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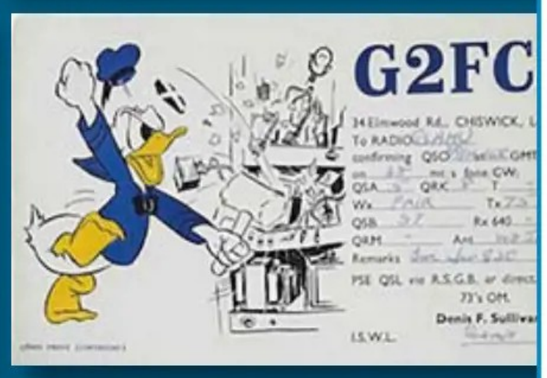
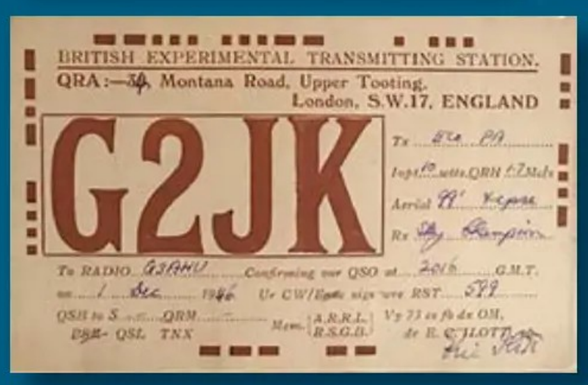


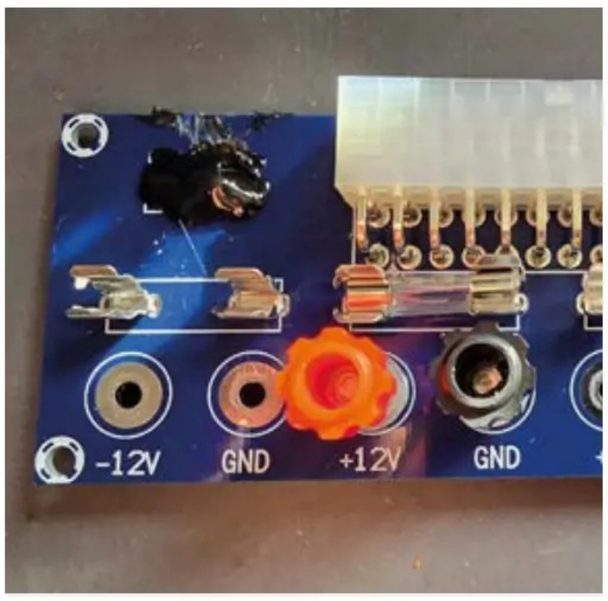


QSL CARDS REMEMBERED

A look at 100 years of these much-loved contact cards

A Face Behind The Call

We meet an amateur with a track record of major scoops



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How to safely use a PC power supply for your transceiver

PRACTICAL Upscaling an old ATX for the shack

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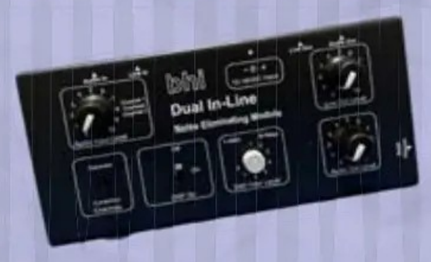

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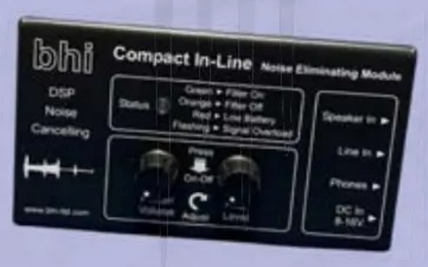

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Incorporating RadioUser

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Keylines

As I write this (late January) we are still waiting for the promised upturn in HF band conditions – hopefully last autumn wasn't the beginning and end of it! Meanwhile, turn to **Tim Kirby's** VHF column to read that there has been some excellent and intriguing propagation on the higher VHF bands.

Radio books & other sources

This month **Georg Wiessala** brings us a review of the latest publications from German publisher Klingenfuss. I find it fascinating that such publications still exist and reassuring, too, that there still seems to be a healthy market for amateur radio publications generally.

Over the years I have accumulated a bookshelf full of amateur radio and, more widely, other radio and electronics books. They are there if I need a quick reference and I do find their information more reassuring, for the most part, than the sort of ephemera we find on the internet. And, of course, the fundamentals of radio haven't changed over the years – I have several volumes of the *Services Textbook of Radio*, which are truly excellent.

That said, the internet does have its uses, not least in the excellent YouTube videos that are posted on pretty much every topic you can think of, from how to build a particular item for the shack to reviews of the latest equipment.

News

I do, sometimes, have a challenge finding suitable items for our *News* pages. Again, many items simply find their way onto club or vendors' websites without being promulgated more widely. I do, though, attempt to keep you, the readers, up to date with product news, club news, significant initiatives by the RSGB, Ofcom news and international news, along with anything else that appears to be of interest. I hope we succeed!

Advertisements

And while on the subject of paper versus internet, I do wonder whether those advertisers who confine themselves to their websites are to an extent shooting themselves in the foot. When I first took over editing *PW*, I ran a survey at Newark to see what readers most liked to turn to in the magazine. As well as the obvious answers of product reviews, software in the shack and so on, looking at vendor advertisements came out highly. And, of course, here at *PW* we are extremely grateful to Martin Lynch, Yaesu, bhi, ECS and other regular advertisers for their continued support. I trust, in return, that you will continue to support those advertisers.

Components

And talking about buying things, discrete components are nowadays much more difficult to buy than used to be the case in the days of Maplins and others. Thank goodness for the traders we see at Rallies and similar. I recall back in the 60s that we used to buy 'goody bags' of assorted components, most of them extremely large by today's standards! Nowadays we are at surface-mount level. And try buying large components for, say, a homebrew linear amplifier, requiring large air-spaced or vacuum capacitors. It's no wonder that the majority of us resort to buying commercial. Such is life I guess, but thank goodness for the G-QRP Club and others who do their level best to make components available in small quantities and at reasonable prices.

Tower saga

This month we feature **Roger G3LDI's** tower saga and quite a tale it is too. Sadly, in recent years, there have been more than a few cases of deaths by falling off towers. Thank goodness most UK radio amateurs who have antenna towers use wind-up rather than fixed ones, so that any work can be done at ground level. Even so, working on antennas is always fraught with potential dangers so do, please, exercise care when doing so. As Roger quotes in his article *"This hobby would be the best ever if we did not have to have antennas!"* Very true! But the simple fact is that we do need antennas and, up to a point, the bigger the better. Or, as that well-worn US quote goes, *"If it didn't fall down last winter, it isn't big enough!"* Thank goodness VHF antennas, generally speaking, are reasonably manageable albeit perhaps not when you decide to embark on moonbounce operation!

Don Field G3XTT
Editor, *Practical Wireless* Magazine

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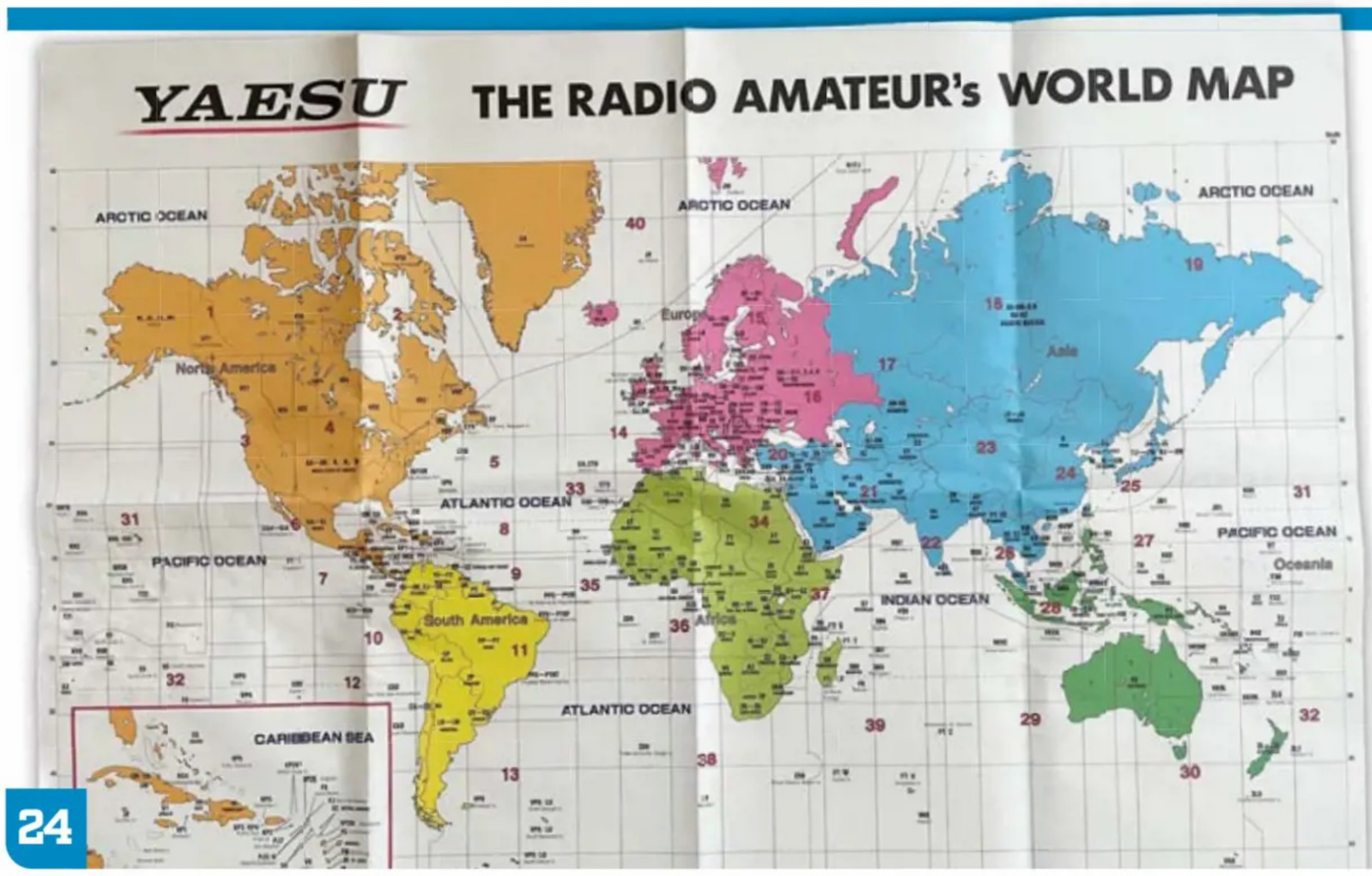

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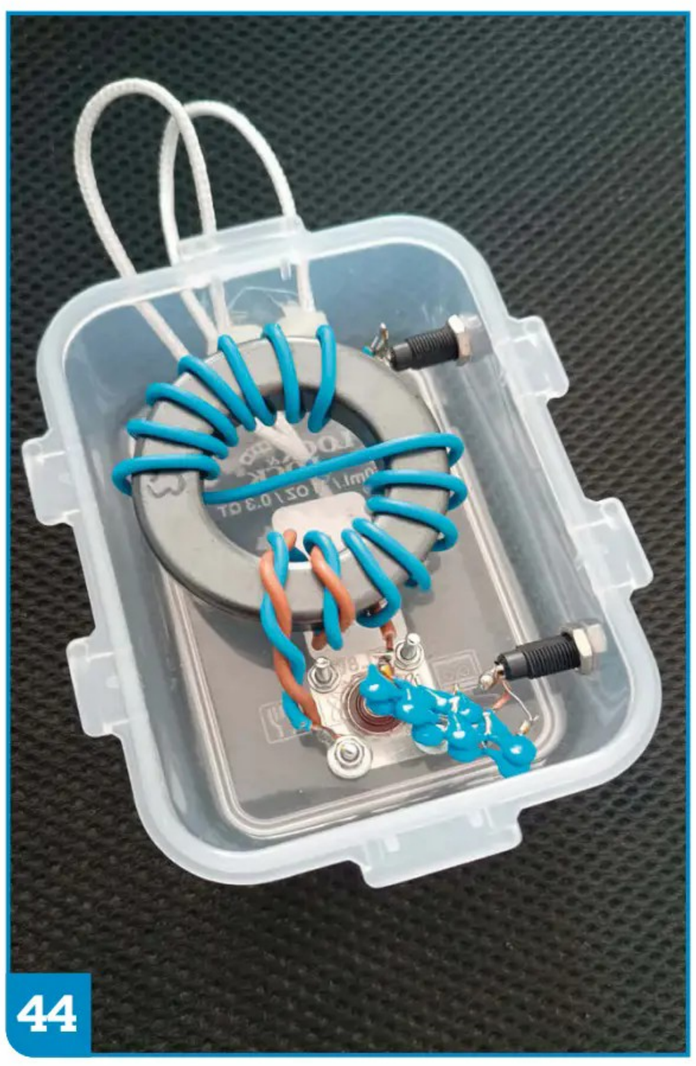
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Locate a rally or event near you; we have our usual comprehensive list.

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RF-Kit transfers to RF-Power

On 1 January 2025, the business of power amplifier manufacturer RF-KIT was transferred to the newly founded company RF-POWER GmbH, based in Salzburg, Austria. *"In order to meet the increasing demand for our power amplifier, production had to be expanded. Naturally, the tasks that my small company had to cope with also increased. That's why I had been looking for competent support for some time,"* says **Reinhard Förtsch**, head of RF-KIT, explaining the reason for the move. This necessary 'man-power' is now supplied by RF-POWER.

The owner and managing director of RF-POWER GmbH is **Wolfgang Klier, OE2VEL**. He has been Managing Director of the Austrian company ViCOS GmbH, which manufactures professional electronics, since 2004. *"We have been producing the RF2K-S power amplifier from RF-KIT since spring 2024. We will continue this at the same location with RF-POWER,"* he explains and adds: *"Reinhard Förtsch, DH3NAB will remain a contact person for our team. By handing over many operational tasks, he now has more time for further development of the RF2K-S and new ideas."* Reinhard Förtsch will be supported in this and in the production transition by **Thomas Rieder DL4MCD**. **Chris Sauvageot DL5NAM** was part of the RF-KIT team from the very beginning and actively helped to make the product a success. He continues to look after the B26-PA mailing list and represents RF-POWER at trade fair stands.

Christian Janßen DL1MGB strengthens the product marketing team. He is responsible for advertising, the website, documentation and trade fair appearances. He will also provide customers with advice and support. RF-KIT's worldwide sales and repair network will continue to be available without restriction and as usual.

"I am looking forward to the production and further development of the RF2K-S power amplifier together with my experienced team at RF-POWER," concluded Wolfgang Klier.

When the hobby project 'B26-PA RF1K2' was launched more than 10 years ago at the Forchheim local club of the DARC (German radio society), none of those involved had any idea how successful the power amplifier would be today. The great interest shown by many radio amateurs was not without consequences. With the establishment of the small company RF-KIT, the product was consistently developed further. It is therefore not surprising that the third generation of the power amplifier, the RF2K-S, is now successfully on the market.

EFFECTS OF STORM DARRAGH: Storm Darragh wreaked havoc in West Wales on 7/8 December. At InternalFire - Museum of Power the polytunnel (60ft x 30ft) used for storing objects being restored or not yet on display has been destroyed. Damage has also been sustained to the roof of the main building.

Most of the affected objects, including the rare and recently acquired Marconi SWB8-E transmitter are now in the museum walkways with the rest sheeted up outside so most are fairly safe but the museum will be unable to open again until they sort out replacement storage.

Other objects including a Marconi T1509 RAF ground station transmitter, a 1920s 500W transmitter, among others are presently stored in the Radio Room passageway.

Without grant assistance available they are going to try their first, hopefully only, crowdfunder.

If you can help it would be greatly appreciated. Please go to the main Internal-Fire website and click on the blue fundraising text for details on how to contribute. Your generosity will help them to be open again on schedule at Easter.

You can contact Paul, Hazel & the trustees at **https://www.internalfire.com**

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Yaesu Releases New Mobile Radios

Yaesu has quietly added three new mobile VHF/UHF transceivers to its website. The FT-3185RASP, FT-3165RASP, and FTM-150RASP all focus on Yaesu's Super-DX feature, which is designed to improve weak signal reception.

While that feature isn't new, Yaesu has added an Audio Digital Signal Processing Unit (ADS) that also activates when engaging Super-DX. ADS is designed to further improve weak signals. All three models include ADS as part of the improved Super-DX feature. Product highlights include:

FT-3185RASP: 85W 144MHz FM Mobile Transceiver, fanless operation

FT-3165RASP: 65W 144MHz FM Mobile Transceiver, includes a front speaker

FTM-150RASP: 55/50W 144/430MHz FM Dual Band Mobile Transceiver, detachable front panel

http://www.yaesu.com

SWR METERS: Moonraker have just taken delivery of a range of VSWR meters covering from 1.8-1300MHz. Prices start from £29.95.

SWR meters are helpful when you're having issues with your radio, as they can measure the quality of the radio waves sent to you from a transmitter. On the other hand, if you think your radio may be consuming too much or too little energy, our power meters can help you get an accurate read and troubleshoot from there.

https://tinyurl.com/yrf5stuy

Anytone AT-D168UV

The Anytone AT-D168UV is a compact, entry-level DMR handheld radio, designed without installing GPS and Bluetooth to provide an affordable solution for users. It supports both UHF and VHF frequencies, features dual-mode digital and analogue operation, and comes equipped with two antennas and two batteries (1800mAh and 2500mAh). With AES256 encryption, Type-C charging, and offers reliable communication for a variety of settings.

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Georg Wiessala
wiessala@hotmail.com

Klingenfuss Reviewed

Georg Wiessala takes a look at the latest professional radio monitoring books and CDs from the Klingenfuss stable.

In December 2024, the latest batch of the hotly anticipated annual Klingenfuss radio publications came out. In the main, the 2025 offering from Germany comprises the following items, containing, according to the blurb, 'secret' HF signals and frequencies for SDR fun' – well, not so 'secret' anymore, when using these:

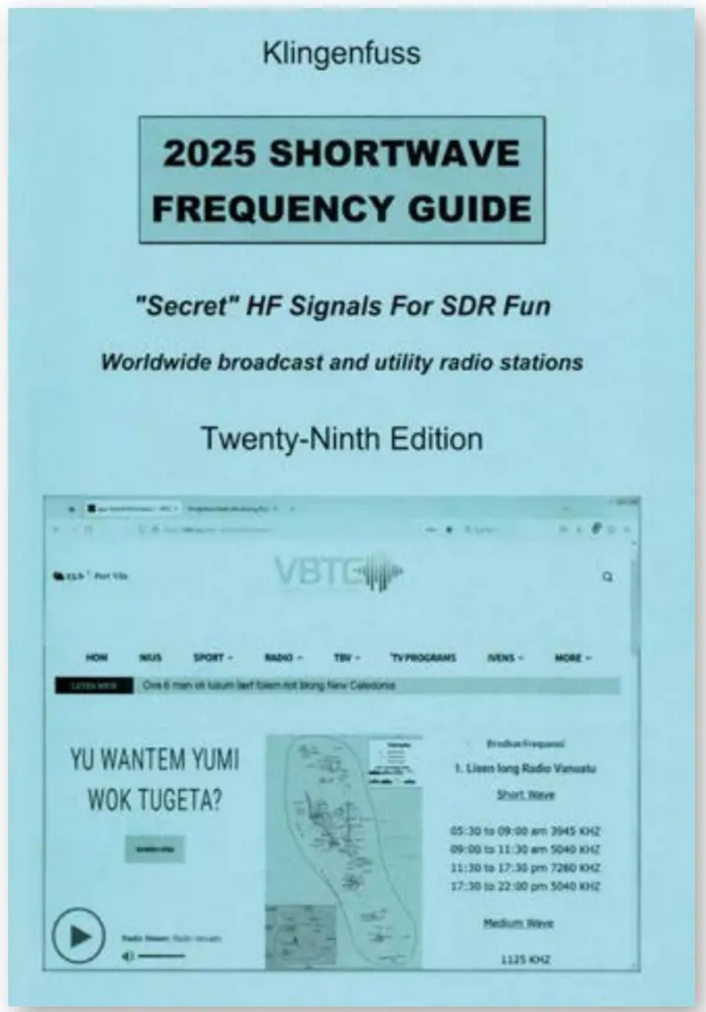
- The 2025 Shortwave Frequency Guide
- The 2025/2026 Guide to Utility Radio Stations
- The 2025 Super Frequency List on CD
- The 2025 Frequency Database for the Perseus LF-MF-HF Software-Defined Receiver
- The 1997-2025 Digital Data Decoder Screenshots on USB Stick (28,000+from 600+ stations).

The Klingenfuss 2025 Shortwave Frequency Guide (SFG)

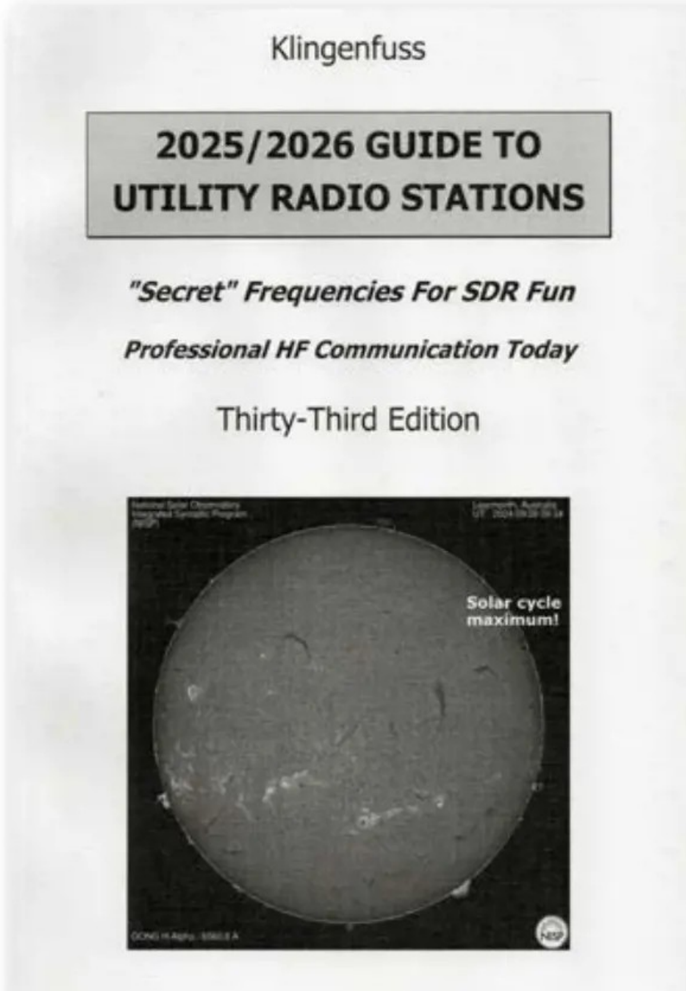
The Klingenfuss *2025 Shortwave Frequency Guide* is the 29th edition of this global HF frequency listing. It runs to 336 pages – the same length as the 2024 version. Its dimensions are 17 x 24 x 2cm, and it weighs in at 581g. The pages are environmentally friendly, i.e. unvarnished. This year's cover shows a picture relating to the Vanuatu Broadcasting and Television Corporation (VBTC; **https://vbtc.vu**). The text (*'Yu Wantem Yumi Wok Tugeta'*) in the Bislama (English-based Creole) language means *'You Want Us to Work Together'* – a great motto for international radio in a troubled world (2025 SFG: p. 2).

