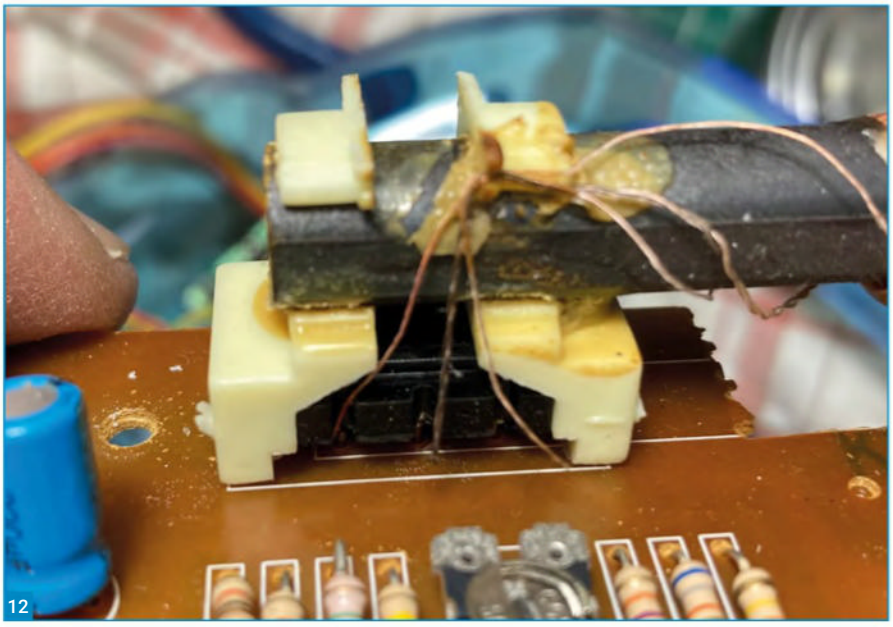
Removal of the PCB and the solar panel from the S360 model may require the storage drum or the entire spring to be manoeuvred out of the case. The spring is half the width of those fitted to the earlier models and is thus less strong

and consequently slightly less problematic. The residual spring tension, even when fully unwound, will pull the storage drum and torque drum close together, but unless they are twisted, bent or pulled apart, the spring poses little risk other than from its exposed edges. These springs are just 0.2mm thick, and while not quite a knife-edge, they can be sharp enough to cause injury. I don't apologise for repeating the advice in Part 1 to wear hand and eye protection when handling Freeplay springs.

On FPR2S models, you may find the two large 6,800µF reservoir capacitors [visible in Fig. 10 at bottom left of the PCB] to be open-circuit; the symptom (if not visible as bulged or leaking electrolyte, etc) is an audible, regular 'click' sound from the speaker as the shunt brake cuts rapidly in and out. Equally these capacitors can go short-circuit, in which case the symptoms are very slow unwinding of the spring, with no reception. Removal of the PCB on most Freeplay radios involves pulling off the spline-fitting volume control knob – not easy due to its tapering shape and smooth slippery surface - and where necessary removing the screws holding the PCB to the front of the case, which on the FPR2 in particular can be extremely tight, and care should be taken not to damage the screw heads. It is also advisable before removing the PCB to set the tuning indicator fully to the right-hand (high frequency) end of its travel so that the 'pip' on the driven end can be lined up into its slot on the tuning capacitor's drive drum more easily on reassembly. This is not necessary on the model S360 as the tuning knob, captive in the front half of the case, carries a pinion which engages with gear teeth inside the tuning drum, the tuning scale on the outside of which is visible through the edgewise window.

Loudspeakers, ferrite rods and other problems

Freeplay loudspeakers seem to be of good quality, and those smaller types fitted to S360 models have a large, low-profile but relatively heavy magnet and are rated at 1 watt, 8Ω. There is usually a transparent insulating disc on the back of the magnet. Unfortunately, they can be damaged if the set is dropped – guess how I discovered that! I have also had to replace an open-circuit speaker in an FPR2. Standard speakers may not fit due to the limited space available behind the PCB, so you may need to search for exact-sized replacements, uncommon but still available. The speakers in the FPR1 and FPR2 sets are screwed into place, whereas those in S360 models are secured in manufacture by softening four thermoplastic tabs and bending them over, which can make removal and replacement tricky. I use a screwdriver blade heated in a blowtorch flame to warm and bend the tabs away in order to remove these speakers, whereas I've had to resort to adhesive to create a rattle-free refitting.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A couple of sets were very crackly on both bands while being tuned, traced to cracked soldered joints in the vicinity of the 'polyvaricon' variable tuning capacitor. Re-flowing the joints cured the faults. Similarly, intermittent low gain on VHF was traced to a single dry joint, difficult to spot visually but identified by tapping around on the print side with an insulated probe. On two FPR2 sets, complete lack of AM reception was due to the Litz wires from the ferrite rod antenna snapping off from the mounting pins, probably caused by the rod moving due to an impact. The ferrite rod together with its plastic mounting bracket are best unsoldered from the PCB to enable the wires to be re-terminated; there are six pins, although only three are used for connections, so a solder sucker is useful here, **Fig. 12**. The ferrite rod on the later FPR2S doesn't seem to suffer the same problem.

On an S360, one of the plastic tie-wraps which secure the ferrite rod antenna to the PCB had snapped, leaving the antenna loose – the cure was obvious. Another S360 had a noisy volume control, which quickly responded to switch cleaner. On another set, thin, reedy audio was caused by the 220µF audio output capacitor being virtually open circuit. You may also encounter a dead set that has been subjected to over-voltage; the absolute maximum Vcc ratings of the U2510B receiver IC is just 13 volts and that of the Sony CXA1691BS is only 14 volts, so the chip itself can be damaged by over-voltage, potentially from an incorrectly-rated mains unit, rendering the set little more than a parts donor. Reverse polarity however is prevented by a series diode. Other than these exceptions, Freeplay radios appear to be electronically very reliable.

Case repairs

Freeplay radio cabinets are made from very strong plastic materials, but they are not immune from damage, particularly if dropped! One early FPR2 in my collection required significant and careful repairs to two of the four internal fixing posts that secure the two halves of the case together, using a combination of brass tubing, drilled hardwood dowels, Araldite and some new self-tapping screws. The telescopic aerial mounting point on the back of the FPR2 case is another weak spot that can be damaged, but to access it internally requires removal of the internal sub-chassis and the spring motor, and if this is to be contemplated, please take the appropriate precautions! There is a large screw in the centre of the winding handle which must first be removed, and there will be some residual tension in the spring due to the end-of-travel limit stop. On reassembly, carefully locate then rotate the torque drum to pre-tension the spring, and ensure that the limit stop arm is engaged in the slot before refitting the winding handle. Again, gloves and eye protection are strongly advised while handling these powerful springs.

The earlier, solid-colour FPR2 cases can be refreshed by first cleaning with 'wet-wipes' then, when dry, brushing on a thin application of silicone dashboard shine before polishing off with a dry cloth. **Fig. 13**. The translucent plastic-cased examples tend to become scratched, but the material responds well to polishing, starting with something like

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Fig. 12: FPR2S ferrite rod and broken connections [Author's collection]. **Fig. 13:** Olive green FPR2 restored case [Author's collection]. **Fig. 14:** Post-2000 Freeplay alternator [image courtesy of Freeplay Industries Ltd].

Greygate No 5 and moving on to a finer grade of metal polish. I use 'Peek' for the final stages as it is gentle, leaves no residue, imparts a high gloss finish and is one of few polish products permitted by the Museum sector.

The end of the spring-driven radio

By the year 2000, the writing was on the wall for the spring-driven radio. Freeplay Energy, a company that is still in existence and headquartered in Cape Town, South Africa, parted company with **Trevor Baylis** in around 2002 and substituted their own patented hand-powered generator based around a gear-driven three-phase alternator and rectifier, storing energy in a rechargeable battery. Many models of radios (and torches) have been made subsequently by Freeplay, but that is another story. Production moved from South Africa to China, in part for cost reasons but also to improve quality control. No doubt, the mechanical spring technology would have been expensive to manufacture, which I believe was the main reason for the change, and the inescapable hazard posed by the powerful steel springs remains a legacy. Trevor Baylis's patent covered only the spring generator and the hysteresis voltage controller, and so by abandoning this system, Freeplay were no longer obliged to pay royalties to use the patented technology. The patented Freeplay geared alternator, **Fig. 14**, is an elegant design in its own right, and the idea has since been widely copied by dozens of manufacturers offering wind-up radios, torches and other devices powered by manual effort.

Conclusion

The wind-up radio has become a world-wide phenomenon, but its inventor derived little financial benefit from his original idea. Despite receiving royalties from his patents, being awarded numerous honours and accolades including an OBE in 1997 and an MBE in 2015, and latterly campaigning tirelessly against the theft of inventors' intellectual property, Trevor Baylis died in relative poverty in 2018 at the age of 80. However, Freeplay Industries estimates that between five and ten million spring-powered sets were manufactured and sold, and around half a million FPR1s were distributed by the Freeplay Foundation during the short reign of that technology. Freeplay radios were cleverly designed and built, perform well and can last virtually forever, with a little care and attention. The powerful springs demand respect, but their presence should not deter the restorer.

Acknowledgements

I am indebted to the following individuals for providing significant amounts of their valuable time, together with clarifications, background information and images, and where appropriate for kindly granting permission for their use in this article:

- **John Hutchinson**, Chief Technology Officer, Freeplay Energy, Cape Town, South Africa
- **Vivian Blick**, European Managing Director 1997-2004, Freeplay Energy, UK
- **Chris Ellis**, Owner and Managing Director, Purley Radio
- **David Taylor G4EBT**

References

[1] Trevor Baylis's autobiography *Clock This*, Headline Publishing 1999, ISBN 0 7472 6332 9
[2] BBC1 *QED* episode from 8 August 1995: **https://m.youtube.com/watch?v=WEBivYnx6Kc**
[3] Temic U2510B single-chip receiver: **www.radiomuseum.org/tubes/tube_u2510b.html**
[4] Sony CXA1691BS single-chip receiver: **https://tinyurl.com/5d5w3sk8**
[5] **https://tinyurl.com/4ejrv5hr**

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1

SOTA LoRa APRS Tracker

David Howard M0BGR reviews the SOTA LoRa APRS tracker while out and about.

The February edition of *Practical Wireless* [**1**] described how to receive satellites using a TinyGS ground station. I have a TinyGS ground station and have been receiving low-power satellites at distances of over 2000km regularly with a very modest antenna, using LoRa technology. I was thinking about what else this technology could do when LoRa APRS caught my eye.

APRS has been around for decades – it was developed by **Bob Bruninga WB4APR** SK. APRS stands for Automatic Packet Reporting System [**2**]. It originally developed in the mid-1980s and used packet radio AX.25 protocol, which was prevalent then, to transmit data, including GPS coordinates, weather station telemetry, data, short text messages and station status over radio frequencies. It has developed considerably over time and the network is now linked to the internet, via iGates, allowing global monitoring of a station's traffic. APRS traffic can be seen, in near real time, on sites such as APRS.FI [**3**]. And, as we will see shortly, it is using LoRa protocol, in addition to AX.25 packet, for transmission.

What is LoRa?

LoRa (Long Range) is a low-power, long-range wireless modulation technique based on Chirp Spread Spectrum (CSS) technology [**4**]. LoRa is widely used for IoT (Internet of Things), industrial and environmental applications, mostly using the 868MHz ISM band. It enables low power battery-operated sensors to transmit small data or text packets over great distances. According to the description, up to 15km is possible rural areas and 2–3km in urban terrain, but we are radio amateurs so we can do better than that!

In 2019 amateur radio operators began using IoT chips, particularly low-cost ESP32-based LoRa boards, to transmit APRS over LoRa, using the 70cm band. Open source firmware was developed by 2020 and APRS over LoRa was considered mainstream by 2021.

I have been using 'traditional' APRS – AX.25 protocol over FM radio (144.8MHz) - since around 2010 but my exploration of LoRa began last year. After a conversation on 2m I set up a TinyGS LoRa satellite tracker station. Recently, I discovered that APRS was also now using LoRa in the 70cm amateur radio band (amateur radio licence required), and I had to have a go. I found a very easy way to try this – SOTA Shops [**5**] sell a very neat LoRa APRS tracker, intended for people doing portable activations such as SOTA, POTA etc. They provide a very comprehensive user guide on their site, which includes instructions on how to buy the parts and build the tracker yourself if you are so inclined. The user guide also contains links to the all important firmware. I am not yet confident with programming microprocessor boards etc. and I was short of time so I elected to buy the pre-built unit, with firmware loaded, from SOTA Shops. I also bought their accessories pack and I will now review what I found.

The SOTA tracker

The tracker and accessories, **Fig. 1**, arrived within about a week of ordering. The first impression of the unit is that it is very small but robust. It comes with two antennas – the one supplied as standard with Heltec ESP32 boards and the one in the accessories pack. I tested them both on my VNA and the latter gave a good SWR very close to 439MHz; the former didn't seem to resonate anywhere near 439MHz. The unit itself, with the accessories, weighs a little over 100g and measures 90x45x25mm (plus antenna) so very easy to carry on a portable operation. Charging is via a USB-C port so I can charge it from my phone charger or power bank, which I always carry, on portable outings anyway.

The accessories pack contains a belt clip, lanyard, desk-top charging unit and an antenna that actually works. The desk-top charger is very small and also connects via USB-C so no bulky power units required. The antenna connector on the tracker is SMA (F) so you can use your own antenna if you need improved range etc.

It is **essential** to attach an antenna **before** powering up. Once switched on the tiny screen on the unit lights up. Though it is small, the

Fig. 1: **LoRa APRS Tracker Sitting in the Desk-Top Charger.** Fig. 2: **My Shooters Hill Track.**
Fig. 3: **My Liverpool Track.**

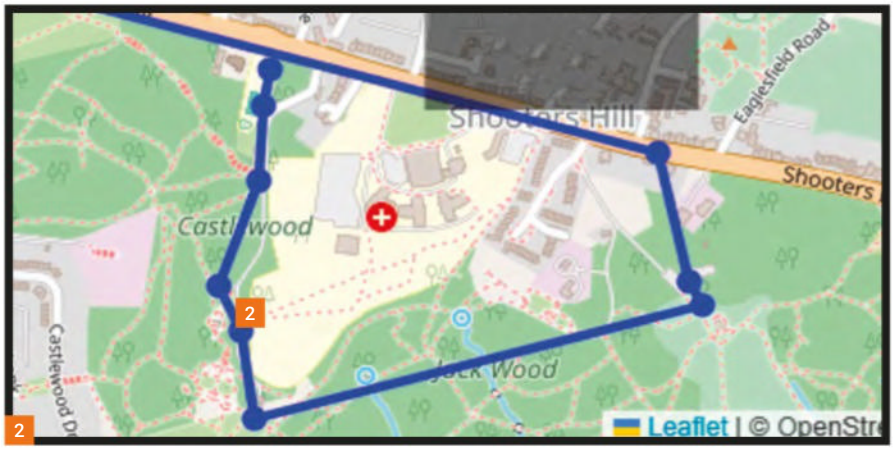
screen is readable with my aged eyes and good glasses. Configuration of the options is done on your phone or with a PC. The instructions, in the user guide, tell you how to switch the tracker to WiFi mode and connect to your phone or computer. You then open the tracker web page and make the changes you want. The ability to change options using a phone means last-minute changes can be made in the field without having to lug a laptop along.

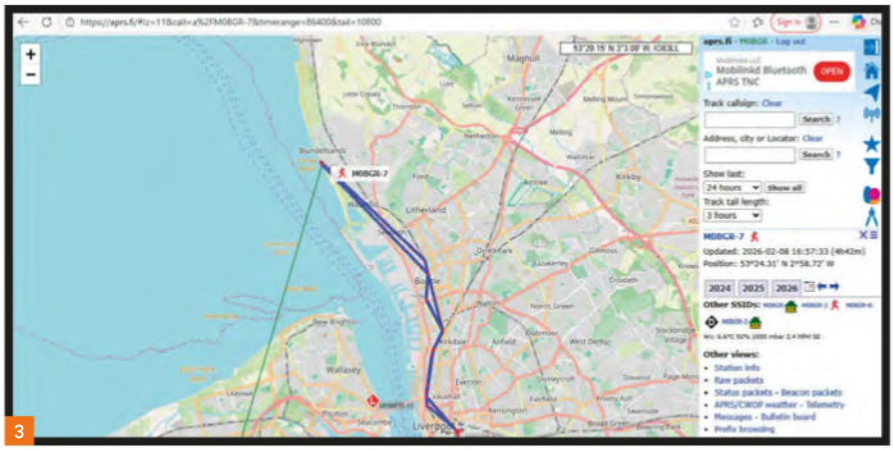
In the field you select the pre-programmed options using the push buttons on the tracker, again very easy. The nice people at SOTA Shops **[5]** had pre-programmed most of what I needed. You can program three callsigns (e.g. M0BGR, MM0BGR and MW0BGR), which you can then easily flip between them if you happen to be doing the Three Peaks Challenge. You can of course pre-program any three callsigns you want. There are three pre-programmed APRS frequencies for Europe, Poland and UK but it was not clear how to change these if you happened to go to the USA for example.

In the field

So how did it perform in the field? I am a fair-weather portable operator but we had a lovely sunny day in mid-January so I took a walk to Shooters Hill in south east London then later plotted my walk on APRS.FI, **Fig. 2**. APRS is not intended as a DX mode because what you need to do is to reach other members of your party, if you are doing peer-peer, or an iGate (possible via a relay station) if you want to be seen further afield. That said, I was keen to see whether LoRa APRS travelled the distances claimed. I started hearing stations and my signals were received by iGates when I was about 90m ASL and it then tracked most of my walk, using several LoRa iGates (shown as a with an 'L' inside a diamond on APRS.FI maps) except when I went into some deep dips. The furthest LoRa APRS iGates I reached were over 20km away, across London so well in excess of my expectations. (Thanks to MB7UAP, G4DDP and 2E1GW for their LoRa APRS iGates).

The only adjustment I made to the configuration was to reduce the transmit interval from 15 to 5 minutes, which is the minimum allowed. I believe this should be one minute, which would be similar to mainstream APRS. Alternatively, a 'Transmit Now' button could be provided. I also added comment text. I had the tracker running for about five hours that day (there is a lovely cafe near the top of Shooters Hill!) and the battery went down by about 30%. So, it should be able to cope with an all-day hike without recourse to my power bank.





On another day, I was visiting Liverpool and travelled by train to Crosby then went for a walk along the seafront, which was almost at sea level, with the tracker in my backpack, **Fig. 3**. I was being heard by local LoRa APRS iGates, but amazingly my signals reached GW0GTW, 55km away in North Wales. As far as I am aware there was no anomalous propagation that day on UHF. Since then, I have used the tracker on shorter walks and been able to access iGates within 10 to 15km regularly, subject to there being a reasonable clear path.

Conclusions

The SOTA LoRa APRS tracker is much smaller and lighter than my FM APRS radio (VR-N76). It is also robust and has a good battery life so ideal for pedestrian operations such as SOTA, POTA, etc. If you want to do more with LoRa APRS than peer-peer contacts, you need to access stations in your area that forward packets or are iGates. The LoRa APRS stations are identified on APRS.FI by the letter 'L' in a diamond. Currently there are fewer LoRa APRS stations than AX.25 stations, but given the simplicity and low cost afforded by LoRa I expect the number will increase. My tracker gave excellent range and will give my FM APRS radio a run for its money even though the tracker output is only around 100mW.

For radio club activities, RAYNET high-altitude balloons, etc. you could consider configuring a small local-area network using the iGate version of the firmware available on the SOTA website. As these are low-power devices I do not believe you need an NoV in UK, if you have an amateur radio licence, but do check your specific licence requirements. I have not yet tried to build an iGate (Spoiler Alert!) but, looking at the documentation, it seems straightforward **[6]**, easier than an FM iGate, and need not tie up a computer. So I hope you will explore LoRa amateur radio applications, particularly LoRa APRS, as I would like to see more LoRa APRS iGates on the air. **PW**

References

[1] Budget Satellites, Daimon Tilley G4USI. Practical Wireless, Feb 2026, p37.
[2] Description of APRS: **https://tinyurl.com/hbczztwt**
[3] APRS.fi website: **https://aprs.fi**
[4] Description of LoRa: **https://en.wikipedia.org/wiki/LoRa**
[5] SOTA Shop (not to be confused with SOTA Beams): **https://sota-shop.co.uk**
[6] **https://tinyurl.com/55ya8zxu**

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Antenna Matching Transformers

Daimon G4USI explains the ins and outs of building your own matching transformers as a cost-effective alternative to buying them.

In this month's *On a Budget* I thought I would demonstrate how you can cheaply and simply make your own antenna matching transformers, at a fraction of the price of a commercial unit, and at the same time, have fun and learn how these devices work. This is not a step-by-step guide, but, in conjunction with a previous article I wrote in *PW* (available in back issues or on my website) you will have enough information to build one yourself.

First of all, some basics in case you are new to antennas. In many cases, resonant antennas, meaning those cut to specific dimensions to resonate on a chosen frequency, often provide an impedance match close enough to the 50Ω that your transceiver expects, such that the antenna can merely be connected by a length of coax cable, for example a simple dipole. In other cases we may choose to use an antenna that is not resonant on any particular frequency, and then use some type of device to provide an impedance match between the 50Ω transceiver and whatever the feedpoint impedance of the antenna is.

In this latter case, some antenna tuning units (ATU's) are capable of matching such antennas without any further help, and this is particularly true of external ATU's, which tend to have the ability to deal with a high mismatch of impedances, often up to 10:1 SWR or more.

However, many modern radios with internal ATU's are only able to match antennas with up to a 3:1 SWR mismatch or thereabouts. In practice this means that such ATU's might be able to return a good SWR match with an antenna that presents an impedance at the feedpoint of up to about 150Ω – largely speaking this is in the realms of 'touching up' an antenna at the band edges of the band it was designed for, rather than across multiple bands. But bear in mind that there are always exceptions to rules, and the Xiegu G90, as one example, has a phenomenal ATU capable of matching almost any antenna thrown at it – you can read more about *some* of the Xiegu ATU's, namely the now obsolete X5105 and the G90 – in my website blog here: **https://g4usi.wordpress.com/category/miscellany**

Breaking this down

I said earlier that in many cases, resonant antennas, meaning those cut to specific dimensions to resonate on a chosen frequency, often provide an impedance match close enough to the 50Ω that your transceiver expects, such that the antenna can merely be connected by a length of coax cable. Let us explore a few different types of common antennas and take a look at what I mean.

The dipole

A dipole is typically resonant on a single frequency band and presents a feedpoint impedance of about 72Ω or so. Connecting a transceiver to this via 50Ω coax gives a 50:72 Ohm impedance ratio. Divide 72 by 50 and you get a figure of 1.44 – and this represents the SWR figure your radio or SWR meter is likely to report. (Note: that is in a perfect world. The presence of trees, masts, obstructions, height above the ground, will also have an impact on this number.)

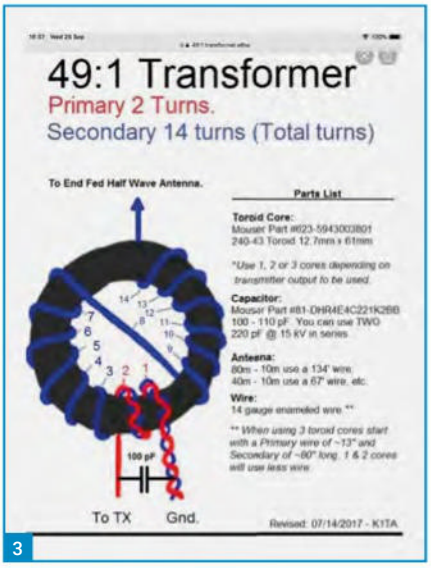
2

Now that SWR figure is perfectly fine and I would use an antenna presenting that SWR without any concerns. But if our dipole was cut (resonant) for, say, the centre of the 20m band, then as we tune towards either the top or bottom end of the band, that figure will rise, and we may decide to use an ATU to 'touch it up' or improve our SWR. Note that if our ATU is in the shack, then it is not really matching the antenna impedance, it is matching the combination of the antenna and the coax to it, but I want to keep it simple and we will not concern ourselves with this here for the moment. In any event, our rig's internal ATU is able to take care of things for us. Note also that conventional centre-fed dipoles like this, are resonant on every odd harmonic too, so a 40m dipole will also be able to be matched adequately on the 15m band, or at least a portion of it.

In the case of a resonant dipole, no further matching transformer is necessary. Again, to keep things simple, I am not covering the use of a 1:1 Balun here, but some recommend a balun at the feedpoint, whose purpose is to match the BALanced nature of the dipole to the UNbalanced nature of coax cable, hence the name. Personally, I don't bother.

The ¼wave vertical ground plane

In this antenna, to keep matters simple, let us assume that the antenna is mounted with its base 5m above the ground with three radials, which are also resonant, and which are parallel to the ground. A similar impedance to that of a centre fed dipole, or 72Ω is present at the feedpoint. However, if we change the angle of the radials and droop them to an angle of about 45° downward from the feedpoint, then the feedpoint impedance gets closer to 50Ω, providing a better match to our 50Ω coaxial cable and a better SWR. Again, no further matching is necessary, except that we might wish to use an ATU at the band edges.



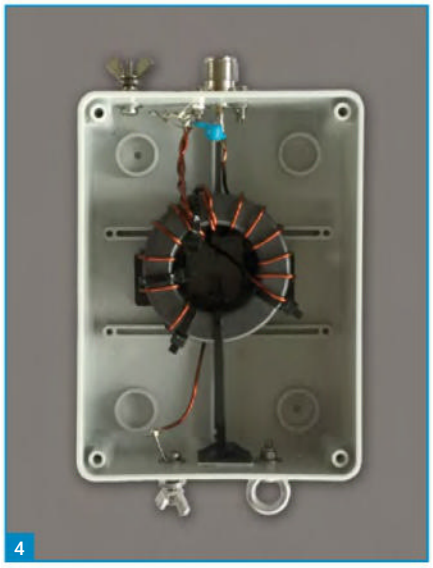


Fig. 1: Kanga pocket transmatch.
Fig. 2: N7DDC ATU.
Fig. 3: Diagram for EFHW 49:1 UNUN.
Fig. 4: The author's 49:1 transformer (internal view). Fig. 5: External view of 49:1 transformer.
Fig. 6: 9:1 UNUN circuit. Fig. 7: 9:1 UNUN wiring.
Fig. 8: 4:1 voltage balun circuit.
Fig. 9: 4:1 voltage balun wiring.

The End Fed Half Wave antenna

This antenna has become extremely popular indeed and is my antenna of choice at home for the 80, 60, 40 and 30m bands.

In this case, the antenna is essentially a dipole on the lowest frequency you wish to operate, and instead of being fed at the centre like a traditional dipole, it is fed at one end. This has many advantages. The first is that it is often easier to deploy than a centre fed antenna as the feedpoint is next to the station. The second is that, whereas a centre fed dipole is resonant on every *other* harmonic, the EFHW is resonant on *every* harmonic.

For example, in my case, I have an EFHW antenna approximately 40m long, which is a half wave on the 80m band, and therefore resonant in that band. By virtue of this dipole being fed at the end rather than the centre, it is also resonant on every harmonic, namely, 40m, 20m and 10m.

The disadvantage that goes with this benefit, is because it is end fed it presents a very high feedpoint impedance, in the order of 2,450Ω or higher. Remembering that this is a ratio of 50:2,450 and dividing the latter by the former – we could expect an SWR of 49:1 or higher – more than enough to blow the final amplifier stage of most transceivers!

Therefore, in order to manage this, while still maintaining the benefits, we need to *transform* this impedance mismatch, and we do so by placing a 49:1 transformer between the coax and the antenna, such that the transceiver sees an overall impedance much closer to the 50Ω it expects. As coax is unbalanced feeder and the EFHW is an unbalanced antenna, this is called a 49:1 UNUN (UNbalanced to UNbalanced).

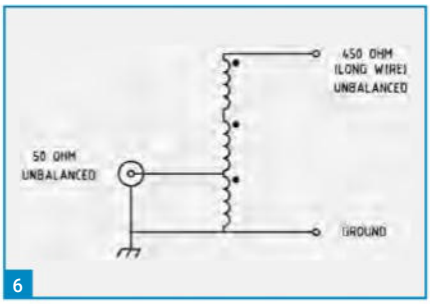
We will see how to make one shortly. But there is a further advantage now, because by providing a better feedpoint impedance match, many internal ATU's will now also be able to match this antenna on its non-resonant frequencies, such as 60 and 30m, for example.

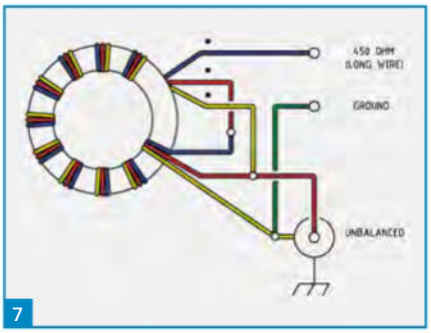
The end fed random wire antenna

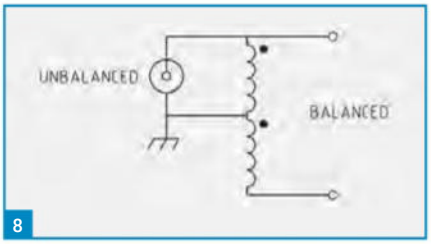
In this case we use a 'random' wire although this is a bit of a misnomer, as to be most effective we want a length of wire which is not a half wave length long on any of the frequencies we wish to use! Why? Well, for the reasons we just examined – a half wave antenna fed at the end has a very high feedpoint impedance. By avoiding lengths that are a half wave long, the impedance at the feedpoint of this type of antenna is typically around 450Ω. Again, 50:450 is a ratio of 9, so we use a 9:1 matching transformer at the junction of our coax and our antenna. Both the antenna and the coax are unbalanced, so again we use a UNUN. Some people refer to this antenna simply as a 'long wire' or 'end fed wire'.

By using this transformer with an ATU, we can often make a good SWR match on many amateur bands from the one antenna. Because of this, this is my antenna of choice on any portable or holiday operations, as it is quick and simple to deploy and is frequency agile.

Depending on your ATU it is often possible to tune a 'random' wire with an external ATU *without* the use of a 9:1 UNUN, and most of my ATU's used in the field can do this, rendering an UNUN uneccessary. For example, **Fig. 1** shows the Kanga Pocket Transmatch ATU, and **Fig. 2** shows a Chinese copy of a N7DDC ATU. The Xiegu X5105 and G90 have no trouble matching an end fed like this, but my experience is that the X6100 and







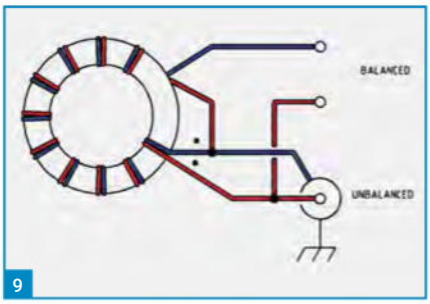


Fig. 10: The interior of the author's 4:1 balun.
Fig. 11: The author's QRP 49:1 UNUN.
Fig. 12: The author's 49:1 UNUN on a BNC connector. Fig. 13: The author's QRP 4:1 balun.
Fig. 14: The interior of the QRP 4:1 balun.

X6200 have significantly downgraded ATUs and are much less capable (I have reviewed all these rigs in back issues of *PW* and these are also on my website.)

The Kanga is an excellent manual tuner, which includes a rudimentary SWR indicator and the ability to make specific connections to either balanced or unbalanced antennas. It is available in kit form for £45 from:
https://tinyurl.com/bdsdhvsk

You can read my review of it in the January 2022 edition or *PW*, or on my website.

The ATU-100 in Fig. 2 is also capable of tuning a long wire without a 9:1 transformer. I brought mine from one of the Chinese websites and reviewed it in the December 2024 *PW*, again a copy is on my website.

We will see how to make a 9:1 UNUN later.

The doublet and its variants

The final antenna and matching transformer we will examine is for a doublet antenna. You can imagine a doublet as a centre-fed antenna, just like a dipole, but it is not usually cut to be resonant on a particular band, and is usually fed, at least in part, by open wire feeder or ladder line. Some well-known examples include the G5RV antenna and variants such as the ZS6BKW antenna, both of which are cut to precise dimensions. However, it is possible to make an effective doublet using any length of dipole and open wire or ladder line feeder, a truly *random* antenna.

In some cases this feeder continues directly to an ATU that is capable of accepting such a feeder (open wire and ladder line is a *balanced* feeder compared to *unbalanced* coax cable.) ATU's such as the Kanga Pocket Transmatch, a number of MFJ ATU's and others are designed to accept these types of feedlines.

In the majority of cases though, many amateurs run coax from their ATU to a point, usually outside, which is a connection between their coax and the ladder line of the antenna. At this junction, with an ATU external to your rig, like the LDG or MAT range, for example, it is sometimes possible just to connect the ladder line to your coax directly, and to tune the ATU for a match and operate.

However, if using a commercial rig with its internal ATU, you will often get better results if you use a transformer at the junction of the coax and the open wire or ladder line feeder. A typical doublet antenna feedpoint impedance is 200Ω or so. Ladder line is either 450Ω or 300Ω.

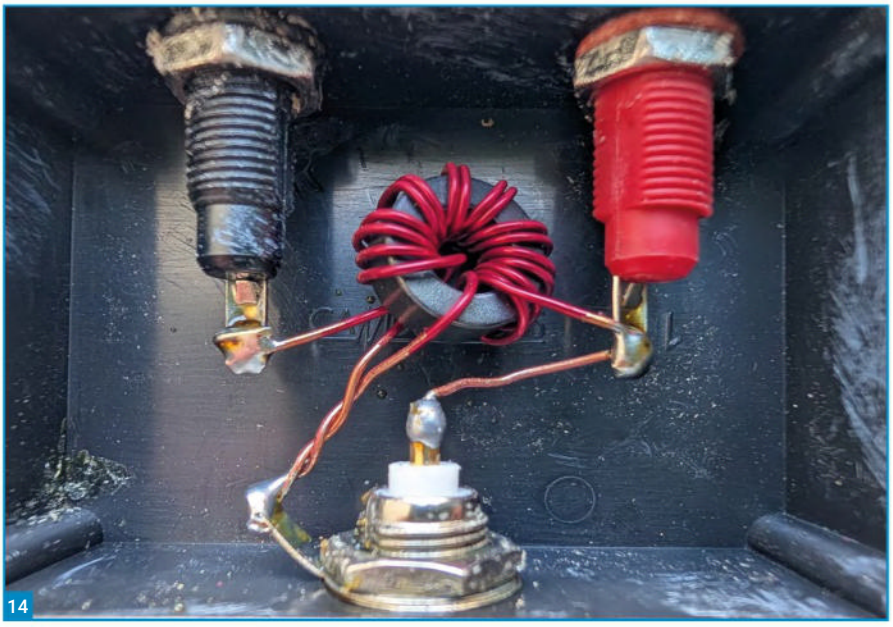
If we consider the 200Ω use case, we can see that 50:200 is a 1:4 ratio and would result in a 4:1 SWR if no form of matching was used. A 4:1 Balun will transform the 200Ω impedance to nearer to 50, allowing almost any ATU to provide an impedance match on multiple bands. Even if using 400 or 300Ω ladder line, the transformer will still bring the impedance down to within the range of an internal ATU.

When I first returned to the hobby after a long absence, I used a Yaesu FT-891, with an LDG Z100 Plus auto ATU, and about 20m of coax to the bottom of 450Ω ladderline feeder connected to a G5RV. I tried this combination both with and without a 4:1 balun. I noticed no difference in performance with or without it, but if I had been using the ATU in my FTdx10, for example, then I think it would have been beneficial, if not essential.

The 4:1 Balun is the last transformer we will consider here.

How to build them

I provided detailed instructions, on a step-by-step basis, to building a 49:1 UNUN transformer in the February 2023 edition of *PW* (again, on my website.) I don't intend to provide such detailed instructions for any of the designs here due to space constraints. Instead, I encourage you to read that article carefully and use its guidance as a basis to build any of the designs shown here this month. The principles are identical. I will also make a shameless plug for my book, published by the RSGB, called *Antenna Basics,* if you are new to all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of this. It is available from the RSGB Bookshop and Amazon!

All I will provide here are some photographs and diagrams for each type of transformer I have covered. I believe that by carefully reading both this article and the February 2023 article, you will be equipped with more than enough knowledge and confidence to tackle any of the designs shown here.

The 49:1 UNUN for an EFHW antenna

If you have access to the aforementioned article, then please refer to that, but also to **Figs 3, 4** and **5**. These give the diagram of how to wind the transformer and internal and external views of my own. Note that in my version I stacked and superglued three ferrite cores together, which means it was capable of operation with power levels over 1kW, and hence the ventilation in the case. However, I have now seen the light and am now totally QRP (!) although the transformer is still in regular use as my main low band antenna.

If you follow this diagram, and the aforementioned article, you should have no trouble building one of these. A single high-quality Fair-Rite FT-240-43 toroid will cost you £8.50 or so, add a suitable capacitor, waterproof box and a little hardware, and this can be built for less than £25 and will easily handle 100W SSB/CW and 50W FT8. This is less than half the price of the commercial equivalent.

The 9:1 UnUn for a 'random' or long wire antenna

I personally have never had the need to build one of these, as my ATU's of choice don't need one, however, they are simple enough to make and follow the same process.

Courtesy of the website of VK6YSF, **Figs 6** & **7** provide a circuit and wiring diagram. Simply follow this, using a T200-2 powered iron toroid core and robust mechanical construction techniques as described in my EFHW *PW* article and you will be fine. Note that there are ten turns of three different wires, wound together as shown. A turn is counted as each time the wire passes through the *centre* of the toroid. Note also that the wires are laid side by side in colours (known as a trifilar winding.) You can use coloured PVC covered wire too and this will make it easier to follow, or you can use plain enamelled wire and a multimeter to keep track of which winding is which. The green coloured wire in Fig. 7 is designed to connect to a counterpoise, a length of wire that acts as an artificial Earth. Terminate this green wire and the blue one to a terminal of your choice – you could use stainless steel bolts and wing nuts as I did in my EFHW, lab style terminal posts or sockets. The choice is yours. Try to make your counterpoise as long as is reasonable for your location – I would suggest 5m or more, run along the ground. More information can be found at:

https://vk6ysf.com/ununn_9-1.htm

and please note that there are a number of 9:1 designs discussed in more detail on that site. I suggest you read the article that accompanies each design to see which may work best for your own situation.

The 4:1 BalUn for a doublet antenna

Fig. 8 shows the circuit diagram of a 4:1 voltage balun of the type used by myself with doublet antennas. Once again the design is courtesy of VK6YSF. **Fig. 9** shows the wiring diagram. This time, two separate wires are used, known as a bifilar winding. The toroid is a T130-2 and, for powers up to 150W, then 18 turns of each colour, wound together, are used. On his website, **Peter** also gives alternative toroid types and turns required for differing power levels. If this is relevant to you, you can find out more at:

https://vk6ysf.com/balun_4-1.htm

Fig. 10 shows the interior of my 4:1 balun to this design which I made back in 2018. Hot melt glue was used to secure the transformer, but a better method is that shown in my 49:1 article, using zip ties, or you could use potting resin or similar.

Summary

This was not meant to be a detailed step-by-step guide to individual antenna transformer builds, rather a taster of why and when we might use them, and a basic idea of how they are made, with signposts of where you may go to get further information. Taken together, this article and the resources listed should give you the confidence to build your own. Remember to use a waterproof box, seal coax connections properly and consider one or two small ventilation holes in the underside – small enough to prevent spiders, but large enough to allow the box to 'breathe' and any condensation to escape.

Don't forget, of course, that the RSGB and ARRL Handbooks contain a wealth of detailed information on such matters, as well as a huge variety of resources on the internet and YouTube to help and guide you through building one yourself. There are a variety of designs and you can build them to cater for just about any power level you like. Earlier you saw pictures of my 49:1 UnUn capable of handling well over 1 kilowatt, and 4:1 Balun capable of handling 150W, but in **Figs 11** to **14** you can see ones that I have made very small for QRP use.

Finally, testing these transformers is quite straightforward, especially with a NanoVNA or other antenna analyser. Simply connect your analyser to the transmitter side of the transformer and a resistor / resistors to the other side to equal the value of the impedance you are seeking to match, e.g. 450Ω resistance for a long wire, and check the SWR. You could also use your transceiver's internal SWR meter if you don't have an analyser – just remember to dial back the power as low as it will go and ensure that the resistance you add to the antenna side of the transformer can handle the power, e.g. 5W, such that it becomes a dummy load.

I hope this has helped those less knowledgeable about antenna matching transformers gain some basic knowledge and the confidence to try and build one for themselves. As a final note, always buy toroids from a reputable source, as many cheap ones are badly inferior. I personally recommend Qubits as a UK company who have served me well, and they can be found at:

https://radio-store.co.uk

I have no connection to this company, except as a satisfied customer.

Until next time. **PW**

The GMDX Convention 2026

We bring you a report of the recent GMDX, the 27th Annual GMDX Convention & Dinner, which took place over the weekend of 27 - 29 March 2026 at the King Robert Hotel in Stirling.

The delegates began to arrive during the afternoon of the Friday for the first event, a curry at **Mr Singh's** India Gate in nearby Dunblane. This has become very popular over the past few years and was attended by 30 hams.

At 11am the following morning the GMDX AGM took place. **Rob GM3YTS** stood down as group Chairman after many years in the position, but he will continue to serve on the committee in an advisory capacity. **Simon GM0SCA** takes over as Chairman for the new session. Simon's first act as Chairman was to thank Rob for his outstanding service to the GMDX group. This was met with a round of applause from all those present.

Following a break for lunch and much conversation, the main convention presentations began, hosted by **Geoff MM5AHO**, and attended by 76 hams. First to take to the stage was **Nobby G0VJG**, who gave us an eye-opening account of the MM0UKI expedition to the Flannan Islands. It may have been reasonably easy for UK hams to work MM0UKI, but it was quite a challenge to get three amateurs to the islands by RIB and then transport all their equipment up a precarious and very slippery carved rock stairway.

Next up was **Fred G4BWP** with an update on the WRTC (World Radio Teamsport Championship) 2026 event and also a presentation about his ZD7WP St Helena trip. It's fair to say that Fred and Nobby endured quite different climatic conditions.

Before the mid-afternoon coffee break, we were delighted to welcome to the convention **Bob Beebe GU4YOX**, President of the Radio Society of Great Britain, to present some trophies.

Jock Kyle GM6WL Award

David MM0AMW has been a longtime supporter of 6m VHF activity in Scotland. He is very active and is a beacon on the band. He scarcely misses an opening and has remarkable success from a remote part of Scotland.

He is active on all modes and has built up an enviable score of countries and squares worked. David is a worthy recipient of the Jock Kyle Trophy. In David's absence the award was collected by **Gordon MM0GOR**.

Jack Wylie GM5YG Award

Keith GM4YXI has been an active radio amateur since 1980 and started his contesting career shortly afterwards.

Since then, he has been able to build up a competitive contest station using the contest call GM5X. He has been highly successful over the years in many of the major contests using both CW and SSB. He also was a member of several multi op teams including GR2HQ, GO2HQ and GB2HQ

In addition to this, he has over many years embarked on many DXpeditions, mainly in the Pacific region, and some of the calls he has aired include ZK2X, A35X, V6Z etc. He is a worthy recipient of the Jack Wylie Trophy.

The Scottish National Field Day Trophy

The Scottish NFD (national field day) trophy was won by **Allan GM4ZUK**, the first time

Photo 1: The GMDX Managing Committee, Gavin GM3GAV (Treasurer), Gordon MM0GOR (Secretary), Rob GM3YTS, Nathan MM9OCC (Director RSGB), Simon GM0SCA (Chairman), Malcolm GM3TAL, Geoff MM5AHO, Martin GM8IEM, Eric GM5RDX (Digest Editor).

Photo 2: RSGB President Bob GU4YOX with the various trophy winners.
Photo 3: The convention speakers, Nobby G0VJG, Fred G4BWP, Richard GI4DOH (pictured), John G4IRN & Werner DJ9KH all received GMDX gifts from Simon GM0SCA, the new Chairman of the GMDX Group.

this has been presented in many years. NFD has been an annual event, usually in the first week in June. For many years (since before WW2) clubs set up camp in a field, powered by generators or batteries, and competed against other clubs throughout the UK. It is a CW only event that this trophy covers, although there is a separate SSB event at a later date. The Scottish NFD trophy has been in existence since the early 1950s.

The Maitland Trophy

The final award of the day was the Maitland Trophy, won by **Brian GM4JYB**. It is awarded to the Scottish station (unassisted section) with best aggregate score in the two RSGB 1.8MHz contests which take place each year. **Gavin GM3GAV** collected it on behalf of Brian.

Both the Scottish NFD trophy and the Maitland trophy have been lying dormant at RSGB headquarters for many years. Bob was delighted to announce that GMDX were now the custodians of the trophies and Rob GM3YTS asked if the RSGB President would kindly present them at this year's GMDX Convention. Bob says, *"I was delighted to attend GMDX and was honoured to present all the trophies today to the worthy winners"*.

In the second session, **John G4IRN** gave an introductory talk on Node Red, along with a description of how he uses this for remote station automation. **Richard GI4DOH** followed with a talk about his latest African adventure. The 9L8MD Sierra Leone DXpedition was not for the faint hearted. Transport from the airport to their QTH was by a barely roadworthy bus, accompanied by armed guards. The journey included a dangerous ferry crossing in the middle of the night. Once at their QTH, 'creative' local mains wiring contributed to make this a DXpedition to remember. The final presentation was by veteran DXpeditioner **Werner DJ9KH**. He travelled to Scotland with his wife and granddaughter and was a very welcome visitor to this year's convention. His detailed explanation of the V6D trip to Chuuk in Micronesia as a 79-year-old was an inspiration to many.

This year we were once again grateful to the many organisations and individuals who offered items for our raffle prize draw. Corporate donations came from: bhi, Moonraker, RSGB, *Practical Wireless*, Icom, Martin Lynch & Sons, SOTAbeams, Radioworld and Canny Components. We were also gifted a handmade Schurr straight Morse key from Rob GM3YTS for auction, this was won by **Julian GM7MTK**. The money raised from the raffle and auction for the Morse key was just under £1,000.

More conversation and drinks followed at the hotel bar. The evening dinner was attended by 60, including all of our guest speakers and Bob Beebe GU4YOX, RSGB President. **PW**

NEWS EXTRA

DLARC: THE RADIO GEEK'S DOOMSCROLLING ANTIDOTE: Immerse yourself in a digital collection of amateur radio and communication artifacts. The internet has aged to the point where it is easy to fall into a rabbit hole, reminiscing about websites from decades past.

The site that fuels those scrolling endeavours is the Internet Archive — a nonprofit that hosts a digital library of internet sites and other artifacts in digital form. The project began in 1996 to archive the web.

Today, it contains one trillion web pages through its 'Wayback Machine', as well as 56 million books and texts. It also works with approximately 1,400 libraries through its Archive-It program to identify and preserve important digital history.

Kay Savetz K6KJN freely admits to having been an Internet Archive power user. Savetz used not just the archive.org website, but also its command line interface to upload many documents. A licensed amateur radio operator since 1989, Savetz's own interviews with Atari 8-bit computer pioneers are among those early uploads. So, when the Amateur Radio Digital Communications foundation provided a significant grant to the Internet Archive to form a collection of the history of amateur radio and adjacent endeavours, the archive sought a lead curator. Savetz was a natural fit.

The project was funded in 2022 and titled the Digital Library of Amateur Radio and Communications. Today, DLARC has approximately 225,000 items, spanning magazines, newsletters and call books.

In computing terms, that's about 26 terabytes of storage space.

https://archive.org/details/dlarc

RSGB EMC COMMITTEE RELEASES NEW LEAFLET: The RSGB EMC Committee has released a new leaflet explaining how to build a portable loop antenna to help radio amateurs find sources of EMF interference. Pair it with a portable receiver, and you can walk around an area, watching for changes in signal strength to pinpoint where interference is coming from. The antenna itself is easy to make from a short length of coaxial cable formed into a loop and a handful of coax connectors.

Despite its small size, the antenna has directional properties making it useful for locating the sources of interference. This is Leaflet 19 in the series of leaflets produced by the Committee and is called 'A simple loop antenna for use in identifying sources of interference'. You can download it and all the other EMC leaflets in the series, from the RSGB website at:

rsgb.org/emc

Broadcasting history

Keith and **Garry** invite you for another trek through the archives.

Keith Hamer
Keith405625.kh1@gmail.com
Garry Smith
Garry405625.gs@gmail.com

BBC Broadcasting House, London: Part X

The outer shell of Broadcasting House, with its cutaway roof, took on the appearance of a great ship with its prow sailing serenely down Regent Street towards the centre of London. Three 35ft lattice masts were installed on the roof, two of which supported aerials for experimental ultra-shortwave transmissions in the 10m band. The aerials were used exclusively by the BBC to monitor the overall signal quality of their own transmissions. Nowadays, many radio enthusiasts find the 10m band an exceptionally interesting part of the frequency spectrum to explore.

An intrepid engineer is shown in **Fig. 2**, making adjustments to one of the three aerial masts. The spire of the 19th-Century *All Souls' Church*, designed in the Regency style by **John Nash**, makes an impressive backdrop. This was in 1932, long before the *Health and Safety Executive* had been dreamt of! Note the engineer's cloth cap instead of a hard helmet, and no visible sign of a safety harness.

The BBC's experiments with ultra-shortwave transmissions were conducted in co-operation with the *Marconi Wireless Telegraph Company Limited*. From earlier work carried out in America and Germany, it seemed that using ultra-shortwaves would not be viable due to the limited distances over which signals could be broadcast relative to short-wave transmissions due to the effects of rapid attenuation and interference. It was also suggested that this type of wave would not be reflected at all by the *Kennelly-Heaviside* layer. However, experiments continued and it was decided to have a large number of ultra-shortwave transmitters on adjacent wavelengths, or even on the same wavelength. Each transmitter provided a local service up to a range of about five miles in densely populated areas. It was subsequently discovered that most problems regarding interference and atmospheric disturbances had largely been eliminated by using these waves.

Vintage Cossor 'Mica Bridge Mounting' advertisement

This month's excursion through vintage copies of dilapidated newspapers and magazines has revealed an advertisement by *A.C.Cossor Ltd.*, for their *Mica Bridge Mounting* invention, **Fig. 1**. The advertisement dates from 24 September 1932. The text has been left in its original format to reflect the spelling, grammar and punctuation of the time.

The *Mica Bridge Mounting* system was invented by Cossor and featured a mica plate to hold the electrode elements in position. This method of construction is still used today in the manufacture of almost all valves.

100 years ago: June 1926

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

In June 1926, a meeting of the *Comité Consultatif International des Communications Téléphoniques à Grande Distance* (*CCI*) was convened in Paris to discuss the possibilities of establishing international circuits for the exchange of programmes.

Radio Kaunas began regular broadcasting in Lithuania on 12 June.

Due to very severe restrictions imposed by the Press in 1926, the BBC were not permitted to broadcast *"anything which might be considered of real news value"* during 'live' Outside Broadcasts, particularly at sports events. Commentaries could only describe scenes in general terms. Attempts were made to circumvent this rule during *Derby Day* on Wednesday, 2 June. A microphone was strategically placed on the racecourse at *Tattenham Corner* in the hope of broadcasting at least the rattle of the horses' hooves as they galloped around the course. Microphones were also installed to record the shouts of the bookmakers, the persuasive efforts of the tipsters, and the cheers or groans of the gambling public. Unfortunately, there was torrential rain all day, so there were no sounds of hooves in the very soft going, and not even the bookies, tipsters and onlookers as they were more interested in taking shelter. Consequently, nothing of interest was broadcast. The BBC weren't even permitted to mention the name of the winner! Well, exactly 100 years later, we can reveal that **Coronach**, ridden by **Joe Childs**, was first past the post.

In focus: The BBC Crystal Palace transmitter – Part III

The television transmitter, formerly owned by the BBC, is located in an extensive area of London known as *Crystal Palace Park*, which, in turn, takes its name from the *Crystal Palace Exhibition*. The rather impressive full title was *The Great Exhibition of the Works of Industry of All Nations*. This was opened in *Hyde Park*, London, on 1 May 1851, by **Queen Victoria**. Many well-known people attended, including **Michael Faraday** who assisted in the planning and judging of the exhibits, one of which was a demonstration of the first public flushing toilets, an invention claimed by **George Jennings**. More than 800,000 visitors took advantage of this modern convenience, paying a total of over £2,000 for the privilege. It's amazing what you learn in *PW*! The sobriquet, '*Crystal Palace*', was derived from the planned enormous edifice being constructed of cast iron and 293,000 panes of glass with the playwright, **Douglas Jerrold**, referring to the

*"**CONSISTENCY***
The employment of Mica Bridge Mounting in Cossor Valves ensures microscopic accuracy in the assembly of the electrode system. As a result the characteristics of every valve are identical with those of the original design developed in the laboratory. Variation is impossible. The performance of each valve is therefore safe-guarded - the Mica Bridge is a virtual guarantee of performance and reliability. Below is an enlarged section of a Cossor A.C. Mains triode - the 41 M.H.L. The use of two Mica Bridges ensures life-long alignment of the elements. Note the 'cut-away' view of the cathode showing the heater wire in position.
SPECIAL OFFER
Send for a free copy of one of the most comprehensive valve catalogues ever published. This, the Cossor 72-page Valve Catalogue, contains full technical data, characteristic curves, operating conditions etc., of all types of Cossor Valves. Please use the coupon.
To Messrs. A. C. Cossor Ltd., Melody Dept., Highbury Grove, London, N.5.
Please send me, free of charge, a copy of the 72-page Cossor Valve Catalogue, B.14.
COSSOR VALVES
A. C. Cossor Ltd., Highbury Grove, London, N.5. Depots at Birmingham, Bristol, Glasgow, Leeds, Liverpool, Manchester, Newcastle, Sheffield, Belfast and Dublin."

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Fig. 1: An advertisement by *A.C.Cossor Ltd.*, for their invention, the '*Mica Bridge Mounting*' system. The advertisement dates from 24 September 1932. Fig. 2: An intrepid engineer, with a head for heights, makes adjustments to one of the three aerial masts on the roof of Broadcasting House without any safety gear. Fig. 3: The very first BBC-2 test film, *The Way To Wimbledon*, which was transmitted on Saturday 4 January 1964.

forthcoming venue as a *"palace of very crystal"* in the satirical magazine, *Punch*, published in July 1850.

The exhibition was a huge success and in 1854, it was completely dismantled, relocated and expanded at *Sydenham Hill* in south London. 80 years later, in 1934, the Scottish inventor, **John Logie Baird**, together with his research team, moved into the new Crystal Palace to continue and expand his experiments with television. The most extensive television complex in Europe was located beneath the concourse of the exhibition centre.

Feedback: BBC Long-Wave saga - Part I

Following the conclusion of our in-depth series covering the history of *BBC Long-Wave* (*PW*, December 2025), **Dave Porter G4OYX** has written from Ludlow in Shropshire with first-hand experience of working at various BBC transmitters.

Dave writes: *"Hi Keith and Garry, I have been following with interest your history of LF transmissions as detailed in* PW *magazine. You certainly seem to have unearthed some esoteric historical facts!*

"I too have been relating the story of BBC LF from 1925 to the present for the 'Signal' *journal, produced by the 'Vintage and Military Amateur Radio Society' (VMARS). After a series of articles, I am coming to the present-day situation and, in particular, the closedown of the service. Much has been printed in the general and technical press concerning the perceived lack of output valves etc., for the present pair of Marconi B6042 transmitters installed in 1985. Much of that has been totally inaccurate, I am sorry (but not surprised) to say.*

"Speaking to ex-BBC colleagues who are now with Arqiva, I am assured that they have enough valves to continue until the publicly-announced closedown date of 26 September 2026. They are pretty sure that all will be fine as they are operating at reduced power from the original 500kW."

Thanks for writing, Dave. There are more first-hand details from Dave to come in the next column!

60 years of BBC-2: Part XXVII

During the run-up to the official start of BBC-2 in April 1964, a series of *Trade Test Films* was introduced. The very first film, entitled *The Way To Wimbledon*, was transmitted on Saturday 4 January 1964, **Fig. 3**, following a sequence which *Radio Times* described as "*Test Card and Music at 9.15am.*" The test transmissions were aired on Channel 33 on 625 lines, UHF.

The 17-minute film, narrated by **John Mills**, was made in 1952 by *British Pathé Documentary Unit*. It showcased preparations for the annual world-famous tennis tournament, organised by the *All England Lawn Tennis & Croquet Club*. It also included prominent 'product placement' for the *Dunlop Maxply Fort* tennis racket!

According to Radio Times, the film was followed at 9.32am by "*Test Card and Tone (400c/s)*".

Service information, Iceland: Part VI

We mentioned in the previous column that the commander of the American AFRTS military base requested permission from the Icelandic government to be able to restrict the coverage area due to potential demands for higher fees to broadcast programmes sourced from the USA.

This was eventually granted and on 15 September 1967, AFRTS broadcasts could only be received in Suðurnes and the southern part of Hafnarfjörður. Programme schedules for the station were published in local newspapers until 1972.

Stay tuned!

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

Mike Richards G4WNC
practicalwireless@warnersgroup.co.uk


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Multi-band WSPR Beacon

Mike G4WNC turns his attention to the RADE FreeDV software

Having just returned from my holidays, I haven't had enough time to finish building the WSPR tx, so I'll have to hold off on my write-up till next month. Sorry to disappoint.

RADE FreeDV

Although I wouldn't normally cover any voice stuff, the developments in FreeDV have created a truly innovative digital mode that's worth a closer look. I'm sure some of their machine language training techniques could well find their way into our more familiar digital modes. It is also feasible that machine language and AI could develop entirely new data transmission systems. Because of this, it's worth spending some time looking at FreeDV.

One of the aims of the Free-DV project has been to create an open-source digital voice system with comparable or better performance than the closed-source systems that dominate current commercial and amateur digital voice products. At the heart of their latest development is the use of neural networks. Neural networks attempt to emulate the way the human brain learns. Our brains learn new things by creating new neural pathways that get stronger the more we use them. A simple illustration of this system's power is the training of animals to perform useful tasks. On my recent visit to Cambodia, I visited the APOPO centre in Siem Reap, where they use trained giant pouched rats to detect land mines, **Fig. 1**. The rats are trained by giving them a food treat every time they detect an explosive. As the pathways in their brains strengthen, they become ever more effective at detecting explosive materials. With their super-sensitive noses, a trained rat can detect a billionth of a gram of explosive! The rats have become so effective that they are the best method we have for clearing mine fields. In just 30 minutes, they can clear an area that would take four days using conventional methods. They have also achieved a 100% success rate since they began mine-clearing. The point here is that artificially replicating nature's neural networks can help us develop innovative solutions to technical problems. When it comes to digital voice, the FreeDV project has been using neural networking to develop a completely new speech encoding and decoding system.