The layout and structure of the book are similar to previous editions. It takes dedication to compile a hefty HF guide like this, and this is evident in its pages. In short, an impressive amount of reliable and tried-and-tested, evidence-based information has, once again, been condensed clearly and in a logical format by **Jörg Klingenfuss** and his team of dedicated global experts and radio monitors. Regarding the latter, it is worth taking a quick look at the 'Who-is-Who' of well-known international radio enthusiasts and professional monitors, whose conscientious work contributed to the latest guide.

Over the last few years, some overall tendencies have emerged in this dependable yearly manual. Among these are, for example, the length and dependability of the listings, the delivery of much-needed critical political and historical context to many of the entries, the value of the wealth of extra information provided – most of which is not to be found elsewhere – the emphasis on modern systems, such as receiving transmissions via the *Kiwi SDR* (web-based Software-Defined Receivers) Network, and, last but not least, the foregrounding of current and developing digital data transmissions, plus a look at the future of HF radio.



Klingenfuss 2025 Shortwave Frequency Guide. 'Secret' HF Signals for SDR Fun. Worldwide Broadcast and Utility Radio Stations
29th ed. 2025 (ISBN 978-3-941040-75-5)
336 pp. pbk. (€45)
https://www.klingenfuss.org



Klingenfuss 2025/2026 Guide to Utility Radio Stations. 'Secret' Frequencies for SDR Fun. Professional HF Communication Today
(Includes a free Supplement published January 2025) 33rd Edition (ISBN 978-3-941040-25-0)
544 pp. pbk. (€55)
https://www.klingenfuss.org

There is a balance to be struck here: on the one hand, Jörg Klingenfuss does, of course, promote, for obvious reasons, the continued relevance of HF *over-the-air* radio transmissions, 'traditional DXing', as it were. On the other hand, there is also a strong current here, and on the website, promoting *internet-based* methods, like WebSDRs, KiwiSDR, and so on, all of which are not, of course, 'real' radio, in the eyes of many.

In fact, on the covers of the books under review here, they are being advertised as conducive to 'SDR Fun', simply because Klingenfuss needs to go with the times, as it were. While, therefore, on the one hand, the books point to the many exposures and downsides of the internet and online-based radio, like susceptibility to censorship and switch-off, unequal global distribution or tracking, it also extols the very virtues of the medium it criticises. It's a balancing act that, perhaps, only Jörg Klingenfuss can pull off with credibility.

These trends and currents continue and are further expanded, in this year's editions. The references, throughout the guides, to ionospheric conditions determined by the current Solar Cycle 25, both set the tone for using HF and perfectly encapsulate the excitement of new technologies and the irreplaceability of broadcast DXing and utility monitoring from home. The cover of the *2025/2026 Guide to Utility Radio Stations* consolidates this theme further (see below).

As before, the 2025/6 SFG relies on a wealth of first-rate screenshots to make its point, and to whet the appetite of every self-respecting radio enthusiast. The screengrabs are not just here for decoration, they shed light on points of technology and show what is possible on HF. This is evident in the introductory chapters on utility and broadcast signals monitoring, which are 'must-read' sections with über-informative content, which is far in excess of what many may reasonably be expected from a frequency guide like this.

Section 2.5 on Radio Services (pp. 16-26), for instance, opens the door wide to numerous data stations, like HF email, radiograms, beacons,

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Fig. 1: Too hot to handle? The Klingenfuss 'Hot Frequencies' website. Fig. 2: From the Present to the Future: Frequency Analysis with Artificial Intelligence.

maritime mobile radio, global humanitarian services, aeronautical and disaster comms, military, meteorological and SFTS (Standard Frequency and Time Signal) providers.

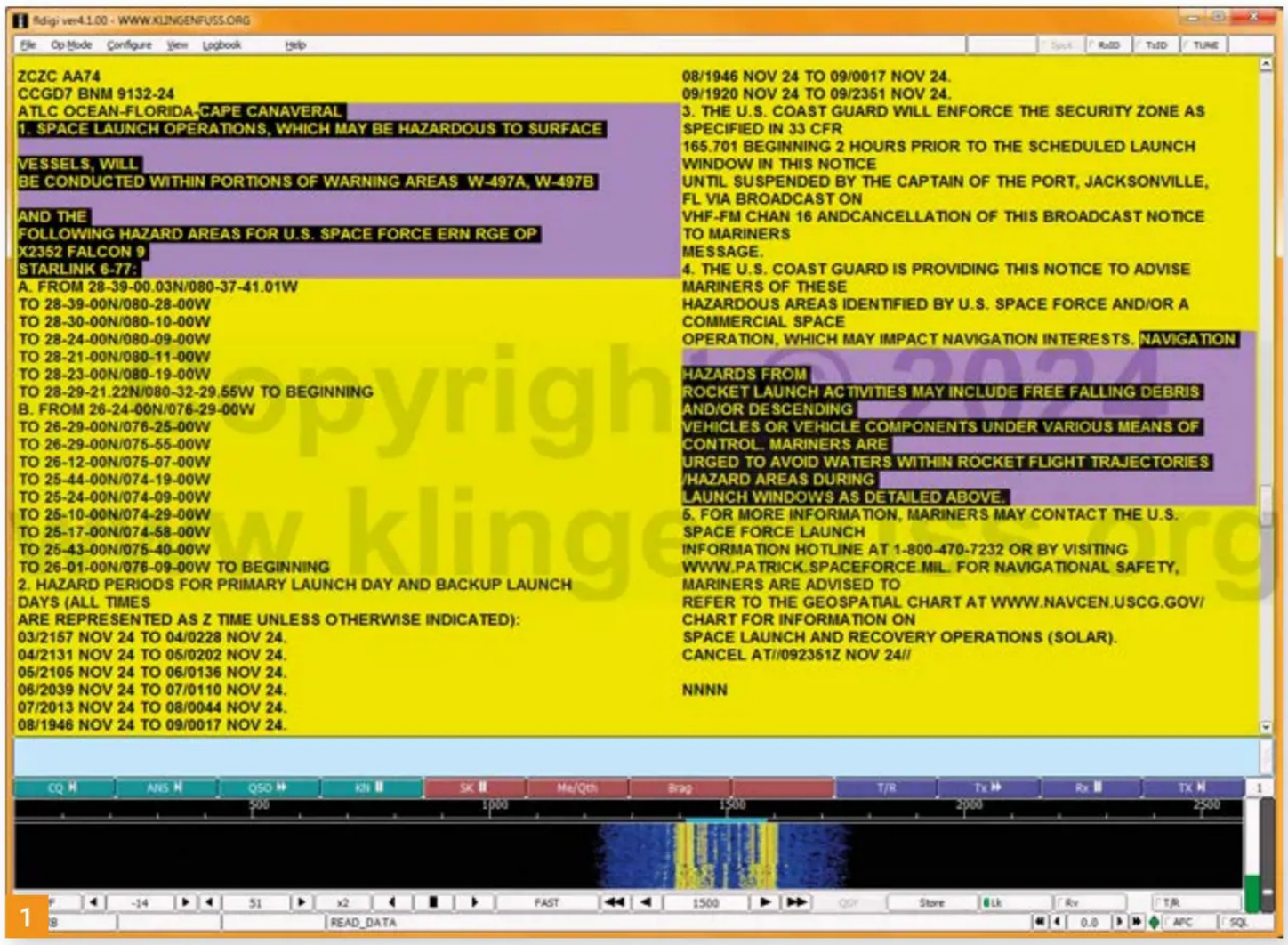
The beginner in this evergreen hobby will find, in the introductory chapters, all the information they could possibly require to understand the technical aspects of propagation and modulation, automatic monitoring and direction-finding, TDOA (Time Difference On Arrival) features, and much else besides – all eloquently illustrated with appropriate screenshots and graphs.

Frequency Listings: Utility and Broadcast

The principal part of the *Klingenfuss 2025 Shortwave Frequency Guide* opens with the *Frequency List of Utility Stations* (Section 3, pp. 50-207) and the *Frequency List of Broadcast Radio Stations* (Section 4, pp. 220-279). The *Utility* table ranges from pages 52 to 194 and covers emissions from 20 to 27870kHz, while the much shorter *Broadcast Stations* list occupies transmissions from 2310 to 26040kHz and appears on pp, 208 - 275. As usual, all entries are clearly organised in the format of frequency, callsign, station name, ITU classifier, mode, and (further) details. If it's on the air, it's in Klingenfuss.

At the end of each section, there is further information, bringing this book to the forefront of contemporary developments. The bit I enjoyed most here (p. 195) was the short section on the use of generative Artificial Intelligence (AI) models in radio traffic monitoring and frequency analysis, courtesy of **Rolf Hänggi**, one of the SFG's contributors (**www.shoc.ch**). Together with other sections in this book, this seriously made me want to learn more about the functions of professional digital data decoders, such as go2MONITOR.

Be sure not to miss out on the ancillary information on both these lists (pp. 50-51 and especially pp. 208-219), for plenty of captivating background detail on how the data are presented, and also some key information on DRM and the future of SW broadcasting. The tenor here is that professional digital utility station radio nets are still steadily on the rise. Of course, they are – especially in this new, 'post-truth', world order. For me, one of the best parts of the book lies obscured here. This is the provision of some much-needed context of such matters as the physical limits of the HF Spectrum, the legacy of the Cold War, issues of service provision, censorships and propaganda, and the demise of the DRM format, among other topics.



Geopolitical embedding and useful appendices

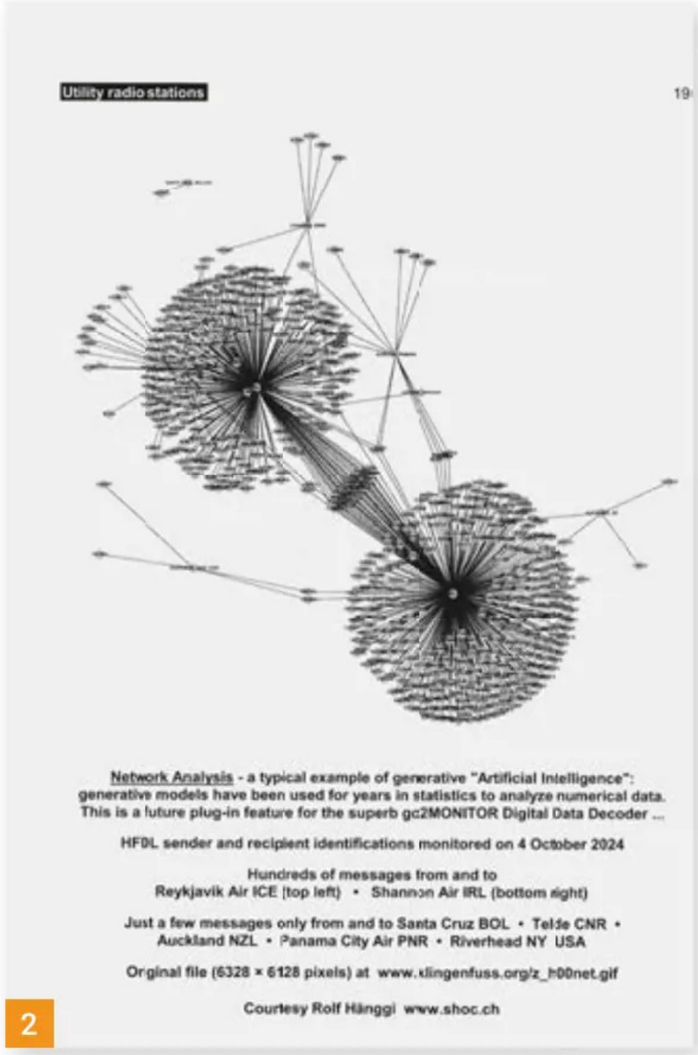
I strongly recommend that you take a look at these pages before you check out the frequency lists. Section 4.4, in particular, on *Internet, SATCOM and HF Radio in Dictatorships – Censorship of the Internet and Restricted Online Access vs. Free Worldwide Shortwave Reception for Everybody* is a necessary overture to pursuing a hobby that lives inside, and through, politics and international relations.

No other guide, as far as I know, contains such eye-opening details, and Jörg Klingenfuss deserves high praise for reminding us of this vital framework. Short Wave does not 'track' you, you do not have to open an 'account', 'log in' or submit to other such data-gangstery, or be 'cookiefied'.

Last, but certainly not least, there are the appendices, from page 280 onwards: Transmission Sites are listed here, as are Broadcast Stations from Alaska to Zambia, and Clandestine Stations. Among the latter, there are some great finds. Take a look at pp. 286-294 and wonder at the stunning dominance on the short waves under the entry of 'China – Communist Undemocratic'.

The entry for Germany always makes me sad: it shows that, since the foolish withdrawal of *Deutsche Welle* from Short Wave, the broadcaster once again merits only one moniker: '*Germany: Nuls Points'*. Compare this with the BBC and other listings here and weep, my German friends. In a world of perfidious, expanding, Russian, Chinese and North Korean influence, this is truly unforgivable. I'll switch to 'Korea – Communist, Undemocratic' now I think – their entry is longer (!)

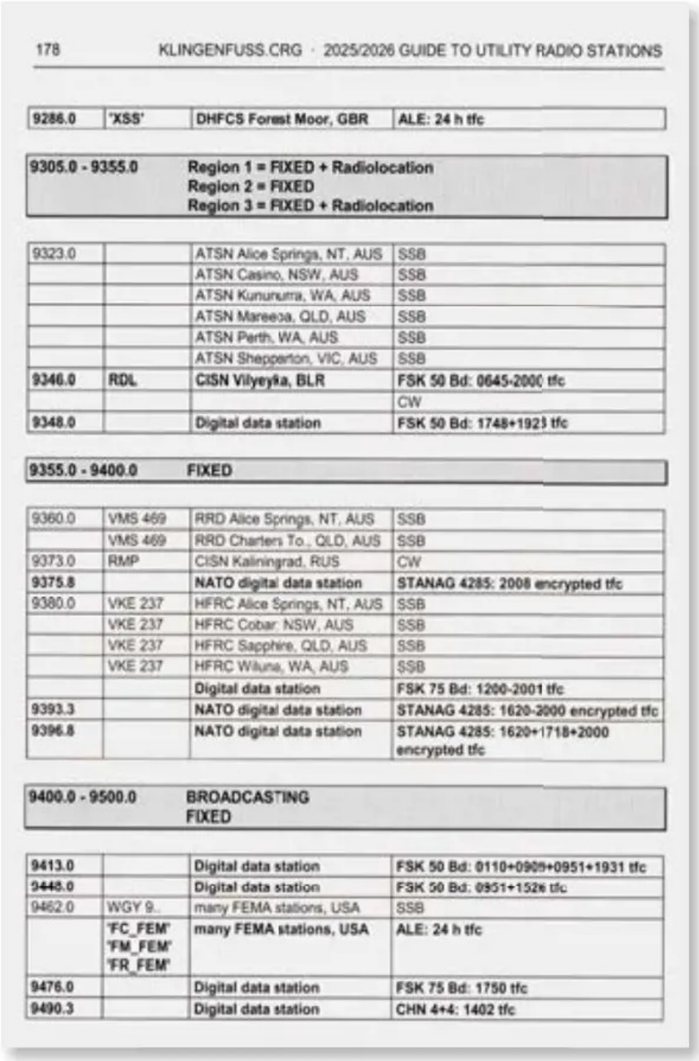
I do like it when HF reception is evidenced



via screenshots, and this is the guide for you if you enjoy this too. The same goes for the *Klingenfuss Digital Data Decoder Screenshots List* on a USB stick for the discerning analyst, sold separately at €210. Following a sample of his best screengrabs, Jörg Klingenfuss finishes this volume by providing many more additional details, like guides to common acronyms, languages, names and target area abbreviations, clandestine stations, and much more.

In conclusion, this remains the most comprehensive guide currently available, and it looks set to remain the go-to gold-standard reference for many years to come in our ever-changing world. Essential, accurate, reliable and highly recommended, indeed.

Buy back issues and archive CDs at www.mymagazinesub.co.uk/practical-wireless



178 KLINGENFUSS.CRG · 2025/2026 GUIDE TO UTILITY RADIO STATIONS

9286.0	'XSS'	DHFCS Forest Moor, GBR	ALE: 24 h tfc
9305.0 - 9355.0	Region 1 = FIXED + Radiolocation Region 2 = FIXED Region 3 = FIXED + Radiolocation		
9323.0		ATSN Alice Springs, NT, AUS	SSB
		ATSN Casino, NSW, AUS	SSB
		ATSN Kununurra, WA, AUS	SSB
		ATSN Mareeba, QLD, AUS	SSB
		ATSN Perth, WA, AUS	SSB
		ATSN Shepparton, VIC, AUS	SSB
9346.0	RDL	CISN Vilyeyka, BLR	FSK 50 Bd: 0645-2000 tfc
			CW
9348.0		Digital data station	FSK 50 Bd: 1748+1923 tfc
9355.0 - 9400.0	FIXED		
9360.0	VMS 469	RRD Alice Springs, NT, AUS	SSB
	VMS 469	RRD Charters To., QLD, AUS	SSB
9373.0	RMP	CISN Kaliningrad, RUS	CW
9375.8		NATO digital data station	STANAG 4285: 2008 encrypted tfc
9380.0	VKE 237	HFRC Alice Springs, NT, AUS	SSB
	VKE 237	HFRC Cobar, NSW, AUS	SSB
	VKE 237	HFRC Sapphire, QLD, AUS	SSB
	VKE 237	HFRC Wiluna, WA, AUS	SSB
		Digital data station	FSK 75 Bd: 1200-2001 tfc
9393.3		NATO digital data station	STANAG 4285: 1620-2000 encrypted tfc
9396.8		NATO digital data station	STANAG 4285: 1620+1718+2000 encrypted tfc
9400.0 - 9500.0	BROADCASTING FIXED		
9413.0		Digital data station	FSK 50 Bd: 0110+0909+0951+1931 tfc
9448.0		Digital data station	FSK 50 Bd: 0951+1526 tfc
9462.0	WGY 9..	many FEMA stations, USA	SSB
	'FC_FEM' 'FM_FEM' 'FR_FEM'	many FEMA stations, USA	ALE: 24 h tfc
9476.0		Digital data station	FSK 75 Bd: 1750 tfc
9490.3		Digital data station	CHN 4+4: 1402 tfc

The Klingenfuss 2025/2026 Guide to Utility Radio Stations (GURS)

The second title under review here is the *Klingenfuss 2025/2026 Guide to Utility Radio Stations*. The GURS also incorporates the 41st edition of the *Guide to Radioteletype Stations*. Its format is the same as the above 2025 Short Wave Frequency Guide, and it weighs 762g. Its pages are varnished and there are 544 of them – which is the same as last year's guide. This is the 33rd edition, with an illustration of the Solar Cycle Maximum on its cover. Solar Cycle 25 also forms part of the general introduction to this guide.

Here, as throughout the other Klingenfuss publications, the point is driven home that Short Wave remains an irreplaceable wireless communications tool. And an inherently anonymous, terror-proof one, I might add. Statements like these are not just part of a Klingenfuss sales ploy; they merit repeating, especially in the world of data communications, which accounts for a whopping 77% of the HF bands, compared to a mere 22% for both amateur radio and broadcasting (GURS, p. 8).

The preparatory section here (pp. 3-52, Sections 1-3.2.2) is almost identical to the one in the SFG (pp. 9-51, Sections (1-2.11) except for some of the screenshots. If you only buy the GURS, then, once again, the preliminaries do merit close reading. Here you have almost a short textbook on data transmissions on HF in itself. The frequency listing itself begins on p. 53, with 20.0kHz (Fixed and Mobile) and ends on page 274, at 30,000kHz (Various Services). Bookended by these, you will find the most comprehensive HF data stations listing imaginable, in ascending order of frequency and organised by Frequency, Region, Callsign, Station ID, and Modulation. You can find sample pages here:

www.klingenfuss.org/utility.htm

The main list is followed by an alphabetical country list of utility transmissions from Afghanistan to Zimbabwe and many useful resources on IDs and callsigns; there is also a compilation of meteorological WEFAX and RTTY (my favourite) and digital data and NAVTEX signals. Section 10 (pp. 365-481) contains screen grabs of many of those digital data stations, such as HFDL. For me, this part simply constitutes a highly enjoyable visual reference and educational resource. If you need more screenshots, check out the separate Klingenfuss offers (see below).

The final sections of the GURS offer valuable reference materials on general matters, such as abbreviations and acronyms, SINGPO and Q-Codes, the phonetic alphabet, the classification of transmissions and stations, the nature of emissions, and an A-Z of general terms and definitions, for when you need a little technical background. Frequencies of the Aeronautical and Maritime Mobile Services can be found in Sections 17 and 18. I enjoy monitoring those, so I often check out these later sections of the GURS first.

The 2025 Super Frequency List on CD
Worldwide HF Communication Today
Broadcast and Utility
MS Windows (English and German)
https://www.klingenfuss.org

The 2025 Super Frequency List on CD

Before I go, the *2025 Super Frequency List on CD* contains a wealth of international HF radio resources at a glance – including a full-text concurrent word search functionality via the F9 key. Try, for example, putting in 'Navy' or 'RAF' (in small letters) or searching elsewhere, by frequency, start time, station, country, modulation or language, using some of the other function keys. This CD is a joy to explore and use.

Due to a lack of space on the disk, the utility frequencies section omits reception times; the broadcast listing records them all, naturally. I would recommend that you check out the 'read-me' files on the disk before starting. You will also appreciate the other text files on this disk and the professional screenshots in the eponymous sub-directory ('Grafikdateien') made with top-of-the-range professional decoder programs, such as PROCITEC, WAVECOM, go2MONITOR, and a host of others.

Conclusion

What can I say: Jörg and his team have done it again! Buy these books and CDs and you will find that, not only do you now have the most up-to-date listings of global broadcast and utility radio stations in this Universe at your fingertips, but you will also learn about much more than simple frequency compilations: conspiracy theories about shortwave monitoring, the future of HF radio, the current solar cycle, the geopolitical quagmire that we are in at the moment – all these and much more gets a mention in these books, and deservedly so. Our hobby is not one you can undertake in isolation from others and world events.

Last but not least, do take a look also at the other offerings and bundles from Jörg Klingenfuss, such as the printed versions of the *'BC2025'* and *'UT2025'* databases, the Klingenfuss *Hot-Frequencies* webpage, the *Decoder Screenshots*, *CD Recordings of Modulation Types*, *2025 Frequency Database for the Perseus LF-HF Software-Defined Receiver*, and the *[Former] HF Utility Stations Database*.

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www.klingenfuss.org

Further information

Catalogue:
https://www.klingenfuss.org/catalogu.pdf
Hot Frequencies and Digital Data Transmission Screenshots:
https://klingenfuss.org/hotfrequ.htm
Internet-Controlled Software-Defined Radios:
https://www.klingenfuss.org/websdr.pdf
KiwiSDR: Wide-band SDR + GPS cape for the BeagleBone Black:
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The German, French, British? 'ham radio' set

Bernard Nock G4BXD gets his hands on a curious relic of WWII.

Bernard Nock G4BXD
military1944@aol.com

There is a line in the very watchable film *Ice Station Zebra* when **Patrick McGoohan** says *"Our British camera developed by our German scientists and your US film developed by your German scientists was in a Russian satellite developed by their German scientists"*. The important thing there, of course, being all the German scientists involved.

So, here we have a German made radio used by the French Secret Service based on a World War II British designed radio set. Indeed, this set is actually a development of a previous copy of the British set the Germans had earlier produced. The famous British set, the B2 as it was known, was the SOE mainstay in use during WW2 and was used throughout the occupied countries by SOE agents and resistance units.

B2M

From the excellent Crypto Museum website [**1**] the first copy, the B2M was codenamed MITCHELL. It is a spy radio set, developed in 1946 by Telefunken in Hannover (Germany), for use by intelligence services and Stay-Behind Organisations (SBO) in post-war Europe. The device was succeeded in 1952 by the similar ESK-52, which was worded as 'Amateur Radio Set' on the operating instructions.