In conventional digital voice systems, the audio passes through several independent processing blocks, i.e. a proprietary vocoder that digitises the voice and produces a stream of data. That is then passed to a conventional FEC (Forward Error Correction) module to add protection bits to improve reliability, and finally to an OFDM (Orthogonal Frequency Division Multiplex) modulator to create the RF signal, **Fig. 2**. At the receiving end, the process is reversed to reconstruct the analogue audio.

The new FreeDV RADE system uses a very different approach. The RADE encoder converts speech features directly into PSK (Phase Shift Keying) symbols, **Fig. 3**, effectively combining quantisation, FEC coding, and modulation into a single stage. At the receive end, the RADE decoder extracts speech features from received PSK symbols, which are then passed to a high-quality FARGAN voice synthesis engine to recreate the speech. To develop this system using machine learning, the model is trained on speech samples and then passed through a simulated radio channel. It is then challenged to replicate the incoming speech. This training process operates in a loop, where the system keeps trying different settings until it can best replicate the incoming speech, **Fig. 4**. It's this repetitive, trial-and-error system that develops and refines the most successful neural pathways.

The result is a very impressive radio voice system with many advantages over existing techniques. FreeDV RADE can send 8kHz audio bandwidth speech over a 1.5kHz RF channel with remarkable clarity. It also gradually degrades as conditions deteriorate, rather than the sharp cut-off that occurs with traditional digital speech. You can hear examples of the system via the FreeDV website.

For more information on FreeDV, and to download the free software, visit: **https://freedv.org**

Crooked pin solution

Following my recent trip to Cambodia (a wonderful country and people), I decided to crack on with *Data Modes* and began building the Ultimate3S kit from QRP-Labs. I knew I was a bit jet-lagged and dopey, but decided to go ahead against my better judgment. I thought I'd start with the synthesiser board, as it was largely pre-assembled, so I only had to fit the strips of connection pins on each side and solder the crystal. My usual trick for ensuring vertical, correctly aligned pins is to use an old breadboard to hold the pins in place, then drop the board on top. This is the technique I used this time, but, in my dazed state, I managed to set the pins one row out of alignment, so they were at an angle instead of vertical, **Fig. 5**. I still find it hard to believe I made such a silly mistake without noticing! Having made the error, I was faced with the problem of how best to straighten the pins. It's not practical to correct with a soldering iron, as I would have to unsolder all 10 pins at once. I could have tried using a solder sucker on each

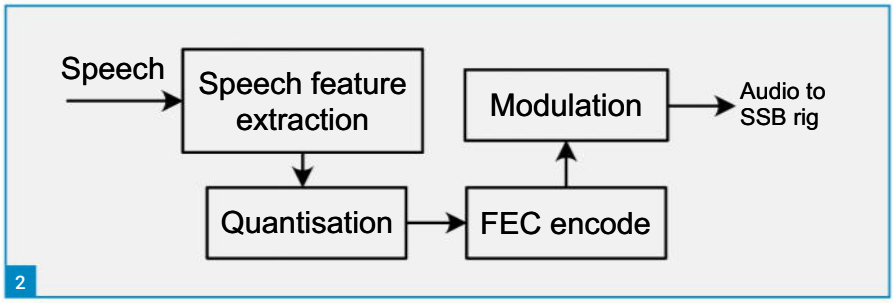
Fig. 1: APOPO land mine detection rat.
Fig. 2: Conventional digital speech processing.
Fig. 3: RADE speech encoding.
Fig. 4: RADE machine learning training loop.
Fig. 5: Misaligned pins!

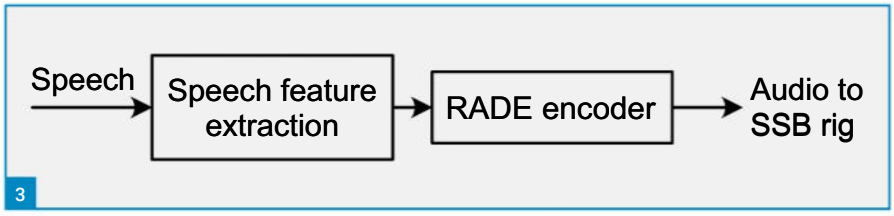
pin, but that doesn't always clear all the solder, and repeated heating to clear it can damage the PCB. The best option seemed to be to use a heat gun, then manoeuvre the pins once the solder had softened. I mounted the board in a small vice with the pins hanging vertically below and waved the heat gun over the pins, watching carefully for the point where the solder shines, which indicates a melt. At that point, I moved to straighten the pins, but they'd straightened themselves! I think what happens, provided the board is mounted horizontally, is that the solder melts and the pins swing vertically due to gravity. I initially thought the pins might fall out, but it seems the surface tension of the molten solder is sufficient to hold the pins in place. So, there we have it, a neat way to straighten misaligned pins. This example used a 10-pin set, but I suspect it will work OK with larger pin sets. Just a couple of points to bear in mind, if you decide to try this. If you have small SMD components close to the pin set, you might need to apply some heat-resistant protective tape to prevent them from being disturbed or blown away. Secondly, ensure the area around your heat gun's airflow is free of heat-sensitive items. The moral of the story, of course, is not to start a construction project when you're tired or jet-lagged!

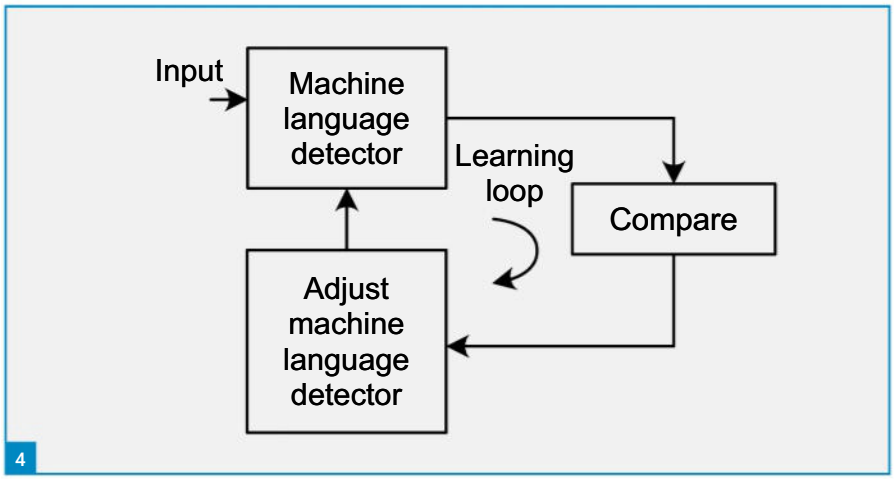
SDR for iPhones!

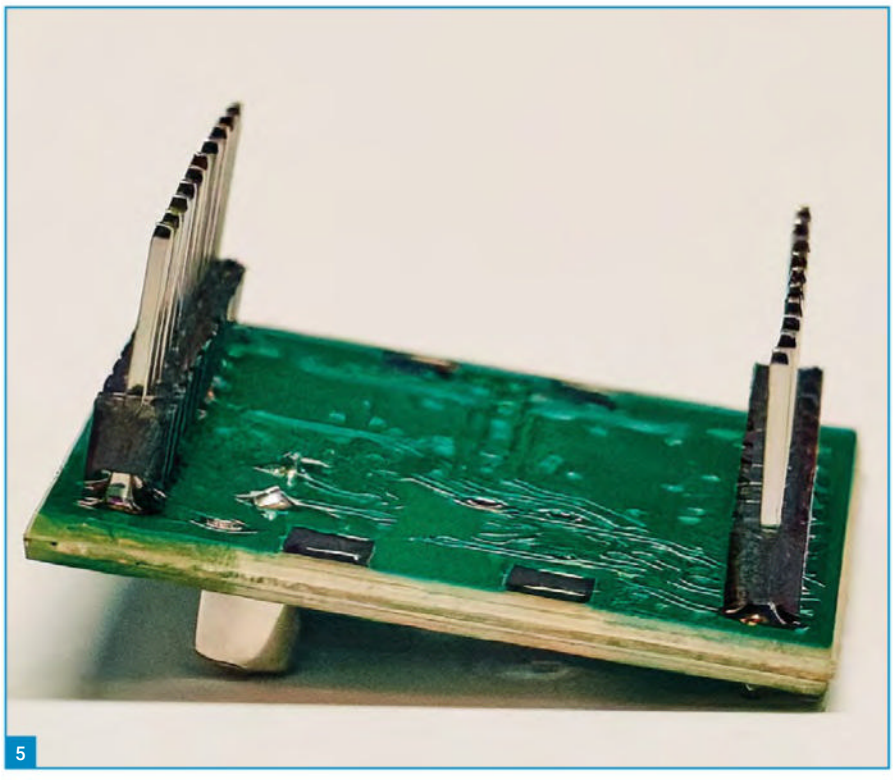
If you're an iPhone user, like me, you may be a bit frustrated by the lack of radio support. One of the main issues is Apple's aversion to third-party apps and hardware devices. The reasoning is to protect the system and provide a more controlled and reliable service to its users. But it's still frustrating when you find nobody is supporting your interest. However, I recently discovered a new SDR application that's been written specifically for the iPhone that lets you listen to your RTL-SDR dongle while connected to your home network. The App is called CoronaSDR and is currently available free of adverts and charge in the App Store. To overcome Apple's third-party hardware limitation, the RTL-SDR is connected to a cheap Raspberry Pi that acts as a network server and broadcasts the IQ data over the network. The Pi also accepts tuning and configuration commands from the iPhone.

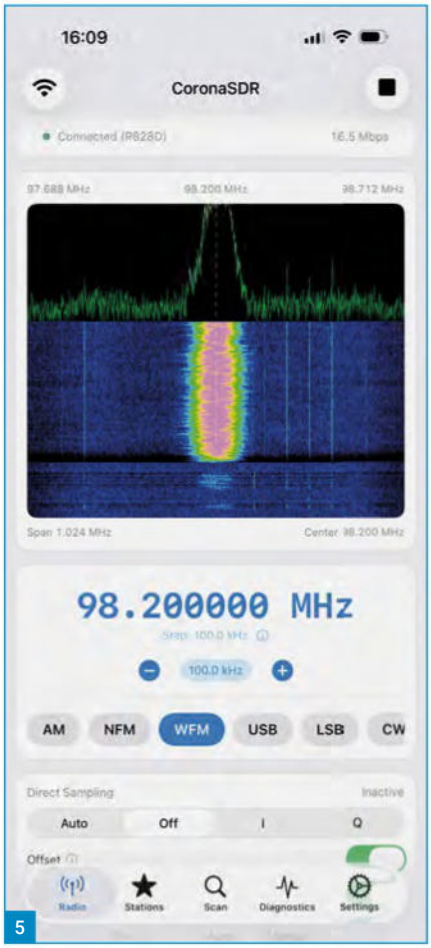
Although newly released and still under development, it appears to work remarkably well. For my initial tests, I set up a Raspberry Pi 4 using one of my RTL-SDR Dongle server SD cards and everything worked first time. The Pi was connected directly to a hardwired Gigabit Ethernet port, so there were no buffering issues.











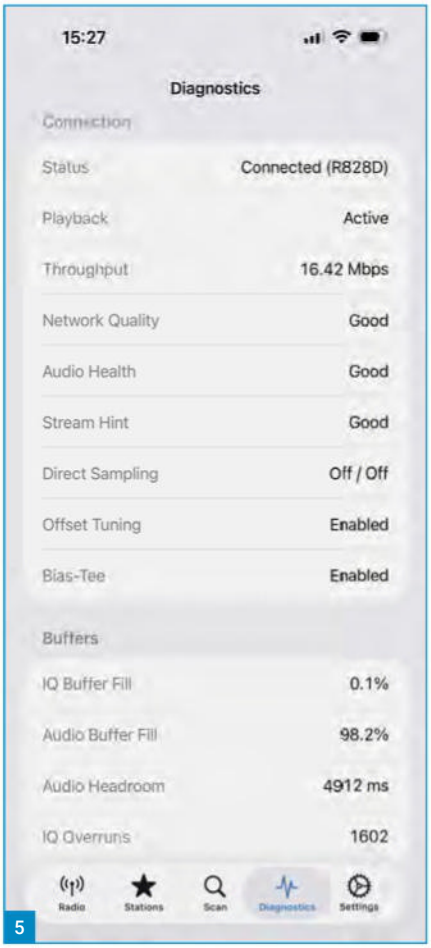


Fig. 6: CoronaSDR running on iPhone.
Fig. 7: CoronaSDR stats page.

As a cheaper alternative, I tried the same SD card, but this time with a £15, Pi Zero 2 using a Wi-Fi connection to my local network. This was quite a test, because I was outside in my shack, and the router was back in the house, probably about 10-15m away, with a few walls in between. My phone was also with me in the shack, so the Wi-Fi data had two potentially difficult paths to penetrate. Despite this handicap, there were very few signs of dropout. When I selected the higher 2.4MSPS or 2.048MSPS sample rates, there was some audio stuttering, indicating network problems. However, as soon as I dropped to 1.024MSPS or 250kSPS, all stuttering disappeared. This is a very impressive result and shows that the App employs efficient network management.

In a practical implementation, this means you could set up the Pi RTL-SDR server and RTL-SDR dongle in the shack and comfortably access them on your iPhone while back inside the house. I've shown a screenshot of the App running on my iPhone 17 in **Fig. 6.** As you can see, it features a spectrum display and a waterfall, along with a useful range of receiver controls. Frequency setting is via the keyboard, and the App is configured to support the latest RTL-SDR Blog V4 dongle with its improved HF coverage. The following receive modes are included: AM, NFM, WFM, USB, LSB and CW. The important RF/IF gain can be set manually or automatically and there's a squelch slider for use with NFM. Along the bottom of the screen is a set of tabs used to access more advanced features, including a stations menu where you can quickly store and recall your favourite stations. If you're an Airband or marine band fan, the radio includes a configurable scan facility that lets you set the range, mode, step size, dwell time, and hold time. This is supplemented by a list scan that covers all the stations/frequencies you've saved in the Stations tab.

For troubleshooting, there's a diagnostics tab that lists a wide range of stats showing how the system is performing (**Fig. 7**). There's enough information in this section to identify any system bottlenecks. Finally, there's the Settings tab, where you can adjust some operating parameters of the SDR. These include the sampling bandwidth, which you can set to one of four options between 250kSPS and 2.4MSPS. This is very helpful because it lets you adjust the sample rate to match your local Wi-Fi speed.

Overall, I have to say I was very impressed with CoronaSDR, especially considering I was testing the original version 1 build. **PW**

BOOK REVIEW

The Bridgwater Beam Wireless Station

In the May 2024 issue of *PW* we reviewed the latest book by **Larry Bennett G4HLN**, *The Marconi Beam Wireless Stations of Somerset*. More recently we ran a two-part article on the same subject (*Marconi's Short Wave Beam System*) by **Michael Jones GW7BBY**. This year marks the centenary of one of those stations – the Bridgwater station, which was actually located at Huntworth, between the village of North Petherton and the town of Bridgwater in Somerset. To commemorate the occasion, Larry has brought out a shorter book, *The Bridgwater Beam Wireless Station*. At 72 pages, the book is much shorter than the 418 pages of the earlier one, given that it focuses specifically on the Bridgwater station. Not surprisingly, it has a lot of the same information so is not necessarily to be recommended to anyone who has the earlier book, which has three substantial chapters dedicated to the Bridgwater station. That said, this new publication has a number of additional photographs, some of them 'colourised' to improve their effect.

The book draws heavily on official records from the Post Office, government and local authorities about the planning, installation and running of the station, which was tasked with improving communications with Canada and South Africa, requiring two beam antennas, one for each direction. These were massive – 287ft high and 12ft square, with 90ft cross arms. Sadly, nothing now remains other than some of the concrete foundations.

The station officially opened on 25 October 1926, although the first day of operation didn't quite go to plan, according to reports published on 27 October: *"Regarding Monday's breakdown of the new Beam Wireless service to Canada, said to have been due to atmospherics, **Senatore Marconi**, in a statement last night, declared that the fading experienced had been quite wrongly attributed to that cause. It had not yet been possible to ascertain what cause was attributable, and possibly some insulation fault was responsible. It was obvious, he added, that an entirely new system could not be expected to be perfect from the very start."*

Nevertheless, the station went on to a busy life and remained in service until 1941 by which time it had been deemed uneconomic and was gradually decommissioned despite a last-minute discussion in 1941 about retaining it in case of war damage to installations elsewhere in the country.

Interestingly, in the early days the construction site received a visit from members of the Taunton & District Amateur Radio Club, still going of course.

The book can be ordered (£5 inclusive on p&p) from Larry's website at:
www.larrybennett.co.uk

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HamRadio.co.uk/FTX1F

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C4FM Digital/FM 55W Dual-Band Mobile Transceiver

The New Flagship Mobile with Super-DX & ASP for Enhanced Coverage
Latest high-performance C4FM Digital/FM Dual-Band Mobile Transceiver, offering 55W VHF / 50W UHF output power and packed with cutting-edge features for superior communication. Designed to replace upon the successful FTM-500DE. **£569.95**

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HF/6m Transceiver

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New Version 2 with Battery Indicator & USB Cable.

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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.
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See: www.HamRadio.co.uk/topbytes

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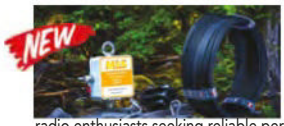

MICRO POTA EFHW 49:1 Kit with 25m of dipoflex available in SO and BNC
Discover the versatility and efficiency of the POTA EFHW 49:1 Kit, designed for amateur radio enthusiasts seeking reliable performance. This comprehensive **kit includes a MICRO with two connector options, ensuring seamless connectivity and ease of use in various setups. With 25 metres of high-quality dipoflex cable, this kit provides excellent flexibility and** durability for outdoor operations.This kit will allow you to make a 20m EFHW..... **£69.95**

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A high power DC regulated Switch Mode **power supply, providing up to 30amp** maximum current.Comes with Over Voltage, Current Limiting and Short Circuit Protection. **£79.00**

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Low-RFI AC Power Supply for HF Transceivers Small, light, easily portable high-power DC supply which has low AC input to DC output **coupling. This is critical to minimise RFI due** to common-mode currents often found with temporary antennas such as end-feds or verticals. **£69.95**

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Compact Desktop Power Supply sets the new standard for high quality..... **£399.00**

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This is just one example of the many available in store.
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Red Pitaya SDRlab 122-16 Internal Clock Starter kit

Professional-grade SDR digitiser and processing platform, tailored for serious experimenters, RF engineers, and advanced amateur radio operators.
The SDRlab 122-16 Internal Clock is based on Red Pitaya's high-performance SDRlab platform, modified for use with an external oscillator connected via the E2 extension port. This flexibility allows integration with GPSDOs, rubidium standards, or other precision clock sources required in demanding RF environments. **£695.00**

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Nissei PS30SW II 30A Switching Power Supply
This Switching Power Supply is designed for radio amateurs, it is composed of a low ripple switching circuit which can perform like a linear power supply. It is small,light, portable, and efficient. **£98.95**

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40 Amps continuous and 45 amps surge. Illuminated dials showing Amps and Volts. **£154.96**

Nissei DG-103 MAX
Digital Display SWR/Power Meter.This digital SWR & Watt meter is highly accurate for measuring Forward Power,Reflected Power, & VSWR **£129.95**

DG-503Max Digital Power Meter..... **Only £139.00**
DG-503 Digital Power Meter ..... **Only £99.00**
NS-2230D 30Amp PSU, Front Power Pole Connectors..... **£84.95**

MyDEL Nissei Compact in-line meters

RS-50: £65.95. RS-70: £69.00 The RS-50 (120W 2m & 70cm) & 70 (200W 160m-6m) are compact in-line meters that present power and SWR on a digital backlit LCD display.

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PR-781 Microphone	**From £199.95**
PR-40 Microphone	**From £249.95**

Steve Telenius-Lowe G4JVG
teleniuslowe@gmail.com

1

Lots of Activity

Steve G4JVG has another packed column, with lots of recent DXpedition activity to report.

Although this is the June issue of *PW*, the column is being compiled in April, which is the month of the year when radio amateurs remember **Guglielmo Marconi**, who was born in April 1874. The best-known amateur radio commemoration of his life and work is 'International Marconi Day' (IMD), which is held every year on the closest Saturday to his birthday.

Marconi went to Cornwall in 1900 and set up a station at Poldhu on the Lizard peninsula, so it is appropriate that IMD is organised by the **Cornish Radio Amateur Club GX4CRC**. This year's IMD is on 25 April, his actual (152nd) birthday. IMD gives radio amateurs the opportunity to make contacts with historic sites used by Marconi and his co-workers.

https://gx4crc.com/imd

Other groups also celebrate Marconi's life and work. For example, special event station II4JDVS was active during April as part of a year-long award scheme commemorating 12 'Marconi Supporters', **Fig. 1**. Its intent is to highlight some of the individuals who may not be as well known as Marconi himself but who played a significant part in his life, work or business. Each month of the year is dedicated to one of these people. April's II4JDVS was dedicated to **Henry Jameson Davis**: other individuals commemorated include **Kemp**, **Fleming** and Marconi's parents. 'Marconi Supporters' is organised by ARI Fidenza Radio Club:

www.arifidenza.it

Chagos remains VQ9

As far back as the December 2024 *HF Highlights*, I speculated that there might be a new DXCC entity soon, following the UK government's announcement that it would cede sovereignty of the Chagos Islands (officially the British Indian Ocean Territory) to Mauritius. This story has hardly been out of the news since and, on 11 April this year, news media stated that the deal had now been shelved because the government had run out of time to put legislation through parliament during the current session. For HF operators this means 'no change': the Chagos Islands remain the British Indian Ocean Territory with the VQ9 prefix.

QSL from yesteryear

This month's QSL from yesteryear is from a 'deleted entity': Southern Sudan (as opposed to the current DXCC entity of the Republic of South Sudan). 36 years ago **John Fung-Loy PA3CXC** led a multi-national DXpedition to Kapoeta in Southern Sudan. My QSO with PA3CXC/ST0 was on 22 April 1990 at 1015UTC on 28MHz SSB, **Fig. 2**. The other members of the team were **Franz DJ9ZB** (**Fig. 3**), **Carlo IK1HJS**, **Hans PA3DFT** and **Henk PA3CWM**.

A deleted DXCC entity is a territory or country that used to exist but no longer does, often for political reasons. Obvious examples are Czechoslovakia, which split into the new DXCC entities of the Czech and Slovak Republics, and the former German Democratic Republic (East Germany) which was subsumed into the Federal Republic of Germany, but there are also plenty of others.

Southern Sudan had been added to the DXCC list in May 1972 but in 1990 was still politically part of Sudan, although the SPLA guerilla army was fighting for full independence. In 1994, though, Southern Sudan was moved to the deleted list (the complete list of deleted DXCC entities can be found by Googling "deleted dxcc list").

PA3CXC/ST0 was on the air for a week and made over 23,500 QSOs. A short video is on YouTube, while the full story of the operation can be read in the Summer 1990 *NCDXF Newsletter*:

youtube.com/watch?v=n2i5SnEGnoQ
ncdxf.org/newsletters/1990-SUMMER.pdf

Fast forward two decades and, after many years of civil war in Sudan, a peace agreement was finally reached. On 9 July 2011 the Republic of South Sudan became Africa's 54th independent state and in July-August a multi-national DXpedition, ST0R (**Fig. 4**), was active from Juba, the first operation from the new DXCC entity of the Republic of South Sudan. The following year, the ITU allocated the Z8 prefix block to South Sudan and a number of amateur licences have since been issued. **Diya Al-Asadi YI1DZ** was one of the first and, as **Z81D**, he is still active, mainly on FT8, from time to time.

The month on the air

The 3Y0K Bouvet Island DXpedition went QRT around 14 March after about two weeks on the air..

Janusz SP9FIH was very active from St Kitts and Nevis as V4/SP9FIH from 24 March, mainly on FT8, but with an entry in the CQ WPX SSB contest.

The CY0S Sable Island DXpedition (see April's *HF Highlights*) closed down on 31 March with over 103,000 QSOs in their log.

The S21WD DXpedition by DJ4MX, DK6SP, DL3ON, M0SDV, S21ABO and S21TV of the Next Generation DX Club also closed down on 31 March. They made 73,000 contacts from IOTA reference AS-140 in Bangladesh.

Polish priest **Dariusz (Darek) Godawa TJ1GD** (also **TL8GD**, **TT1GD** and **TN8GD**) activated Mondoleh Island in Cameroon, a rare IOTA counter (AF-095), as TJ1GD/P from 3 April. This activity was to celebrate the 165th birthday of Polish explorer Stefan Szolc-Rogoziński, who visited the island between 1883 and 1885. Darek himself has been awarded the title of 'Notable to the Royal Court of Mondoli Village' (**Fig. 5**). For more details see:

qrz.com/db/TJ1GD/P

C6AFD was an operation by AD8FD from IOTA NA-001 in the Bahamas between 24 and 30 March. Activity was on SSB and FT8 on bands from 7 to 28MHz. There's a good website with photos and a report on the operation at:

ad8fd.com/dxpeditions/eleuthera-2026

Three Italian operators have announced activity as 7P8WR from Lesotho between 23 April and 1 May. More information at:

qrz.com/db/7P8WR

Finally, the Italian DXpedition Team announced that April's Ghana AF-084 DXpedition (see last month's *HF Highlights*) was cancelled.

What to look for in May-June

As is normal during the mid-year period, there are far fewer special activities and DXpeditions planned than in the period around the equinoxes and in the winter.

One operation that has been announced is 3B9N from Rodrigues Island between April and 22 May. The operator is VU3OPT / OM0GA (also M0KGA). Equipment used will be a Yaesu FT-991A at 100W to a Sigma SE X80 multi-band vertical.

9n7ga.com/duration-and-qth-of-dxpeditions

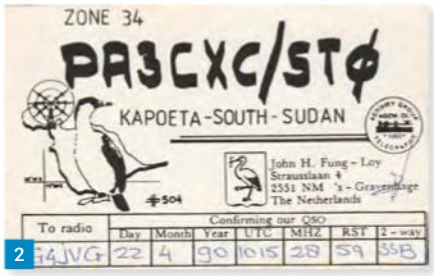
Readers' news

Reg Williams G0OOF reckoned this has been *"one of the best months ever for working DXpeditions, which lead to some busy times trying to work most of them. The pinnacle for me, probably like so many others was to work 3Y0K Bouvet Island as an ATNO ['All Time New One' – **Ed**]. I managed to work five bands on FT8. Not easy for some of those bands and strangely not worked on 14MHz. The QSOs were later confirmed so I was pleased about that. Europe was well positioned to work Bouvet. The DXpedition had a very successful operation from start to finish.*

"Sable Island, CY0S, I had worked on SSB in 2016 but only on one band, so it was good to work this DXpedition on FT8 and have five QSOs confirmed. I have had problems setting up my radio with 'Super Fox' (S/F) mode. The radio was always sluggish to respond to communicating with the software. CY0S started their operation on FT8 S/F so I thought 'nothing to lose'. They were decoded on 7MHz and soon a QSO was completed even though the radio was also sluggish on transmit and receive. Later in the operation the team were using FT8 in normal mode. On a later occasion they were working 3.5MHz at 2200UTC. Hustler 6BTV antennas are well known for poor 80m operation with a very narrow frequency range before the SWR rises rapidly. I took a chance on making a QSO with the DXpedition, even though the SWR was high and even with the radio's tuner. They were decoded and worked in a short space of time. SSB conditions for me were impossible, with lots of QRM and guides ['policemen'] informing DXers that it was a split frequency operation.

"S21WD, Bangladesh. I had worked a DXpedition from there on FT8, S21DX in 2024, so I just made the one QSO. XX9W, Macao, was an ATNO for me. This DXpedition I worked on three bands FT8, later confirmed.

"All the DXpeditions took some hours to work and very often waiting for propagation to be suitable. Those new to FT8 were finding it difficult to know how to use it and it was not the best time to find out, with opportunities missed to work the DXpeditions. It does work the other way round, of course, with timing issues etc. It seems to be now that DXpeditions use digital modes, mostly FT8/4, as their main mode of operation."



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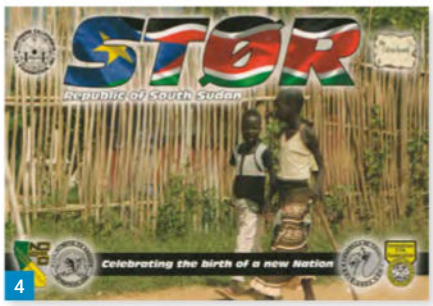

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Fig. 1: The 'Marconi Supporters' certificate. Fig. 2: PA3CXC/ST0 was a 1990 DXpedition to what is now a deleted DXCC entity: Southern Sudan. Fig. 3: Left, Franz DJ9ZB (SK, 2022), with G4JVG at Friedrichshafen. Franz was a member of the 1990 PA3CXC/ST0 Southern Sudan DXpedition team. Fig. 4: ST0R was the first operation from the new DXCC entity of the Republic of South Sudan in 2011. Fig. 5: Darek TJ1GD/P has been made a 'Notable to the Royal Court of Mondoli Village'. Fig. 6: The OS8D motorcycle portable station with Yaesu FT-710 on 6 April.

Etienne Vrebos OS8D *"got some nice DX this month: about 400 QSOs from home with the usual rig and PA and about 900 QSOs as OS8D/P, mostly castles, bunkers, parks and FF. But my FT-891 went out suddenly during an outdoor activity: no receive any more, I couldn't hear anything, totally deaf. I changed the antenna, the microphone, the battery (as spares with me), the transmit worked great as everybody could hear me, I checked by phone with some friends who all said I was 59+. I checked at home when back from far away with the same result: no receive any more. Sent it back to the dealer (the rig is only nine months old) and hope to get it soon back. Would be nice to hear / read something about this from* PW *readers in order to react in case of 'no warranty' from dealer. He already told me it could happen if I use a second rig just near the 891, even a 2m rig, but on the motorcycle I transport only one rig and had no other transmitters in the neighbourhood. Yesterday I made an activity by motorcycle with the Yaesu FT-710,* **Fig. 6**, *but it's too heavy and too big to be transported by motorcycle. I did it once, but the 710 is too nice too to be handled from a motorcycle."* We hope you will be able to resume your portable activities soon, Etienne.

Tim Kirby GW4VXE / GW4MM had a good month on the air: *"I've just looked back at my log for March and it lists six new countries in the month. That doesn't happen often! Fiji, Maldives, Palau, Bouvet, Kiribati and Nigeria. It just shows what you can work when you're looking around the DXpedition frequencies on FT8 (which I must confess, I don't do that often). Conditions generally don't seem to have been that great (as I write this the SFI is 98) and my evening operations have been on 18MHz, sometimes and more often on 14MHz rather than 21MHz. Even with the poor conditions, it's been fun working SOTA and POTA portables on the other side of the Atlantic on CW. I did try out FT2! It seemed to work OK, but as I wrote in my column last month* ['The World of VHF', *PW* May 2026], *throwing away all that sensitivity goes against the grain for me!"*

Martin Burch VK4CG reckoned he had *"nothing to report"* this month, although he had just visited the Redcliffe and District Radio Club's Hamfest (to the north of Brisbane), where he said the new Icom IC-7300MK2 was generating a lot of interest.

Owen Williams G0PHY said it had been *"a month of mixed fortunes, with the bulk of contacts made during the CQ WPX SSB contest. The month started with a 7MHz contact with J51A and a 24MHz QSO with VP2EWE. Highlights of the WPX*

Fig. 7: Carl M8HPI and Lindsay Gorse, on their wedding day. Fig. 8: M8HPI/P antenna on the beach at Shanklin on the Isle of Wight.

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contest included early morning contacts on the first day with KL5DX in Alaska, V47T and VP2M in the Caribbean and TI1T in Costa Rica, all on 14MHz. Most of the contest QSOs were on 21MHz including one with NT6Q near San Diego. The month ended with three contacts with V4/SP9FIH." Owen added that although he heard both the 3Y0K Bouvet and S21WD Bangladesh DXpeditions at good strength, he did not contact either of them. Both operations were on IOTA islands and Owen commented *"I'm on 399 confirmed IOTAs so either one of these would have given [me] the 400th."*

Simon Davis-Crane G7WKX sent in an impressive log of contacts made using 50 to 100W into a single-element antenna. He added: *"Whilst I worked J51A a few times earlier in March quite easily on FT8, I missed CY0S as the one time I got through the pile-up they did not send RR73. Maybe next time?"*

Finally, hearty congratulations to our regular contributor **Carl Gorse M8HPI** and to the new **Mrs Lindsay Gorse**, who got married in March, **Fig. 7**. Between his wedding duties, Carl managed to get on the air a little using 100W from a Yaesu FT-891 to the Mad Dog Coil vertical antenna (see last month's *HF Highlights*). For their honeymoon, the new couple went to the Isle of Wight where they activated nine parks (**Fig. 8**) and had a fantastic holiday. Their next trip was to the Norbreck Rally in Blackpool.

28MHz beacons

The 28MHz beacon report for the period 1 to 31 March was compiled by **Neil Clarke G0CAS**. First this month paths to North America were good up to the 13th and then were hit hard from the 14th except on the 20th, when seven call areas were heard and on the 28th when two areas, W4 and W5, were logged. The cause of this was a prolonged spell of geomagnetic activity. Last year USA beacons were heard on 27 days, this March only on 16 days. Farther north, VA3XCD 28170 and VE3TEN 28175 were heard on eight and 10 days respectively, but neither were logged after the 10th. Beacons heard from South America were PY2BBM 28198 and PY4MAB 28276 when both were heard on 30 days. On 28200 LU4AA and OA4B were logged on 31 and 20 days respectively. A regularly-heard beacon from Argentina, LU2DT 28193, has not been heard since mid-December 2025 but it was logged on 291 days during last year. On 28200, ZS6DN and 5Z4B were heard on 26 and 25 days during the month. ZS1TEN 28222, located in northern Cape Town, was logged on 26 days.

Small openings via Sporadic E still occurred during March, though admittedly not many. For example, on the 1st, C30P 28256, OZ7IGY 28271 and IZ0CWW 28295 were logged, followed the next day by ZB2TEN 28168 on the 2nd and again on the 9th when also ED4YBA 28263 was heard. To Scandinavia, when OH9TEN 28267 was heard on the 22nd, and LA5TEN 28238 and SK7GH 28298 were logged during the afternoon of the 25th.

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).

Reg G0OOF (MS): 3.5MHz FT8: CY0S. **7.0MHz FT8:** 3Y0K, CY0S. **10MHz FT8:** 3Y0K, CY0S, S21WD, XX9W. **14MHz FT8:** 7X5EU, CY0S, P4/WE9V, XX9W. **18MHz FT8:** 3Y0K, CY0S, V4/SP9FIH. **21MHz FT8:** CY0S, KL4RL. **24MHz FT8:** 3Y0K. **28MHz FT8:** 3Y0K, CY0S.

Etienne OS8D (HB): 14MHz SSB: HD8R, JW8EKA, S79VU, T8OK, VK2GJC, VK3EY, VP2EAD. **18MHz SSB:** CY0S, YB3ETY. **21MHz SSB:** 9Z4BM, B1Z, BI8AD, D4C, EX9A, J51A, J62K, LU1DK, P49Y, PZ5TW, S21WD, TO7O, UN7CFI, VK9DX, VP2ELX, ZM4T. **24MHz SSB:** 3Y0K, CE0Y/DJ4EL. **28MHz SSB:** 4K3ZX, 5X2VJ, 7Q2T, 9J2RO, BV3VN, EX8ABR, HK4LRM, J51A, LU1VJC, LU9CNS/J, NP4IA, V4/SP9FIH, V47T, VU2DSI, ZP9HTL.

Martin VK4CG (MS): 7MHz SSB: FK8HC, KR7JD. **14MHz SSB:** JG2MQM, SM6GFR. **21MHz SSB:** JO3DDD, YB3KM, ZM3WW. **28MHz SSB:** BD7MQ, JG1LFR, NH7T, XX9W, YE9XAJ.

Owen G0PHY (MS): 7MHz SSB: CN3A, J51A, UP0L. **14MHz SSB:** HZ1TT, KL5DX, TI1T, V47T, V4/SP9FIH, VP2M. **21MHz SSB:** 8P5A, D4C, EX9A, NT6Q, PZ5TW, UP4L, V26K, V47T, V4/SP9FIH, VP2M. **24MHz SSB:** V4/SP9FIH, VP2EWE.

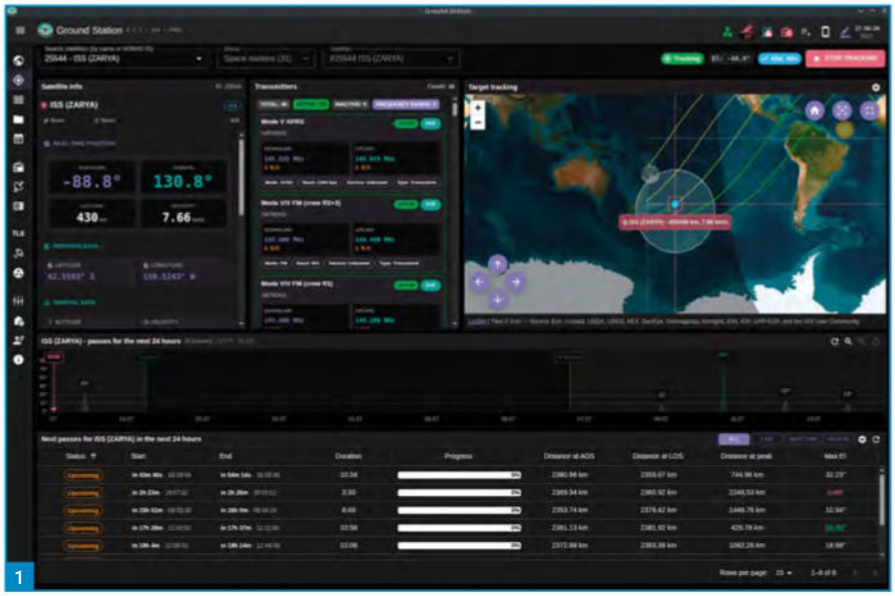
Simon G7WKX (MS): 7MHz SSB: YD6BBJ. **10MHz FT8:** V4/SP9FIH. **14MHz FT8:** TX5EU. **18MHz FT8:** 4S6NDB, VP2EAD. **21MHz FT8:** 4K6SA, 6K5BXQ, DV6YDG, TJ1GD, TL8GD, VR2VGM. **21MHz FT4:** VU2EII. **24MHz FT8:** ZS3JDL. **28MHz FT8:** VK8DNT.

Carl M8HPI (MS): 18MHz SSB: KM7CSS. **21MHz SSB:** CX4BAN, HK4T, PY5EW, VE7LGP, XQ3PCN.

Signing off

Thanks to all contributors. Please send all input for this column to teleniuslowe@gmail.com by the 11th of each month. For the August issue the deadline is 11 June. 73, Steve G4JVG. **PW**

Tim Kirby GW4VXE
gw4vxe@icloud.com



Declining solar numbers and what does it mean for the Es season?

Tim GW4VXE has his usual band reports as well as an update on the AnyTone AT-D890UV for satellite use.

As I write this column (mid-April), the Solar Flux is a modest 93. It seems like only 'yesterday' when we were looking at numbers around 200! While I'm fairly sure that the flux number will recover from where it is, it's probably fair to say that the cycle is now on the wane and we won't see such high numbers again in this cycle. Of course, making any predictions about propagation, solar numbers and the like is highly dangerous and I shall be delighted to be proven wrong.

What effect will this have on the forthcoming Es season? That will be really interesting to see. Last year, we saw little of the extended multi-hop Es openings to North America, or the morning openings to Japan. Will this year's lower solar activity help these openings? You may remember I asked **Jim Bacon G3YLA** for his ideas about whether there was a correlation between solar maxima and poor Es. Jim felt there was perhaps a weak connection, in that Es forms less readily if the K is greater than 3, which of course, in periods of solar maximum, it often is.

So – we'll see! Here's hoping for a good Es season, which by the time you read this, will hopefully be underway.

Software updates

Jef VanRaepenbusch ON8NT always includes an interesting list of new software that he's become aware of and there's often so much it's hard to pick out what would be useful and interesting to most readers. This month, Jef mentions a project called PyTNC Pro by **Stefaan Desmedt KO6IKR** which is a fully featured APRS application for Windows. You can read more at:

https://tinyurl.com/5n7ahwfm

Jef also mentions Ground Station, **Fig. 1**, which is an Open Source SDR platform for Satellite Tracking and Decoding. You can read more at:

https://github.com/sgoudelis/ground-station

There's also POTACAT which, on first inspection, seems to offer remote operation for many radios, using a Raspberry Pi and a web browser. I haven't investigated fully, but if you're interested, take a look at

https://potacat.com

I spent a little time recently looking at WFView which is an interface for Icom and Kenwood radios. It offers remote operation for Icom radios, but not yet Kenwood (which was disappointing for me and my TS-590SG!). It's fully featured, so if you've an Icom radio and fancy having a play, it's easy to install, free and you can find it at:

https://wfview.org

More on the AnyTone AT-D890UV for satellite operators

Patrick Stoddard WD9EWK has been experimenting with this new radio from the satellite operator's point of view and writes, *"The AnyTone AT-D890UV has been on the market here a few months, Physically, it is about the same size and weight as the earlier AT-D868UV and AT-D878UV, but in a blue case. The AT-D890UV is advertised as supporting NXDN as well as FM and DMR, but the radio comes out of the box only supporting FM and DMR. NXDN support is available with an additional firmware update. For satellite operators, the AT-D890UV has full-duplex functionality for V/U and U/V FM satellites. The issues with 70cm receiver desense while transmitting on 2m, something that affected other Chinese-brand handheld radios advertising full-duplex operation in the past, are not present with the AT-D890UV. I have used it with the ISS cross-band repeater, SO-50, AO-123, and SO-125.*

"The AT-D890UV has a satellite tracking and tuning function built into the firmware. Keplerian elements are updated through the CPS software. I have not tried this functionality, since it only works for half-duplex operation.

"Full-duplex operation with this radio is similar to what you would see with radios like the Kenwood TH-D7 and TH-D72, Yaesu FT-470 and FT-530, and other older radios. When switching VFOs or tuning a VFO, it isn't as smooth as you would hear with other radios - receive audio is briefly interrupted. The AT-D890UV is capable of tuning in 2.5kHz steps, but I have not found it necessary to use that size. I have found the 5kHz tuning steps are fine for FM satellite operating with this radio. Before the release of the version 1.04 firmware in early March, the full-duplex functionality was on all the time. With the version1.04 firmware, there is now a menu option to enable or disable the ability to receive while transmitting.

"The AT-D890UV can receive signals from three satellite-navigation networks - GPS, the Russian GLONASS, and the Chinese BeiDou (BDS). Any of these systems, or any combination of these three systems, can be used for GPS functionality. Using only GPS, the AT-D890UV seems to lock onto the signals faster than what I see with other radios having GPS functionality. The display shows latitude

Fig. 1: A screenshot from Ground Station an application for satellite operators and experimenters.

Fig. 2: Portable operation can be as simple as this, a Quansheng portable from a good location can work a long way.

and longitude in decimal degrees to six places. Starting with the version 1.04 firmware, a Maidenhead grid locator is displayed along with the latitude and longitude.

"Headsets and speaker/microphones use the Kenwood style configuration (speaker audio from the 2.5mm socket on the side of the radio). There is a male SMA connector on top of the radio for an antenna, and two 2m/70cm antennas are supplied (7in/18cm, 15in/38cm).

"I have a link on my QRZ.com page to codeplugs I made for the AT-D890UV for full-duplex satellite operating, using both VFOs. The codeplugs have memory channels for the uplinks and downlinks of several FM satellites, along with settings to help with working satellites. There are two versions of this codeplug; one for radios with firmware up to version 1.03, and one for radios with version 1.04 to handle the new menu operation that enables full-duplex operation".

The 8m band

Roger Lapthorn G3XBM (Cambridge) has decided not to request a new permit for the band this year.

The 6m band

Dave Edwards G7RAU (Lizard, Cornwall) worked D2UY on 14 March at around 2145UTC, although Dave says he had been audible for hours! On 12 March ZS6NK, ZS6OB, ZS6NL and others were also heard.

Here at **GW4VXE** (Goodwick, Pembrokeshire) the band has been pretty quiet although there has been the occasional bit of Es. On 31 March I was excited to see a decode from VP8LP (GD18) at around 1720UTC. Sadly, it was only one decode. As far as I could see, VP8LP had an extensive opening into Southern Europe and North America that day, so I imagine I caught a meteor burst from Southern Europe, allowing me to receive him briefly. On 5 April, I put the rig on the vertical, thinking that there might be some Es around. I didn't see any Es all day, but around 1910UTC, I did copy PY5CC and PP5ZP coming through.

Roger G3XBM says it has mostly been inter-G activity over the last few weeks.

The 2m band

Keith Watkins G8IXN (Redruth) worked CT9ACF (IM12) on the morning of 4 April. Keith used 50W to a vertical. He's recently changed from an IC-9700 to an IC-7400, having decided that his IC-9700 was an expensive luxury! Keith's also been experimenting with FreeDV and finding it works quite well at low signal strengths and thinking that it might work well on, say, 6 and 2m when SSB would be a struggle. He's keen to try it out on VHF, having had some success with it on HF already. Keith mentions that FreeDV version 2.3 will be coming out soon and should run on slower PCs. For people that want to make weak signal voice contacts on VHF/UHF this could well be worth a try.

Peter Atkins G4DOL (Dorset) has been enjoying some of the tropo and worked CT9ACF (IM12) and EA2XR (IN83) on 3 April. Next day on the 4th, Peter worked F6IFX (JN08), F6HRE (IN93), F4FMB (IN96), F6DRO (JN03), F6IFX (JN08), F6END (IN97), TM50KKR (JN18), F8CED (IN87), F6CBN (JN05) and CT9ACF once again. Peter said it was good to enjoy some tropo again after what seemed like a long time.

Andy Adams GW0KZG (Letterston, Pembrokeshire) also worked CT9ACF on 3 April. Andy also worked **Yuri UT1FG/MM** between 3 and 8 April on his way to Norway from IO22, IO23, IO33 and IO46. Unfortunately, Yuri's amplifier had failed so he was restricted to using around 20W, but was a remarkable signal at times.

Roger G3XBM is active in the UKAC sessions as well as local nets.

Dave G7RAU says that CT9ACF (IM12) was very strong between 2 and 4 April and was endstop at the start of the opening. Had Dave been around, he thinks he could have worked Stevo on the Quansheng portable and whip! (**Fig. 2**). During the same period, Dave heard 11 different EA8 stations in IL18/IL28 but was not able to transmit owing to a faulty relay which is now, hopefully, fixed. Dave is using a 12-element M2 Yagi on 2m.

Here at GW4VXE, I noticed some tropo up to the Western Isles on 31 March with GM0HBK (IO77) being visible on 2m FT8. Sadly, our paths didn't cross this time, although we both heard each other at different times. On 3 April, I spotted CT9ACF (IM12) at around -15 on the vertical - unfortunately I wasn't in the shack at the time, otherwise a QSO would have been possible. A little later, around 1400UTC, GM0HBK was visible once again. Next day on the 4th, I checked 2m fairly early and CT9ACF was on and a good signal. I didn't catch him then, but by about 0730UTC signals had improved even more and I was able to complete a QSO. Around 1030UTC propagation had moved slightly and I could see EA8CSB calling on FT8 – signals were up and down for an hour

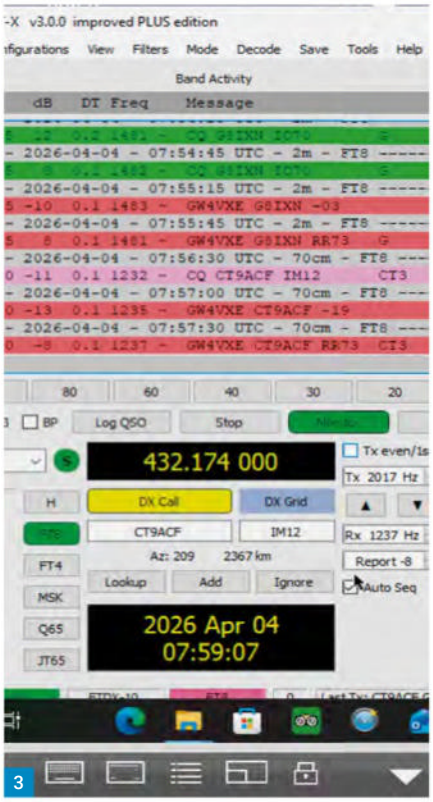


Fig. 3: A screenshot of GW4VXE's 70cm QSO with CT9ACF. Fig. 4: The summit of GW/MW-032 Upper Park with a number of SOTA operators getting ready to activate it for the first time.

or so, but we managed to complete a QSO. A little later, I could see EA8RS as well, but wasn't able to work him. On 7 April, both **Paul G4RRA** and Andy GW0KZG kindly messaged to say that UT1FG/MM was in IO22. I saw a few isolated decodes from him during the morning and decided to call him when I got to the shack and to my surprise and delight, he came straight back. Better still, he was just on the point of crossing into IO23, so a few minutes later, I was able to work him from there, another new square. Around 1900UTC I was able to make a very marginal QSO with Yuri from IO34 – another new one! Next day, I did see the odd decode from Yuri in IO46, but not enough to be able to complete a QSO.

The 70cm band

Roger G3XBM goes on for the UKAC sessions and takes part in the FT8 Activity periods and is amazed how well his 10W to the 144MHz big wheel omni does on the band.

Dave G7RAU says that CT9ACF (IM12) was very strong between 2 and 4 April.

Only one QSO to report here at GW4VXE, but it's a good one! Having completed my QSO with Stevo CT9ACF on 2m, I switched over to 70cm in the hope that he might be there as well. Sure enough he was, coming through at around -11 on the vertical. I gave him a call and was delighted when he came straight back **[Fig. 3]**. This isn't my best DX on 70cm, having worked EA8 as well as hearing D4VHF – but it was a new country for me on the band.

Summits on the Air (SOTA)

Simon Davis Crane G7WKX (Liverpool) writes, *"We are just back home from our successful SOTA activation of GW/MW-032 Upper Park this morning, with the group of approximately 10 other activators* **[Fig. 4]**. *I managed two contacts on 23cm FM, using my old Yaesu FT-2311 into a simple handheld log-periodic antenna. I worked one station in Bolton, G7LWT and* ***Peter MW0PJE/P*** *who was on Welsh SOTA GW/NW-060, for the summit-to-summit contact.*

"Earlier in March, I have chased a handful of SOTA activators on 2m SSB, as well as some on 23cm FM.

"I've recently obtained a Yaesu amplifier for my 290R2, which I'll be using on future SOTA and POTA activations when I can. We will be visiting Ireland (the Wicklow Mountains) in mid-May, targeting some of the bigger mountains, if the weather allows".

Satellites

Jef ON8NT, **Dave 5B4AOB** and **Pete MM9SQL** all mentioned that FO-29 was available this month, its 30th year of operation. FO-29 is one of the satellites that needs full sunlight to operate in now that its batteries are degraded, so there are only certain times of year when it's available.

Jef ON8NT monitored the ARISS schools contact on 25 March from the ISS to a school in Luxembourg and then again on 30 March for a school in Canterbury, the Simon Langton Grammar School for Boys. Jef used FT4 on FO-29 to work OM5TE (JN98) and on RS-44 to work R5AO (KO86), RM9C (MO07), SM3ULU (JP81), PD7JVW (JO31), N2YZH (FN22), N8HRZ (EN91), LY1R (KO14), F5RRS (JN36), F6HRO (IN88), PA3AIW (JO21) and PD5JOS (JO21).

FM and DAB DX

It was nice to meet with **Simon Evans** (Twyning, Gloucestershire) on one of my recent visits to Cheltenham. This month Simon says that there hasn't been much FM or DAB DX noted, although on 7 April there was a brief opening to northeastern France, but only around the Lille area.

Simon also mentions that the DAB experiment in Ireland has been extended for another year from April and a second ensemble has been permitted in the south and west of Ireland. On one of the DAB forums, 7A has been noted testing for the second Failte DAB. You can read more at:
https://failtedab.ie

And finally

That's it for this month. Hopefully by next time we shall have some Es contacts to report. All being well too, the weather will have improved somewhat and a bit more portable operation will be possible. Do send your reports and pictures of any VHF/UHF related portable activity – it would be great to include them in the column. Thanks to everyone who has contributed month – it's much appreciated. **PW**

Roger Daniel G4RUW
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50 countries on 2m with 10W

Roger Daniel G4RUW looks back at his quest to work 50 countries on 2m with just 10W – a great accomplishment.

The requirements for being able to do this are as follows: Patience and yet more patience; Time, lots of time. In my case 40 years almost to the day; A fair understanding of propagation and the various types of propagation and what to expect from them; An understanding XYL. Most important; A transceiver and antenna; A belief that it is possible to achieve the task.

First to mention the QTH. I live to the west of Newbury in the Kennet Valley; the canal and the river can be seen from my bedroom. The station is about 200ft above sea level with hills to the north rising to 300ft and to the south hills up to 400ft. Due east of me is the town centre with of course higher noise level in that direction.

If you go up Walbury Hill (one of the highest points in the south of England), you can see Newbury is very much in a basin from that vantage point. So, as you can tell, not the best of locations for VHF working let alone with just 10W.

Starting out

I received my B-class licence in April 1984. The B-class gave us 2m and up. Although I've been a SWL on the amateur bands since I was 14 years old I had no knowledge or understanding of VHF but with a new licence I was itching to get on air. At the time I was married with two children and a mortgage, in other words no money. I managed to scrape together enough to buy a second-hand Mizuho SB2M transceiver with an output of 1 watt.

I later found that it only put out 950mW. I made a 5-element cubical quad from solid aluminium wire and a wooden boom. It was fed using 50Ω TV coax mounted about 15ft or so above the ground. Why did I use TV coax? Simple answer, money was short. One thing to mention here the quad was very good for auroral reception probably due to the vertical component of the quad helping. Maybe!

Back in the 1980's there was a lot of activity on 2m, far more than today, so with no great expectation of working much with 950mW I started off. In just a few weeks I'd managed to work as far north as Manchester, then east Anglia and then GW. Then one weekend during a VHF contest I worked across the water to France, real DX!

A good friend of mine, **Roy G3KJC**, was kind enough to give me a homebrew 10W amplifier. This made a big difference to what I could work, so slowly the DX was worked and it set me to thinking could I work 50 countries with 10W.

The idea came from my first sporadic E contact to Italy so I looked at the map to see how many countries were in an arch from Italy. It is a fair few. Thinking again depending on propagation I concluded that to work 50 countries was feasible.

The quest continues

At the time I got my licence the sun was active and aurora was fairly common. I remember working my first GM and PA via this mode and various tropo openings gave me LA, SM, OZ, DJ, etc. The country tally was very slowly rising.

To work sporadic E was fairly difficult then as it was really within the lap of the gods, but there were and still are pointers to look out for. First listen on 10m. If strong short skip was evident, then listen up. At the time we did not have 6m issued to us so it was listen on the FM home radio to see if foreign stations were coming in on 80MHz and up. If stations were evident, then excitement starts but it's still a long way to go from FM radio to 144MHz.

There were at the time three of us locally interested in 2m DX: **Norman G3NVO**, sadly now SK, **Malcom G4MKF** and myself. If one of us heard something, a quick phone call, while later we had a 70cm link that worked well.

So, with gaining an understanding of the various types of propagation the locator squares and countries started to creep up. After a few years with the Mizuho and 10W amplifier I changed rigs and antenna to a Yaesu FT-221R and a 9-element Tonna with a masthead pre-amp, fitted to a rotator. The FT-221R had a MuTek front end fitted. Still with only 10W output I plodded on. As time went by some really interesting contacts were made. For instance, I had heard Greece many times on sporadic E but could not work one. Then one day there was a good opening to that area, again no SV but to my surprise I heard and worked SV9 on Crete, really amazing with just 10W. Best DX to the south west is EA8 and CT9 – the CT9 was my 50th country.

In summary

Of all the countries worked I have all confirmed accept EA6 Mallorca. Now some years ago we were on holiday in Mallorca with friends and were travelling around the island when we came into a small costal town. In front of us I saw a couple of towers, one with HF beams, the other with VHF antennas. I then saw the name of the street and recognised it was the town and street where I had sent my QSL card and IRC. So, we stopped. The house was up a steep bank from the road with steps to a door in a 2m high fence that went around the property. The reply was not what I expected, the sound of two or three of what sounded like very large dogs trying to dismantle the gate. I valued the back of my shorts more than a QSL card so still do not have EA6 confirmed.

All countries that I have worked have been on SSB and lately FT8. A handful of squares have been CW. I am no great CW op. The station now is an Icom IC-9700 so, yes, a reward to myself now with 100W instead of 10W and the antenna still a modest 7 element beam. There are still a few countries out there to be worked such as T77, C31, 3A, HV, UA2, ER, Z3 and ZA. I have heard but not worked them but if I do work them in the future, I can say now it won't be with 10W.

Well, I do wonder is there anyone else out there in G land or EU who has worked 50 countries on 2m with 10W. Is this a first I ask myself, it's been a heck of a challenge but great fun. **PW**

Keith Rawlings G4MIU
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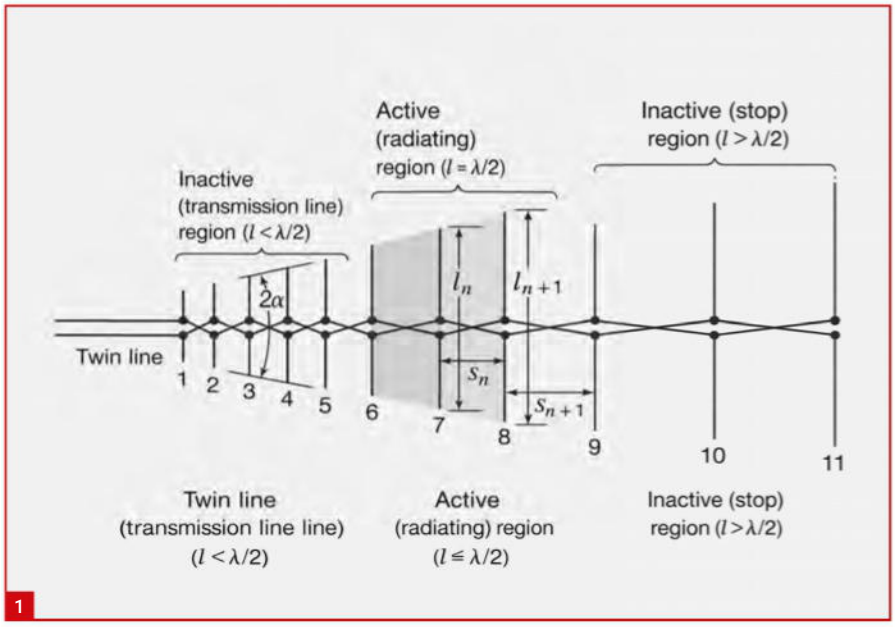


1

The Log Periodic

Keith G4MIU discusses log periodic antennas including the ZA048 direction finding antenna.