The B2M is a clone of the British Type 3 Mark II, commonly known as the B2, albeit built with German parts. However, unlike the B2 – which consists of three separate units – the B2M is an all-in-one device. At the front panel, the individual units – transmitter, receiver and PSU – are separated by white lines. On the inside however, the three individual units are still visible.

Like the B2, the B2M comes with a set of plug-in coils for the various frequency ranges. The desired coil must be installed in the socket marked 'X' at the front panel. Unused coils are stowed on a wooden frame that is kept in the accessory compartment at the right. Other items that are provided in the accessory compartment are a screwdriver, Morse keys, headphones, spare valves and a spare vibrator pack and power cables.

ESK-52

It is this set, the ESK-52 that I shall look at here, a recent acquisition at the Military Wireless Museum here in Kidderminster. Again, from the excellent Crypto Museum site: The ESK-52 was a spy radio station, developed by Telefunken in Hannover (Germany) in 1952 for clandestine operations by the French intelligence services.

The radio was based on the similar Type 41, which was built for the German intelligence service, the Bundesnachrichtendienst (BND). Like the Type 41, it is actually a post-war replica of the British Type 3 Mk II (B2) spy radio set. For security reasons the ESK-52 was officially described in the documentation as Amateur Radio Set.

The ESK-52, Emphager Sender Kurzwelle, with 52 being the year, was used for many years during the Cold War by the French intelligence service. Although the radio officially had to be destroyed once it was decommissioned, it has miraculously escaped demolition. It is currently unknown how many ESK-52 sets were produced, but given the low serial number of our (CM) set (0059) it is likely that no more than 100 sets were produced. Today they are a very rare find.

Like the British B2 the equipment comprises a transmitter mounted at the top, a receiver below that and a power supply unit to the right. The design is based on the B2M, but contains a number of improvements, such as the absence of plug-in coils in the transmitter section. Although the ESK-52 consists of three units (RX, TX and PSU), they are mounted together in a single frame (and wired internally) that is built inside the suitcase.

The transmitter (TX) is built around two valves (tubes): a 6AG7 for the crystal-based oscillator (CO) and a 6L6 for the RF power amplifier (PA). The British B2 used an EL32 and 6L6 in its transmitter. The transmitter covers a frequency range of 3 to 16MHz, the same range as the B2, and produces an output power of 20W depending upon frequency. The transmitter is suitable for CW (Morse Code) only.

The metal encased 6AG7 is used as a standard crystal controlled Colpitts oscillator with the cathode being taken to the Morse key socket. The built-in switching selects suitable cathode capacitors and output coils taps for the various bands covered.

The 6L6 forms the power amplifier stage, it has its output coil built-in with numerous taps selected for the various bands operating in the standard Pi type of network. There is neutralisation provided to ensure stable operation across the ranges.

The B2 had a plug-in set of four reversible

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Fig. 1: The British B2 radio set.
Fig. 2: The B2M German copy.
Fig. 3: The ESK-52 radio set.
Fig. 4: Inside the ESK-52.
Fig. 5: Close up of the PA coil setup.

coils giving eight bands whereas the ESK has its output coil inside the case with switched taps for the different bands. Actual frequency of operation is by choice of a suitable crystal, which could be used either on the frequency marked or doubled up, a 6MHz crystal doubling to 12MHz output frequency at the antenna.

As the transmitter of the ESK-52 can only be used for CW, an improved version, known as the ESK-632 was released in 1954. A modulation amplifier using an ECC81 was added to the transmitter, allowing the connection of a crystal microphone in order to produce control grid Amplitude Modulation of the output stage.[**1**]

The superheterodyne receiver is built around four valves: 2 x ECH42 and 2 x EAF42. The British B2 used 7R7 and 7Q7 types in a similar four-valve superhet configuration. It has the same frequency span as the transmitter (3 to 16MHz), divided over three ranges (3-5.5, 5.5-7 and 7-16MHz) with an IF frequency at 470kHz, the same as the B2. Tuning is through a fisheye lens to a numbered scale and cards were used with pre-marked frequencies and the corresponding tuning dial number to make for easy use.

In an operational context, the ESK-52 was supplied with a frequency table that was used by the operator to determine which channel to use on certain days and times. Several blank frequency tables were provided for 'future' use by the operator. The tables were supplied in a transparent plastic sleeve **(Fig. 6)**.

The receiver is a standard superhet design, an ECH42 triode hexode is used, the local oscillator using the triode section and the hexode section mixes the local oscillator signal with the incoming RF signal to produce the 470kHz IF frequency. An EAF42, single diode variable-μ pentode with a common cathode, is used as the first stage of IF amplification, the diode section not being used in this stage.

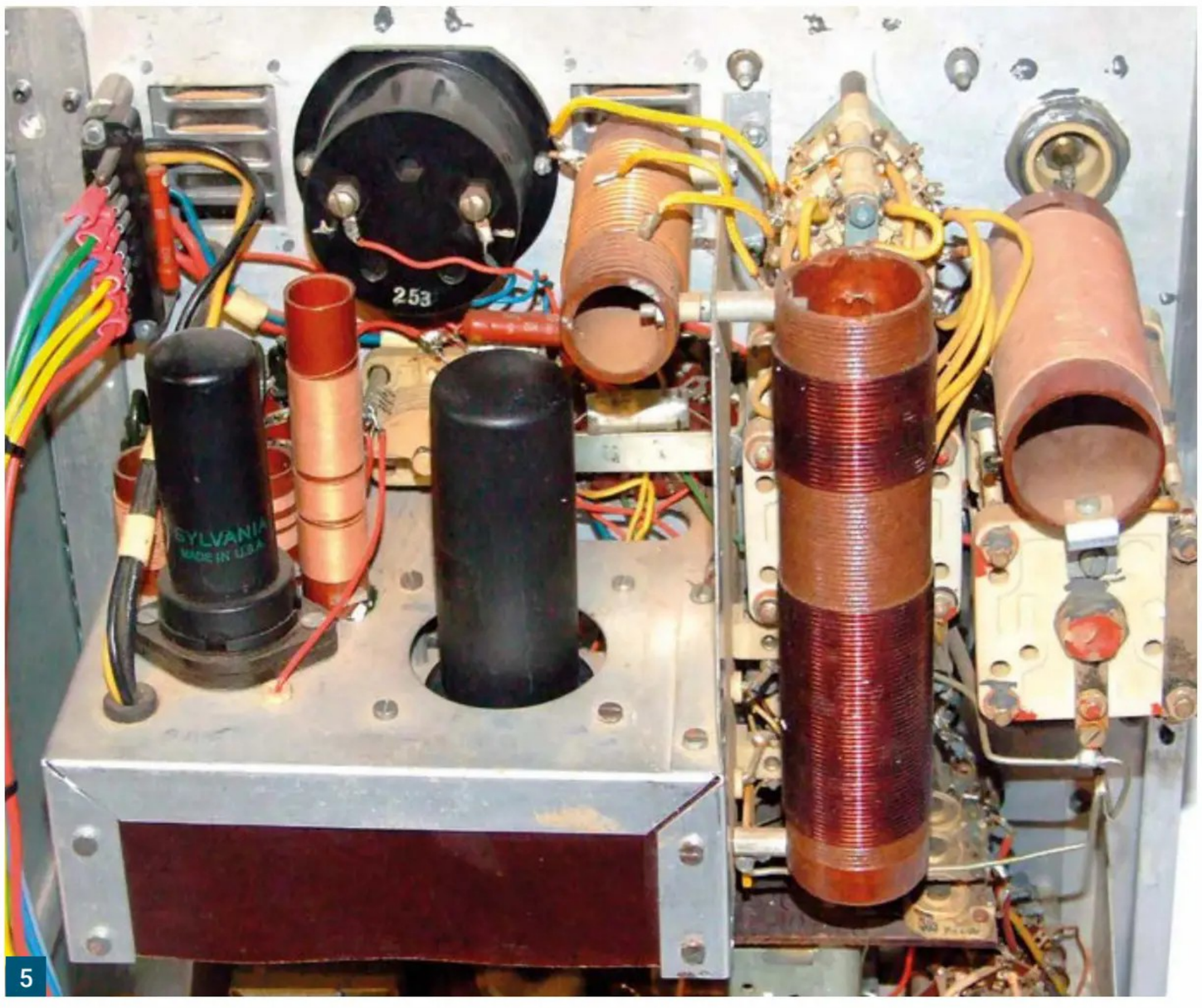
A second ECH42 is used as the second IF amplifier with the triode section forming the BFO circuit, the set having a BFO on/off switch and a tuning control. A second EAF42 is then used, the diode section being the audio detection diode while the pentode section is used as the audio amplifier driving an output transformer supplying audio to the headphones.

The Power Supply Unit (PSU) is mounted to the right of the transmitter and receiver and is internally wired to the other two units. The original design of the set had the three units connected with plugs and sockets but the example I have has had the three units hardwired to each other.

2

3

4



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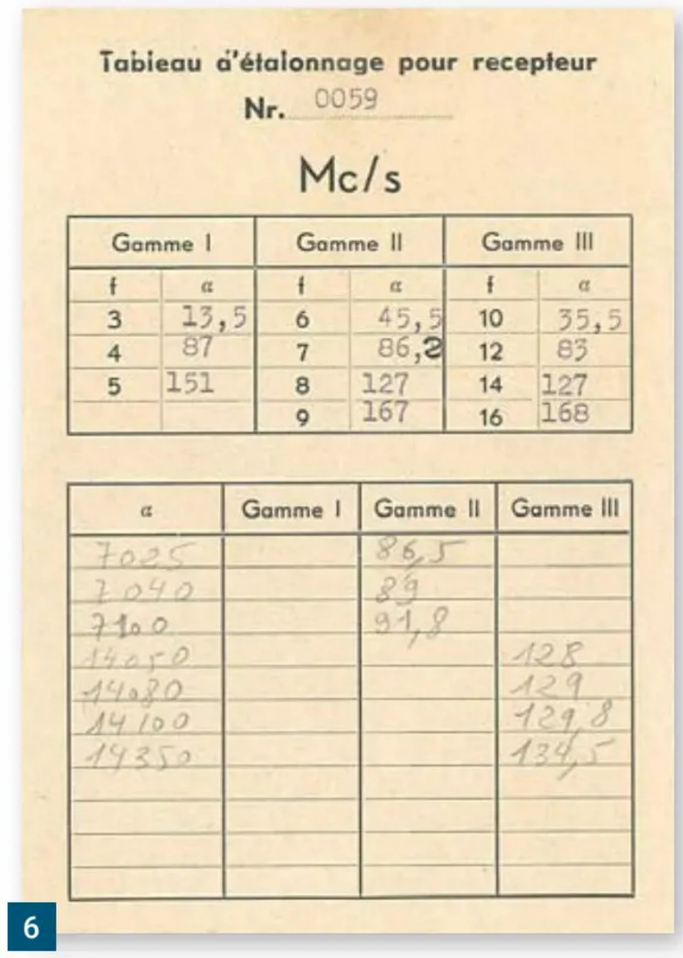


Tabieau d'étalonnage pour recepteur

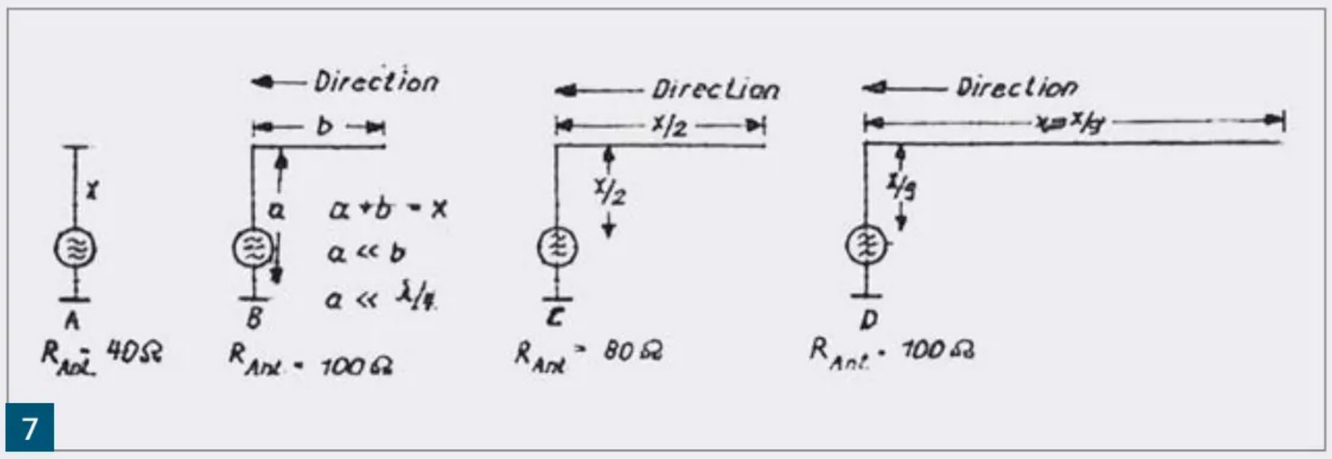
Nr. 0059

Mc/s

Gamme I		Gamme II		Gamme III	
f	a	f	a	f	a
3	13,5	6	45,5	10	35,5
4	87	7	86,2	12	83
5	151	8	127	14	127
		9	167	16	168

a	Gamme I	Gamme II	Gamme III
7025		86,5	
7040		89	
7100		91,8	
14050			128
14080			129
14100			129,8
14350			134,5

6



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8

Fig. 6: The operator's frequency chart.
Fig. 7: The various antennas discussed.
Fig. 8: What it will look like in the case.

The PSU is suitable for a wide range of AC mains voltages (90 - 230V), but can also, as in the B2 set, be operated by a 6V DC battery. In the latter case an electromechanical vibrator is used to convert the 6V DC into the HT voltages needed by the set.

The standard transport method for the ESK-52 was a cardboard suitcase of the period. It has a large storage compartment to the right of the radio set, in which all the accessories, such as the Morse key, the headphones and the antenna wires are kept. Also in this compartment are the spare values, fuses, a mains lamp adapter allowing the set to be plugged into a standard light bulb fitting and maybe a small screwdriver etc.

There was a pouch or pocket inside the suitcase lid which held the operating instructions, in French, and a technical manual with circuit diagrams. The documents were apparently entitled 'Amateur Radio Set' to hide its true purpose.

I am still searching for the correct connectors for the AC and the DC inputs plus a suitable suitcase. In the meantime, I shall be carefully applying some volts to the set while diligently monitoring the various stages in an attempt to bring the set to life and see if it will result in a secret QSO after all these years. Hopefully I can bring you news of the results in the near future.

Antenna

The User Guide supplied with the radio describes various antennas. It states (excuse my French translation skills): The study which is attached to the present note gives four antenna types that may be used.

Type A. Gives a circular emission for medium range varying from 500 -1000km. (For a frequency of 8000kc/s, we find on curve A a length of wire of 9m to be used with the set.)

Type B. Clandestine par excellence, L reverses whose base 'b' will be larger which 'a' will be much less than 1/4 wave. (For a frequency of 7Mc/s we find on curve B a length of wire of 12m, the wavelength being approximately 43m, l/4 is 10m 75. We can therefore predict 7m for base 'b' and 5m. for 'a' (length significantly less than l/4 i.e. 10m 75) This slightly directional antenna has a radiation whose effectiveness is substantially equal to type A.

Type C. Antenna whose reflection is superior to that of type b The orientation effect of x/2 is slightly significant. The energy gain on type A is evaluated between 10 and 20%. in any case, we are assured of a range superior to type A.

Type D. Antenna with the best reflection by far and this thanks to the direction that will be assigned to it. The energy gain on type A is estimated between 60 - 80%. A disadvantage that depends on the state of the ground - if it is too dry or too wet, there is a risk that the energy will be dissipated in another direction (beat of 30-40 degrees on 4 points

As with the British B2 during the war, the book is all well and good but when trying to operate covertly you simple throw out the longest, highest bit of wire you can in the hope of contacting base whilst not being spotted. This could be a challenge but will be good fun for sure. **PW**

References

Crypto Museum
www.cryptomuseum.com/index.htm

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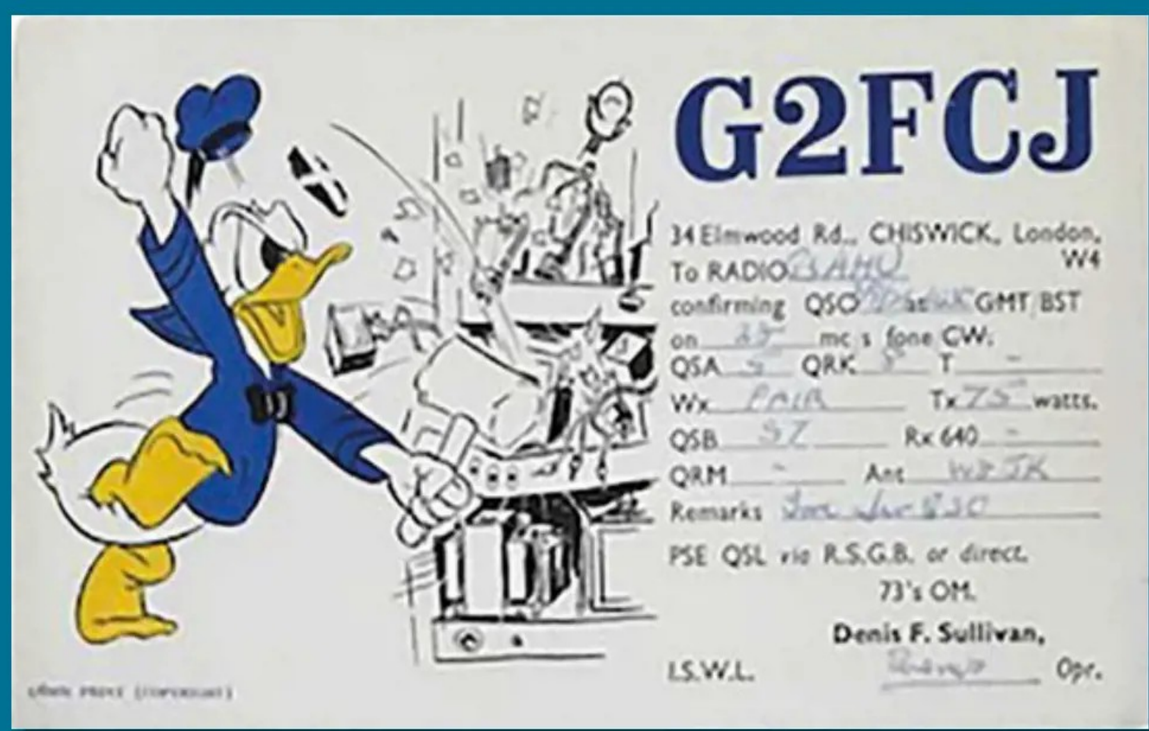
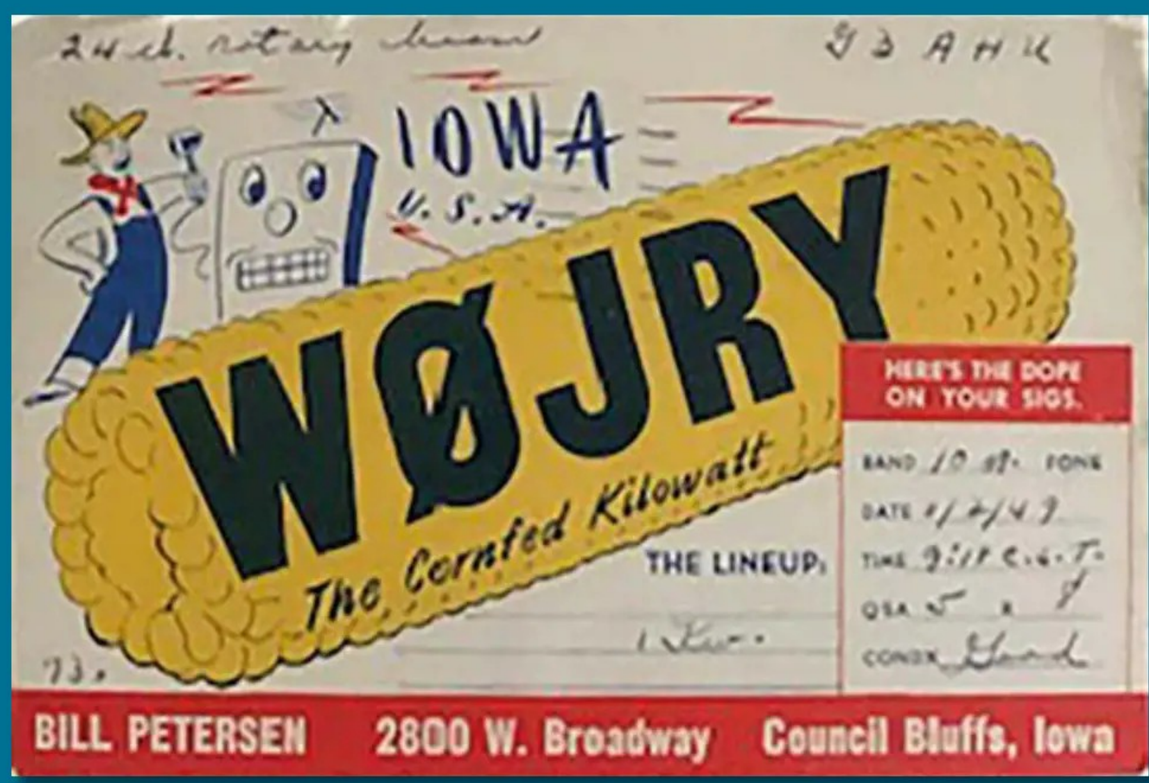
g4owy6@gmail.com





Paper QSL Cards in Memoriam?

Ray Howes G4OWY uncovers some of the early history of QSL cards.

Who was the first person to put a pen to a piece of card to validate a radio contact which morphed into what is now known as a QSL card? Well, **William Edward Frederick Corsham** is often credited with printing the first QSL card in January1922. The *British Amateur Radio Association,* had published an obituary corroborating the fact. Corsham, then a member of the *Amateur Radio Research Association* and the *British Wireless League* (not to be confused with the *Amateur Radio Relay League,* an American ham radio organisation), was actively engaged in the military with all things radio. So, he would have been an ideal candidate to cotton on to the concept of the QSL card to verify communication links with other like-minded people.

Whether it was Corsham who touched the finishing line first, or maybe someone else beat him to the tape is open for review. A fellow radio American hobbyist, **Don A Hoffman 8UX**, had sneaked in sometime during 1919 (coincidentally, the year of my late father's birth). At that time, Hoffmann lived in Akron, Ohio (the one-time rubber capital of the world. Headquarters of the likes of *Goodyear/Firestone*). A retired Lieutenant Commander in the U.S.N Reserve, and an 'accomplished artist', he'd also contributed regularly to *QST*. His artistic skills no doubt gave him a leg-up with a 'suggestion' of a QSL card. Hoffman was given credit for it in a 1919 issue of *QST* (as 8ADU). A fellow ham commented that a *"note on Don's QSL card stated that he was the Originator of the QSL card fad"*, also noting that there had been other claims. It seems then, that Hoffman wasn't the first person to come up with the original idea of a QSL card. Though it appears that he was the first person to design and print an actual QSL type card, rather than its 'Originator'.

Further along the path, it transpired that a 'radio signal' response had been confirmed and documented in 1916. Sent via a postcard, it confirmed that a contact had occurred with 8VX (**W T Fraser**), in Buffalo, NY, and **Edward Andrews 3TQ** then living at an address in Philadelphia, USA. Andrews later sent a letter to *QST* magazine detailing his surprise at receiving a record of their communications via the postal system.