Hello and welcome to this month's *Antennas*. When it comes to spending money on radio equipment I am usually quite careful, I don't for example, have an impulse and then rush out to buy one of the latest and probably expensive, transceivers. In the past any purchases of this kind will have been well thought through.

I am, on the other hand, a bit weak when it comes to 'tools and gadgets', items that will typically cost less than £50 or so. My shelves are full of tools and testers, most bought on a whim rather than for any particular job (My wife has now banned me from the middle isle of any Lidl store!).

So recently, while I was browsing the Mirfield electronics website for something I did need (a TinyGTC) I spotted a ZA048 Planar Log Periodic Antenna which they promote for use with the TinySA Spectrum Analyser and which has a useful frequency coverage of 400MHz to 8GHz.

This antenna had already caught my attention a while back last year. I found it on AliExpress for a tad under £15 and while tempted to purchase one I was put off by the fact that two previous orders from that site had been problematic with both being sent to totally wrong addresses. I have no issue with AliExpress as I received instant refunds but didn't fancy it happening again.

So, although the Mirfield item was twice the price I was at least dealing with an item that was in the UK and being supplied from a UK seller.

So, impulse, click on item, and the next day it arrived along with the TinyQTC.

The Log Periodic

The LPDA (Log Periodic Dipole Array) can come in many forms and there is something about them I have always found fascinating. Presently I have two models manufactured by Create, another that was originally marketed by Moonraker, each bought cheaply in need of repair, and two homemade designs, all of them intended for VHF/UHF use.

Many readers may be familiar with an LPDA in its conventional format as depicted in **Fig. 1**. The LPDA is a wideband directional antenna which has found use in many applications from commercial radio, military, electronic warfare, surveillance, HF/VHF/UHF spectrum monitoring, EMC testing and amateur use. While they may resemble a Yagi Uda array they are quite different.

A Yagi is generally a single band antenna with its gain and radiation pattern optimised for that band, such as 6m, 2m etc. The LPDA (which is a Travelling Wave Antenna) on the other hand has a relatively flat response in both gain and directivity over a much wider range. Just how much gain and over what frequencies will depend on the design.

An LPDA is made up from a series of dipole elements that progressively increase in length and spacing and are arranged along the antenna's booms in a logarithmic pattern.

Two separate 'booms' are used with each dipole element's connection alternatively between each boom. These booms act as transmission lines and this arrangement ensures that only the elements closest to resonance at a given frequency will be active.

If we look at **Fig. 1**, we can see that the antenna has three regions with only those dipoles near the resonant frequency being in the active region (as radiators). The active region will move along the array as frequency is changed. The length and spacing ratio are calculated using a scaling factor known as Tau.

The convenience of having a directional antenna that is wide band and has some gain and directivity comes at a price. For a given number of elements an LPDA will have less gain, a broader radiation pattern and less F/B ratio than a Yagi (which will be more efficient on a single band). Also, the design and construction of the LPDA is more complex, it will likely be heavier than a Yagi and have more wind resistance.

You can expect an LPDA to provide a Wide bandwidth covering ratios like 2:1, 3:1, or even more. It has a typical gain of 6–10 dBi, it will provide some Front-to-Back ratio and its impedance should be consistent across its design frequency.

LPDA's are quite common for VHF-UHF work where their dimensions are quite manageable but they are also popular for HF use with both military and commercial users as well as a number of amateurs who are lucky enough to have the room!

This is a brief description of a conventional LPDA but there are many variations of the design.

One is the Log Periodic Yagi. See **Fig. 2**. This antenna is a combination of the LPDA and Yagi and will give a wider bandwidth than a conventional Yagi for a given band. There is also a variant called the Log Periodic V Antenna which is similar to the conventional LPDA but the elements are bent back by about 38°. I am not sure of the purpose of this other than to perhaps make the array more compact.

A Log Periodic Monopole Array is another variant. This is a very convenient method of construction for fixed/monitoring links on HF. It is essentially one half of the conventional LPDA where instead of the elements being a total of λ/2 in length they are λ/4 long. I assume that the other half of the array is provided by ground.

Fig. 1: LPDA design and working concept (from Antennas and Wave Propagation 5th edition, Kraus, Marhefka, Khan).

Fig. 2: Log Periodic Yagi (from VHF-UHF Manual 3rd edition. Evans G3RPE, Jessop G6JP).
Fig. 3: Planar EW antennas. Fig. 4: Top view of the antenna holding the TinySA horizontally.
Fig. 5: TinySA held vertically with handle and screen showing mobile phone signals.
Fig. 6: VSWR plot.

Evidence of this version of the LPDA has been seen in the South China Sea where the Chinese PLA have constructed tall masts with sloping support wires which have vertical wires hanging from them. They have been identified by some as LP Monopoles, presumably for Signals intelligence use.

Coming down is size another variant is the Logarithmic Spiral Antenna, one format of which is built in planar form on a substrate of some type.

Incidentally, most of us have some form of a planar antenna in our pockets or siting on the desk as they are widely used in wireless devices such as mobile phones and other such devices where the antenna may be formed on the PCB. This makes the provision of an on-board antenna relatively simple to manufacture.

A Planar Array may be seen in **Fig. 3** which was taken at IWM Duxford, and is of one of the EW sensors fitted to a trials Eurofighter Typhoon which was, at the time, in the IWM collection. The 'pod' is seen with its dielectric covers removed and the two circular objects are planar antennas, and, while it is not possible to tell from the photo if they are of the Log Spiral design (They may have been Archimedean Spirals), they demonstrate a form of a flat planar design.

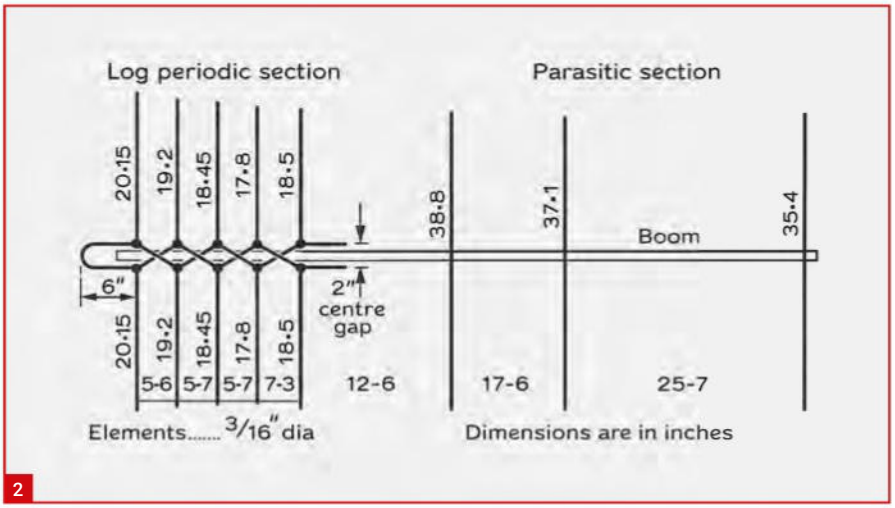
The subject of planar designs brings me back to….!

The ZA048 Log Periodic 'direction finding antenna'

This antenna, emanating from Zeenko in China, is a planar design with the elements quite literally etched on to either side of a piece of thin PCB material, **Fig. 4**.

A planar antenna such as the ZA048 is flat, low-profile and very light in weight. In many cases the elements of a planar antenna are printed on one side of the dielectric material of a circuit board and this usually consists of a metal radiating track on one side and a ground plane on the other. On the ZA048 both sides are etched with the antenna's elements.

The antenna was supplied with a form of desktop camera tripod and an adjustable mobile phone holder that screwed into the tripod. These were supplied as the kit is marketed towards the TinySA Spectrum Analyser, the tripod being used as a handle and the TinySA fitted to the holder at the rear of the antenna. See **Fig. 5**.



Specifications

Online I have found that the specs quoted from different sources vary slightly but in general they agree with those on the Mirfield website. Quote: *"The antenna's input resistance is rated at 50Ω, and return loss fluctuates when the antenna is connected to a 50Ω source. In most frequency bands above 1GHz, the return loss is about 10dB or less, and the VSWR is about 2. In the 400MHz-1GHz band, the return loss is about 4.5dB or less, and the VSWR is about 4. The VSWR increases rapidly at frequencies below 400MHz"*.

The antenna's dimensions are 270mm across, 230mm long, with a thickness of some 1mm. The overall plan view resembles a small Avro Vulcan B1 bomber!

The RF connection is an SMA connector which is soldered directly to the PCB and I probably wouldn't want to put too much strain on it. The overall design is well made and while not flimsy it is, in my view, rather delicate and should be treated as such.

Matching

The maximum frequency I can measure with my available analysers is 4.4GHz by using the VNA-3G. So, to evaluate the antenna's matching I set the analyser to sweep from 100MHz to 4.4GHz. The reason I started at 100MHz was that I had seen it claimed that the antenna was useable down to this frequency.

At these frequencies it was important to make sure the calibration point of the VNA was at the antenna's SMA connector. For this I used a good quality lead with an SMA plug on either end and calibrated with my Rosenberger Calibration Kit, the parameters of which could be entered into NanoSaver. An SOL calibration was performed on the end of the cable to calibrate out the effects of the cable. The results of a NanoSaver VSWR sweep can be seen in **Fig. 6**.

Above 1GHz the response is reasonably flat, below 3:1, but below there are some places where the matching is not good. However, I did find that, depending on how the antenna was held, there was some interaction that affected the VSWR.

In use

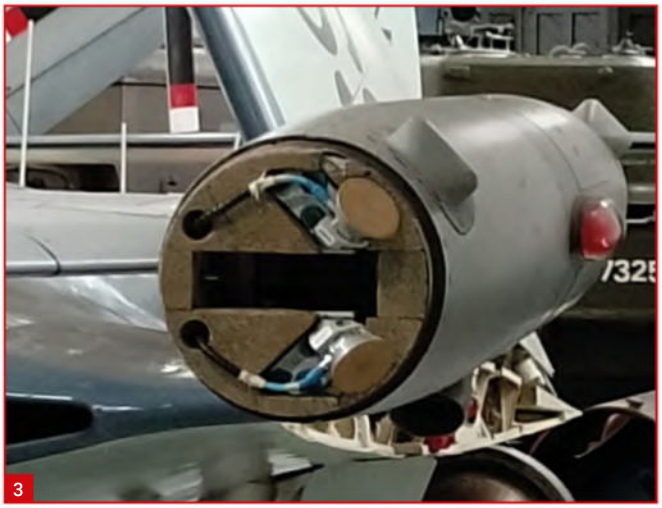
The rear of the antenna has a hole to match the ¼in UNC thread on the handle. The antenna sits on the handle and the mounting bracket screws onto this. The TinySA fits, just, into the bracket. With it fully opened up the clips only grip to about halfway up the analyser body and consequently it is not held solidly and any jarring will see the analyser fall out. The analyser may be held flat against the antenna **(Fig. 4)** or, preferably, standing up from it as in **Fig. 5.**

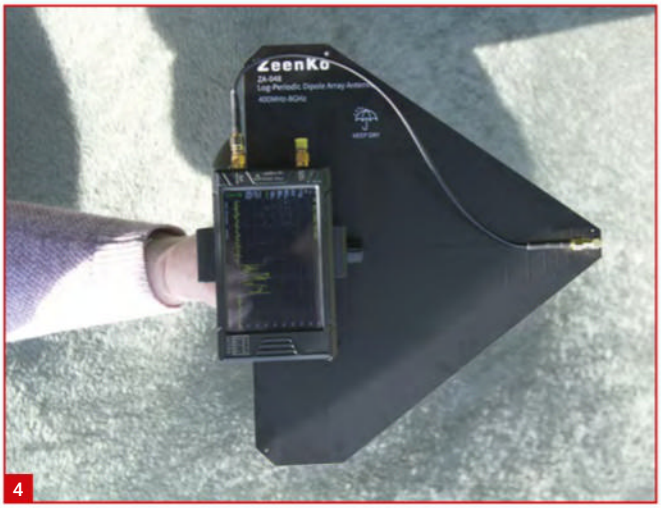
If searching for telecoms signals, these will invariably be vertically polarised. The way the analyser is held means that the whole assembly has to be turned on its side, making viewing the screen difficult.

In **Fig. 5** the TinySA has been set to sweep from 850MHz to 1GHz and local mobile phone signals can be seen. The two masts closest to me, roughly 1km to the southwest and 1.5km to the south east could easily be seen to drop in signal strength as the antenna was rotated although this only equated to 3-5dB according to the TinySA.

Moving frequency, two known local DMR shop watch frequencies around 453MHz were easily displayed on the screen with maximum response in pretty much the direction they should have been with around 7dB in reduction of signal off the back on the antenna.

It was easy to point the antenna and see where my wireless router was on both 2.4 and 5GHz. To try the antenna below 400MHz I looked on the WFM band. BBC Radio Essex on 103.5MHz read -85dBm with the antenna pointing at the transmitter and disappeared into the noise floor at -103dBm when turned away.





On VHF airband two distant Volmet stations could be heard using a scanner but turning the antenna made little difference.

The general direction of Digital TV MUX's was easily found too.

Conclusion

With such wide coverage it is difficult to fully assess the antenna's performance here, but overall it seems to work and I found the antenna fun to use with the TinySA.

As the weather has got warmer I have started to use the combination to indicate the locations of the various strong SCADA transmissions on UHF close to where I live (Just for fun!).

I think the antenna could be used to locate interference and I can see it being useful in education too.

I have not tried yet but it may benefit from being used on the end of an insulated pole of some sort with the analyser held some distance away as I can't help the feeling that mounting the analyser on the antenna will affect the directivity at some frequencies.

As I say fun to use and worth having in the gadgets box.

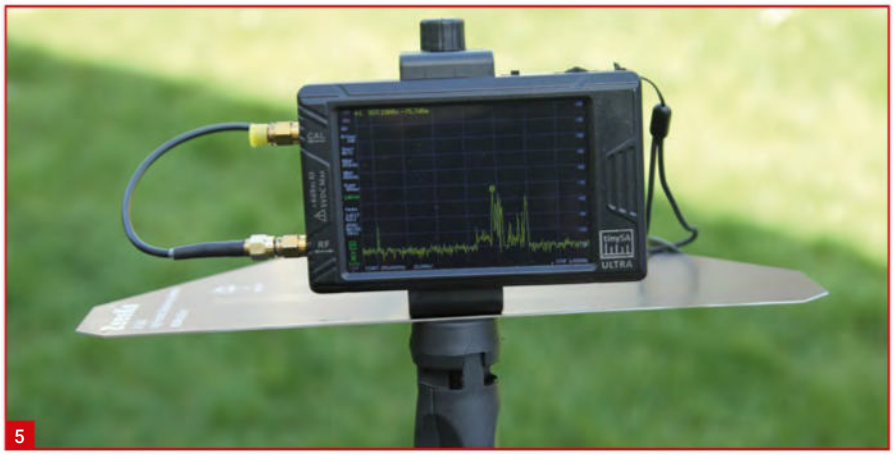
Prices

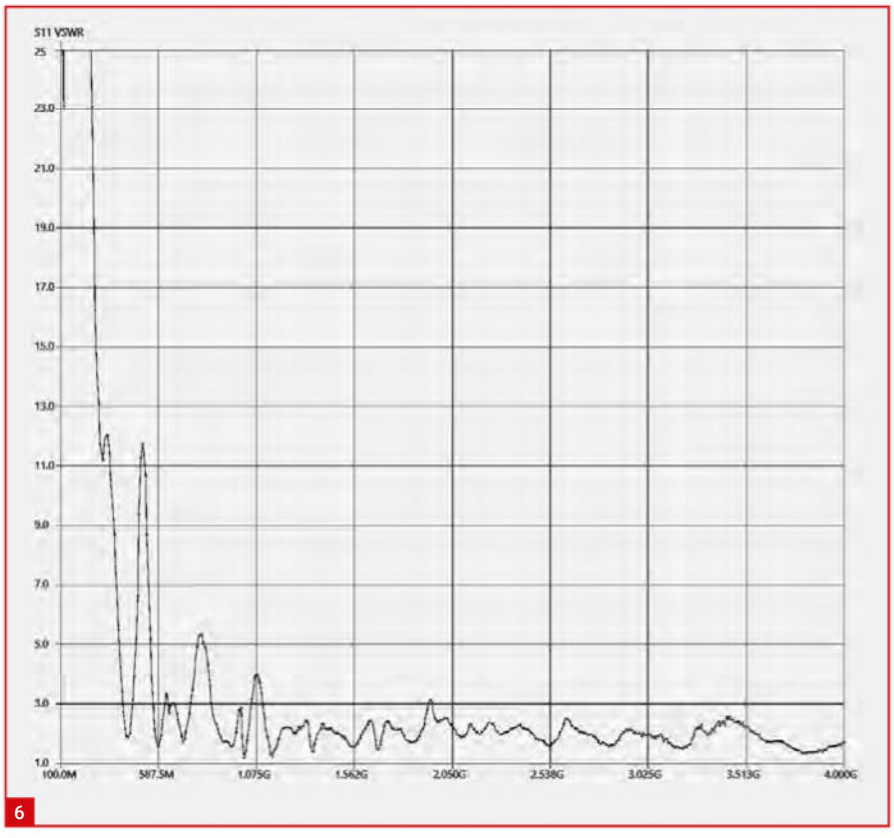
The current price for the ZA048 from Mirfield Electronics (who are in the UK) is £29.95 + p&p. Alternatively, there are a number of sources online for this same antenna and I guess most readers will do a Google search first if they are interested in obtaining the antenna. Here is a random selection of sources as of March 2026:

- Banggood £16.83.
- AliExpress £28.89

Note that Chinese sales sites often seem to change prices each time they are viewed!

- Eleshop.EU €32.23
- Listing on eBay from China £38.11
- Listing on eBay from China $33.06 **PW**





Tom Morgan G0CAJ (ex-ZS1AFS/ZT1T)
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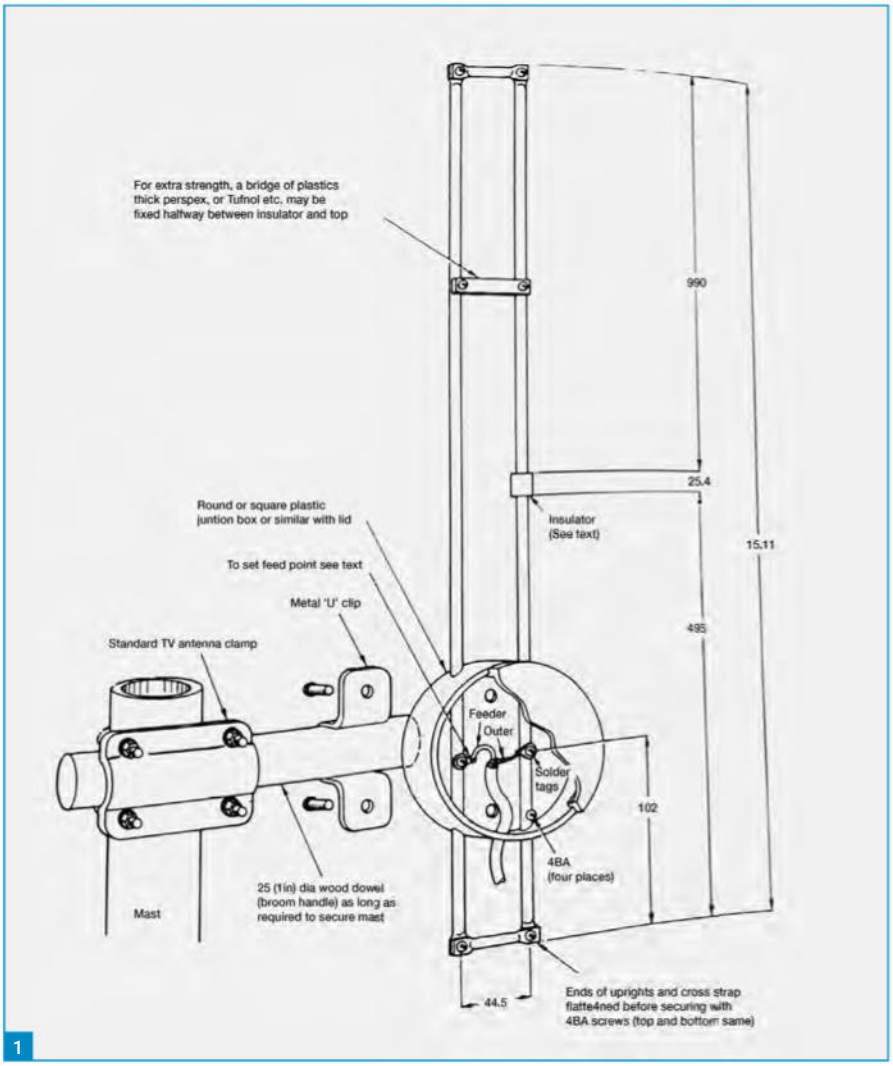

1

Sue's Slim Jim

Tom G0CAJ returns to the classic Slim Jim, with some advice on building one for other bands.

I know several people have written about Slim Jims but this article should enable hams, and emergency responders, to cut one for any band. But first there's a little history regarding this ubiquitous antenna. In these days of commercialisation of ham radio, there are still DIY projects that work as well as the expensive options available.

One of the most famous British amateur radio books that dealt with antennas was *Out of Thin Air*, originally published by *Practical Wireless* in 1981. It was reprinted five times! But later, in 1995, after several requests by readers of *PW*, a new compilation was published. Unfortunately, many of the original projects had become dated and, of course, several components had become obsolete or unobtainable. That's progress, I guess.

So, in 1995 *More…Out of Thin Air* appeared. Things moved on a little quicker as the new millennium beckoned. For example, I scoured the wardrobes of several friends for wire coat hangers to make the Tabletop Antenna for 144MHz. Everyone was using plastic! One of the authors included in both books was the late **Fred Judd G2BCX**. He caught the imagination of many ham operators with his Slim Jim and further refinements. He got the name from its slim shape and the J type matching stub, hence the Slim Jim.

The basics

Before going onto **Sue's** Slim Jim we can look at the basic principle of the antenna. G2BCX wrote, *"It's an end-fed vertical folded dipole"*. And he made the point that *"the spacing between the parallel elements is not critical"*. The currents in each leg are in phase whereas in the matching stub they are out-of-phase. So, there is little radiation from the stub. Provided the antenna is matched correctly, there should be a low SWR over the 2MHz of the 144MHz band (at that time). **Fig. 1** shows the original drawing from p.62, *More …Out of Thin Air* [**1**].

I remember seeing several of these that were sold commercially. The connections were encapsulated in what looked like a large plastic pillbox. A friend of mine made one using a plastic container that had held Pond's hand cream (solely used by his wife, he said). The biggest problem with the design was that rain eventually got in and corroded the terminals. G2BCX went as far as producing plans for an Ultra-Slim Jim. But bending the tubing was a deterrent for many.

Apparently, Fred made one for boats that was sealed in a plastic tube. Sue and I were very interested because we were building our ocean-going yacht. And that's when we came across a design that removed most of the constructional difficulties. Keeping the connections (and the antenna) dry was still a must. But what could be simpler than a piece of 300Ω feeder?

When I was first licensed I lived on the top of Dollis Hill, London NW2. This was the chosen site of the original GPO research station because it was the tallest hill in the London postcode area. On clear days one could see the crowds at Ascot racecourse 30 miles away, from the flat roof! What I needed was a VHF (2m) antenna on the top of our three-storey townhouse. The obvious option was a Slim Jim using 300Ω twin feeder. The main reasons were cost, ease of construction, and Sue G0EZN took on the project.

The dimensions for 2m (145.5MHz) are in **Fig. 2**. The convenience of adjusting the SWR to a particular frequency at the final stage is a bonus. See annotation on Fig. 2 for instruction. The great thing about ribbon Slim Jims is they can be rolled up when carried/transported, and there is a convenient loop at the top for attachment, like when hanging from the mast spreader of our yacht (cross trees). I'm still using the one Sue made when we started in the 1980s! I've replaced the plastic tubing several times. It is now held up by a child's fishing rod.

The photo, **Fig. 3**, shows it amongst the vines. Every winter I cut back the vegetation. Although it's not an absolute test, I run 5 watts from my FT-8900 to the local repeater 50 miles away. It's not in direct line of sight, but it's always 5/9 on receive.

Over the years Sue made several Slim Jims for different hams. She used one at her own

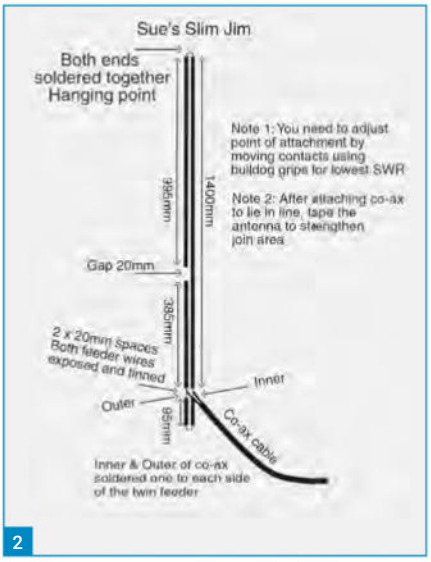

Fig. 1: Original Slim Jim drawing. Fig. 2: Detailed dimensions. Fig. 3: Among the vines. Fig. 4: A Slim Jim made from parts of an old Band 1 TV antenna.

station when she ran the technical services at a large high school, also on the top of Dollis Hill. (On HF she used a W3DZZ.) We were in touch with many hams. But all that changed when we arrived in Robertson, South Africa. Although more radio is being used on farms, there were a lot fewer hams, and the number in South Africa is diminishing. The most recent number I have seen quoted nationally by the SARL is 1622 members eligible to vote in the 2020 election! And it's a lot less, now.

One day our pilot friend **Alwyn** (pronounced Alvain), who flew Sue for her aerial photo shoots for the *South African Nautical Almanac*, visited. During tea he said, *"I monitor the local airfield from my office, using my handheld, but I'd like to hear pilots calling in from further out. Can you help?"* The rubber duck inside his office was not a good choice. So, I said, *"What about improving your antenna?"* We had a discussion about commercial antennas, but lack of availability was a problem. So, Sue made a Slim Jim to go above his roof. The frequency of our local airfield is 124.80MHz for aircraft below 1500feet.

Cape Town Information is on 126.5MHz and 125.1MHz.

The general area frequency is 124.4MHz.

Cape Town Approach is on 119.7MHz.

The latter gets busy in the mornings as the 'tourists' arrived.

Fig. 2 shows dimensions for 145.500MHz. But aeroplane VHF operates from 118 to 137MHz. We will take a mid-point of 125MHz. Fortunately, the maths is easy. All dimensions can be worked out on a basic calculator. Take dimension A - 1400mm:

145.5 ÷ 125 x 1400 = Dimension A for the air bands. (1630mm for convenience)

Using the factor 145.5÷125 the new measurements can be substituted for the old.

In general: 145.5 ÷ New frequency x Old measurement = New measurement

Needless to say, news spread about the air band antenna and Sue made a couple more.

Fig. 4 shows a Slim Jim made from a collapsible pointing stick I used to use during lectures, a piece of a UK Band One TV antenna, a cleat backing plate from our yacht and a plastic irrigation T-piece. The original design is from a *Practical Wireless* Antenna Special article, April 1996 issue, written by **Chris Williams G7NBP**. It's very handy for portable use. Large pipe ties below the plate hold the antenna up. The lug on the coax inner is fixed with a self-tapping screw on the short tube and the braid, held by a thin jubilee clip, is adjusted for best SWR, on the other leg. A crocodile clip holds the braid while adjusting (and soldering if it's permanent). I use self-amalgamating tape to waterproof the cable if it's temporary, or glue from a glue gun when permanent.

I seem to remember from my Dollis Hill days that one 10m fan had a Slim Jim in a plastic pipe for 10m FM! Other HF bands may not be so manageable. Latterly, there was an article in *Antenna On Line* about the Slimtenna. This an HF variant of the Slim Jim.

I have been prompted to write because we had had a visit from a farmer who bought a farm that had no cell phone coverage. He was installing a radio link to his house in town. It was a straightforward job. And we were able to install a spare mobile whip for his baakie (pickup truck) and a Slim Jim on his house. But that's another story …

NOTE: One little utilised function of my FT-8900 is its reception of the VHF air bands. The mode is AM, but unfortunately, there is no transmit.

Reference

[1] Used with kind permission of Warners Group Publications PLC, Publishers of *Practical Wireless* and *Radio User*. The publication *Even More Out of Thin Air* was a sequel published by PW in 2007. **PW**

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Starting Hobby Radio for Free (Pt IV)

David M0BGR introduces the reception of data modes.

So far in these articles we have used online SDR receivers to listen to analogue, mostly voice, signals from around the world. This series of articles is like that tin of toffees at Christmas – meant for sharing. So even if you have lots of experience in radio matters, please read on and share with someone, particularly if they are studying STEM subjects or languages, etc.

During your exploration of the various frequency bands you will have heard squeaks, squawks and whistles and wondered what these are. Some of them may be digital signals that are increasingly used to transmit information over radio waves and you can decode some of these.