3TQ, commended the *"spirit of unselfishness that is quite evident in Mr Fraser and others who send cards which tell of receiving the signals of a fellow amateur"*. He was obviously surprised that someone *"would go the trouble and expense of having a postal printed to inform those whose signals he hears"*. Such a thing, *"goes toward aiding the perfection and inspiration of amateur work"*. Thinking it a very good idea that the ARRL and the readers of *QST* be asked to consider using the 'postal method to notify' contacts with other amateurs. What had actually initiated Andrews' excitement and his subsequent letter was the fact that he'd been informed that his signals had been heard loud and clear 400 miles distant - *"accomplished with 1.4kW"*. He had *"felt somewhat elated"*, and presumably overwhelmed?

The introduction of Q-codes

Although Q-codes had originated in the UK in 1912 at a London Radiotelegraph Convention, they'd previously been suggested at a Berlin International Radiotelegraph Conference in 1906. Come 1909, the British Government developed a List of Abbreviations (beginning with a 'Q') for shipping and coast station telegraphy use. At the International Radiotelegraph Conference held in the US State of Washington during the latter half 1927 the General Radio and Additional Radio regulations pertaining to radio services were modified for maritime, amateur radio, commercial broadcasting and fixed radio station use. The amended frequency allocations were subsequently assigned to all representative countries. Q-codes would become the de facto method for all commercial communications telegraphy traffic - including amateur radio operators, who gradually picked up on the idea to copy the innovative use of Q-codes then being used by commercial telegraphists. In passing,

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putting aside radio contest activities, I've never really understood why it is that Q-codes are habitually used on HF/VHF/UHF phone? Why use CW lingo when there is a perfectly adequate language to express ourselves during an on-air phone conversation. It's unnecessary when band conditions do not necessitate the use of Q-codes. Anyhow, not everyone was overjoyed at the emergence of QSL cards. In the luxury of hindsight, it seems ridiculous why anyone would not applaud it. But some ham operators thought otherwise and had voiced their concerns.

A voice of dissent

One such vocal dissenter was **Harold S Pyle 8ST**. He'd written an article (appropriately entitled: *The Amateur DX Report Card. A Study of the International Fad That 8UX Started)* published in a September 1924 issue of *QST,* explaining that he was not totally against the idea of QSL cards, but did have misgivings. Commenting, that the *"majority of amateur DX report cards have many faults"*. And to avoid *"cheapening your card with a display of vaudeville humor"*. And 8ST was none too keen on his fellow hams *"plastering the station walls with report cards"*. As QSL cards became popularised, it appears that 8ST's cautionary advice about 'vaudeville humor' had fallen on deaf ears. Many cards at that time began to feature outrageous and whimsical depictions that would have surely had Mr Pyle throwing up his hands in despair.

Using post cards

During the 1920's of course, other than telephones, conversations in homes, at work or on a street, radio was the only way that most people could connect with each other in real time - unless you had access to ham radio equipment, that is. As postal systems expanded globally during the late 19th century, particularly in the US and Britain, which at that time had coincided with a huge interest in public radio broadcasting (and ham radio), Post Offices provided an ideal conduit for hams to connect with their fellow radio hobbyists utilising handwritten post-cards as reception report confirmations. Postcards went beyond their primary function as a link to enable the public to keep in touch via the mails, these cards would be eagerly adopted by the ham community as a convenient 'QSL card'. However, in the 1920's, American hams sending a postcard to an address in the US cost 1 cent (for a couple of years or so starting 1925 it cost 2 cents. In the UK, 1 Penny for inland post). So, sending lots of 'QSL cards' may have been seen as an expensive option? And given the fact that during that era in the UK and the US, disposable incomes were not overly generous, firing off QSL postcards to all and sundry was perhaps the preserve of the wealthier ham?

But during those halcyon days, signal reports were the primary reason for sending/receiving QSL cards. The geographical spread of a ham-radio signal was an unknown.

The reason then, why 3TQ was so overjoyed to have received a postcard report from a *"fellow amateur"* informing him that his signals had spanned *"400 miles"*. Before the idea of using a postal card as a QSL became commonplace, handwritten letters were the accepted way to send a reception report to a fellow operator. As ham radio gained more traction, writing letters with

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the details of a contact and so on began to be a drudge and time consuming, letters were dumped in favour of postcards. Cheaper too. Hence, were embraced by everyone. Many of these early letter and postcard type of QSL's are a nostalgic record of the bygone days of amateur radio (aside from the generic type, some are works of art). More importantly, they document and highlight the remarkable odyssey of those who pioneered the so-called 'useless short-waves'. The rich tableau of these evocative paper mementoes aptly demonstrate that they are (and continue to be) historic documents, and should be cherished as such. The odd thing is, in purely monetary terms, they ain't worth much.

QSL cards at auction

Occasionally, I come across QSL card collections (old or otherwise) while attending philatelic auctions. Sometimes I buy the QSL cards rather than the stamps. And as noted, more often than not they are sold for a pittance. I do recall (must have been about 15 years ago) however, that one such lot of QSL cards (with other related ephemera), sold for nine hundred pounds or so. Everything in this lot contained Pitcairn Islands material. Many cards featured **Tom Christian VR6TC/VP6TC** and his wife **Betty VR6YL/VP6YL** plus other VR6 (including **VR6AC Floyd McCoy**) operator cards. Two original QSL cards (one signed) from **Andrew Christian VR6AY** (the first ham operator on Pitcairn) were included. Plus books, various letters, photographs and so on. And VP6PAC cards (Pitcairn Amateur Radio Club). A treasure trove of all things Pitcairn. This lot was bought by an American buyer. I was the underbidder. Oh, and various details about the radio broadcasting business from this remote volcanic outcrop in the South Pacific Ocean. For instance, in 1939, a NZ ham, **Nelson Dyett ZL2FR**, whose wife happened to be a Pitcairner, had taken his ham gear to the island where later, this and other equipment was installed by the NZ Navy for shipping communications.

This station was first identified using Dyett's call-sign VR6AA. Later, in 1944, yet more radio equipment was transported to Pitcairn, courtesy again, of the NZ Navy. This station was given the call-sign ZKG. A meteorological weather forecasting station had been installed a few months later using the callsign ZBF exclusively for weather information. More shortwave equipment arrived in 1952 and the callsign changed to ZBP for Pitcairn Radio. This station was intended to be used for radio broadcasts to cover most of the South Pacific area. During 1961, 1962, 1966 and 1985 (in 1938, a couple of program broadcasts from VR6A/VR6AY/PITC occurred via a US/California NBS relay. Cards from that era show the location of Pitcairn and the radio equipment used), more attempts were made to put Pitcairn on the radio broadcasting map. But other than the broadcasts that were put skyward to test the viability of a public radio broadcasting service from Pitcairn, a permanent radio broadcast station was shelved. QSL cards are extant from the early radio broadcast service viability tests - but few and far between. Maybe there were some in that Pitcairn treasure trove I mentioned earlier?

A gradual change to electronic verifications

As time went by, with more and more amateur radio hobbyists finally embracing the use of Q-code abbreviations, the writing out of laborious handwritten reception and/or transmission reports, became a thing of the past. It was a no-brainer. After all, commercial telegraphists had been utilising Q-codes since 1909 - for shipping and coastal radio stations, they were a vital component for reliable communications. Q-codes would serve yet another useful function too. These codes would usher in a convenient method to overcome the barrier that existed between operators who spoke different languages. The public at large also reaped an unexpected reward. Shorter messages were far cheaper to send. And now that Q-codes had been universally adopted by hams, they became permanently imbedded into ham radio operational folklore.

Although QSL cards are still indispensable for verification purposes, the traditional printed card now has a popular adversary. The eQSL. Created during the late 1990's, the electronic form of the QSL card would, however, provide advantages.

One of which is the exchange of QSO confirmation in real time - no need to spend time writing out paper based QSL cards and posting them off to a QSL manager with the appropriate SAE's. This task can now be done via a computer keyboard. All relevant QSO info can be entered, recorded and stored in a database for subsequent retrieval. And now that eQSL's have captured the high-ground (a godsend for radio-sport devotees and DX award hunters), it staggers the imagination of just what can be accomplished with all that data mined from on-air contacts. A scenario way beyond the avarice of 1920's ham radio operators. Anyhow, putting aside the inherent problems of maintaining a raft of QSO digital data and organising it (the ability to file every past and future QSO for instant recall), does the advantages of an eQSL outweigh the thrill and anticipation of receiving a personally handwritten QSL card through your letterbox, other than an e-mail box or some other electronic wizardry of your choice?

Personally, I don't think so. On the plus side though, unlike yesteryear when contact confirmation via a piece of card sent via the postal system (later, a 'QSL manager') was the only option, we now have the best of both worlds. Write them out or digitise them. But the sad thing is that as the eQSL gains more momentum, the paper-based version will inevitably be discarded. As yet more QSL reports continue to be fashioned from electrons rather than paper, can we dare hope that a quiet solemnity is afoot concerning the likely demise of the traditional paper based QSL cards? These cards are a testament to a time when ham radio was still in its embryonic stages, where experimentation and discovery were like magical experiences for those then engaged in the expertise of radio.

Paper QSL cards are the real deal. A mirror to those long-lost days when hams were engaged in the experimental wonders of radio, which ultimately transformed the landscape of RF communications for ever. Not merely a record of our past achievements, but a tangible thing that physically connects us to all those past tinkerers and experimenters - the shoulders of whom we continue to stand upon today. **PW**

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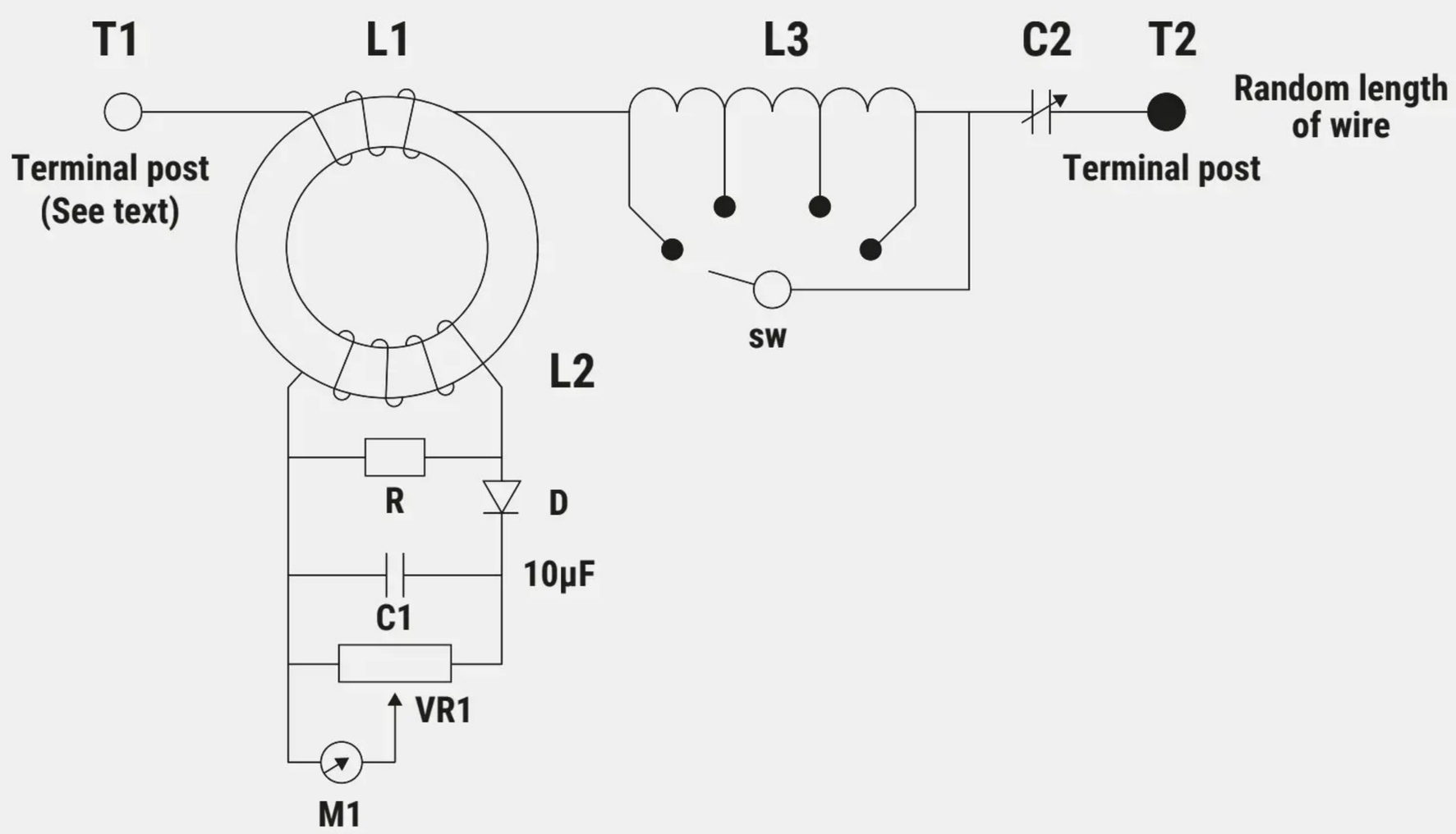

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Dr Colyn Baillie-Searle GD4EIP
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Revisit the Earth Tuner

Colyn Baillie-Searle GD4EIP revisits a circuit from a 1990 issue of PW.

When visiting amateurs, the subject of how to earth equipment frequently arises. It is then time to look at how the station is wired up. Most often the transmitter is connected to an antenna tuner unit (ATU) and then to an antenna, but seldom is there a wire from the earth terminal on the set or antenna tuner going to an earth rod. I then explain that they must have two earths, one safety through the mains supply, which is the three pin mains supply plug, and then a separate RF earth. What is an RF earth? In general, it is a wire connected to the last piece of equipment going to an earth rod in the ground. If a station is on the ground floor, then all they require is a short wire through the wall of the building into a copper earth stake in the ground. This is an ideal situation but most of us are not fortunate to have a shack close to the ground floor. With other stations it could be upstairs like mine, which can cause a problem as a length of wire down to an earth rod in the ground could resonate on one of the operating frequencies and thus there could be RF in the shack, which is not ideal. I did have a wire going out of my window to a rod in the ground and I had RF in the shack then one day, holding a metal mic stand I felt RF, it felt warm to the touch. I realised that I had a problem so the Earth tuner was designed. I called it Earth Tuner as I thought I was tuning my RF earth wire, but I suppose it could be called a Counterpoise Tuner or, as MFJ called it, Artificial Ground. Basically, it does not matter what it is called as long as it tunes a length of wire to resonance.

How it all started

My shack is on the first floor of an old cottage and one morning while I was transmitting on 80m I felt a tingle and a warm feeling on my hand from the metal mic stand I was using at that time. I thought it must be RF. I needed to get rid of this RF thus I thought a quarter wavelength of wire acting as a counterpoise might do the trick. So, I worked out a quarter wavelength of wire for 80m and connected the one end to the earth terminal on my antenna tuner and the other end out of the window. Problem solved.

Once I had completed the QSO I then considered putting out a quarter wavelength of wire for each band, but that was not practical as having a bunch of wires dangling out of the window would not look very nice. Therefore, I thought if I could resonate a random length of wire to look like a quarter wave for each band, then that should solve the problem.

When capacitive reactance of a capacitor is connected to an inductor of inductive reactance in series then at a particular frequency, called resonant frequency, the resultant impedance is due to the resistance of the inductor wire alone, which will be very low.

In a series circuit consisting of a resistor R, inductor L and a capacitor C then when the reactive components are equal and cancel each other, only the resistance of the wire is seen in the circuit. Below shows the basic Maths for this combination (and see also **Fig. 2**):

Inductive reactance $XL = 2\pi f_L$
(f in Hz, L in Henrys)

Capacitive reactance $X_C = 1/2\pi f_C$
(C in Farads)

When $X_L > X_C$ $Z = \sqrt{(R^2 + (X_L - X_C)^2)}$

When $X_C > X_L$ $Z = \sqrt{(R^2 + (X_C - X_L)^2)}$

When $X_L = X_C$ $Z = \sqrt{R^2} = R$

The condition Zin =R is called series resonance and current is a maximum due to R only.

In 1990 *Practical Wireless* published my article on the Earth Tuner [**1**]. In 1992 MFJ used the design and brought out their Artificial Ground. A Swedish amateur, SM6AQR published the circuit from *PW* and claimed he designed it but that was published in 2008. MFJ have stopped trading now and I thought it would be a good idea to revisit the original article in order that amateurs can build their own from parts in the junk box. **Hans PA1HR** [**2**] has built one from the *PW* article and has made a very nice job of it. Since my original article was

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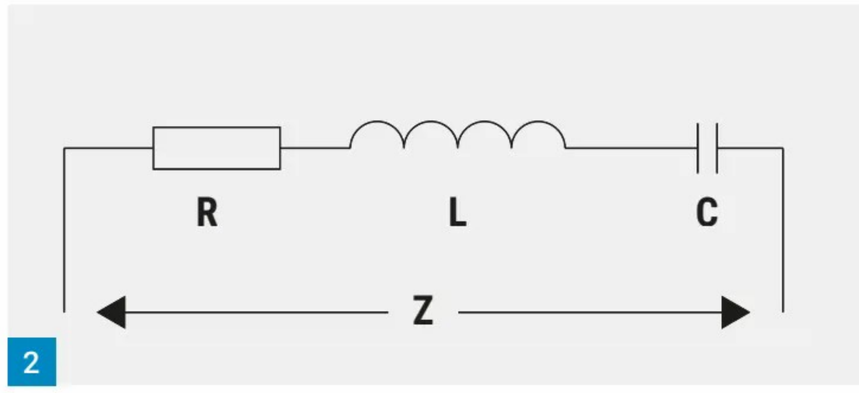

Fig. 1: Circuit of Earth Tuner.
Fig. 2: Terminology used in formulae.

published, I am aware of a number of amateurs who have built them and are very pleased with the result.

I constructed the circuit on a small table next to the window with a capacitor to hand and a B&W inductor which I had in my junk box. I then needed a method to measure the current in the wire so with a small toroid, a simple current sensor was made and I was able to tune the random length of wire with the aid of a crocodile clip attached to a short length of wire to a tap winding on the inductor. Then in conjunction with the capacitor I was able to resonate the wire for maximum deflection on a meter indicating that the RF was down the wire and there was now no RF on the mic stand.

I tried attaching different lengths of wire from this hook out of the window but it did not seem to matter what length I used as I could tune it with the series inductor and capacitor circuit. Today I use a 3m length of ordinary wire going out of the window down the wall and taped off at the end.

Final circuit

So, let's look at the final circuit, which consists of a current sensor, switched inductor and a variable capacitor which I am sure one can find in a junk box, **Fig. 1**.

I will start with terminal T1, which is an insulated terminal post. This terminal post must be insulated from the chassis. There is usually a terminal lug to solder wires to it on the rear of the terminal. From the lug, a wire is soldered to the primary L1 of the current sensing toroid. The toroid I used was a Fair-lite FT50-43 but any small toroid from old amateur equipment should work. Often one can come across them on old computer boards. The primary consists of 3 turns and the secondary 20 turns. The gauge of the wire does not have to be very thick as it is not passing large currents. The secondary is connected across a resistor which controls the sensitivity. The larger the resistor, the more voltage is applied to the rest of the circuit; 100Ω or 150Ω will be satisfactory under most conditions. The diode D is a germanium diode type such as IN34. If you cannot get one, then a silicon diode will do, such as a 1N4148 but there will be a little more voltage drop across it in comparison to the germanium one. Capacitor C1 is 10nF, which goes across the variable resistor VR1.

VR1 is a 50kΩ linear type but other values will work as its purpose is to alter the deflection on the meter, which is a 100μA. The other end of L1 is connected to a coil L3, of 12 turns wound on a diameter of about 2in with a connection every second turn, so there will be one connection where L1 connects to the coil L3 and then every second turn from that first one. There should be 7 or 8 tapping connections. Connect wires from a rotary switch SW with at least 10 positions to each tap of the coil L3. The common terminal of the switch is connected to the rotor of the capacitor C2. The capacitor C2 must be mounted so that the stator is fastened to the chassis. The end of inductor L3 is now soldered to the rotor plates of the capacitor. Finally fasten a terminal at the rear of the chassis but this terminal is not insulated from the chassis and with the aid of an Ohm meter check that this terminal is connected to the chassis. At the same time check that the input terminal is insulated from the chassis. The Earth tuner is now complete.

Operation

Every piece of equipment has a terminal for an earth wire but if you are using a linear and an ATU, the coax screen between each piece of equipment is technically connecting the chassis together, therefore one only one external earth point is required and that will be from the last piece of equipment in use, which could be the ATU. Attach a short length of wire from this ATU or the last piece of equipment in the circuit to the insulated terminal on the earth tuner.

Then connect any length of wire, I would suggest at least 3m but it does not matter if it is longer than that, to the other terminal. This wire will act as the earth or tuned counterpoise, which can basically go anywhere.

Now the earth tuner is ready to use and it has to be tuned for each band. This is done by switching on the transmitter and while transmitting rotate the switch SW to obtain maximum deflection of the meter M1. Finally, rotate the capacitor to obtain final maximum deflection. The earth tuner is now working and any stray RF will be going down the wire which has been connected to T2. **PW**

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1. Practical wireless 1990.
2. **https://tinyurl.com/bdduyzjs**
3. José Luis Giordano, CA4GIO QST Vol.108, No.12, pp.30-32, December 2024.

News Extra

HUMBER FORTRESS CLUB: The Humber Fortress DX Amateur Radio Club MX0HFC has a club and social evening from 7pm every Friday at their club headquarters in Patrington Haven, East Yorkshire. For further information please visit the website: **www.hfdxarc.com**

HAM RADIO IRELAND, THE DIGITAL MAGAZINE, IS BACK: A popular online ham radio magazine is returning for readers in Ireland and around the world. *Ham Radio Ireland* is back. After a period of inactivity late last year, the free independent downloadable newsletter resumed online publication in late January.
Shortly after its creators launched its predecessor, the *Connacht Regional Newsletter*, in 2022, they realised it held appeal beyond its initial readership in western Ireland and it was renamed *Ham Radio Ireland*. Authors volunteered sharing their expertise on QRP, satellite operation, VHF/UHF, home construction, keyboard modes and other topics. According to **Steve Wright EI5DD**, editorial contributions eventually slowed to a trickle, making continued publication a challenge. By last September, production had stopped.
John Tubritt EI3HQB from *Collective Communications* and Steve Wright EI5DD are on the editorial team to revive the magazine in a new format. Initially the best site for downloads will be via the Facebook page of *Ham Radio Ireland*. Links will soon be available on other social media platforms.