Some online SDR receivers have applications built into the websites that make decoding signals very easy. For others, you may need to extract the signals from the SDR website and decode them yourself. This is not a daunting as it may sound – there are many decoding apps available, mostly free or funded by voluntary contributions.

Starting simple

I am getting ahead of myself so let's start with a very simple digital signal and decode it with an inbuilt app. Radio teleprinter is perhaps the earliest digital system for information transmission over radio (some will argue that Morse code claims that prize but let's not debate that here). Radio teleprinter or RTTY originally used big, heavy and clunky electro-mechanical machines to code, decode and print text messages. Now, it is most usually done by software, but teleprinters can still be seen in museums, such as Bletchley Park.

RTTY coding is very simple – a byte, for one letter, consists of only five bits with no error correction. The astute reader will have spotted that 5 bits is enough for 31 characters, so not enough for the standard alphabet plus 10 numerical digits and maybe some punctuation. There is a special 'Figure Shift' character that says *"numbers follow until the next figure shift which switches back to letters"*. How economical is that! On the radio the ones and noughts are transmitted with two audio tones.

To demonstrate RTTY we will use broadcasts by the 'Hamburg Marine Weather Service' Open KiwiSDR and search for 'Hamrs' which is close to the weather transmitter and so almost certain to get a good signal. Set the frequency to 7646. Above the frequency bars you will see flags (you may need to zoom in). Click on the flag marked 'DDH7'. A new window called 'FSK Decoder' should pop up on the left of the screen and a decode window will appear at the top. The control panel should automatically change to 'FSK' and 'CW'. You will hear rapidly alternating high and low frequency tones, which represent the binary ones and noughts of the signal. Readable text should appear in the decode window, **Fig. 1**. As RTTY does not have error correcting some characters may be garbled, particularly if you are listening to a weak signal.

Amateur radio operators sometimes use RTTY, particularly on frequencies around 7043kHz and 14083kHz. If there is not a flag, you will need to select FSK and CW in the control panel. RTTY signals look like tram lines and you should align the checked pointers, at the top of the waterfall, with these tram lines. You will need to zoom in as positioning needs to be accurate.

While we are looking at weather data, you can decode weather fax transmissions. These are not transmitted 24x7 but there is a schedule at [**1**]. You will see there are transmissions all round the world and you can select a regional SDR receiver if you are interested in Asia, for example, but we will use a different weather service, Australia, to try this out. Open RX-TX.info, select KiwiSDR in Type and search for 'VK6SEG' near Perth, WA. then click on the 'FAX Aus' flag to tune to 5755kHz. If WMV Wiluna is transmitting, you will hear a sound like a musical note combined with someone eating crisps. If there is no transmission, wait until the next scheduled start time when the picture should start to appear in the pop-up window. I found that tuning to the exact frequency produced a very dark picture and 5753kHz worked better. If the picture appears split in the wrong place, then position your pointer where the left-hand edge should be and shift click. If VK6SEG is not available, then there are other Kiwi SDRs in the Perth area. The pop-up window has its own control panel where you can easily select other weather fax transmissions.

For those who enjoy monitoring air bands, there is the digital reporting system, ADSB. Many online SDRs have receivers that will cover 1090MHz. Search for 'Bedford' OpenWebRX receiver and in the control panel receiver list and scroll down to 'RTL-SDR V3 ADS-B' receiver. A pop-up window will appear, on the left-hand side, and will soon begin to populate with the aircraft details it is receiving (if not, then click on the 'ADSB' flag above 1090.0MHz). These details will also update automatically as new information becomes available.

Some SDR receivers support another air band data mode – ACARS. PA3BBL has such an SDR called 'SDR Play ACARS', **Fig. 2**. Try 131.650MHz, with the flag 'ACARS Europe' as this appears to be busy. Part of the ACARS message may appear as binary code. Sometimes the decoder [**2**] will decode these messages, or parts of them. Copy the text you want and paste it into the decoder.

SDR receiver 'openwebrxnl' is located at Alkmaar near the Dutch coast and also has an AIS receiver on 161.975 and 162.025MHz for shipping data. Select the 'Airspy Marine 160-163' receiver and click on the AIS flag. Ships' data will start to scroll in the AIS pop-up window, **Fig. 3**. If you want more information about a ship, click the blue number in the 'Call sign' column.

On the amateur bands

We will now take a quick look at data on the amateur radio bands and there is lots of it. At the moment, FT8 mode is very popular but it only allows messages with a maximum length of 13 characters so information exchange is very limited. We will choose a French SDR receiver – so search for F4MZI in the rx-tx.info search box. When the site opens and you have started to OpenWebRX select the 'RSP 40m' receiver in the control panel. Zoom in and click on the 'FT8' flag at about 7.074MHz. As usual, a pop-up window will open and you will start to see decoded signals. The columns are as listed in **Table 1**.

You will notice that several signals can be transmitted at once. The messages, **Fig. 4**, need some explaining. As before, 'CQ' is a station requesting a response so station with the call sign R2ZU, in Russia (the 'R2' prefix tells me this – we discussed callsigns in a previous article) is calling CQ from Maidenhead locator (a global grid system used by amateur radio operators [**3**]) KO81. You can see where a locator is by using an online tool [**4**].

Further down, K1ZZ (in USA) is telling JH4AAG that his signal-to-noise ratio is -01dB Below that, IU6STP (in Italy) is telling T77RN (in San Marino) his grid is JN63. And that is about the limit of exchanges in FT8 but it is useful to see what signals are travelling where. FT8 is one of many data schemes in the 'WSJT-X' program. The *PW* editor would never give me enough space to describe them all so I will leave you to read for yourself [**5**].

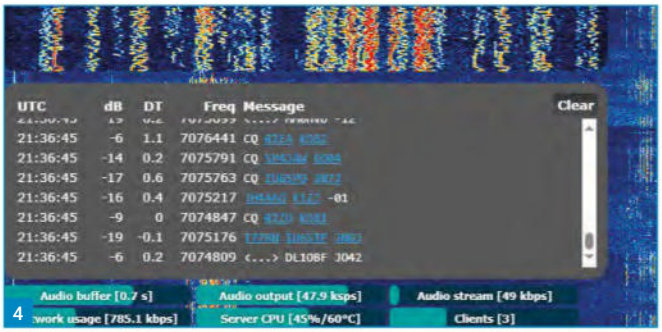

Fig. 1: Hamburg Weather Service teleprinter transmission. Fig. 2: ACARS screen. Fig. 3: AIS screen. Fig. 4: FT8 screen.

There are many other data modes used by amateurs and commercial stations, but you should have got the idea by now about how to use the decoders built into online SDRs.

· Chose a receiver in your area of interest.

· Open a receiver that covers the band you want (do explore if you are not sure).

· Look for a flag above the frequency scale that identifies a data mode.

· Click on the flag and watch the pop-up window.

You can now continue to explore the many and varied data signals that you can listen to using decoders in online SDR receivers, but we will now move on and see how you can use programs on your computer to decode signals yourself. There are many decoding programs out there so I will just cover a few here. Most of them are free and download sites can be found on your favourite search engine, but of course the authors will welcome small donations to reward their work.

My favourite data mode, as a listener, is Slow Scan TV (SSTV). This, like RTTY, belongs in a bygone era but it is quirky and there is something magical about watching a picture appear on my screen. There is an excellent piece of free software, rx-sstv, from amateur radio operator ON6MU **[6]** - download the setup file and follow the instructions to install on your computer. Most amateur radio SSTV is around 14230kHz in Europe, which usually works best in daylight hours, so choose a suitable Web SDR and tune to this, using USB mode. You will soon hear a chirping sound, which is SSTV for you to decode.

Time in UTC	dB – Signal to Noise Ratio	DT Time deviation (Clock error)	Frequency in Hz	Message

Table 1: FT8 pop-up window.

Decoding

Before we can get programs like rx-sstv to work we have to get the audio from your web browser into the program and unfortunately most computers no longer have a microphone socket. The easiest way is to turn up the volume on your computer and use its in-built microphone. In rx-sstv check that Microphone is the default recording device. rx-sstv should now decode and SSTV signals you hear.

There are two problems with using this method: any external noise (phones ringing, dogs barking, kids fighting …) will degrade the signal. Even if you live in an anechoic chamber, you will find the tones used for data signals are carefully chosen to get very annoying very quickly, so there is a better way, using a piece of free software called Virtual Audio Cable **[7]**. You can install this on your computer and then, using the computer sounds control panel, set VB-Audio as default in Output and select VB-Audio as the Record device in rx-sstv settings. *I recommend you make a note, or better still screenshot, of your computer Sounds settings before you start. You will want to put them back to normal when you finish playing radio!*

There are programs, such as 'SeaTTY' **[8]** which will decode weather fax, RTTY and many more signals. You can connect the audio from you chosen SDR to SeaTTY using Virtual Audio Cable.

There is an amateur radio application, 'JS8Call' **[9]**, which is similar to FT8, but more interesting (IMHO!). Again, you can install its decode program and connect it with Virtual Audio Cable.

There are many other data modes and decoding programs that we don't have space to cover here. One of the problems you will encounter is identifying the correct mode, so you can use the correct decoder, but fortunately help is at hand. The flags above the frequency scale on the Web SDR sites may help – use them to learn what different signals look like and their sounds. There is a comprehensive Wiki **[10]** that gives pictures (zoom in on the waterfall to match) and sometimes audio of the various signals.

Try the built-in decoders in the WebSDR websites and if you find modes that you like, then find a decode program online and connect its audio to your WebSDR site with Virtual Audio Cable. You are now on the way to having your own radio station, but more on that next time. **PW**

References

[1] **https://weatherfax.com/stations**
[2] **www.avdelphi.com/acars_tools.html**
[3] **https://tinyurl.com/2f62tspx**
[4] **https://tinyurl.com/7274cjnp**
[5] **https://tinyurl.com/2f5ds8z8**
[6] **www.qsl.net/on6mu/rxsstv.htm**
[7] **https://vb-audio.com/Cable**
[8] **www.dxsoft.com/en/products/seatty**
[9] **https://tinyurl.com/3hdhawbd**
[10] **https://tinyurl.com/y23aw2vj**

POTA Update

Colin updates readers on the Parks on the Air (POTA) award scheme and welcomes a very large increase in the number of parks covered by the scheme both in the UK and around the world.

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It's a few years since I last looked at the various 'things on the air' awards schemes. I'm thinking here of schemes such as Parks on the Air (POTA), Summits on the Air (SOTA), Castles on the Air (COTA), Islands on the Air (IOTA) and similar schemes. While the schemes I have just mentioned are reasonably well established, others have come along such as the two flavours of BOTA (Beaches on the Air and Bunkers on the Air). I'm not going to attempt to look at each of these award schemes in depth this month, but to focus on some recent changes to the Parks on the Air scheme and to a lesser extent World-Wide Flora and Fauna (WWFF).

Activators & Hunters

Most of these award schemes distinguish between two types of operators. Activators are people who operate from a park, mountain top, castle, lighthouse, bunker etc. Hunters are people who make contacts from any location with activators who are located in a park, etc.

Parks on the Air (POTA)

Although originating in the USA, this scheme is now well established almost worldwide. Even rare DX entities such as Bouvet Island and Sable Islands (**Fig. 1**) are now designated Parks on the Air. When I previously looked at POTA, it included 500 English, 189 Scottish and 103 Welsh 'parks', many of which had yet to be activated. POTA had yet to include parks in Northern Ireland, Eire, Jersey, Guernsey and the Isle of Man. Many DXCC entities in Europe such as most of Scandinavia, the Baltic states, many Balkan states, some eastern European countries and Russia were not yet included in POTA.

In the intervening years, not only has the number of parks increased to 4781 in England, 1224 in Scotland and 291 in Wales, but POTA now covers Northern Ireland with 63 parks, Eire with 232 parks, Jersey with 5 parks, Guernsey with 8 parks and the Isle of Man with 8 parks.

Just about all European DXCC entities have designated parks for POTA, including Scandinavia, the Baltic States and many Balkan states. Even the Russian Federation has a few parks designated for POTA.

Part of the increase in POTA parks is due to the change in criteria of what can be considered a park for POTA purposes. Previously POTA in the UK excluded parks such as local council-owned recreation parks in UK towns and cities – places where you might see swings and slides, football pitches etc. – confining its scope to national parks, sites of scientific interest (SSI), nature reserves and similar countryside.

POTA continues to require just ten contacts for an activation to be credited to the activator. I'd strongly suggest visiting the really useful POTA website (below) to get all the latest information and the rules for the POTA awards.

https://pota.app

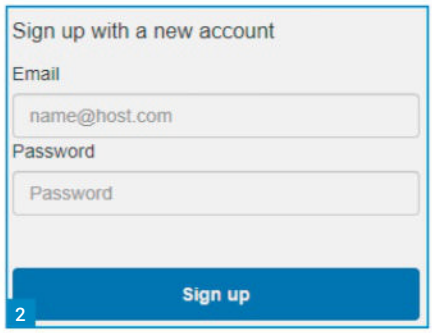


Fig. 1: A POTA Certificate for working the Sable Island park. Fig. 2: Registering with POTA is very simple. Fig. 3: Registering with WWFF. Fig. 4: A spot on the POTA website showing current activations. Fig. 5: A map near the entrance of Durleston Country Park in Dorset (POTA GB-0187, WWFF GFF-0376).

Enrolling in POTA

Enrolling in POTA is very simple with a link on the home page of the website (**Fig.2**). Having done so, you may wish to visit the My Hunter Log on the drop down under your callsign. Many newcomers to POTA are surprised to find that they already have some entries as Hunters.

World-Wide Flora and Fauna (WWFF)

There appears to have been fewer and much smaller changes to the Word-Wide Flora and Fauna (WWFF) award scheme. It has stuck to the fundamental definition of a park being National Parks, Sites of Scientific Interest, Nature reserves and similar. Recreation grounds are certainly not in the scope of the WWFF scheme. WWFF also continues to require 44 QSOs for an activation to count for an activator. Unlike POTA, the QSOs for WWFF can be accrued over several visits to a park to reach the 44 QSOs required for a valid activation.

For England, WWFF still has fewer than 600 current parks, Wales, 118, Scotland less than 200. The Isle of Man has 23 of which 11 are closed to the public, Jersey has 19 and Guernsey has 30, several of which are on Sark and Alderney. Like POTA, WWFF has a website at:

https://wwff.co

Enrolling in WWFF

Enrolling in WWFF is very simple with a link on the home page of the WWFF website (**Fig. 3**).

POTA vs WWFF

The increase in countries covered by POTA, along with the greater range of in-scope parks and the need for just ten QSOs for a valid activation to my mind makes the POTA scheme more attractive than WWFF for anyone starting out. That said, most WWFF parks are also POTA parks, so there's no reason why the contacts of a successful WWFF activation cannot also be credited as valid POTA activations. Whichever you decide to use, I'd certainly recommend registering on the respective scheme's website to get all the latest information and posting a spot outlining the dates, times, bands, mode and park you plan to operate from (**Fig. 4**).

Operating from a Park

If you are thinking of activating a WWFF or POTA reference, you'll need to do a little research first. You'll need to find a map that clearly shows the extent of the area of the park / countryside in question, so that you can choose where to operate from. Most of the areas will have maps on the internet showing their boundaries. You'll often find maps at the entrance or throughout the area in question **Fig. 5**. Having set up your station, you call CQ POTA or CQ WWFF, or just CQ and work stations using whatever mode you wish, making sure that you keep an accurate log. Many activators will be using lower power than they use at home so may need to adjust their operating technique accordingly (e.g. longer CQ calls, repeating the exchange).

To increase your chances of making contacts you can advertise your activation on the POTA website. WWFF has a view of the DX Cluster to which you can add your activation, so that hunters can be aware of your activation.

Equipment

There are no WWFF or POTA specific rules regarding what equipment may or may not be used. However, it is expected that park activators consider other users of the park, so a noisy generator in the most tranquil spot is not the most appropriate source of power. Otherwise, you'll probably want to use lightweight or portable equipment, battery powered in many cases. SOTA and COTA activators will already be suitably equipped.

Getting there

Unlike awards such as Summits on the Air (SOTA), there is no requirement to get to the operating location by foot. It is perfectly OK to operate from a vehicle. In fact, it is quite possible to operate from a building or even your home if it is located within a WWFF or POTA area. You could find that in many cases a SOTA activation also counts as a WWFF and POTA activation. If you join in a Worked All Britain (WAB) net, you could also be exchanging your WAB square with those you contact - the WWFF database helpfully provides WAB references for some UK areas. If that's not enough, you might also find that a favourite VHF contest site is in a WWFF and POTA area!

Operating in an area

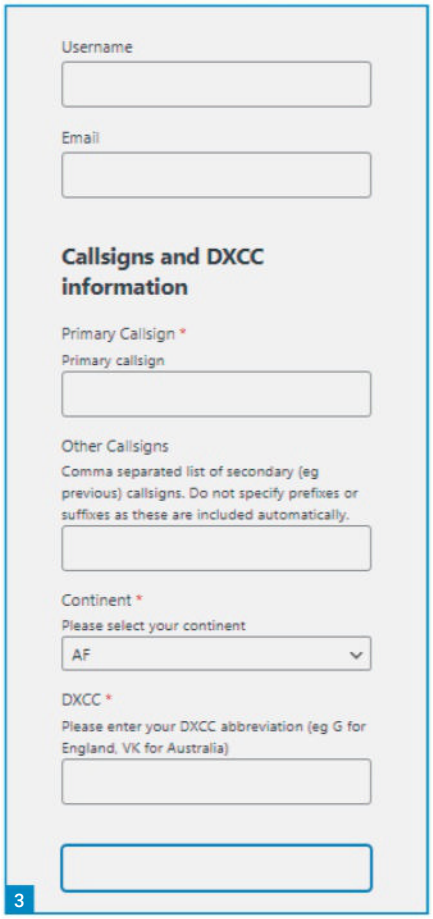
With both schemes, you can operate anywhere in an area limited by the local bylaws, rules etc. of the area. Just because you want to activate an area, doesn't give you any more rights than any member of the public who wishes to have a walk there. For example, you can't operate in any part of the area that is closed to the general public, and you mustn't block footpaths, rights of way or harm the wildlife and environment etc.

You can operate from a tent, a bench or any other way that suits you provided that you comply with the local bylaws and similar. You can operate from a vehicle, which means that there is no need to climb to the top of hills or mountains. This makes both POTA and WWFF very accessible to those with disabilities or no longer as agile as they once were. It also makes operation in inclement weather more feasible.

Making contacts

You don't have to exchange any specific information for a contact to be valid for POTA or WWFF. The minimum information to be logged is just date and time (UTC), callsign worked, band, mode, report sent and report received. If you are looking to make some Park-to-Park contacts, then it makes sense to record the other activator's park reference.

Contacts via repeaters, IRLP, remote stations and EchoLink are not valid for WWFF purposes. POTA allows the use of repeaters just to announce your arrival, but not to make contacts towards the awards.



POTA activation

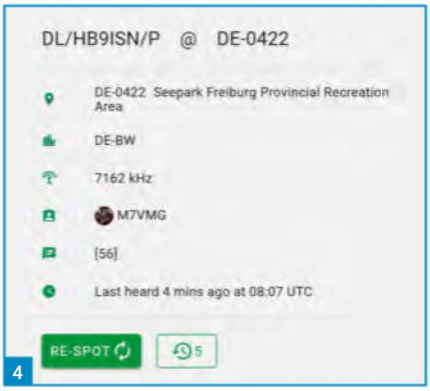
For a POTA operation to be counted as an activation, at least ten QSOs need to have been made on the same day within a period between 00:00 and 23:59UTC. A hunter can still claim credit even if you've made just a single contact, so it's good practice to submit a log every time you operate from a park, even if you didn't make ten QSOs so that the hunter can gain credit. POTA gives additional credits for 'Late Shift' contacts made after dusk or in the dark.

WWFF activation

To gain a WWFF activation credit, you'll need to make at least 44 QSOs from the same area of countryside. Unlike POTA, the 44 QSOs can be accrued over multiple outings - they don't have to be made during a single outing. So, for example, if you activate a WWFF reference area today and make 30 QSOs, you could return on another day and make a further 14 or more QSOs, making 44 QSOs in total, and thus qualify as an activator of the WWFF area.

Logs

Both award schemes accept logs submitted in adi format. Almost all computer logging programs have a facility to export adi files as do many data-mode programs such as Fldigi, WSJT-X and MTTY. In addition, the WWFF award scheme also accepts logs in a prescribed .csv format.



POTA logs

Submitting logs for POTA has also changed. The naming format is now callsign@park#-yyyymmdd where # is the POTA reference.

For example, if I operated from the Isles of Scilly (POTA reference GB-0347) on Christmas Day last year, I would name my log G6MXL@GB-0347-20251225. Logs are now uploaded to the server directly. There is no longer a need to send it by email to a coordinator.

WWFF Logs

For WWFF, logs are submitted to the relevant Log manager who in turn will upload the log to Logsearch. The log file should be named in the format **callsign@referenceYYYYMMDD.adi** The email address is **logs@gxff.uk** For those in Eire the email address is **eifflogs@gmail.com** I'd suggest visiting the WWFF website (below) to see details of national awards, contact details of national coordinators, log managers and award managers etc.

https://wwff.co/awards/national-programs

Old contacts

WWFF allows contacts as far back as 1 July 2008 to be uploaded. If you have contacts that you made from a park before joining POTA, you can submit your log after you have joined up.

Claiming Awards

You can claim awards via the POTA and WWFF websites. Both provide the awards as .pdf files which can be downloaded and printed. **PW**

More about Morse

Roger G3LDI covers a wide range of Morse-related topics in this month's column.

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For those joining this column for the first time, welcome! Over recent months I have been writing a series of articles aimed at encouraging nervous newcomers to CW, as well as old timers who perhaps once held a Morse licence but have not ventured onto the mode for many years. If that sounds like you, do dig out the back issues — I think you will find something useful.

Well, it all seems to have paid off. I have had several emails telling me that these articles were the necessary prompt — or KUTB (work it out for yourself!) — that was needed, and several readers are now having QSOs on a regular basis. I am reasonably happy with that result, and I suspect there were more who took the plunge without emailing me. They will soon realise what pleasure there is to be had in making CW QSOs!

Language

I teach Morse by suggesting it is much like learning a language. If you have studied languages at school, you have a head start. Assimilating basic conversation into abbreviations is a challenge to a newcomer, but learning all the abbreviations you can will set you in good stead for conversational Morse code. It is easier if you have studied languages, but success requires what I call my four Big P words: Passion, Practice, Perseverance, and Patience. I have covered each of these in detail in previous articles, but they bear repeating here because they really are the foundation of everything.

Passion is what gets you started — that genuine desire to master the mode. Practice is what keeps you going day by day. Perseverance carries you through the frustrating plateaus that every operator encounters. And Patience, perhaps the most important of all, reminds you that this is a journey measured in months and years, not days. Age comes into the equation too, with youngsters able to learn much faster than older people — but plenty of operators, as the letters below demonstrate, have taken up CW in their sixties and beyond with great success. Providing you stick with it, success will be yours.

Consider also the added complexity for non-English speakers. A German resident who uses Morse on the bands and talks to English people must receive the Morse in English, translate to German, compose a reply in German, and then send the Morse back in English! This email from Germany illustrates the point beautifully: *"Hello Roger, I am DL7GA, Name is* ***Gerd****. I monthly receive the* Practical Wireless *here in Germany. I only want to say: my congratulations for this wonderful report and your words to all beginners. I learned CW at the age of 63; now I am 67 and getting better and better, but sometimes/often I don't understand — especially when my concentration goes down after 10 minutes. Hi.*

1

"My QTH is the worst you can imagine. Nice surroundings, but in a deeeeep valley near Regensburg. Bad conditions for amateur radio — but it works so far. Sometimes I try my very best on 40m.

"So that's all from my side. Enjoy our hobby. Mni tks, es gd luck — and stay healthy.

"Vy 73 de DL7GA, Gerd"

What a lovely letter — and what an inspiration Gerd is. Learning CW at 63, operating from what he cheerfully describes as the worst QTH imaginable, and still persevering at 67. That is the Morse spirit in a nutshell. The concentration issue he mentions after ten minutes is very common and nothing to be ashamed of; it simply improves with time and regular practice. This should help **Tony M7NFK** in my Beginner's class. Tony is over 70 and is struggling, but I hope he reads this and gets some encouragement from Gerd's comments!

This next encouraging note came from **Fred Gordon** (who omitted to include his callsign): *"Roger, your article on CW in* Practical Wireless *is, by far, the best I have read in many a long day. Like you, I'm an oldie (80 this year), and still trying to master CW. However, your article has stirred up my determination not to give up and to keep trying. As you imply, receiving is more difficult than sending.*

"Your comments aimed at younger generations are spot on. My radio club, Aberdeen Amateur Radio Society, is sometimes asked to introduce radio to young people. It often comes as a shock for some to learn that their cherished phones are just a form of radio.

"Many thanks for the article and I look forward to further encouragements for young people.

"73, Fred"

Fred makes an excellent point about young people and radio. Introducing them to the fact that the device in their pocket is fundamentally a radio transceiver is often a real eye-opener, and a wonderful gateway into the hobby. If your club does any outreach work with youngsters, do keep it up — it matters more than you might think. And Fred, do send me your callsign next time!

I also had a follow-up from **Russell G0RBG**, which just shows that once you do take the plunge, the water seems warmer than you thought! Keep it up, Russell — and let's hope this serves to inspire other nervous operators.

"Roger, thank you for your kind reply. Since that first QSO, I have to admit I am now riding the CW wave, so to speak, and feeling more confident every time. It's a bit like your first downhill run on a sledge as a child — frightening at first, but you can't wait to run back up the hill to have another ride. It's amazing how both reading and sending feels easier when you relax.

"At present I look for a clear frequency around 7.025Mc/s. Please continue writing the articles!

"73, Russell G0RBG"

Just imagine how difficult all this is if you are Chinese! The following video provides wonderful encouragement — and watching it made my eyes water somewhat. I am very glad that I am an English speaker!

Watch:
www.youtube.com/watch?v=QSeInNtwvEY

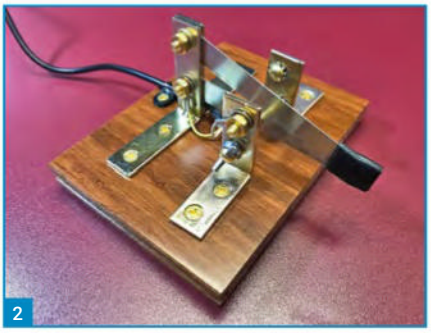
Glass arm

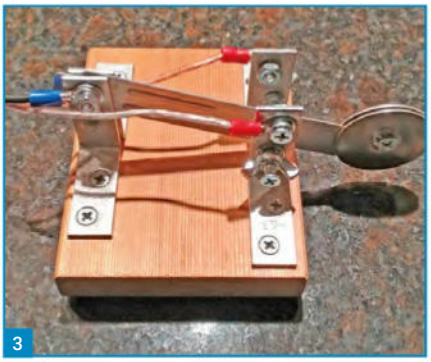
I wonder how many readers remember what a 'Glass Arm' is? I certainly recall operators of my youth mentioning it. A recent posting by **Tom K3TW,** Lecanto, FL USA, explained this and some solutions very well (**Fig. 1**).

"We all know what 'Glass Arm' feels like after sending CW for long periods on a standard straight key. The bug eliminated this problem by using the lateral motion of the wrist. You can use just the dash side of the bug to send CW, and it works quite well.

"Here's another possible solution: a solid-state touch sensor or force sensor. The solid-state version uses an output keying transistor (NPN for positive keying voltages, PNP for negative keying voltages; FETs can also be used). The force sensor has circular contacts that respond to pressure or capacitance. In fact, you can use these keys to send CW with just your index finger! There are many references describing the design of these devices; if there is interest, I will find some related web links and post them on the Reflector".

Tom adds: *"FB Roger. Yes, there are other mechanical paddles that can relieve 'Glass Arm'. I remember seeing commercial units of these keys back in the 1970s. Basically, it's the same as two*



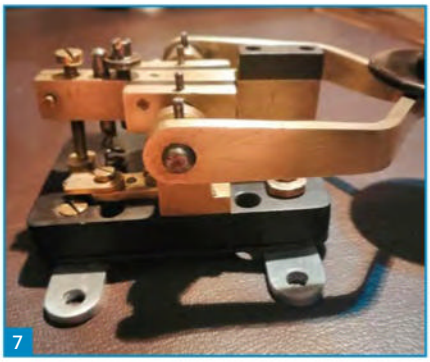


Fig. 1: Glass arm. Figs 2 and 3: Examples of Cootie keys. Figs 4 and 5: Keys from the collection of G7VAK. Figs 6 and 7: The key picked up by MI0TMW at a recent sale.

dash paddles on a bug, which makes sending manual CW very easy. After a little practice, you can send nice CW. I hope this helps.

"161 and see you on the CW Bands. Tom K3TW"

See also:

https://tinyurl.com/4ucnauz2

Cootie keying

Tom's web link above leads me neatly into the subject of Cootie keying. I have heard several iterations of Cootie keying and I must admit I am not enamoured with the end result. Using a Cootie key is a cheap introduction to the use of a paddle, but it takes a lot of practice to make it sound reasonable. Try it by all means, but make sure that the resulting CW will be acceptable to the operator tasked with receiving it. When I said 'cheap', I really meant it — my first Cootie key cost me nothing more than the price of a hacksaw blade and an hour or so of construction. It was a satisfying little project, and I learned a great deal about the mechanics of keying simply by building it. If you have any basic construction skills, I would encourage you to have a go.