HB9RG TROPHY CELEBRATES FIRST AMATEUR RADIO CONTACT VIA SATELLITE: AMSAT Switzerland has announced a special event and contest that encourages hams to make extreme long-distance contacts via amateur satellite. The event recognises **Dr. Hans Rudolf Lauber HB9RG** and his contribution to amateur radio. HB9RG and **Alfons Häring DL6EZA** conducted the first amateur radio contact via satellite on 10 March 1965. The event runs for two weeks, 3-16 March 2025. The ten furthest contacts will be evaluated.
https://www.amsat-hb.org
https://tinyurl.com/bdzhyjnu

FORTHCOMING EVENTS: The 24th Contest Club Finland DX and Contest Meeting takes place over the weekend of 4-6 April, starting with a cruise from Finland, with the event itself being held in the Tallink Spa & Conference Hotel, Tallinn, Estonia.
https://www.ohdxf.fi
The same weekend on 5 April, the 26th GMDX Convention & Dinner will be held at the King Robert Hotel, Stirling.
https://gmdx.org.uk/category/convention

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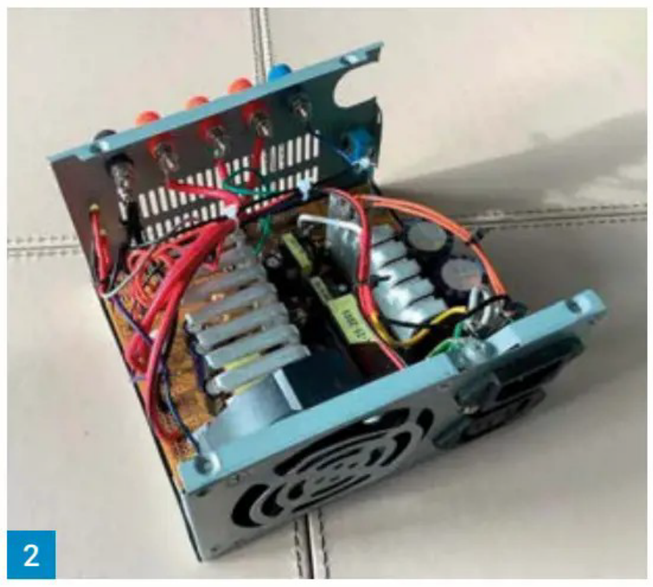
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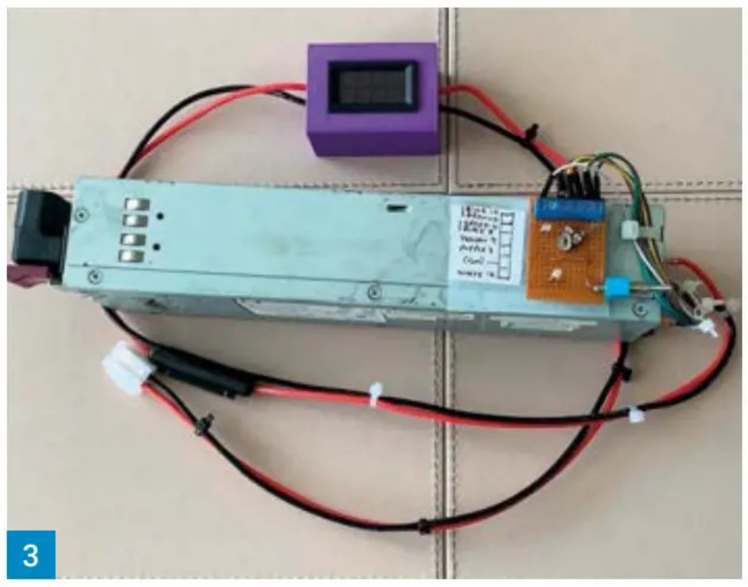
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Using an ATX

Tony Jones G7ETW describes how to repurpose an ATX or similar PSU for the shack.

If there is one thing we all need from time to time, it's a cheap PSU. I've been playing with some ex-PC power supplies, but they're due to leave me in a few days. Before they go, I'll share what I learned.

The first ATX

Fig. 1 was the start, a 'converted' ATX switch mode computer power supply I was given. This can provide 30A at 12V, which is impressive. With such computer-use SMPUs, RF optimisation was not a design consideration. Perhaps I was lucky, but I had no issues on HF.

That said, I've mainly used this to power a range of Chinese 2m/70cm mobiles, a CB I was mending and a Bluetooth class D audio amp. It's been good as gold.

The second ATX

For £5 I bought another ATX of the same make as the first one. I wanted to do the conversion mod myself and see how similar the boards were.

The photo, **Fig. 2**, shows my efforts. I additionally pulled out the minus 12V line, for things requiring a split rail, e.g. audio amps and op amps. Absolutely anyone who can solder could do this job, I say. There is lots of information on the 'conversion' process on the net. I won't recap it other than to say that if there is a fan, the 'minimum load' – typically a low value wire-wound resistor – which people used to add is not needed.

These two units show how much fans differ. The first one has a 125 mm 'silent' fan on top, and it is barely audible. The second one has a built-in smaller fan, and that's annoyingly loud.

12.2V is nice, and this exceeds the minus 15% (11.7V) low-voltage supply tolerance most radios are specified for, but 13.8V would be more useful and the original mod doesn't give that. People have done this, though. By dragging down the sense voltage on the PWM regulator chip, the duty cycle ramps up to compensate for what it thinks is a falling output and raises it. Or so the theory goes.

Well, yes. That makes sense, but whenever I've I tried that, the tiniest voltage lift causes over-voltage protection to kick in. Some PSUs just shut down, some go into an audible high-frequency oscillation. It's interesting that both PSUs put out 12.2V almost exactly. These things are exceptionally well regulated!

SMPS architecture can obviously deliver any desired DC voltage, so using an ATX as a jumping-off point and making design modifications to up the output is surely possible, but's that's not in the spirit of this common internet 'hack'.

So, *PW* readers, is there a way, a simple way, to get my 13.8V? Please let me know if you've cracked this.

A meatier PSU

I was talking about all this at the RNARS shack one day and a member offered me a spare HP server supply which was variable, he said, and could do huge amps. Naturally I couldn't resist that.

The photo, **Fig. 3**, shows the 'modified' PSU. Heavy and solid, just picking this up tells you that these things mean business.

Initially it did not work, but my friend's wiring did not inspire me, and sometimes things are going spare for a reason! I removed the fragile wiring and tried the PSU in 'as intended' mode. Result! 12.5V out, and a fan loud enough to scare the birds away!

I needed to make reliable connections to the 12-pin matrix in the front connector. I tried soldering to these tiny pins, and that worked, but my wiring looked no better than my friend's, and I thought I would be forever fixing this. I used Dupont connectors, familiar to anyone who does Arduino or breadboarding work. I was pleased with the result, **Fig. 4**.

Fig. 5 shows the 'circuit diagram' – like the ATX conversion, this is a wiring job really. With a 265Ω resistor joining pins 3 and 9, I get 13.8V. At much above 14.5V, over-voltage protection shuts the PSU down. In daily use I find 13.5V does me fine.

Grounding pin 4 slows down fan enormously

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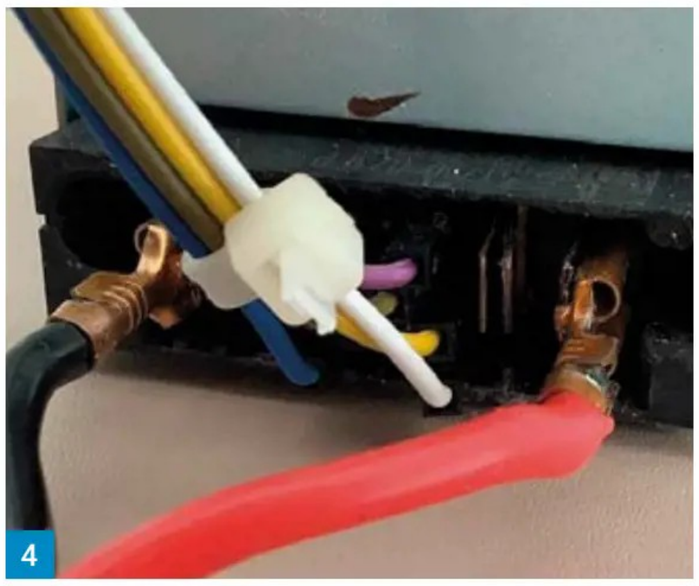

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Fig. 1: The author's first ATX.
Fig. 2: And his second.
Fig. 3: The HP server supply.
Fig. 4: Using Dupont connectors.
Fig. 5: Circuit diagram of the HP PSU.
Fig. 6: Meter wiring.
Fig. 7: ATX breakout board.

– this is essential. This is now acceptably quiet, but can run faster at high current draw if it feels the need.

The LEDs are '5V' types, with inbuilt smd resistors too small to see. They look white, but glow red. I use these with Arduinos and Raspberry PIs – they're dearer, but they save a lot of space on breadboard.

For the output connectors, some experimentation was required. I tried some heavy duty 4mm connectors, but the solder joints – being edge to edge –snapped off with any cable movement. The possibility of a 47A short circuit in a wooden shed made me very uneasy!

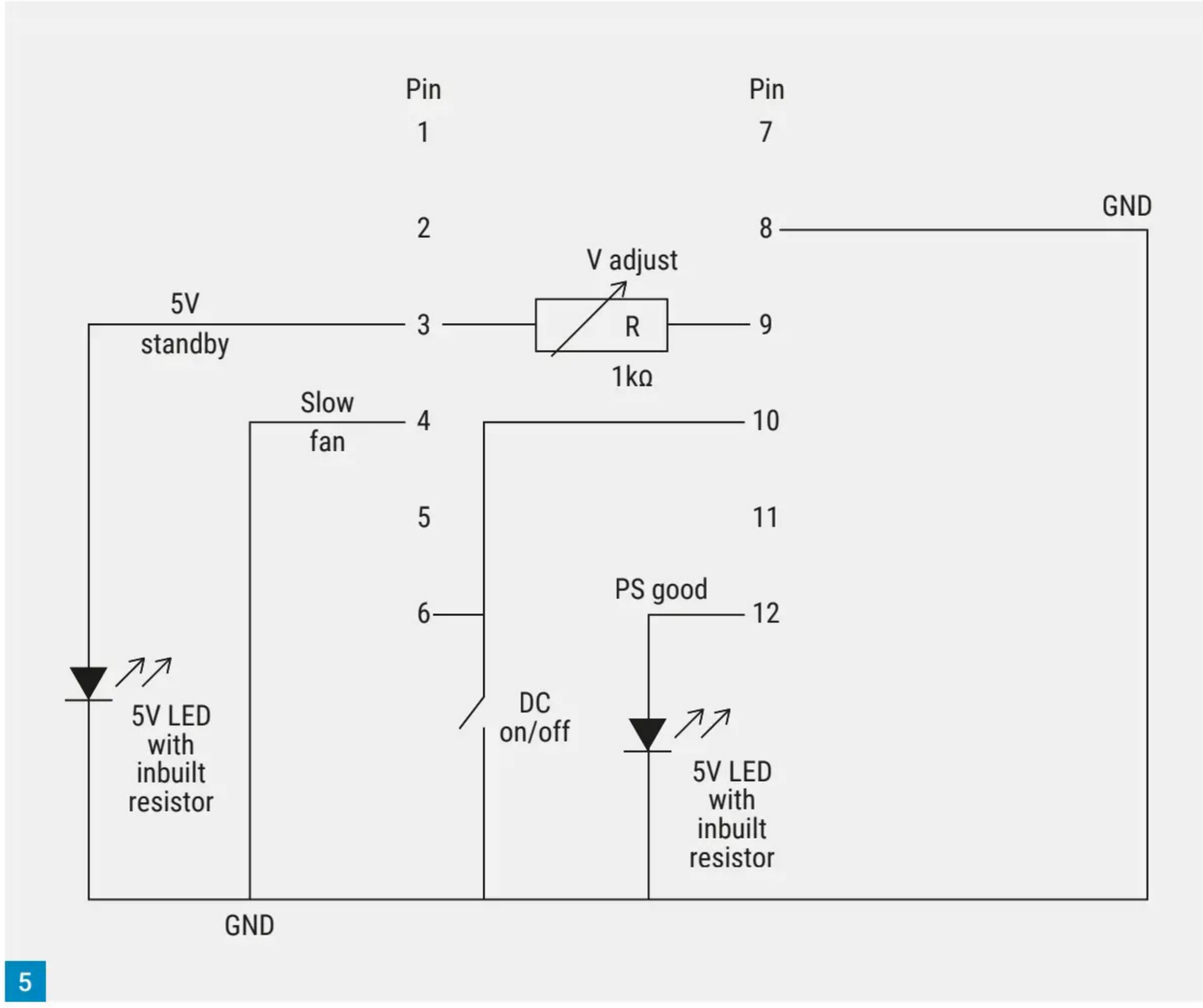
Direct cable connections gave no better results – I could not get a good solder anchor inside the connectors. Almost resigned to doing away with the front panel, I tried some 6.3mm spade connectors I'd been using to make fuse holders for blade-type car fuses, and these fitted perfectly.

Metering

These Volt and Amp meters are all over eBay and Amazon for about £5 each (or a tenth of that on Aliexpress), and they offer a neat solution for DC monitoring. They can measure up to 100V and – so they say – 100A. The wiring (see **Fig. 6**) is a bit strange but makes sense if you regard the ammeter as a 'traditional' one.

Conclusion

There are a lot of old PC and server PSUs about, and for free or a few pounds, I can wholeheartedly recommend them for basic shack use. If you don't fancy all that messing about above, there are breakout boards that you can use. **Fig. 7** shows an ATX one [*and see also this month's article by Billy McFarland – **ed**.*], but there are ones for server units as well. **PW**



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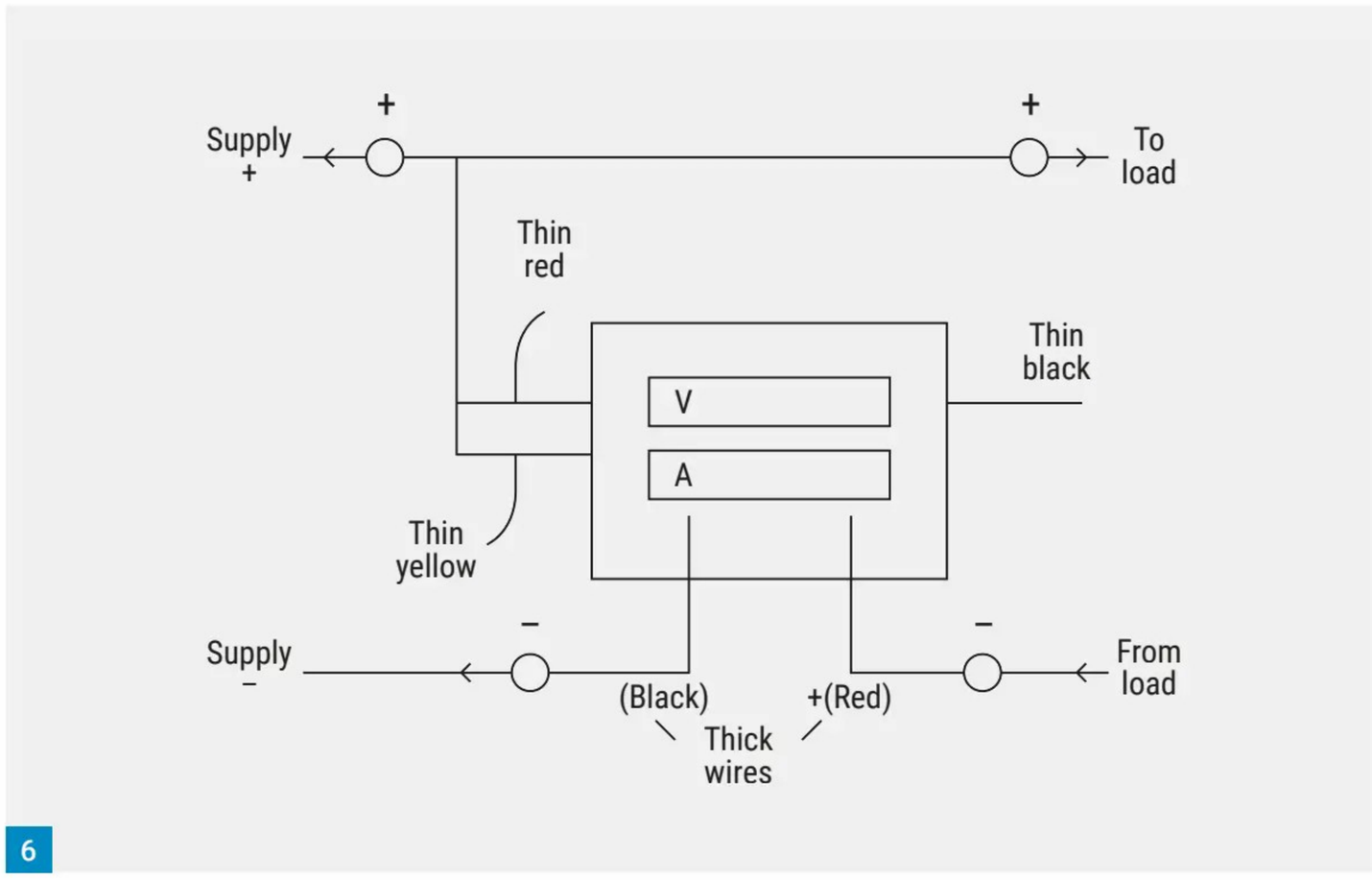

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Broadcasting history

Keith Hamer and **Garry Smith** continue the special series looking back at the BBC's coverage of Coronations since 1937. There is also a vintage Coronation advertisement from the archives for a 'Ronette' crystal microphone. The series highlighting broadcasting events from exactly 100 years ago features the first radio station in Japan and John Logie Baird's demonstration of his 'Televisor'. The saga charting the rise and fall of BBC 198kHz transmissions focuses on the original power arrangements at the Westerglen transmitter in Scotland. Coverage detailing 60 years of BBC-2 looks at the first short, 'warm-up' programme. We also continue our series about the development of Swiss Radio and Television since 1922 with the festival marking the closure of the Beromünster transmitter.

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BBC coronations: Part XXIII

In the previous column, we mentioned that the BBC used specially designed zoom lenses, manufactured by *Watson & Son* and *Taylor, Taylor & Hobson Limited*, (originally formed in 1886 by brothers **William** and **Thomas Taylor**), for television coverage of the Coronation on 2 June 1953. Another special innovation, relatively new to television in 1953, was the *Dallmeyer 40in Double-Folded Telephoto Lens*. Such a device was fitted to a camera positioned at the *Victoria Memorial* facing *Buckingham Palace*. Its horizontal angle (in conjunction with an image-orthicon pick-up tube) was as little as 1.75°, which enabled a very close view of members of the Royal Family during their appearances on the balcony. An angle of this order called for extreme care during broadcasts as any slight shake or vibration - even the effect of a slight puff of wind - would result in a greatly exaggerated movement of the image on the screen.

The camera positioned over the West Door of *Westminster Abbey* was fitted with a zoom lens, **Fig. 2**. Due to the low roof, the viewfinder had to be removed and placed on the floor.

Every effort was made to transmit the clearest possible pictures and a noticeable enhancement of definition came from the use of new *Derivative Equalisers*, developed by the *BBC Research Department*, and produced in sufficient quantity to equip nearly all the cameras used on Coronation Day.

The equalisers worked on the principle of adding to the picture signal derivatives of itself obtained using differentiating circuits. This technique provided a simple means of adjusting and compensating for optical and electrical losses.

Vintage coronation crystal microphones

This month's rummage through vintage copies of unkempt newspapers and magazines has unveiled an advertisement by *City & Rural Radio*, based in Swansea, which mentions the *Ronette Coronation Crystal Microphone*, **Fig. 1**. The advertisement dates from May 1953. The text has been left in its original format to reflect the spelling, grammar and punctuation of the time.

This is the full text of the company's advertisement offering various types of equipment.

The *Ronette Coronation.53 Crystal Microphone* was a high-impedance device and cost 52 shillings. Before decimalisation, there were 20 shillings to the pound. The microphone featured a crystal of *Rochelle salt* (sodium potassium tartrate tetrahydrate). Unfortunately, this particular form of salt is fragile and prone to problems under damp conditions, therefore these microphones did not enjoy a very long lifespan. The microphone was basically a standard *Ronette 088-u7 'Soundball'* device, which had been in production for some time. Ronette simply modified this microphone by including the legend, *CORONATION.53* in small, raised, dark characters on the black plastic housing!

100 years ago: March 1925

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

4 March 1925, heralded the first 'live' broadcast of an American President's inauguration. This was the second inauguration of **Calvin Coolidge**.

On 8 March, *Westinghouse Electric*, owner of *KDKA*, among other stations, announced from its Pittsburgh headquarters a proposal to form 'radio networks' via shortwave technology.

1

CITY & RURAL
Immediate delivery from stock.
"VIEWMASTER"
(LONDON — SUTTON COLDFIELD— HOLME MOSS—KIRK O' SHOTTS— WENVOE — NEWCASTLE—BELFAST)
SPECIFIED COMPONENTS
SEND FOR STAGE I NOW— price £3.2.3 post free.
Complete Kits, Stage-by-Stage and Single Components Supplied
" VIEWMASTER " ENVELOPES, 7 6.
NEW LANE TAPE TABLE, £17 10 -, plus 10 - carriage and packing
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RONETTE " CORONATION " CRYSTAL MICROPHONES, 52 -.
TAPE AMPLIFIERS, AMPLIFIER KITS, OSCILLATOR UNITS, & OSCILLATOR COILS, from stock.
LIST 2 d.
" SCOTCH BOY " TAPE, 35 -.
" FERROVOICE " TAPE, 26 -.
(1,200 ft. reels)
For Attention—Advice—Service write
CITY & RURAL RADIO
101, HIGH STREET,
SWANSEA, GLAM.
Telephone : Swansea 4677

"CITY & RURAL
Immediate delivery from stock.
'VIEWMASTER'
(LONDON - SUTTON COLDFIELD – HOLME MOSS – KIRK O' SHOTTS – WENVOE – NEWCASTLE – BELFAST)
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price £3.2.3 post free.
Complete Kits, Stage-by-Stage and Single Components Supplied.
" VIEWMASTER " ENVELOPES, 7/6.
NEW LANE TAPE TABLE £17 10 -. plus 10- carriage and packing.
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RONETTE CORONATION CRYSTAL MICROPHONES. 52 -.
TAPE AMPLIFIERS, AMPLIFIER KITS, OSCILLATOR UNITS & OSCILLATOR COILS, from stock.
LIST 2d.
" SCOTCH BOY " TAPE, 35 -.
" FERROVOICE " TAPE, 26 -.
(1,200 ft reels)
For Attention-Advice-Service write
CITY & RURAL RADIO
101, HIGH STREET,
SWANSEA, GLAM.
Telephone : Swansea 4677"

The first transatlantic radio broadcast took place on 14 March 1925. It featured orchestral music, some 'live' from London's *Savoy Hotel*. The broadcast began its partial circumnavigation of the Earth at station 2LO in London.