A Cootie key, also known as a sideswiper, is a double-sided straight key used for sending Morse code. Rather than the traditional up-and-down switching action of a standard key, a sideswiper's action goes side-to-side. It has two switches with a centre 'off' position, so in theory making each character uses about half the motion of a regular key.

How does it work?

A Cootie key has only two terminals, since the dot and dash sides are tied together. So, an 'S' is sent with three motions — a push to one side, followed by a push to the other side, followed by a final push back. An 'R' has the same motion except the middle push is held longer to make a dash. Think of it as a straight key on its side with two contacts.

Is it hard to use?

The Cootie key is known for being difficult to master, but with some practice many operators find it easier and more natural to use than paddles and an Iambic keyer. Sending with a Cootie key is considered very personal, because you control the spacing, duration, and timing of every dit, dah, and space — your messaging takes on a whole different 'feel'. A couple of examples are shown in **Figs 2** and **3**.

Morse for the disabled

One of my contacts regarding the 'Morse for the Disabled' chapter of my new book is **Paul G7VAK**. Paul says he can only send Morse, as receiving is very difficult due to the effects of neurosurgery and his short-term memory. I hope to address this in that chapter, but if you do hear Paul on 40m CW, please have a little patience and understanding. Don't just send back 'LID' if his CW is not perfect — at least he is trying! Anyway, Paul very kindly sent me some pictures of his key collection; a couple are shown in **Figs 4** and **5**. The military key is not one I recognise, so it is particularly good to feature it. The book itself is progressing well and I hope to have more details to share in a future issue. It aims to cover the practical and technical challenges faced by disabled operators who wish to use CW, and I would welcome any contributions or experiences from readers who fall into this category, or who work with disabled amateurs. Do please get in touch.

A mystery key — can you help?

Merv MI0TMW sent some pictures of a Morse key he picked up in Belfast at a sale for £10. It looks a well-made key in solid brass and cleaned up very nicely. A couple of pictures are shown in **Figs 6** and **7**. Merv would very much like to know if anybody can identify it and provide some history. If you can help, please get in touch!

Until next time...

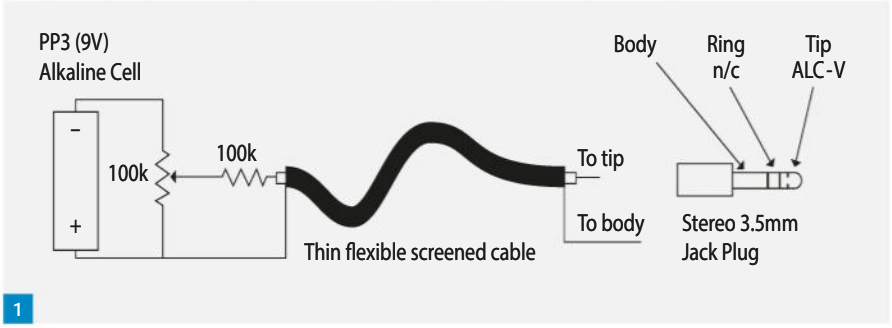
What a month it has been for reader correspondence — long may it continue! The letters from Gerd, Fred, and Russell are a timely reminder of what this hobby is really about: community, encouragement, and the quiet satisfaction of making a contact using nothing but dots and dashes. Whether you are 17 or 80, whether you are operating from a hilltop or a deeeeep valley near Regensburg, CW has a place for you.

Remember the four Big P words: Passion, Practice, Perseverance, and Patience. Keep them in mind on the days when the code seems to flow backwards and the pile-ups feel impenetrable. Every single operator you now admire on the CW bands was once exactly where you are.

As ever, I welcome your letters, photographs, and questions. And if you have finally taken the plunge and made your first CW QSO since reading these articles — do write and tell me. It really does make my day.

73 and May the Morse be with you! **Roger G3LDI**. **PW**

Colin Redwood G6MXL
practicalwireless@warnersgroup.co.uk



1

The 43rd Annual Practical Wireless 144MHz QRP Contest

Colin Redwood G6MXL, our QRP Contest adjudicator, introduces the 2026 event, which takes place on Sunday 14 June 2026.

The popular *Practical Wireless* 144MHz QRP Contest is the ideal way for newcomers to the VHF bands and contesting to get a good feel for many aspects of amateur radio contests. It is an excellent way to experience the thrill of making contacts over many km on the 2m band. This year certificates will again be distributed by email.

Power

The power limit will again be **5 Watts** at the transmitter.

Equipment

The only equipment you'll need is a low-power 2m transceiver and an antenna. While you can expect to make some contacts with a basic 2m FM handheld transceiver, most of the activity is likely to take place using single sideband (SSB). Most stations use horizontally polarised Yagi antennas when using SSB or CW.

Location

As always at 2m, a clear take-off such as a hill-top will certainly help. Every year new entrants are surprised just how far their signals can travel between hilltops.

You'll need to find the 6-character IARU locator (sometimes known as 'Maidenhead Locator' or 'Grid') for your station's location, for example IO92KL. I think the easiest way is to visit:
https://dxcluster.ha8tks.hu/hamgeocoding

Contest exchange

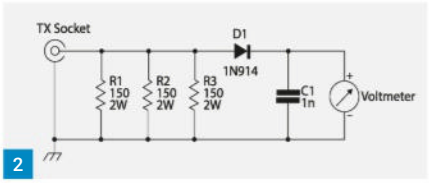
For each contact to count towards your score, you'll need to exchange your callsign (**including any /P**), signal report using the standard RS(T) code, serial number and locator.

The RS(T) code consists of readability on a scale of one to five and signal strength from one to nine.

The serial number starts at 001 for your first contact and increases by one for each subsequent contact you make. So, the fourth contact you make will have serial number 004. For Morse contacts there is also the tone (on a scale of one to nine).

Exchange example

Imagine your callsign is M8ABC/P, you are located in IO91GI and have a contact with M7ZXT/P as your fourth contact. You might transmit, "*Mike seven Zulu X-Ray Tango Stroke Portable from Mike eight Alpha Bravo Charlie Stroke Portable, you are five and six, zero zero four, in India Oscar nine one Golf India*". Using phonetics will make sure that similar sounding letters (e.g. B, D, P, V) are clearly understood by the station you are in contact with.



2

Fig. 1: A useful technique to reduce power to 5W on higher power transmitters. Fig. 2: A small power meter, to verify the power output. A 21.7V level indicates 5W output. 2W metal film resistors are available from CPC (Farnell).

Hints and tips

Most newcomers to contesting find that replying to other stations' "*CQ Contest*" calls is a good way to start. As your confidence in exchanging reports, serial numbers and locators increases, then finding a clear frequency, calling "*CQ Contest*" and waiting for stations to reply to you is also a good technique. A mix of the two techniques can be an effective strategy. Make a point of accurately recording in your log the details of each contact as required by the rules – in particular the callsign of each station you contact, **including any /P suffix**, their locator and the time in UTC (not BST). UTC is one hour behind BST, so when it is 13:00 BST, it is 12:00 UTC.

If you are transferring a paper log to a computer log, be careful to transcribe the details accurately. The format of locators is letter letter number number letter letter.

Directional antennas

If you use a directional antenna, then I would strongly recommend that you rotate it to point in different directions during the contest (e.g. South West England, Northern Ireland, the Republic of Ireland and Scotland). This will not only enable you to make more contacts, but will likely increase the number of different locator squares you contact, which is a part of your overall score.

Batteries

Many entrants use rechargeable batteries for power. Make sure you have enough power to run your station for the full duration of the contest. I'd suggest making three diary entries: the first a couple of days before the contest as a reminder to charge your batteries, the second for the day of the contest (Sunday 14 June 2026), and the third a few days after the contest to remind you to submit your entry.The rules appear on the next page. The contest website is also a valuable source of information and has a link for downloading log sheets and an online entry form (known as a cover sheet).
www.pwcontest.org.uk

Submitting an entry

Don't forget to submit your entry after the contest. Electronic entries via email are much preferred, make the task of adjudication easier and minimise the risk of transcription errors. Paper entries may be transcribed for adjudication purposes at entrants' risk. All entries that provide an email address will be acknowledged.
entries@pwcontest.org.uk

Have a go

There will certainly be plenty of other *PW* readers on the air, keen to exchange reports, serial numbers and locators. Good luck in the contest!

The 2026 Rules

The 43rd Annual Practical Wireless 144MHz QRP Contest, 2026 Rules.

1. General: The contest is open to all licensed Radio Amateurs operating fixed or portable stations, using SSB, CW, AM or FM in the 2m (144MHz to 146MHz) band. Entries may be from individuals or from groups, clubs, etc. The contest runs from **0900 to 1500 UTC** on **Sunday 14 June 2026**.

All stations must operate within the terms of their licence. Entrants must observe the band plan and must keep clear of normal calling frequencies (144.300MHz and 145.500MHz) even for *"CQ"* calls. Entrants must allow other users of the band to carry out their activities without hindrance. Please avoid frequencies used by GB2RS (144.250MHz and 145.525MHz), ATV talkback (144.750MHz) and other frequencies in use for non-contest purposes.

The station must use the same callsign throughout the contest and may not change its location.

2. Contacts: Contacts will consist of the exchange of the following minimum information:

callsigns of both stations (**including any /P suffix**)
signal reports, standard RS(T) system
serial numbers: a 3-digit number incremented by one for each contact starting at 001 for the first contact.
locator (i.e. full 6-character IARU Universal Locator for the location of the station.

Information must be sent to, and received from, each station individually using **just** the 2m band, and contacts may not be established with more than one station at a time. Simultaneous operation on more than one frequency is not permitted.

If a non-competing station is worked and unable to send their full Universal Locator, their location may be logged instead. However, for a square to count as a multiplier (see rule 4), a full 6-character locator must have been received in at least one contact with a station in the square.

Contacts via repeaters, satellites, or using digital voice modes (including D-STAR, Fusion, DMR and Echolink) and data modes or machine-generated modes such as FT8, JT65, RTTY and PSK31 are not permitted. Neither is the use of DX Clusters, ON4KST chat (even just logging on), social media or any other method of enabling contacts or contest exchanges.

3. Power: The output power of the **transmitter** or **transverter** final stage must not exceed **5 Watts** peak envelope power (PEP). If the equipment is capable of higher power, the power must be reduced and measured by satisfactory means. With most modern transceivers, power can be reduced by using a menu setting.

An alternative is to apply a (variable) negative voltage to the transmitter ALC line reached via the accessory socket, **Fig. 1**. Stations cannot rely on feeder loss to meet the 5W power limit.

The output power can be accurately measured using the simple circuit of **Fig. 2**. Connect this to the 50Ω output of the transmitter and adjust the power so that the voltmeter does not exceed 21.7V on a 'good whistle' into the microphone.

4. Scoring: Each contact will score one point. The total number of points gained during the contest will then be multiplied by the number of different locator squares with which contacts were made (a 'square' here is the area defined by the first four characters of the IARU Locator).

Example: 52 stations worked in IO81, IO90, IO91, IO92 and JO01 squares; final score = 52 x 5 = 260.

Only one contact with a given station will count as a scoring contact, even if it has changed its location, e.g. gone /M or /P. If a duplicate contact is inadvertently made, it must still be recorded in the log and clearly marked as a duplicate (not necessary in computer log files).

5. The Log: Logs must contain the following information for each contact:

time (**UTC – not BST**)
callsign of the station worked (**including any regional secondary locator and any /P suffix**)
report sent (e.g. 56)
serial number sent
report received (e.g. 54)
serial number received
locator received

The preferred form of a log is a computer file in REG1TEST, .log, .adi or .edi formats sent by email. This may be generated by contest logging software such as MINOS or EI5DI's SDV, provided it contains all the information listed above. Alternatively, a file in any other suitable format (such as the spreadsheet available on the contest website) or in plain text, provided each of the items above is separated by a separating character such as a comma or tab, is acceptable. Give the file a name including the station callsign (e.g. g6mxl-p.log), and send as a standard email attachment to **entries@pwcontest.org.uk**

Email entries will be acknowledged within 8 days. If there is any problem with your entry, you will be contacted by email.

Log sheets and covering information sheets for paper-based entries are available for downloading from the contest website:
www.pwcontest.org.uk

6. Entries: The covering information listed below must be provided with each entry. Please submit this using the online facility on the website. For postal entries, it should be written on a separate sheet of A4-sized paper.

The information required for every entry is:

name of the entrant (or of a club etc. in a group entry) as it is to appear in the results table and on the certificate
callsign you transmitted during the contest, **including any regional secondary locator required to identify your country and any /P suffix** (e.g. G6MXL/P)
name and address for correspondence
location of the station during the contest
full 6-character locator you transmitted during the contest
whether single or multi-operator (a single operator is an individual who received no assistance from any person in operating the station, which is either his/her permanent home station or a portable station established solely by him/her); if multi-operator, include a list of operators' names and callsigns
a full description of the equipment used, to include transmitted PEP output power
if the transmitting equipment (including any transverter employed) is capable of more than 5W PEP output in the 144MHz band, a description of the methods used to (1) **reduce** and (2) **measure** the 144MHz output power
antenna used and the approximate station height in metres above sea level (ASL)

the following declaration must be included in the email text or written and signed by the entrant: *"I confirm that the station was operated within the rules and spirit of the event, and that the information provided is correct"*.

Failure to supply the required information may lead to loss of points or disqualification.

Entries by email must be sent to
entries@pwcontest.org.uk

Paper entries should be sent to: Practical Wireless Contest, c/o Colin Redwood G6MXL, 53 Woodpecker Drive, Poole BH17 7SB.

Entries must be received not later than Tuesday 30 June 2026. Late entries will be disallowed.

Any other comments about the station, the contest and conditions during it are welcome along with photographs. Please note these cannot be returned and may be published in *Practical Wireless* or on the contest website. Please send them by separate email or post, **to arrive by Tuesday 30 June 2026**.

When entering, you will be asked to agree to the storing and processing of your entry and to the publication of the results. Warners Group Publications data policy can be seen at:
https://tinyurl.com/bddtjncz

7. Miscellaneous: When operating portable, obtain permission from the owner of the land before using the site and observe any restrictions on access. Always leave the site clean and tidy, removing all litter. Observe the Country Code.

Take reasonable precautions to avoid choosing a site which another group is also planning to use. It is wise to have an alternative site available just in case.

8. Poor Signals: Make sure your transmitting equipment is properly adjusted and is not radiating a broad or poor-quality signal, e.g. by over-driving or excessive speech compression. On the other hand, be aware that your receiver may experience problems due to the numerous strong signals it will have to handle, which may lead you to believe that another station is radiating a poor signal. Before reaching this conclusion, try heavy attenuation at the received input. Using a high-gain RF preamplifier is likely to worsen strong-signal problems, so it is best to be able to switch it off when necessary.

If after making the checks above, you are certain that another station participating in the *PW* 144MHz QRP contest is radiating poor quality signals, please call the station, giving your callsign, and tell them about the problem. You cannot expect a station with a poor signal to do something about it if they are unaware!

If you receive or send a report of poor-quality signals, you must record on the cover sheet full details of the complaint including time, callsigns of stations involved, nature of complaint and actions taken **during** the contest to investigate and resolve.

9. Adjudication: Points will be deducted for errors in the information sent or received as shown by the logs. Unmarked duplicate contacts in paper-based logs will carry a heavy points penalty. Failure to supply all the information required in Rule 6 may also lead to deduction of points. A breach of these rules may lead to disqualification. In the case of any dispute, the decision of the adjudicator will be final.

1

The Transit Satellites

Tony Jones G7ETW investigates the precursor to the modern GPS satellite system.

Tony Jones G7ETW
charles.jones125@yahoo.co.uk

On 4 October 1957, the world changed. I wasn't overly troubled at the time, being three months old, but America was less sanguine. I'm talking about the launch of Sputnik, the USSR's 'Travelling Companion', pictured in **Fig. 1**. This changed the USA's self-image overnight, leading to the 'Space Race' which continues to this day with the Artemis program.

But that's not what this article is about. Sputnik was, of course, harmless. It did nothing but beep to the planet below (see *Sputnik Transmissions* sidebar for details) but that was quite earth-shattering enough. 'What could a satellite transmit?' scientists all over the world asked themselves.

At the John Hopkins University in Baltimore, **William Guier** and **George Weiffenbach**, pictured (left and right) in **Fig. 2**, used Sputnik's Doppler Curve (see *Doppler Explained* sidebar. There is some maths; you have been warned!) to calculate its orbit. But it was their director, **Dr Frank McClure**, centre in Fig. 2, who made the massive mental leap. He reasoned that if receiving a satellite's signals at a known location allowed a satellite's orbit to be calculated, then the reverse was true: by receiving signals from a satellite of *known orbit*, the location of the receiver could be determined.

McClure designed such a satellite positioning system and proposed it to the US Navy. A global, weather-independent navigation technology appealed to them greatly, and they agreed to sponsor it. A collaboration of the US Department of Defence's newly-created DARPA (Defense Advanced Research Projects Agency) and John Hopkins Applied Physics Laboratory began work on Transit, as McClure named his creation, in 1958.

In September 1959, Transit 1A, shown in **Fig. 3**, was completed and launched but failed to reach orbit. Transit 1B followed, successfully, less than a year later. Tests began in 1960 and in 1964, the system achieved operational status. In 1967 it was made available for civilian use.

By any standards, that was rapid work. Would McClure's 'blue-sky' thinking have found favour in the absence of a red threat, I wonder? I somehow doubt it.

Transit design architecture

Transit had three components: satellites, tracking stations and a control centre.

Ten satellites initially (five of them were spares) orbited the earth in polar orbits at 27km/s at an altitude of 1100km; each orbit took 106 minutes. The North-South passes obviously spread out, the satellites were farthest apart at the equator.

Every two minutes satellites transmitted the time and precise orbital data on fixed 150 and 400MHz frequencies. These 'coherent pairing' bands are refracted differently by the ionosphere, and using both allowed positioning corrections to be made. To this day VHF and UHF are used together for earth-space communications.

13 ground stations, located all over the world, continuously tracked the satellites during the implementation phase. The UK's only station (designated number 6) was at Lasham Airfield, in Hampshire. It was a 24-hour operation, manned by three operators working shifts.

A single control centre in the USA received data from tracking stations and processed it, uploading orbital data and clock updates individually to satellites daily. This data came to them on paper tape.

I used to be a computer operator, so I know paper tape. Its transfer rate was very respectable, it was robust, it was cheap and it was lightweight. So, this was a good data medium. But the data had to get from distant stations to the USA quickly, to be of use. Was this couriered by military planes? I don't know; perhaps a reader can answer that.

Transit in use

Imagine you're a Transit technician on a US navy boat of some kind.

Only one Transit 'bird' is ever visible, and you

Sputnik's Transmissions

Sputnik 1 was only on-air for a few weeks because it ran on non-rechargeable batteries. Two weeks after it was first heard, it died. Sputnik 2 followed in the spring of 1958, and that simply carried on.

Sputnik 1 had two 1W plain-carrier transmitters, the main one on 20.005MHz and another on 40.002MHz. Transmissions were alternating, and pulsed, giving rise to the 'beeping' recollection people have of Sputnik. Basic telemetry of the satellite's health was encoded in the duty-cycles, but that was all.

Complex communications were not the objective; Russia's aim was for signals that they, and other nations, could easily receive.

20.005 and 40.002MHz are short wave frequencies. Guier was studying microwaves and happened to have a suitable receiver handy at the university, which is how he got on to this. But the USSR was not remotely trying to keep Sputnik a secret - it wanted ordinary people, especially Americans, to be able to hear it, and their choice of 20.005MHz was very clever.

Based in Maryland was the Beltsville WWV time-signal transmitter. This was a voice, AM service and people had receivers for this. By putting Sputnik's on-off carrier just within the AM passband, listeners could hear the time signals with a faint (but I dare say annoying) beep in the background.

"We mean you no harm, America", was the USSR's unspoken message. *"We could have disrupted this service of yours, but we haven't done that. We just want you to know we're here, in space"*.

have to wait for it. When it appears above the horizon, you have 15 minutes to get a 'fix'.

On first reception of a signal, the boat's onboard computer starts storing data. Using this information, the satellite's pass is modelled in real time.

Analysis of the satellite's radio transmission frequencies is key to this. At some point, transmissions are received with zero Doppler shift. This is when the satellite and the ship are at the same latitude. The satellite does not have to be overhead. No, this is not obvious. And longitude, as ever, is harder to determine.

The cycle of Doppler shifts as the satellite approaches and departs depends on an angle related to the ship's longitudinal offset (but not direction) from the satellite's overhead North-South pass. The rotation of the Earth makes possible another correction, giving the direction of this offset and hence the boat's longitude.

Transit was only accurate to about a kilometre at the outset, but by the end of its operational life this had come down to 25m. There were 36 satellites by then, so the process was also a lot quicker.

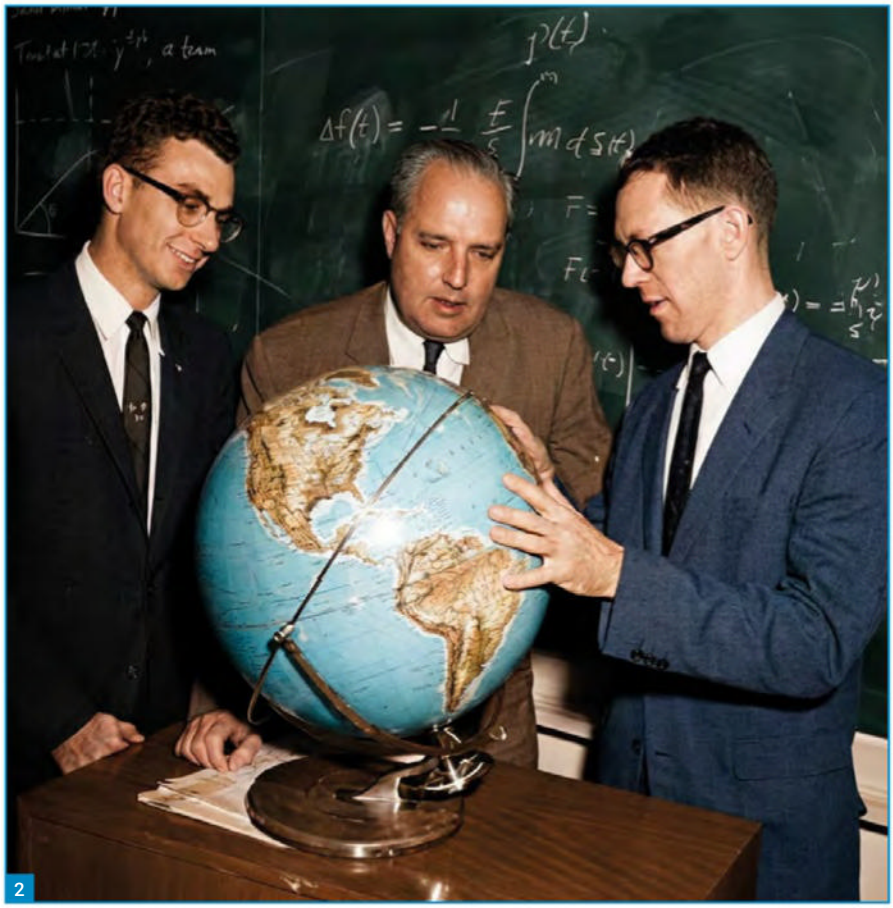


Fig. 1: Sputnik. Fig. 2: Guier, McClure, Weiffenbach. Fig. 3: Transit 1a. Fig. 4: Christian Doppler.

Conclusion

Perhaps unsurprisingly, I had never heard of Transit, but a chance encounter with another radio amateur - one of the three engineers who worked at Lasham - brought this piece of Cold War history to my notice, and I'm very grateful to him for that.

The radio frequencies interested me. The analogue aspect of the system appealed to me. But it was Transit's longevity that astonished me; this system was not only usable, and was actually used, right up to 1996 when the GPS system took over.

There is another thing. I never cease to be amazed at the important, world-critical things the post-WW2 generation of electronics engineers quietly got on with in their careers. This was an era when engineers, not computers, made the world work.

If you would like to know more about Transit, I draw your attention to two documents I found when I was putting the finishing touches to this article. They are very informative.

'The Transit Satellite Geodesy Program', written by **Steve M Yionulis**. To be found at: **https://tinyurl.com/k5vnermj**

'Technical Memorandum The Transit System 1975' by **H D Black**, **R E Jenkins** and **L L Pryor**. To be found at: **https://tinyurl.com/357bky99**

Doppler explained

Doppler shift is proportional to the relative velocity of a transmitter to a receiver. (**Christian Doppler**, pictured in **Fig. 4**, first described this in his 1842 treatise *On the coloured light of binary stars and some other stars in the heavens*. He lived in Salzburg, right next door to a house Mozart had lived in. On a city walking tour I took, the guide pointed out Mozart's house, but Doppler did not get a mention, so I drew his attention to Doppler's plaque. He did not know, nor did any of my fellow walkers, who Doppler was!)

Let's take a two-dimensional example, as shown in **Fig. 5**. Observer A is standing a few inches to the side of some dead straight railway tracks, armed with a handheld audio frequency logger. A train appears, travelling at 90km/h with its 500Hz whistle blowing.

The train approaches and Observer A measures the whistle frequency; it's a constant 541.8Hz. The train passes, and momentarily the frequency is 500Hz, but this then drops to constant 464.2Hz. These altered frequencies are not symmetrical about 500Hz, please note. The following formula shows why.

Observed frequency =

Actual Frequency X (Speed_of_Sound + Relative_Velocity_of_Observer) / (Speed_of_Sound + Relative_Velocity_of_Train)

Observer A is stationary, so that simplifies things. The speed of sound (in air, at 20°C) is 343.2m/s and the train's speed in appropriate units is 25m/s. *Relative* velocity is a vector, signed depending on the train's direction. It's minus 25m/s as the train approaches A's position and plus 25m/s as it speeds away.

That's pretty straightforward I think.

At point B, a few hundred metres to one side on a line crossing the tracks *at right angles* to point A, stands Observer B. His frequency counter logs a sliding tone, starting high and dropping as the train approaches. As the train passes through point A, his meter also reads 500Hz for an instant then the frequency drops below that and continues to fall as the train moves away.

This difference between A's and B's measurements arise from differences in how the train's speed must be treated. Observer A was perfectly in line with the train. Its (scalar) speed and its (vector) velocity are the same for him.

Fig. 6 depicts a reminder of vectors. A dog-walker, standing on a four-wheeled trolley, is exercising two dogs on leads. With the dogs pulling inline, the dog-walker zooms along, straight ahead. If the dogs pull at right angles, no motion (but angry animals) results. But when the dogs pull at an acute angle, the trio progresses straight ahead again, but not as quickly as for the dogs' inline pull. This is because the dogs' velocity vectors have aligned forwards and negating sideways components.

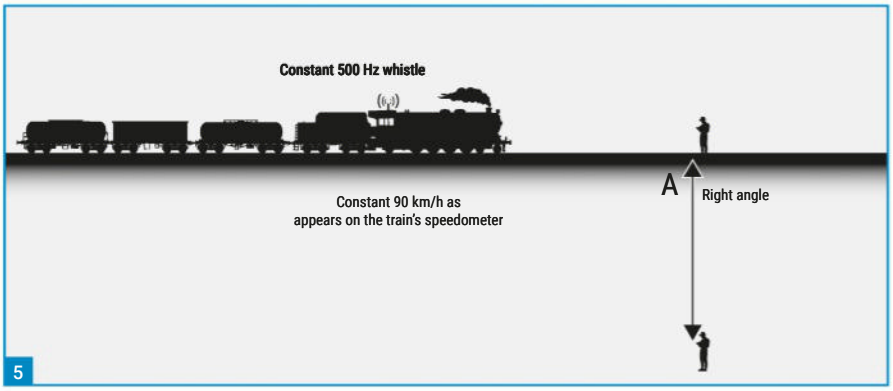
Despite the train having a constant speed, its velocity with respect to B is constantly changing and sound waves radiate outwards to him at varying angles, reaching a maximum of 90° at point A. This is illustrated (absolutely not to scale) in **Fig. 7**. The component of the train's velocity vector along each of these lines is the train's *radial velocity* V_{radial}.

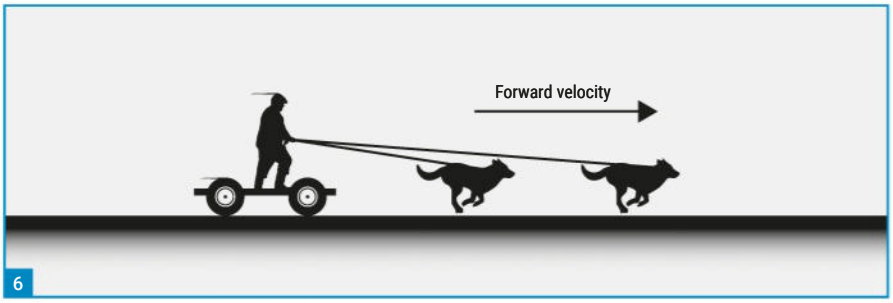
V_{radial} = Speed x Cosine (Departure Angle)

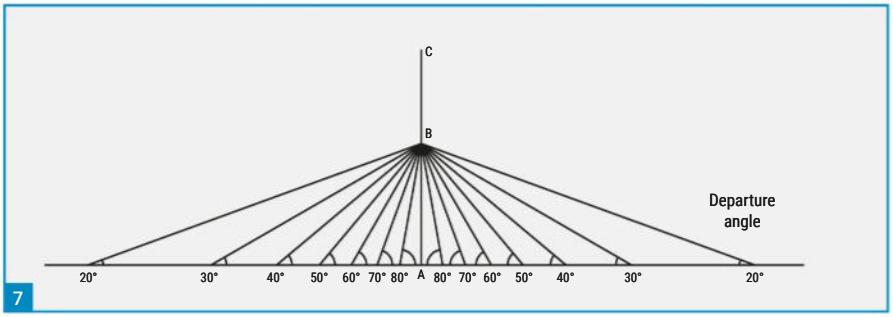
An observer at point C at the same time would be at different, bigger (because he is even further away) angles and he would hear the whistle's pitch variations differently to his colleague at point B.