An unassuming building at Tokyo's *Atagoyama* (Mount Atago in central Tokyo) is considered to be the birthplace of Japanese broadcasting, as well as the home of Japan's public broadcaster, *NHK*. Regular radio broadcasts started here on 12 July

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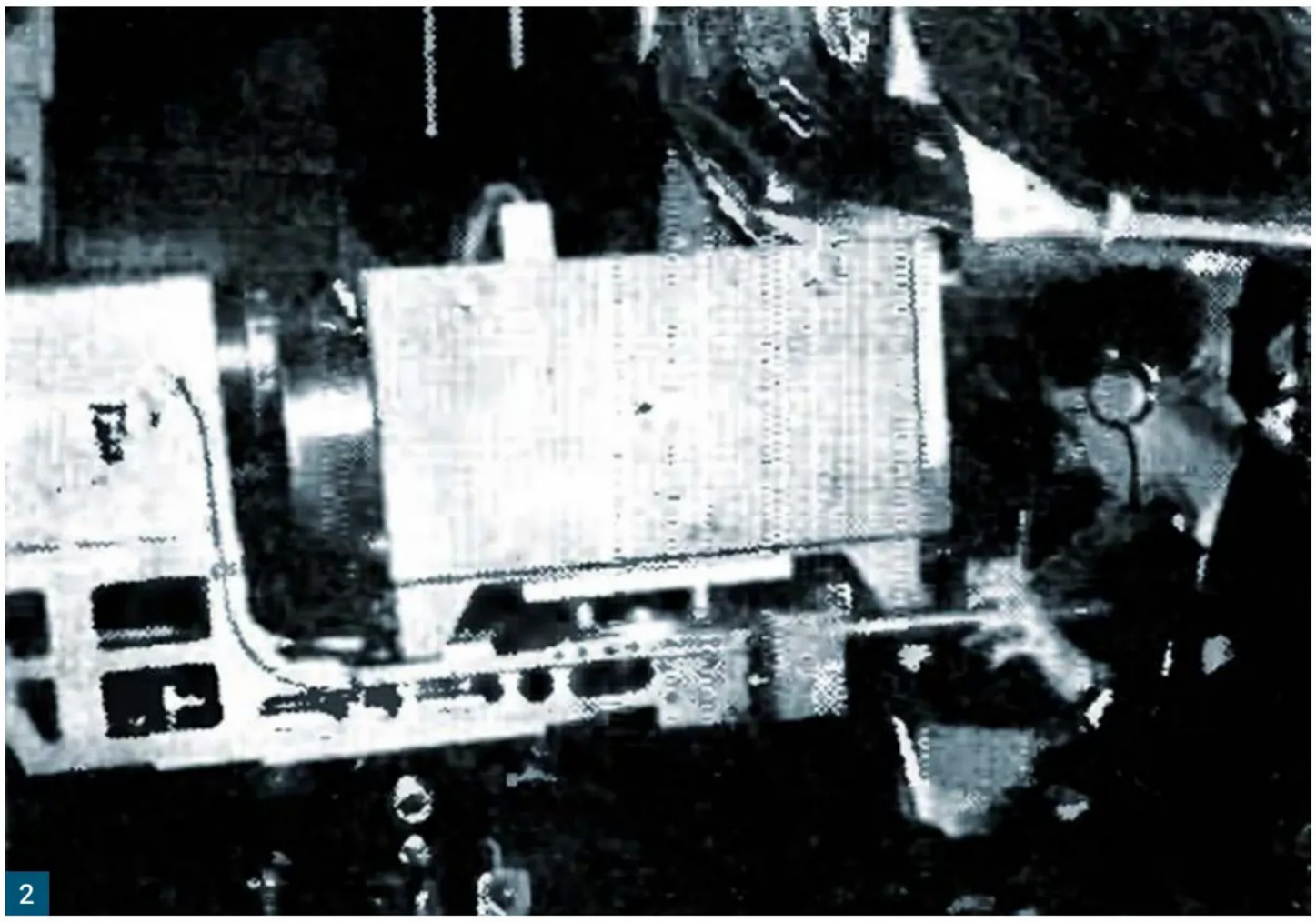

Fig. 1: An advertisement from May 1953, offering the *Ronette Coronation Crystal Microphone* for 52 shillings. Fig. 2: In this rare photograph, the television camera, positioned over the West Door of *Westminster Abbey* for the 1953 Coronation, is shown being fitted with a zoom lens.
Fig. 3: A Swiss Alphorn player carrying his traditional, world-famous instrument as part of the festival marking the closure of the Beromünster transmitter on 28 December 2008.

1925. However, Japan's very first radio station was known as *JOAK* and broadcasts began a few months earlier, on 22 March, from the library of the *Tokyo Higher School of Arts and Crafts* in nearby Shibaura. The school was used as a temporary broadcasting station.

At 9.30am, the announcer began with the station's callsign. He sounded as if he was talking over the telephone to someone hard of hearing, exaggerating his intonation, and carefully extending the pronunciation of each letter: J . O . A . K. Due to the announcer's telephone-like enunciation, many listeners dubbed the radio station as *wireless telephone listening*.

After the sign-on, the station manager, **Shimpei Goto**, talked about his hope that radio would offer listeners equal access to the benefits of modern culture, a higher quality of family life, and better public education. He expected that the new medium would invigorate Japan's economy.

Because of this historic broadcast, 22 March is now known as *Broadcasting Memorial Day*. Established by NHK in 1943, an event is held at *NHK Hall* in Shibaura to present the *Broadcasting Culture Award* to prominent figures who have contributed to the world of Japanese broadcasting.

Beginning on 25 March 1925, **John Logie Baird** demonstrated to the public at *Selfridge's Department Store* in Oxford Street, London, the transmission of basic outlines of simple objects during a three-week exhibition. His invention, the *Televisor*, employed 30 scanning lines with 12.5 frames per second.

In March 1925, a conference was held at the BBC in London with delegates from ten European countries agreeing unanimously that a union of international broadcasters should be formed. This resulted in the establishment of the *Union Internationale de Radiophonie* with its permanent headquarters in Geneva.

The rise and fall of 198kHz: Part XVI

The long-wave and medium-wave transmitters at Westerglen in Scotland were powered by generators producing 230V DC. The power was conveyed by overhead busbars from the *Power-House* to the *Machine-Room*, in which were housed all the various motor-generator sets required to convert the main power supply to operate at the different levels required for the numerous inputs to the transmitters.

The principle of having three types of motor-generator sets was adopted. One was normally in use for each transmitter with one being left spare. The sets supplied high-tension at 12kV to the anodes of the power valves, which were rated at 230kW. Each set consisted of one drive-motor and two generators on the same shaft, each generator having two commutators. The four commutators were in series, the voltage across each being 3kV. The baseplate of each set was not insulated, the main insulation being provided on the shaft.

Low-tension generators supplied filament current for the power valves at 20V, the maximum current being 1,300A for each transmitter. Three sets of three motor-generators supplied grid bias voltages for the various sections of the transmitter, and high-tension power for the earlier stages.

60 years of BBC-2: Part XII

The most important element in BBC-2 presentation when the station opened in April 1964 was a short programme called *Line-Up*. Its function was to 'warm up' the channel every evening from 7.20pm until 7.30pm, at which time the main programme commenced.

There were two anchormen, **John Stone** and **Denis Tuohy**. The programme included a short informal news summary from *Television News*, a weather forecast plus programme information, as well as its own original material.

Service Information, Switzerland: Part XXV

After 77 years of it opening, the medium-wave station at *Beromünster* was taken off the air. The station, also known as the *Blosenbergturm*, started broadcasting on 1 May 1931, via a 215m self-supporting tower.

To mark the occasion, a two-day folk festival was held, attended by around 15,000 people. The event featured entertainment from over 40 Swiss folk music groups. A Swiss Alphorn player in national costume is shown in **Fig. 3** carrying his traditional, world-famous instrument towards the transmitter.

Despite protests by many loyal listeners in Switzerland, and beyond, the Beromünster transmitter was finally switched off at midnight on Sunday 28 December 2008.

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**

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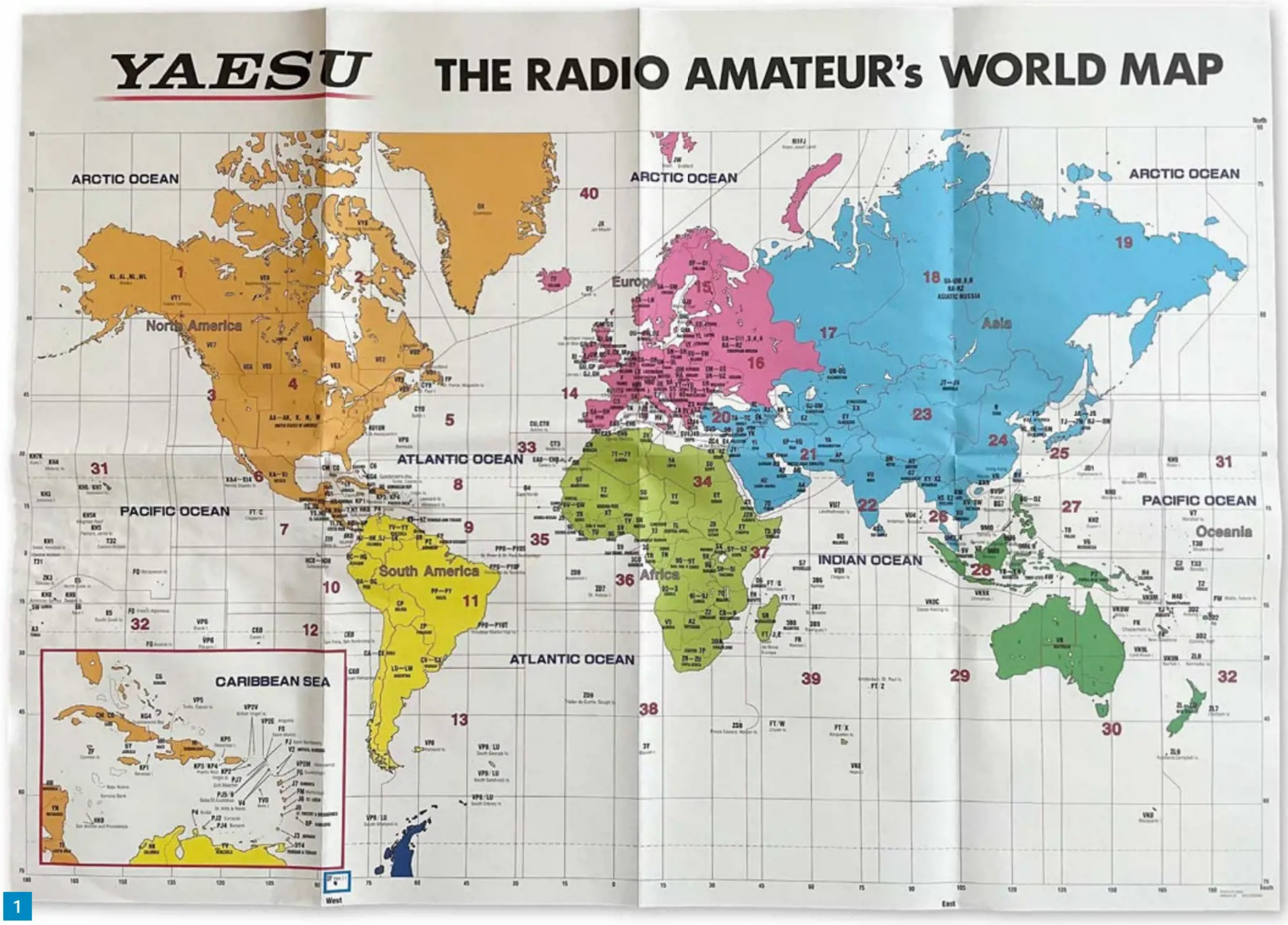

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The BeaconBox

Martin Waller G0PJO builds a unit to visually indicate RBN spots of the NCDXF beacons.

While reading the article *Radio and Maps – Mapping Radio* by **Georg Wiessala** in the October 2024 issue of *PW*, my attention was drawn to the picture of the MFJ-890 Beacon Monitor. This device displays the activity of HF beacons within the NCDXF/IARU International Beacon Project. To do this it synchronises with a time signal and then lights up small LEDs on a map as and when they become active on the chosen frequency. The user then listens to that frequency to see if beacons can be heard. In doing so they gain insight into the current HF propagation conditions. The whole device is just 6.75 x 5.25in, quite compact.

This got me thinking. Instead of going looking for beacons that I may be able to hear why can't I have the beacons come to me? The Reverse Beacon Network (RBN) may just be able to help me with this.

The RBN is *"a network of stations listening to the bands and reporting what stations they hear, when and how well"*. I have made use of data from the RBN before in the RBNSpyBox project first published in the July 2019 issue of *PW*.

Along with an interactive web interface the RBN also provides access to terse data via telnet. This data contains one line for each spot and typically looks like:

DX de G4ZFE-#: 21150.0 CS3B CW
15 dB 20 WPM NCDXF B 1441Z

From this we can determine that G4ZFE spotted CS3B on 21.150MHz at 1441UTC with an SNR of 15dB and the fact that it is a NCDXF beacon. So, if we are in the UK, we could look out for similar reports for beacons in the NCDXF/IARU network spotted by G callsigns and from that, in a similar way to the MFJ-890, determine current HF conditions.

The solution

So how can this data best be displayed? The obvious answer is on a map. When it comes to amateur radio and maps the most famous map of all must be the YAESU RADIO AMATEUR's WORLD MAP, **Fig. 1**. Yaesu give these away with all their HF offerings, I can't imagine how many are out there, and I'd guess that most are still in their original boxes having never been used. Can we give these maps a new lease of life? Can we turn them into something informative, interactive, and fun?

(Other suitable World maps are available. The RSGB sell one and one of the popular high street book shops tend to sell cheap World maps too.)

The map will need lights, one for each of the NCDXF/IARU beacons. The NCDXF website provides grid square locations for all 18 of their beacons so accurately locating the lights should not be an issue. They also need to be quite large and bright. I chose to use 8mm WS2812D RGB LEDs. These devices can be wired in series to form a chain of individually addressable LEDs. Each LED can represent any RGB colour. Unfortunately, each LED requires a 75Ω resistor and 100nF capacitor and mounting these

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Fig. 1: The Yaesu world map.
Figs 2 & 3: LED holder, lower and upper side.
Fig. 4: Frequency display board.

behind the map initially proved fiddly. To make life easier I designed a small PCB to host the resistor, capacitor, and LED and this sits behind the map and is held in place by a matching LED holder mounted in the board holding the map. See **Figs 2** and **3**.

There is also a frequency display board having one LED for each of the five frequencies used by the beacons and one LED that is used to indicate that data from the RBN is being processed. It also contains a small tactile mode switch used to switch between display modes as described below, **Fig. 4**.

To process the data, I chose the ESP32-WROOM-32. This device has built in Wi-Fi and more than enough processing power to process The Reverse Beacon Network data. It can be programmed using C++ via the Arduino IDE. A small PCB was designed to hold the ESP32 along with a duplicate mode button.

The Circuit

The circuit is quite simple. It's a chain of 24 WS2812D RGB LEDs and a push switch, **Fig. 5.**

Software

What does the software do? Obviously, the software needs to process the RBN data but before it can do that it needs to be configured, it needs to know which Wi-Fi network to connect to, which callsign to accept as valid spotters, etc. To support configuration the software provides a simple web interface containing configuration pages and live data pages.

Beyond that I chose three modes of operation. 'Beacons Heard' mode, 'Beacons Active' mode, and 'Beacons in Daylight' mode. The small tactile buttons on the frequency display board, the processor board, and the button on the home webpage can be used to cycle through these modes.

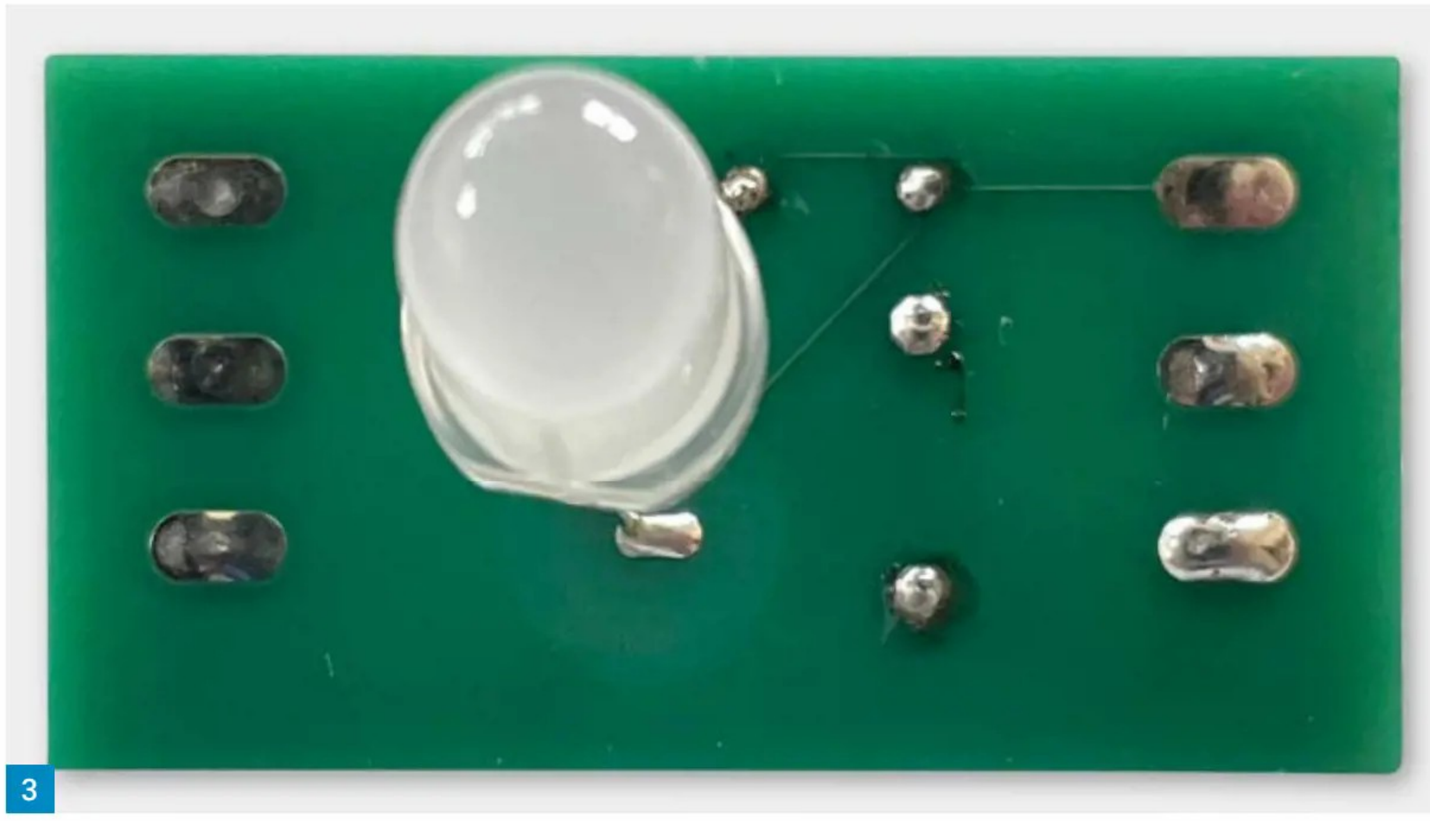
In 'Beacons Heard' mode the frequency display cycles through each of the frequencies used by the NCDXF/IARU beacons and illuminates on the map the LED associated with each beacon that has been heard in the last 5 minutes – this duration is configurable via the Web interface.

The 'Beacons Active' mode is a simple emulation of the MFJ-890 Beacon Monitor and shows you which beacons are currently transmitting on which frequency. If you browse to the schedule (URL below), you will see the LEDs lit up in sync with the changing list of beacons on the left-hand side of the page.

www.ncdxf.org/beacon/index.html#Schedule

The 'Beacons in Daylight' mode does just that, it shows which beacons are currently in daylight. This might be useful if chasing grey line propagation.

2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On top of these modes sits an animation mode. This provides a way to cycle the BeaconBox through the modes on a time basis. Again, this is configured via the Web interface.

Starting the build

The build starts with a frame for the map. The map is quite large, and the frame must be deep enough to accommodate the LED PCBs that protrude slightly on the back. I failed to find a commercial offering, so I ended up building one. For the base I chose 9mm MDF, I then used some narrow timber strips to form a frame. The 9mm MDF may seem heavy for the job, but I had some 'in stock' so 9mm it was. Extra timber strips were used on the back to provide protection for the LED PCBs.

The next task was to drill the holes. Using the grid square locations on the NCDXF website and a good eye I used a bradawl, pushing it though the map and into the MDF to mark the position of each beacon. Accuracy isn't a big problem but having the beacons vaguely correct is a good thing and will add to the aesthetics. The holes were cut with a 13mm flat wood drill bit making sure there was a scrap piece of wood behind it to stop the MDF blowing out.

I decided to locate the frequency display PCB along the bottom of the map, towards the right-hand side. There was nothing of significance on the map at this point so no information would be

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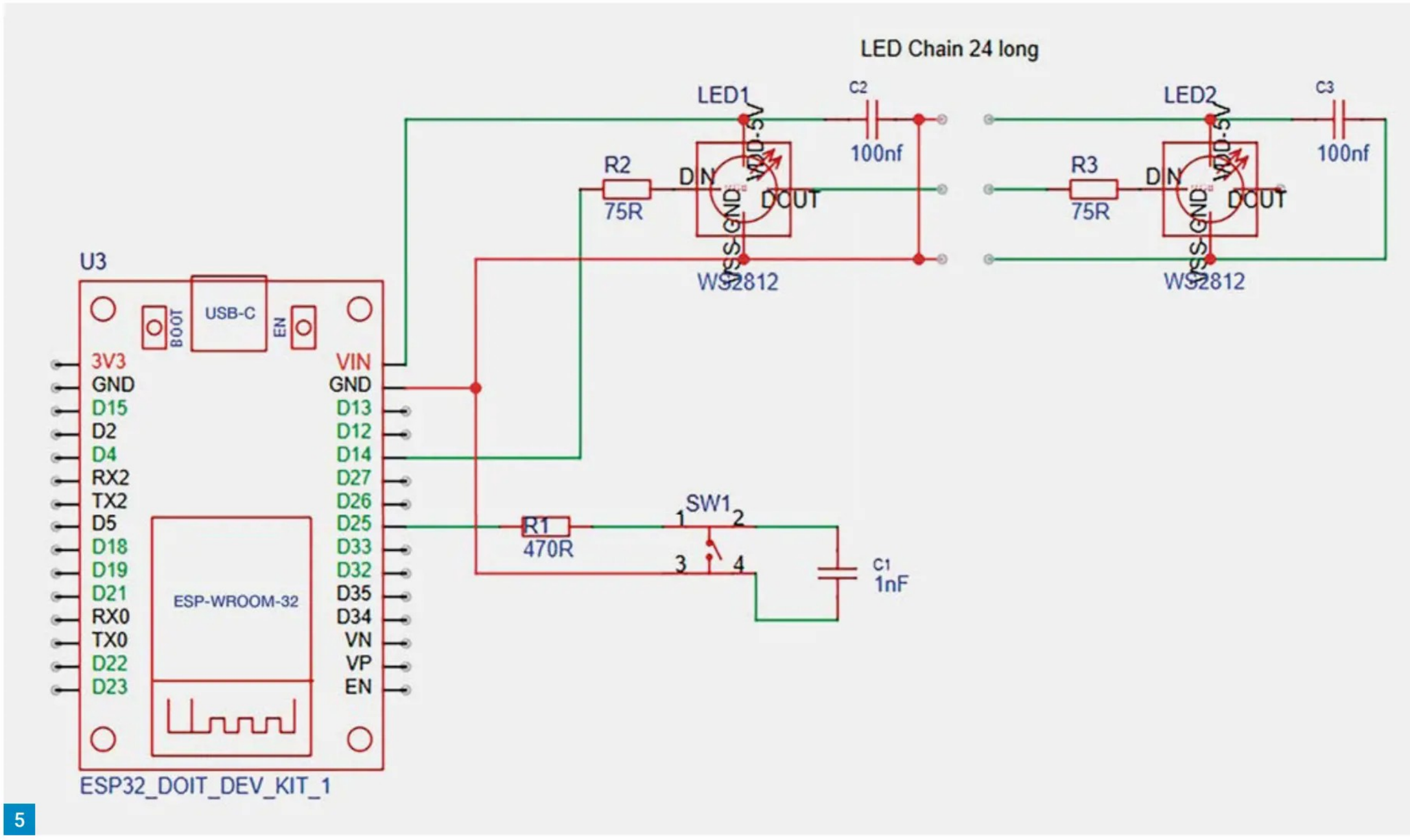

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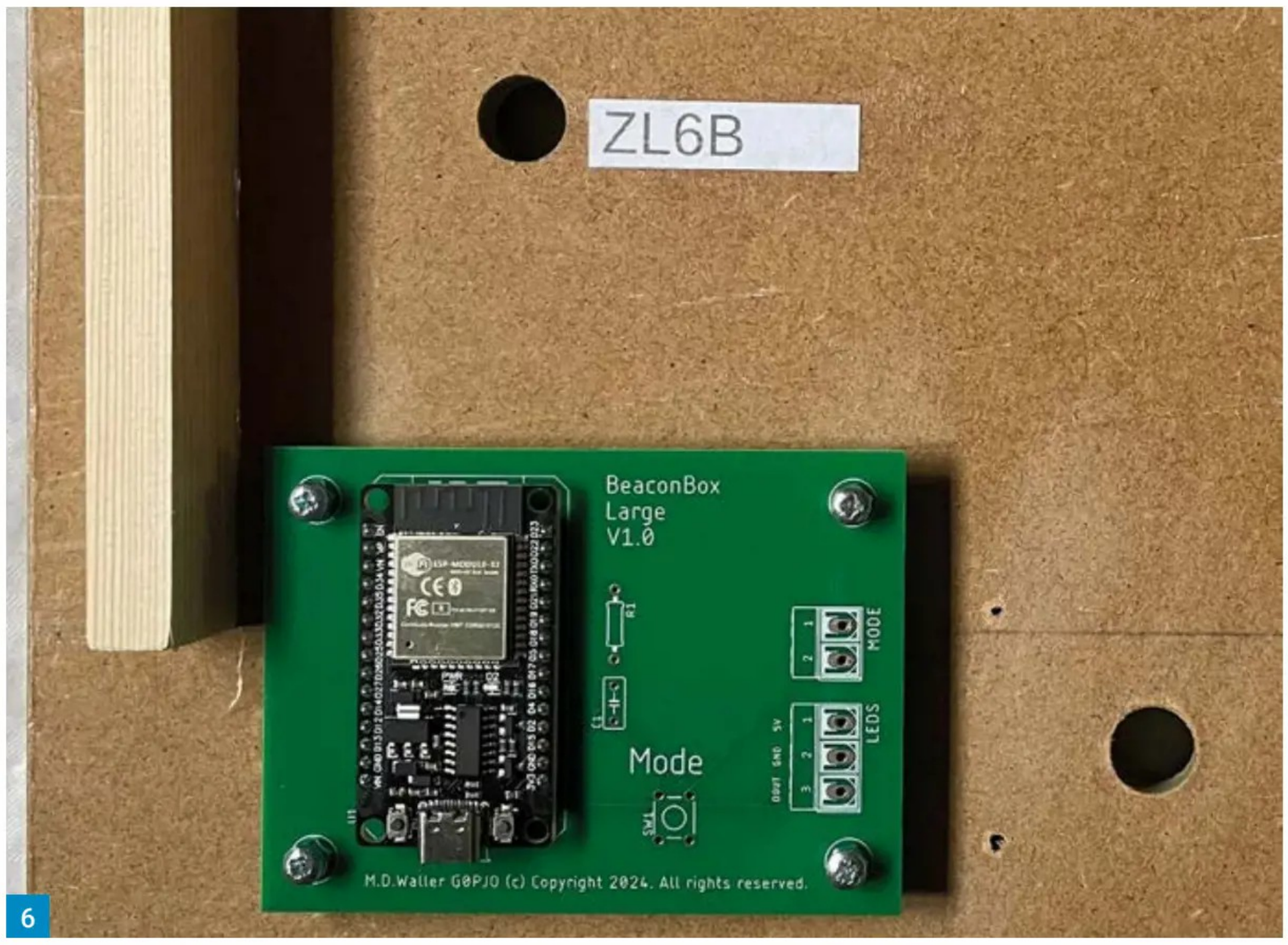

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Fig. 5: The circuit.
Fig. 6: The controller PCB.
Fig. 7: Front of BeaconBox
Fig. 8: Rear of BeaconBox.
Fig. 9:
Fig. 10:

covered up.