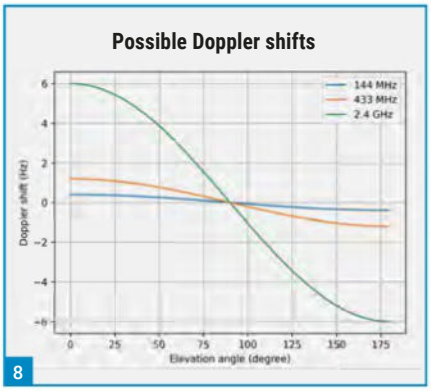
But point B alone will serve my mathematical purpose. I built a table of observed frequencies for point B for the angles 20° to 90°, as in **Fig. 7**. **Fig. 8** is the result; this is the train's Doppler Curve.

I went looking for a Transit satellite Doppler curve, but could not find one. But I offer, in **Fig. 9**, an ISS pass Doppler curve chart to show the same thing for some amateur radio frequencies. The x axis is time, not elevation angle, but for a fixed location and a timed pass, that is the same thing.









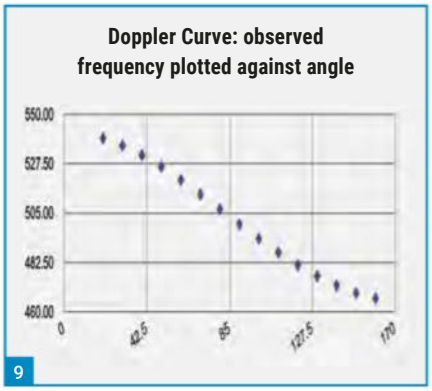


Fig. 5: Observer and train. Fig. 6: Dogs pulling observer on cart.
Fig. 7: Pitch variations according to angle. Fig. 8: The train's Doppler curve. Fig. 9: ISS Doppler curve.

Specialist Dealers

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YAESU FRG 7700 good condition GWO £90.
HEATHKIT SB 301 RX good condition non working spares or repair £50 ono. **Tel 01273 834355**
Email: shadobi23@gmail.com

Wanted

HELP! FISHPOND 182A INDICATOR. Part of HS2 Radar WW2 RAF. For a display, So does not need to work. What have you? Please contact **Geoff: 07931 188113 or Email: gw.g3yvf@btinternet.com**

BATTERY. B103 Ever Ready/ Batrymax combined LT/HT for all-dry valve portable radio. Dead, dried out or reproduction would do. Even just a 4-way output socket from this or similar battery.
Godfrey G4GLM (020) 8958 5113
cgmm2@btinternet.com EDGWARE

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Your Letters

Send your letters to: Practical Wireless Letters, Warners Group Publications plc West Street, Bourne, Lincs PE10 9PH
E-mail: practicalwireless@warnersgroup.co.uk

Transistor Radio

Dear Don,
In 1959 BBC Children's TV showed you how to build a Transistor Radio. I attach a scan of the first instruction page. I remember buying the parts from a local shop and building the set. My father had to check the circuit to get it working. I had had some old metal headphones and managed to fall asleep in bed listening to the radio. Happy Days.
Trevor Wells
Nottingham

*(**Editor's comment**: Thanks, Trevor. I actually remember that one – I had the same leaflet from the BBC if I remember correctly. As you say, 'Happy Days'!)*

BBC TELEVISION

MAKING YOUR OWN TRANSISTOR POCKET RADIO SET

Every step in making this radio set will be shown in 'FOCUS' on BBC Children's Television between 5 and 6 p.m. beginning

MONDAY 23 MARCH 1959

COMPONENT PARTS REQUIRED may be normal-size items, and need not be miniaturized. The latter cost rather more and, as the set is not unduly small, are not necessary. It is very likely that, unless you have a shop in your locality which specializes in components for the home constructor, you will not be able to obtain the parts from your local dealer. In this case, unless the dealer is willing to obtain them for you, you will have to order them by post. To find names and addresses of firms which supply parts for building your receiver, consult your local library. There are many such shops in London and one in most big cities and towns. If you order by post, be sure to ask for the components exactly as listed. Prices are only approximate and are those applying at most dealers in the London area. It is quite possible that they vary throughout the country. If you are buying a soldering-iron the small instrument type is best and costs about 25s. The deaf-aid type earpiece and high resistance types obtainable very cheaply.

COMPONENTS REQUIRED

All prices are approximate and will probably vary in different places.

Piece of thin 'peg board' or hardboard or 3-ply wood, size about 2¾ in. by 5¼ in.
Coil: Dual range crystal set type DRR 2. Other crystal set coils, if on hand, may be tried but DRR 2 is best, 4s.
C.1. 500 pf solid dielectric tuning condenser, 4/- to 6/-.
C.2. 2 mfd. electrolytic condenser, rating 15 v. or more, 1s. 6d.
C.3. 2 mfd. electrolytic condenser, rating 15 v. or more, 1s. 6d.
R.1. 220 k.ohm resistor ¼ watt, 6d.
R.2. 22 k.ohm resistor ¼ watt, 6d.
R.3. 4,700 ohm resistor ¼ watt, 6d.
R.4. 220 k.ohm resistor ¼ watt, 6d.
R.5. 22 k.ohm resistor ¼ watt, 6d.

Petitions, Death Throes, Forgotten Bands & Fishing

Dear Don,
Just the other day, a friend alerted me to that 'online government petition to allow unrestricted development of amateur radio antennas'. It is the case of course, that there have never been any restrictions (or constraints) on the development of amateur radio antennas - the restrictions come into play when a newly developed antenna is sited in a garden or wherever. Perhaps hoisted aloft a 60ft tower or something similar. Likewise, VHF/UHF antennas can also occasionally be viewed by those with no interest in hamradio as 'ginormous monstrosities' like the HF variants. However, in the main, the latter, depending on gain and so on, are usually small and can be made fairly inconspicuous - unlike 4 element tri-banders and 40m 3 element HF Cubical-Quads. Which cannot. To the uninitiated they stand out like an unwelcome carbuncle, advertising their presence to every potential naysayer.

So no, it's probably not a good idea to draw attention to huge metal structures sited in domestic urban environments. By all means draw attention to ham radio, but definitely not to the ambitions of some of our fellow communicators who can't resist the temptation to erect the equivalent of a mini Eiffel Tower in a tiny back garden. Well, unless it has planning permission, that's asking for a heap of misery (I once put up a collapsible 20ft scaffold pole in a garden at another property, the reaction to which beggars belief). As Don rightly points out, courtesy of the online malarkey, 'objections' can and will appear thick and fast. And yes, planning permissions are indeed more difficult to obtain nowadays. No doubt due to dense domestic housing developments that are now de rigueur.

As for those 'forgotten bands', although they're forgotten by many radio amateurs, they are definitely never forgotten by those who covet our allocations at 10GHz etc. Whether more activity would be generated if commercial equipment (like 23cm) was available for these GHz bands is doubtful, if only because of the economic viability of manufacture. So, I don't think it's likely to happen any time soon.

Henryk SM0JHF is right of course, that the effects of the internet on amateur radio has been 'greatly exaggerated'. It's just another string to our bow. Another 'tool'. As I've mentioned before, the inevitable march of technological advancement relative to ham radio, generally speaking, is a good

Rallies & Events

All information published here reflects the situation up to and including **15th April 2026**. 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**

13 June 2026
THE ROCHDALE & DISTRICT AMATEUR RADIO SUMMER RALLY: St. Vincent de Paul's Hall, Norden, Rochdale, OL12 7QR. Doors open at 10am with entry still only £3. Usual Traders and caterers will be in attendance. Plenty of free parking. Contact Martin Shore (Treasurer and Rally Organiser) on
Tel: 07587 709006
Email: rally.radars@hotmail.com

14 June 2026
JUNCTION 28 RADIO RALLY: New venue for 2026. The Post Mill Centre, South Normanton, Derbyshire DE55 2EJ. Doors open 1015. Admission £4. Large and small suppliers and individuals providing new and used equipment, components, accessories and test gear. Free onsite parking, toilets and fully accessible venue. Licensed bar and café serving refreshments. Indoor and outdoor tables available. For more information and to book tables contact:
j28rally@snadarc.com
snadarc.com

14 June 2026
THE MENDIPS RADIO RALLY: Farrington Gurney Memorial Hall, Church Lane, Farrington Gurney BS39 6UA, Doors Open 9.30am (Traders from 7.30am), Entrance £3, Club Stands, Traders and Car Boot in the Field, Free Parking, Refreshments.
For more information and table bookings please contact Luke.
Tel: 07870 168 197
Email: luke@mymixradio.co.uk

21 June 2026
EAST SUFFOLK WIRELESS REVIVAL (IPSWICH RADIO RALLY): Kirton Recreation Ground, Back Road, Kirton IP10 0PW (just off the A14). Doors open at 9.30am and the entry fee for visitors is £3. The venue has free car parking. Trade tables are from £10. There will be trade stands, a car boot sale, a Bring & Buy, special interest groups, GB4SWR HF station and an RSGB bookstall. Catering is available on site.
Kevin G8MXV, 07710 046 846
www.eswr.org.uk

26-28 June 2026
HAM RADIO 2026: Messe, Friedrichshafen.
www.hamradio-friedrichshafen.com

5 July 2026
NEWBURY RADIO RALLY: Newbury Showground, next to junction 13 of M4 motorway in Berkshire, RG18 9QZ. This is the 38th year of The Newbury Radio Rally and is the ideal event for anyone interested in radio communications, computing and electronics. There will be a display area with an amateur radio station, exhibits, special interest groups, clubs and societies.
Open to sellers at 08.00hr and visitors at 09.00hr. Massive Free parking. Entry is £4 visitor, £15 seller's pitch. Advance bookings (with discount) can be made via the website (below). On-site catering. Disabled facilities.
Email: NewburyRally@nadars.org.uk
www.nadars.org.uk

11 July 2026
HUMBER FORTRESS DX AMATEUR RADIO CLUB – RADIO RALLY 2026: Welwick Village Hall, Northfield Lane, Welwick, Nr Hull, HU12 0SH. Doors open from 10:00am. General admission: £3.50 per visitor (under-14s free). Fully disabled-friendly access. Free local parking. Refreshments available – including our ever-popular bacon sarnies. We have a limited number of tables available, so early booking is strongly recommended. For more information or to book a table, We look forward to welcoming traders, enthusiasts, newcomers, and friends old and new for another fantastic day celebrating radio and community.
Email Rally@hfdxarc.com
https://hfdxarc.com/booking-form-2026

12 July 2026
MCMICHAEL RADIO & ELECTRONICS RALLY 2026: 09:00 entry (08:00 for Trader Set-up). This year the Rally is being held at a new venue: White Waltham Airfield, Maidenhead, SL6 3LW White Waltham Airfield is home of the West London Aero Club (WLAC) and is one of the oldest and best known airfields in the country. The airfield is situated just three miles from the M4 (J8/9) and six miles from the M40 (J4). Central London is only 35 miles away and easily accessible by train or taxi.
The Airfield site provides a large, level and accessible space for the increasing expansion of the rally, offering more space for Visitors, Stall Holders, Traders, Car Booters, Catering and visitor parking. Blue Badge parking is also available. Entrance Fees: Visitors - £4 per person, Traders - £15 per Table (includes entry for two people). Traders - Large Pitches (Double) £30.
The West London Aero Club will be providing on site catering for breakfast and lunch and will also be running a Licensed Bar including local Rebellion Beer. Berkshire Lowland Search and Rescue will be providing a First Response service. Dogs are welcome, but please keep them on a lead at all times. Follow us on Social Media for the latest McMichael Rally News:
Email: General Enquiries: rally@radarc.org
Traders: traders@radarc.org
Tel: Colin Ashley 07706 512505
https://mcmichaelrally.org.uk
Facebook: www.facebook.com/McMichaelRadioRally
Instagram: @mcmichael_radio_rally
Twitter: @McMichaelRally

19 July 2026
LINCOLN SHORT WAVE CLUB SUMMER RADIO RALLY: The Festival Hall, Caistor Road, Market Rasen LN8 3HT, Admission £3, Doors open 10am, Indoor event ample free parking. Over 50 tables of traders and special interest groups. Hot refreshments including our famous bacon butties. Card payments accepted. Tables £10.
Steve M5ZZZ, 07777699069
Email: m5zzz@outlook.com

25 July 2026
WILTSHIRE RADIO RALLY: Kington Langley Village Hall and Playing Fields, Nr Chippenham Wilts, SN15 5NJ. 9am to 1pm - Indoor and outdoor trading with 4 acres for outdoor sellers.
Admission Buyers £3, Outside Traders £10 per pitch. Indoors £10 per table. Sellers welcome from 7am. Large Parking area. Catering and toilet facilities.
Email chairman@chippenhamradio.club
www.chippenhamradio.club

9 August 2026
FLIGHT REFUELLING ARS HAMFEST: Cobham Sports and Social Club Ground, Merley, near Wimborne, Dorset BH21 3DA. 9am to 3pm. Admission £5 (includes parking). Talk-in on 145.550MHz.
Onsite catering and bar. No dogs except assistance dogs. Indoor and field pitches. Car boot sellers and field traders welcome from 7am. Booking forms available via:
frars.co.uk

14 August 2026
31ST ANNUAL MINI_RALLY NIGHT: Cockenzie & Port Seton Amateur Radio Club. Community Hall, Main Hall, Port Seton. 1800 to 2100.
Bring along your own "junk" and sell it yourself. Tables on First Come First Served basis. Entrance fee £4 for everyone.

16 August 2026
WEST MANCHESTER RADIO CLUB RED ROSE SUMMER RALLY|: Mather Hall, Mather Lane, Leigh WN7 2PJ. Doors open 10am.
rally@wmrc.co.uk
lesjackson@ntlworld.com
Tel: 07796 264569

6 September 2026
TELFORD HAMFEST: Harper Adams University near Telford TF10 8ND. Doors open 10:15am. Admission £5 (Children up to 16 free). Easy travel access, unlimited free parking and catering on-site. The Hamfest takes place inside a large sports hall with plenty of space between tables and also outdoor tables. RSGB Bookstall, bring and buy and G-QRP Convention on 5 September, contact G-QRP for information.
hamfest@tdars.org.uk

13 September 2026
CAISTER LIFEBOAT RADIO RALLY: Caister Lifeboat station, Caister on Sea, NR30 5DJ. Entrance via carpark on Beach Rd. Raffle, onsite cafe, gift shop, museum. Free entry, open 10am-3pm (9am for sellers). Inside and outside spaces available.
Zane M1BFI: m1bfi@outlook.com
Tel: 07711 214790

thing. Besides, technology imbues ham radio with all manner of exciting possibilities. And as it's always been since our hobby took its first tentative steps into the realm of communication via the seeming magic of 'invisible waves', some of its advocates have religiously resisted the onset of doing things differently. And like nowadays, eagerly promote the idea that ham radio is somehow in its death-throes, that ongoing technical advancement will reduce it to a meaningless pursuit, akin to playing hopscotch. It's a specious argument that continues to haunt amateur radio like an unwelcome poltergeist.

No, 'cheap chip tuned radios' (**Georg Wiessala**) will never be embraced by 'serious DX'ers or radio amateurs'. Why would they be? They are what they are - cheap and cheerful. They're aimed at a specific demographic. Those who want an inexpensive conduit to all bands and all modes in one small box. You get what you pay for.

Putting aside the obvious 'security and privacy implications' of this type of radio - which we need to be wary of, I guess they could be termed a 'toy', much like 'toy cars' (EV's). Oh, the last time I looked inside a very expensive transceiver, it was chock full of 'chip based' components.

Lastly, as I spend a lot of time fishing for contacts on HF, that ingenious Wave Caster antenna idea by **Frank Howell K4FMH**, will probably be an excellent choice (when I get round to making one) to further my QSO exploits on the short-wave bands. But perhaps like some other sky-wave chasers, I do tend to use the wrong type of bait.

Ray Howes G4OWY/G6AUW
Weymouth

Op Amp article clarification

Dear Don,

On page 39 of the April *PW* Fig. 7 shows the op amp's inverting – and noninverting + terminals swapped (in what is intended to be the noninverting configuration). In discussion with author **Tony G7ETW** he kindly suggested that my comments would be appropriate as a letter and here is a further explanation that I also gave him.

The article looks at zero/short-circuit R feedback resistors. In the inverting amplifier, output clamps to 0V ground. The noninverting input is already at ground, the output has to follow to make both inputs the same voltage. V_{in} now sees R_{in} simply as a load to (virtual) ground. The gain equation gives this result correctly.

Noninverting becomes a standard unity-gain buffer and the equation is also correct. If it makes it easier to visualise, just slide what was originally labelled R_{in} rightwards along the zero-ohm wire that now connects the inverting input to the output. No change to the circuit, but it's now more obvious that R_{in} has simply become the output load.

Reference: Manning GL *Getting started in op amps, RadCom*, November 2016, p72

Godfrey Manning G4GLM
Edgware

5MHz & FT8

Dear Don,

In the April 2026 edition of *PW* you asked for readers' reports about 'forgotten' bands, so here's my story about using 5MHz for the first time.

In January last year (2025) I finally achieved my lifetime objective of working into VK-land on all nine HF bands, when I had an FT8 QSO with VK5PW on 1.8MHz using my IC-7300. What would I do next, I wondered?

Then last autumn I read that there was a new version of WSJT-X that incorporated easy access buttons for all bands including 60m (5MHz.) I decided to download the new software (WSJT-X v3.0.0) and give it a try. 60m was a band I had never used before.

Step One was to read the guidance and confirm that I would need to use an audio frequency of 1kHz or lower, so as to stay within the permitted UK allocation. Next, I checked whether the internal ATU of the IC-7300 could match my antenna - a wire 40m long strung between trees in the garden. It could.

It was 17 February 2026 with 15:30 on the station clock and, using PSK Reporter, I could see that there were a few other stations active - all European. I found a clear frequency and called CQ, the plan being to check PSK Reporter to see whether I was getting out before attempting to make any real QSOs. Imagine my surprise when my very first call was answered by OE3KLU (Vienna) with good reports in both directions. This was clearly going to be fun! That day I worked a total of 25 stations all over Europe on the band. In the following days, the impression I gained was that UK stations are fairly rare on the band and in great demand. Perhaps, because of our licence restrictions, operators are reluctant to use the band in case they accidentally breach their licence regulations. Checking, it was evident that all other UK stations were also operating below 1kHz. My strategy must be a good one.

I soon realised that this was a band that got better after dark. Contacts with Eastern USA and Canada followed at about 21:30 on 3 March. I was running about 35 watts - my normal power level on HF. Another surprise came when PSK Reporter confirmed that my 5MHz signals were reaching Australia at good strength. Unfortunately, though, Australian amateurs aren't yet allowed to transmit on 5MHz, so it will be some time before a two-way QSO becomes possible.

So, to sum up, it is easy to operate FT8 on 5MHz from the UK, so long as you set up your station correctly. There are many contacts to be had, even if you're a 'boring old G-station' and worldwide communication seems to be possible. I look forward to one day, perhaps, having a QSO with VK (or ZL) for my tenth HF band.

Incidentally, I have been reading *PW* since, aged 13, I bought my first ever copy - the July 1963 edition. Keep up the good work!

Steve Beal G3WZK
Warlingham, Surrey

A Bright Idea

Dear Don,

I was thinking about some firm of compact lighting whilst at a remote location and came up with the following. Why not have an LED mounted in the back of the microphone. I have fitted a 3mm white LED through the back face of my MH-31 microphone, with a small momentary switch protruding on the opposite side from the PTT. It was a tight fit. There is 5V available in the microphone and I used a 100Ω dropper resistor. It works a treat.

Graham Yoxall M0CYX
Portsmouth

Parliamentary Petition

Dear Don,

I was surprised to read in *PW* about the parliamentary petition to allow amateur radio enthusiasts to erect antenna installations without planning permission. So surprised that I had to go and read the petition for myself! I will say now that, although I am a licensed amateur, I will *not* be signing it. Frankly, I'm astonished that anyone is so selfish and thoughtless as to initiate such a petition. The petition calls for amateur radio enthusiasts to be allowed to install up to two antennas up to 15m, or 5m above roof height - whichever is greater - and up to a width of 8m without planning permission, thus denying neighbours or others affected the right to object.

Try and imagine how you would feel, if you weren't involved in the hobby, if your neighbour in a typical small suburban garden wanted to erect a steel tower of that height with metal poles 8m long atop it. You would be, I suspect, very unhappy. If the petition supporters get their way, you would have no

right to object.

Get real people, to the average person our beloved antennas are nothing but eyesores. If these structures are to be allowed, where would you draw the line?

I'm sure it's annoying to have to fight to get your beloved chunk of metal in the sky but I for one sincerely hope this petition sinks without trace.

Tim Kearsley G4WFT
Rushden, Northants

(***Editor's comment***: *Personally, I agree with you Tim, but I felt it appropriate to at least draw attention to what was being proposed in 'our' name. Incidentally, it appears that the link was wrong. The hyperlink should read:* ***https://petition.parliament.uk/petitions/755675*** Not: ***https://petition.parliament.uk/petitions/755657*** For what it's worth.)

Contests

Dear Don,

Like many amateurs I have noticed since taking the hobby up again just over ten years ago, how much different aspects of Amateur Radio can cause real debate, and sometimes worse.

I think I've heard most of the negativity, ranging from on-air comments from 'older' licensees that, and I quote; *"They haven't earned the right"* and in this context the UK amateur was referring to people like me who gained a class 'B' licence and then had the audacity to use HF when the rules changed, to FT8 haters, contest haters, QRP haters, those who insist on using old and sometimes drifting valve transceivers (I admit, I do), data transmission haters, etc, etc, and on it goes.

I am pretty sure that I've never felt this level of angst/hate/passion - take your pick, about any of the above; perhaps I'm not taking the hobby seriously enough. Possibly I'm not - there are, after all, much more important and pressing things in life than 'playing radio' I would argue.

That said, there is one area, and it's contentious to some people I know, that does make me think; the much debated contests.

When I first attempted to enter the HF arena it felt like a very big step. Suddenly I was playing with the 'grown- ups' - at least that's what I thought. I'd read the books, listened and listened until I was pretty sure of how I should be operating, before I pressed the PTT.

And then I noticed what happens when you call CQ. Nothing happened. No replies. Was I actually transmitting? Was the microphone gain correct? Was the transmit power set correctly? Was I speaking gobbledegook and not realising? I quickly learned not to call CQ and instead answer the calls of other established operators already on air.

It was at about this time I came across contests. What a godsend they proved to be. No more shouting into the microphone with no reply, a response would come and the confirmation I needed. Yes, I wasn't talking Klingon and yes my transceiver and antenna both worked. Hooray!

Today, Saturday 28 March, contests were everywhere. These contests allowed me to work eight stations from Brazil across Europe and into Ukraine. Would these contacts have happened at any other time? For me, No.

I know some people despise contests but surely they are an enabler for amateur radio aren't they? What's worse, a band alive with conversations across continents or the silence of dead air through either poor band conditions or just pure apathy?

Richard White G6NFE
Shrewsbury

Havering & District Amateur Radio Club

Dear Don,

This Club was established in 1965 by **Mr Oliver Tillett G3TPJ**. They ran a class for beginners and held mock examinations. It used to average between 20 and 30 members attending the club meetings every week. Then Covid came along, the Council closed our meeting place and we lost all our members. Since we re-opened we now average about 6 or 7 members attending each week. The Radio Society of Great Britain has now decided that all applications for a licence and examinations should be made online. I think this ruling has contributed to the fall in membership. I personally think that matters would improve if club members were allowed to continue taking their examinations on club premises. If you attend a club's meeting there is usually somebody who is prepared to give advice if there is anything you don't understand. What do your readers think?

T J Gladman M6AMI
President,
Havering & District Amateur Radio Cub
Rainham

Amateur Radio: Fun while it lasted

Dear Don,

Before the Second World War virtually all amateur radio equipment was devised and built by gifted amateurs. These were the real pioneers of the craft, passing on wisdom to all and contributing to amateur and professional thought and practice on radio and propagation. After WWII radio amateurs increasingly used modified military and commercial gear as it became available on the surplus market although a lot of equipment was still home-made. Nowadays it is unusual to hear of stations using self-built or modified professional gear except if you listen to the Old Timer nets such as RAOTA or VMARS in the UK. Most, if not all, of our kit has been made for us by professionals. Mine included.

Since I retired in 2017 and moved to a location near Bury with a good take-off and a longish garden I have pursued amateur radio as a hobby keenly and seriously, using store-bought VHF and HF equipment and a home-made aerial system and test gear.

In the past I have sent construction articles and written several letters to *Practical Wireless* and other journals about my experiences and expressing my opinions regarding the current state of the hobby which I will not dwell on here. Suffice to say that I am saddened by its apparently inexorable decline over the last few years, brought about, in my opinion, by an outclassed, ineffective yet verbose and self-congratulatory leadership and a complacent, apathetic, ignorant and increasingly untrained, undisciplined and unskilled membership which has reached the state where it is unable even to recognise how much standards within the hobby have deteriorated and where it has gone wrong, let alone take any action to rectify matters.

I run between 1 and 25 watts on VHF and UHF and a maximum of 100 watts on HF using wire aerials. In the space of nine years I have seen the near-obliteration of any chance of HF DX due to contests, bad practice and unbelievably crowded and noisy bands – this latter being brought about by the sheer number of stations trying to make contact at kilowatt strength and above, along with uncontrolled electrical noise (Legislation notwithstanding) from a plethora of sources, local and distant.

We as radio amateurs now have no recourse to official measures to investigate this problem since our licence fee was waived. All this takes place on bands where a dedicated few are still trying to make contact using less than 5 watts.

Strangely, the VHF and UHF bands show a different picture: they are mainly empty here in Lancashire, getting busy occasionally with some good nets in the evenings. Daytime contacts have declined due to there now being no 'Class B' licence, which restricted HF usage to those proficient at Morse and also to the number of VHF & UHF repeaters up and down the country all carrying a single QSO, usually from abroad, which limits or prevents their

local availability. What a frustrating waste of resources.

The use of the internet and mobile phones to link radio equipment is definitely nothing to do with amateur radio, no matter what anyone says. By the way, it's the definition of the foregoing as amateur radio and its use of amateur facilities I'm against, not the practice. There was an old joke about the Irish VCR that would record programs you didn't like and then play them back when you were out... Sound like FT8?

Please don't get the wrong idea – FT8 certainly has its uses but as it is an entirely computer-driven setup it is not really amateur radio either. Amateur radio is not about data-gathering only, that's the Scientific Method, used by those in the pursuit of knowledge and understanding. It's about the commitment to live person–to-person communication and acquiring the patience, observational and social skills, techniques and protocols necessary to do this with the minimum of disruption and inconvenience to others.

Should it still be called amateur radio? There might be a few amateurs who continue to build and maintain their own equipment but I think the majority now use professionally-built gear and send it back to the supplier when it goes wrong. I can imagine that a person would soon tire of something that might well have cost thousands, does everything at the press of a single button, shows pictures and looks and sounds perfect – but can't be easily programmed or used; many operators can be heard expressing frustration after spending large amounts on a transceiver they can't set up properly or that has functions they don't understand. They may have been seduced into this purchase by the current ridiculously low standards needed to pass the amateur radio exam – in stages - and are now regretting it.

There is probably no going back to the days when a proper exam in Licensing Conditions and Transmitter Interference, plus Operating Practices, Procedures and Theory as well as Morse was needed for a licence to transmit on HF. Everything is now aimed at convenience rather than achievement, expediency rather than true progress, ease rather than fulfilling and sustaining effort. I think it's fair to say that the days of the true gifted radio amateur are numbered. Well, it was fun while it lasted.

Pat Walton M1BNH
Bury, Lancs

*(**Editor's comment**: I can't resist commenting Pat, although I feel sure readers will do too. Personally, I see the HF bands rather too quiet most of the time – FT8 frequencies excepted – so it's good to hear a DXpedition or a contest livening things up. I suspect the advent of WhatsApp – free voice and video communications anywhere in the world – has taken the 'magic' out of long distance radio. When I first started in the hobby there were many ex-pats around the world who relied on amateur radio to stay in touch with the 'home country'. The simple fact is that many of us, myself included, have been in this hobby for about half the time that mankind has understood radio – or wireless as it used to be called of course. It doesn't surprise me in the least that times have moved on. Talk to a newly licensed youngster – if you can find one – and he or she will accept the hobby for what it is nowadays, and will probably be out and about activating Summits, Castles, or whatever.)*

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Dear Don,

A quick comment on **Steve G1YBB's** excellent article that I read as a nerdy chemist this morning: in the body of the article he refers to taking advice on which plastic to use and selects polypropylene. However, all the image captions refer to polycarbonate - which has notably different physical, chemical and optical properties from polyprop. Not sure if it's in Steve's copy or in editing, but you may want to disambiguate that in next month's issue.

David G3WGN M6O
Totnes

*(**Editor's comment**: Thanks David. My apologies – the contradiction seems to have passed both Steve and me by. Polypropylene it is!)*

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