The next problem was what to do with the controller PCB. It could be mounted in a box of its own – BeaconBox – but I chose to locate it on the reverse side of the frame. To aid this four mounting holes were drilled bottom right and PCB standoffs bolted in, **Fig. 6**. You'll also notice that I labelled each of the holes with the callsign of the associated beacon. These help identify the holes and associated LEDs should anything go wrong!

Once I was happy all the holes were drilled it was time to mount the map in the frame. The map is large and there was an obvious need to use a glue that would give time for adjustment. Contact adhesive would not have provided this, so I chose good, old fashioned, wallpaper paste. Before pasting the map home, I lined the frame with some sheets of A4 printer paper.

Sadly, my wallpapering skills let me down. When sticking the map down I applied paste to the board and then laid the map on top. The map quickly soaked up water from the paste, expanded, and wrinkled! Some of the wrinkles came out when it dried, and some did not. Reading around it seems that I should have pasted the map, not the board, and let it stand for a minute or two before laying it on the board.

Next build the controller board. I chose to mount the ESP32 in headers. I am never keen soldering so many pins on one device as I would never be able to get it out again. At this point it is worth installing the software as it can be used to test the LED PCBs built later.

To make life easier I've not released the complete source code as building it can be quite tricky and requires a good knowledge of the Arduino IDE tools. Instead, I've released a single binary file that can be installed quite easily using software, freely available from Espressif who manufacture the ESP32 devices. The software and installation steps can be found on the BeaconBox GitHub site.

Next build the frequency display board. This is straightforward, and you should have no issues.

Next build and install the LED PCBs. There are 18 of these and it might seem quite daunting but once you get into the swing, they are quite easy. The most important thing to get right is the

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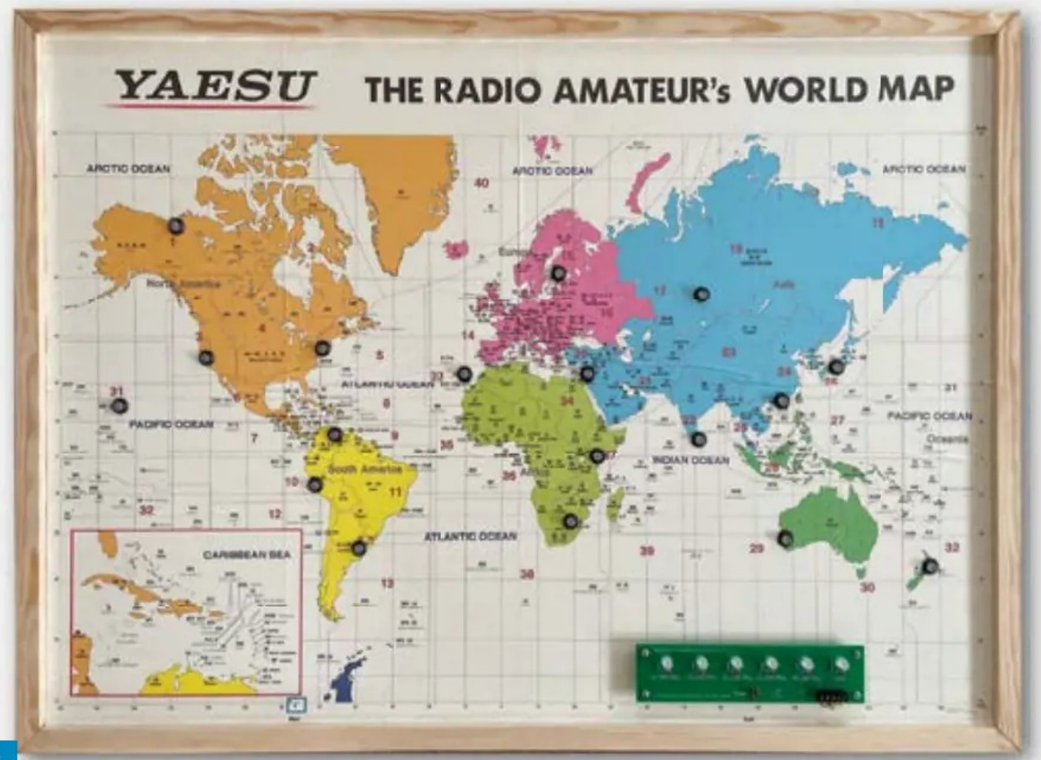

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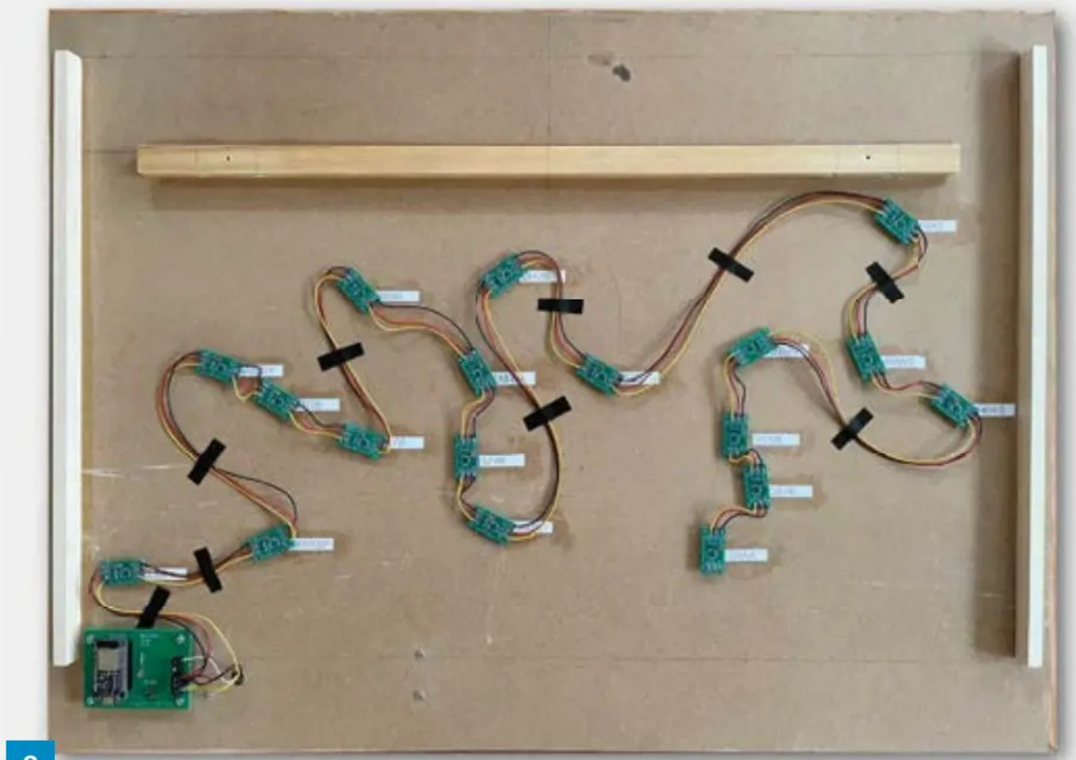
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amount of leg length left on the LEDs. The easy way of doing this is to offer up the LED to the PCB, ensuring the correct orientation, and then slip on an LED holder. There is a knack to this. I found that if you spin the holder around the LED, you'll find a point at which the LED slips in. Don't be tempted to force them home. Once the LED is securely in the holder, then hold the LED holder flush to the PCB and solder the connections.

It is possible to test each PCB as you build them. Simply connect the PCB VCC, GND, and DIN to the 5V, GND, and DOUT of the controller board and apply power. You should see the LED light up white. When I'd built two, I chained them together and repeated the test. That way I knew that the chaining was working correctly. I did this with every pair that I built. Once all 18 have been completed you can start installing them in the frame to form the chain. The chain must be built in a specific order, this can be found on the BeaconBox GitHub site.

Finally connect the controller board to the frequency board and the start of the LED chain to the frequency board.

You should now have something that looks like **Figs 7** and **8**.

I have toyed with the idea of adding labels below each beacon LED showing the callsign but I've not found an acceptable way of doing this yet.

Configuration

When power is applied to BeaconBox it opens a Wi-Fi access point called 'BeaconBox'. You can connect to this access point, using a PC or phone, and browse to

http://192.168.4.1/.

At the top you'll see a 'Settings' button that will take you to a page that looks like **Fig. 9**.

The first fields to complete are the 'WiFi SSID' and 'Wi-Fi Password' fields. These need to be correct for a Wi-Fi network that BeaconBox can use to access the RBN. The next field to complete is the 'Callsign' field. This is passed to the RBN to identify who is using the data. This could be anything but it's polite to give a callsign or some unique identifier for yourself. The 'Spotter Wildcards' field defaults to 'G*' so this is correct if you are in the UK. If you are elsewhere in the World then you may want to change this. For help, click on the 'Click for Help' text. You can then hit the 'update' button at the bottom of the page.

BeaconBox will then attempt to connect to your Wi-Fi network, then to the RBN, and then start processing data. If you hit the 'Home' button to return to the Home page you should see **Fig. 10**.

The LEDs on the board should also start to come alive. The Web pages are not meant to be the main interface to the BeaconBox. They were developed for testing purposes but turned out to be quite handy!

Check out the settings page for other configurable features such as animation mode, LED brightness, etc.

Also, the board should now be on your Wi-Fi network so you should be able to simply browse to

http://BeaconBox

without having to connect to the BeaconBox access point. I found that my BT router took a few minutes to acknowledge the BeaconBox device so please be patient.

GitHub

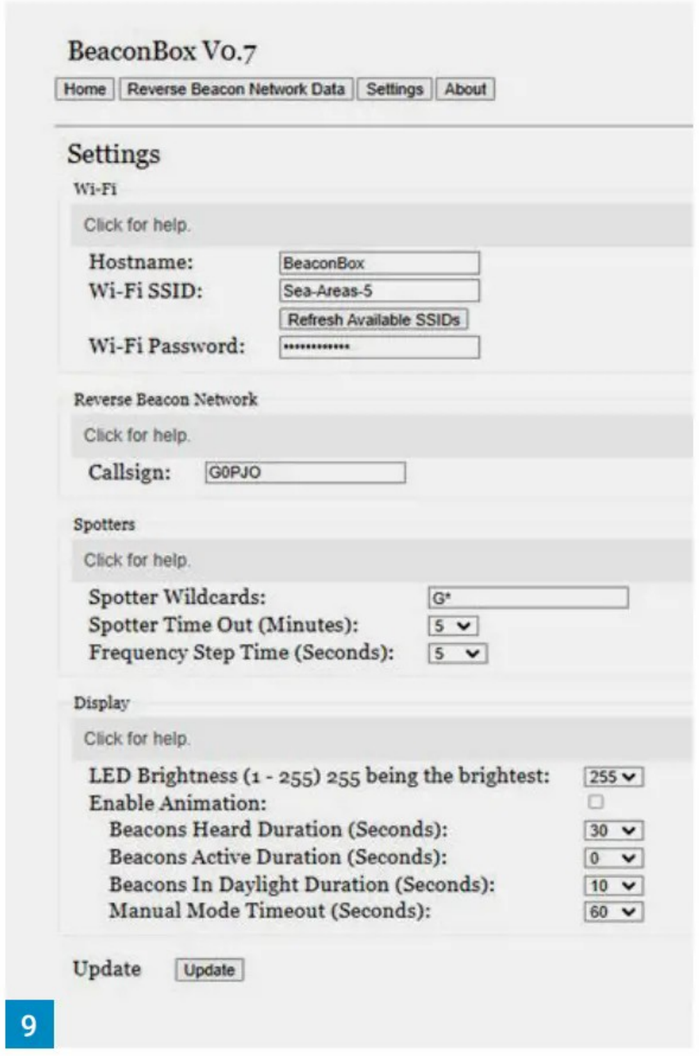
The associated GitHub page contains three videos that show the BeaconBox in each mode of operations, a full component list, software, details of how to install the software, Eagle PCB files, and more.

As always, I have a few spare PCBs that I'd be more than happy to pass on, at cost, to anyone wishing to build BeaconBox.

If you have any questions, please don't hesitate to contact me at

Martin@The-Wallers.net

or via the GitHub page. **PW**



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https://www.ncdxf.org/beacon
https://www.reversebeacon.net

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WSJT-X 2.7.0-rc8 Message System

Mike Richards G4WNC starts with the latest release of WSJT before covering the new Windows PC Manager and SDR level measurements.

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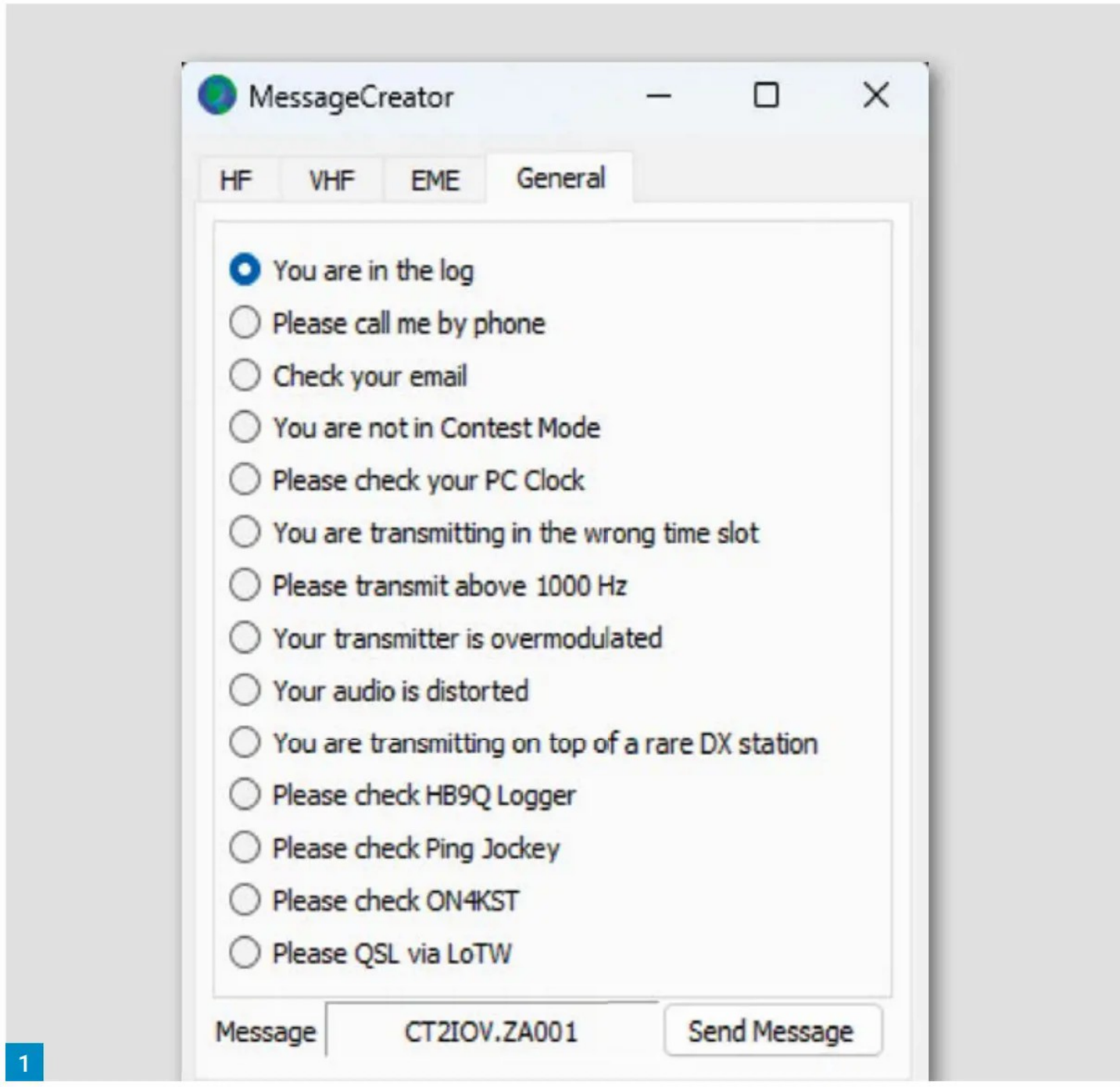
The latest candidate release from the WSJT-X team includes a helpful new messaging system. As you know, FT8/4 have very limited messaging capabilities due to the fixed data format. However, the WSJT-X team has devised a neat system for prepared messages. I've shown the list of messages in **Fig. 1**.



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These messages are sent as a message number. For example, I wanted to send the *"You are in the log"* message to CT2OV, which translated to: CT1OV.ZA001, with the 001 indicating it was message 1 of the preformatted general messages. There are separate message tabs for HF, VHF, and EME focusing on mode and frequency changes. The message system will likely be helpful during contests or DX contacts where you might want the station to QSY to another band or change mode. This release only arrived while writing this column, so I'll report back when I've had a chance to play next month!

Windows PC Manager

Microsoft has recently launched a new application designed to help us keep our PCs running well. It's called Microsoft PC Manager, a free application available from the Microsoft store. At the time of writing, it wasn't available from the UK Microsoft store, but you can use a simple trick to get it. The software release has been phased over several global regions but not yet in the UK. To get access, you temporarily change your region, install the App and revert your region. Here's a step-by-step guide:

1. In the Windows search box, type Region and select Region settings from the popup.
2. Change the Country and region to USA in the Region section and restart your PC.
3. You can now open the Microsoft Store to find and install PC Manager.
4. Once the Application installation is complete, go back to the region settings and change the region back to the UK.

I've shown a screenshot of the PC Manager home page in **Fig. 2**. One of the App's main benefits is to reveal existing Windows tools and utilities that are typically buried in the Control Panel and other areas of the operating system. In that respect, it does a great job. The App's front page provides a dashboard view summarising your PC's current state. This includes memory usage, size of temporary files, number of active Apps, last startup time and a display of potential savings from a disk cleanup. Dominating the home page is a large Boost button. Pressing this will kill unnecessary processes to boost memory space while deleting temporary files. It does this very quickly and includes an optional Smart Boost feature to automatically run the boost process whenever your PC has a high usage of RAM, or there are more than 1GB of temporary files.

The Health Check option offers to clean up the system by deleting various cache stores and killing running Apps. I've shown a screenshot in **Fig. 3**. The Deep cleanup tool digs further into the system and provides a list with checkboxes of all areas with potential memory and disk space savings. This option must be used with care as you don't necessarily want to delete all the cache stores. The process box was handy as it presented a list of all the running processes with the facility to kill any of them. You can, of course, do this with Task Manager, but PC Manager provides a much quicker solution.

The Startup section similarly provides a helpful view of the startup time complete with a list of all the startup apps, their impact on the boot time, and a switch to turn them on/off.

The Protection tab of PC Manager gives access to virus protection plus Windows Update. It also contains a popup blocker for popups that are embedded in apps. The Storage Management tab has many valuable goodies, including Deep Cleanup, Downloaded Files, Large Files and Duplicate Files.

I found the latter two particularly useful as they could be set to scan all the drives connected to your PC. With the large file scan, you can select the drive and the threshold of what constitutes a large file. I found this helpful for finding large files I'd forgotten about! The Apps tab contains several tools to help manage the Apps installed on your PC.

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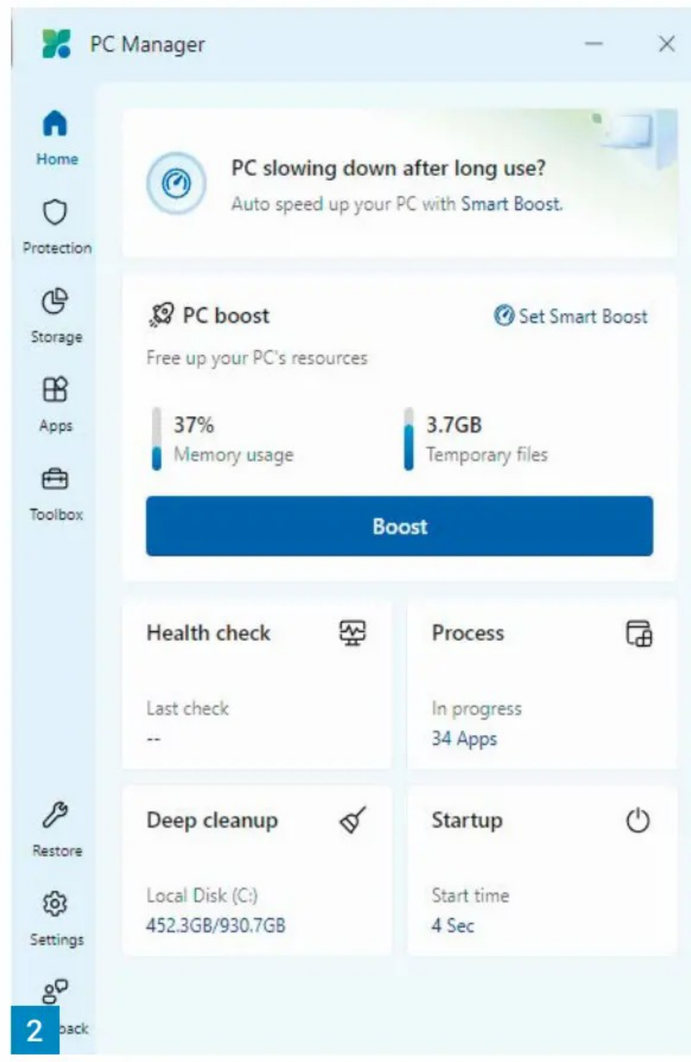
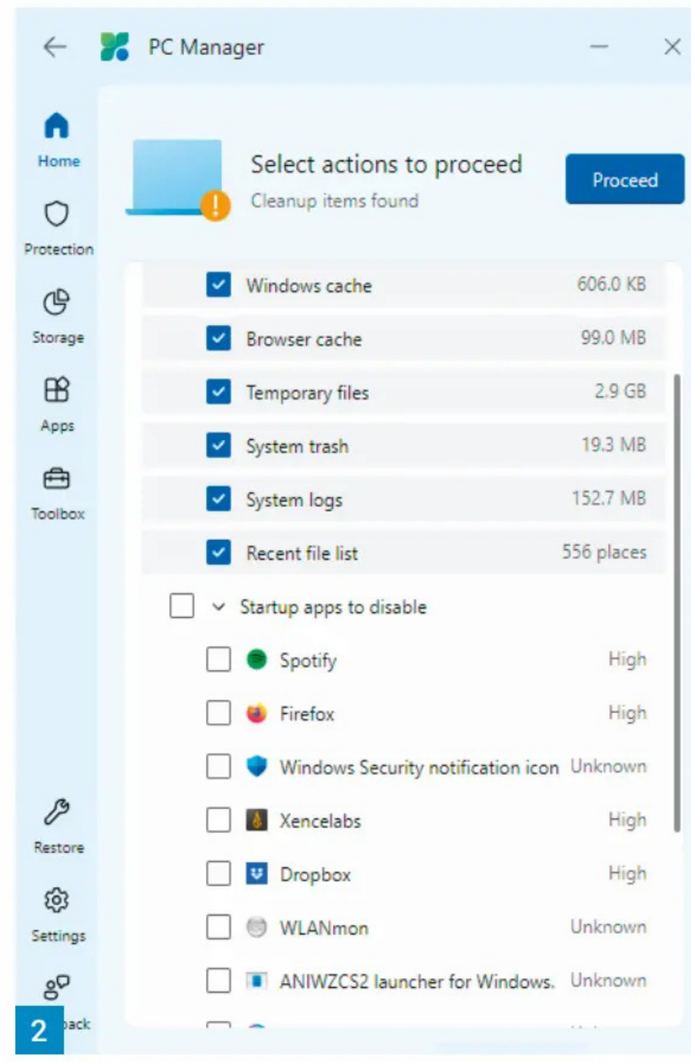
Fig. 1: WSJT-X General messages available in the latest RC8.
Fig. 2: Microsoft PC Manager Home screen.
Fig. 3: PC Manager file cleanup screen.
Fig. 4: Front-end diagram of a typical high-end SDR.

This provided speedy and convenient access for monitoring, controlling and uninstalling your Apps. Finally, the Toolbox tab provided a quick way to access standard Windows apps such as screenshots, voice recorder, Notepad, Calculator, translator, currency converter, etc.

To summarise, PC Manager is a handy addition to Windows that combines many Windows tools and controls into an easy-to-use interface. It will certainly be staying on my PC. However, it would be good if Microsoft could make the PC Manager window resizable. The current version's window is a fixed size, which means scrolling within the App to see the available options.

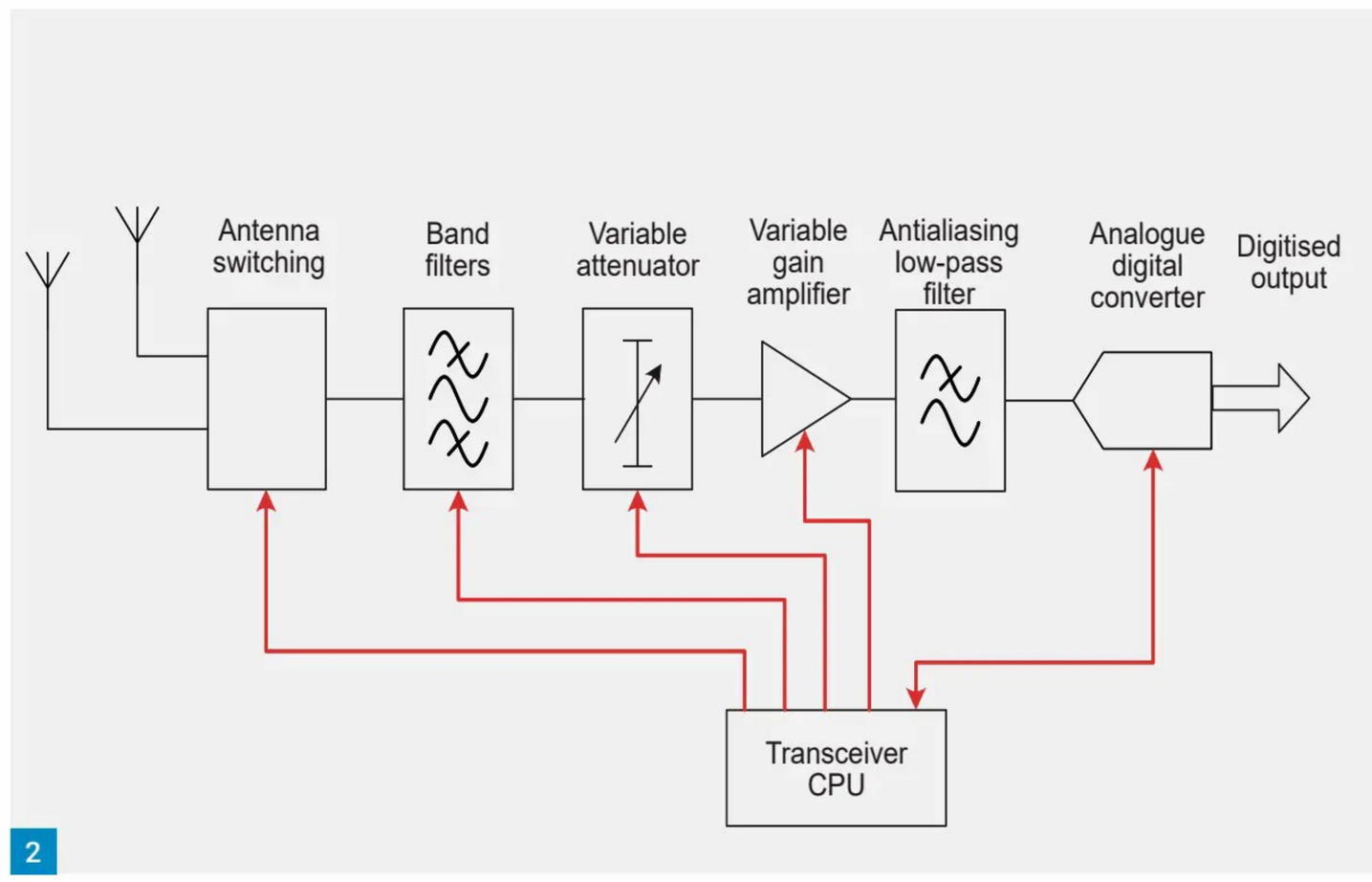


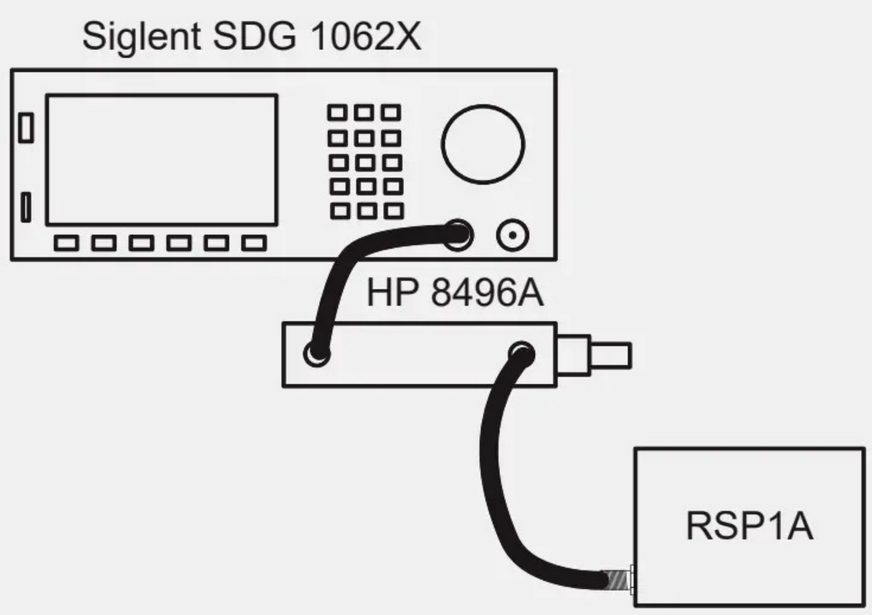


SDR level measurement

I recently presented my *"SDR Explained without the Maths"* talk to Reading & District Amateur Radio Club. The talk was well received and was followed by plenty of interesting questions. One area of frustration for many SDR users is the measurement of signal levels in SDRs. Few systems offer accurate input power readings in dBm; this is frustrating because modern ADCs (Analogue to Digital Converters) can take very precise measurements.

In most SDR receive systems, the clock oscillator that controls the sample rate will typically employ a TCXO (Temperature Compensated Crystal Oscillator). Many will also feature GPS tempering of that oscillator. This provides a very accurate measurement clock, so any frequency displays should be





RF input	Test Freq and SDRconnect recorded signal level					
	3.6MHz	7.1MHz	14.1MHz	21.1MHz	28.1MHz	50.1MHz
-40	-40.1	-40.7	-40.8	-40.8	-40.4	-40.5
-50	-50.1	-50.7	-50.8	-50.8	-50.4	-50.5
-60	-60.5	-60.8	-61	-60.9	-60.2	-60.4
-70	-70.6	-70.8	-71.2	-70.9	-70.4	-70.6
-80	-80.5	-80.8	-81.1	-80.9	-80.6	-80.8
-90	-90.5	-90.8	-91.1	-90.9	-90.5	-90.7
-100	-100.5	-100.8	-101.1	-100.8	-100.5	-100.5
-110	-110.3	-110.6	-111	-110.6	-110.4	-110.3
-120	119.8	-120.2	-119.7	-119.6	-120.2	-119.8
-130	-125.2	-125.2	-125.4	-125.6	-125.8	-125.6

Fig. 5: SDRplay RSP1A/SDRconnect measurement system. Fig. 6: RSP1A/SDRconnect level measurement results.

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correspondingly accurate. Regarding signal level accuracy, most ADC chips have an internal voltage reference to provide precise voltage measurements for each sample. In some cases, the accuracy is further enhanced with a separate, high-precision voltage reference device.

With all this technology, why can't we have spectrum displays and signal meters showing accurate input powers in dBm? To understand why this is a problem, we need to look at the SDR architecture. I'll use a generic high-end SDR with the ADC close to the antenna for this example. I've shown a block diagram of such a system in **Fig. 4**. While the ADC can indeed make very accurate measurements when it comes to measuring the signal power at the antenna, there are a lot of variables in the signal path ahead of the ADC.

The receiver's CPU (Central Processing Unit) controls all the blocks before the ADC. The band filters and antenna switching losses are static once a particular combination is selected, but the remaining stages are dynamically controlled. They aim to manage the incoming RF to reach the ADC at the optimum level.

In many cases, that means controlling the amplifier gain and attenuator loss to ensure any strong signal doesn't get close to the clipping point of the ADC. At the other end of the scale, the CPU adjusts the attenuation and amplifier gain to boost weak signals so that they exceed the noise floor of the ADC.

This gain adjustment is critical for best performance and to avoid ADC clipping. Gain and attenuation adjustments are made in real-time and are constantly changing. In practice, the optimum management of gain distribution is verging on a black art and is often the key differentiator between what appear to be similarly specified SDRs. This situation becomes even more complex for mid-range SDRs that employ complex band-pass and notch filters to tame the receiver's spurious responses. Computing the input power in dBm requires the CPU to know the losses through all the stages between the antenna and the ADC.

From this description, I hope you can see that measuring the antenna input power in dBm is not a trivial task. As a result, many SDRs take the more straightforward option of displaying the signal level as dBFS (dB Full Scale); this is the signal level relative to the full-scale resolution of the ADC. In this case, 0dBFS will usually be close to the clipping point of the ADC. As it's crucial to avoid the clipping point of ADCs, this is a relevant measure for SDRs and particularly helpful if you adopt manual control of the receiver's gain distribution.

Despite these complications, input power levels can be computed with useful accuracy,

"Although the RSP1A doesn't provide an ideal 50Ω resistive load, the SDRPlay engineers have clearly considered this when calculating the power level display for SDRconnect"

provided the dynamic gain profiles of all the preceding stages are known. One popular SDR receiver and software combination that achieves this is the SDRPlay range of receivers when used with SDRuno and SDRconnect software.

To test the accuracy of the SDRplay system, I used an SDRPlay RSP-1A with the latest SDRconnect software on my Windows 11 PC. The test setup is shown in **Fig. 5**. This comprises the Siglent SDG 1062X Arbitrary Waveform Generator with an HP 8496A 110dB variable attenuator. My Siglent produces remarkably accurate and consistent sinewave output levels down to about -30dBm. The HP 8496A is a well respected and accurate laboratory grade RF attenuator rated from DC to 4GHz. For my tests, the Siglent was set for an output power of -20dBm in a 50Ω load, and the HP 8496A was adjusted in 10dB steps to deliver the required power directly to the SMA antenna jack of the RSP1A.

I've shown the results in **Fig. 6**. If we assume that my test input is accurate, the SDRconnect results are very nearly within 1dB of the expected value from 3.6MHz to 50.1MHz over the range -40dBm to -110dBm. Measurements below -110dBm were compromised by noise and hence not reliable. The SDRconnect receive mode was USB and the gain and AGC controls were set to their default values during measurement. As a final check, I measured the input impedance of the RSP1A at 7.1MHz using a VNA to see if it was close to the ideal 50Ω. The measured result was 27.2Ω -9.35j. To keep this measurement as accurate as possible, I calibrated the VNA at 7.1MHz before use and reduced the VNA test level to -40dBm, i.e. below the overload point of the RSP1A.

Although the RSP1A doesn't provide an ideal 50Ω resistive load, the SDRPlay engineers have clearly considered this when calculating the power level display for SDRconnect. These tests indicate that the RSP1A and other SDRplay models could make a valuable measuring receiver when combined with the SDRplay software. **PW**

News Extra

TAUNTON CLUB NEWS: Members of Taunton and District Radio Club enjoyed a construction night at their first meeting of 2025. A variety of kits from Kanga were constructed, including CW tutors, keyers and ATU's. More experienced constructors (G4USI and G7BEH) were on hand to offer advice and assist with troubleshooting. Pictured (left to right) M7LRT, M7UTX, G7BEH, M0LHC, M0XMS and G0MJF.

RSGB IS THE OFFICIAL BRITISH SCIENCE WEEK PARTNER: The RSGB is delighted to announce that it is an official partner for British Science Week 2025, run by the British Science Association.

The RSGB Outreach Team worked with the RSGB Comms Team to offer an amateur radio-related activity, and this will feature in the British Science Week Community Pack. This links with the Society's strategic priority of Growth and its desire to reach new audiences. The Society is very excited that amateur radio will be featured for the first time in this important national STEM campaign.

This year's event runs 7-16 March with the theme of 'Change and adapt'. Created by **John Hislop G7OHO** and tested by RSGB School Youth Champion **Chris Aitken, MM0WIC** and other members of the Outreach Team with various groups and ages, the RSGB activity uses amateur radio to find out how different countries are adapting to climate change. It is a simple activity that is also designed to get people on the air. Community or youth groups will need access to a Digital Mobile Radio (DMR) repeater and assistance from a radio amateur – which is why the support of the amateur radio community is needed to make this as effective as possible It is not just for young people and the RSGB has a range of additional activity ideas you could try with your community, friends and family too. The RSGB hopes its ideas and resources will encourage you to get out there and inspire others.

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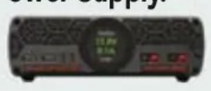

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1

Roger Dowling G3NKH
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Laurie Margolis G3UML

Roger Dowling G3NKH meets an amateur with quite a track record of 'scoops'.

The UK Government's recent controversial decision to return the Chagos islands in the Indian Ocean to Mauritius led inevitably to questions about Britain's other dependencies around the world. **David Lammy**, in the House of Commons, hastily assured his fellow MPs: *"I want to reassure the House, and all members of the UK family worldwide, that this agreement does not signal any change in policy to Britain's other Overseas Territories. British sovereignty of the Falkland Islands, Gibraltar and the Sovereign Base Areas is not up for negotiation. The situations are not comparable"*. The sensitivity of the Falklands issue comes as no surprise as memories are still fresh of the way the Government of the day was caught entirely unprepared on 2 April 1982, when Argentina invaded and occupied the Falkland Islands, a Crown colony since 1841, followed by the invasion of South Georgia the next day. The resulting 74-day conflict ended only after the loss of over 250 British military personnel, over 600 Argentinians and three Falkland Islanders.

Many readers will know of the important role played by amateur radio in the days that followed the invasion, thanks to the involvement of BBC newsman **Laurie Margolis G3UML**, **Fig. 1**, who played a leading amateur radio role in those days before the internet or mobile phones in re-establishing communication with the Falklands. Laurie retired from the BBC last August, so it seemed a good time to make contact with him to learn more about this occasion when he became the news himself rather than his normal role behind the scenes. But, as we shall learn later, I would also discover that the Falklands was not the first time that he had found himself in front of the cameras and microphones rather than behind them.

Early influences

It is not surprising that Laurie developed an early interest in amateur radio as his father **Maurice**, an East-ender then living in Ilford, Essex, was licensed as G3NMR in 1959. *"He worked in clothing manufacture"*, Laurie told me. *"But he was a 'natural engineer' who was really good at electronics and mechanical engineering"*. Maurice's first commercial transmitter was a state-of-the-art Labgear LG-300, though he could build his own equipment too. "I remember he built an enormous rig which my mother always called the 'gas oven'. It was huge and really did look a bit like an Aga!" Maurice was a top-flight DX operator, and in his earlier years formed and ran the hugely successful Amateur Radio Mobile Society, ARMS, **Fig. 2**.

"My mother Sylvia was always interested in amateur radio, though she never took out a licence herself", said Laurie. *"But she loved the social side of the hobby and the contacts one could make with interesting people all over the world. She had a successful BBC career as a broadcaster and producer, working on such programmes as Woman's Hour, You and Yours, the Today programme and numerous others. She also had a flair for publicity and promotion, and became the RSGB's honorary Public Relations Officer. She was a regular contributor to* CQ *magazine in the 1960s and 1970s, writing humorously about the social side of amateur radio and she developed a very large following. She was later admitted posthumously to the CQ Magazine's 'Hall of Fame'"*.

Laurie was educated locally before going up to Chelsea College, then a small constituent college of London University. *"But I made the mistake of thinking that I could follow up my interest in electronics as a full-time career"*, said Laurie. *"I ended up with a rather poor degree, with comments*

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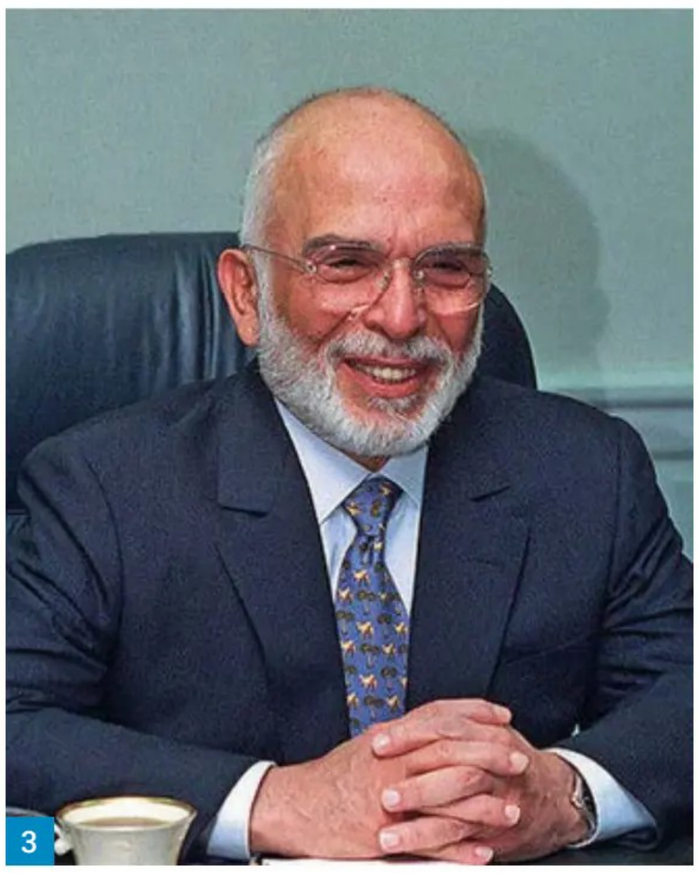

Fig. 1: Laurie G3UML in his shack today, using a Yaesu FTdx101D transceiver and an SPE Expert 1.5K-FA solid-state linear. Fig. 2: Maurice (G3NMR) and Sylvia Margolis at an Amateur Radio Mobile Society rally in 1969. In the centre is Short Wave Magazine's Paul Essery (G3KFE). Fig. 3: King Hussein of Jordan (JY1). Fig. 4: QSL card from JY1. Fig. 5: The QSO between JY1 and the '20-year-old Ilford electronics student' made headline news.

like essays being readable but journalistic rather than technical in context!" His younger brother **Jonathan**, now a successful journalist and author, had always known that he himself wanted to be a writer and he encouraged Laurie to study for a graduate journalism course at University College, Cardiff.

Laurie joined the BBC as a trainee in 1974, working alongside such well-known figures as **Jeremy Paxman** and **Jeremy Bowen**. Subsequently he worked as a sub-editor in the radio newsroom and as a foreign radio news editor. After spells as a radio and television reporter, he became a news editor at BBC Television Centre before a final move to become a senior news editor for BBC TV, BBC Radio and the BBC News Channel at New Broadcasting House in central London. Laurie retired, after 50 years' service, last August.

Making the news – by Royal appointment

Laurie was still a first-year student at London University in 1970 in the hope of pursuing a career in electronics when, to his surprise he found himself at the centre of a major news story. He was at home in Ilford monitoring the HF bands and was astonished to find himself listening to the Harrow and Sandhurst educated **King Hussein of Jordan JY1**, **Fig. 3**. *"I was really excited to work him"*, said Laurie, *"not just because he was famous but because I'd never worked Jordan before"*. He quickly put his father on too, and recalls that Hussein quite liked the idea of chatting to both father and son in the same QSO. *"I suppose when you're a king you think in terms of dynasties, inheritances and that sort of thing!"* JY1 kindly QSL'd to confirm the contact, **Fig. 4**, and Laurie was able to use this in his DXCC application.

In September 1970, Laurie had to return to university to re-take some exams. At this time, there was a full-scale civil war in Jordan between the well-equipped and formidable Palestine Liberation Organisation (PLO) and the mostly Bedouin Hashemite Jordanian army.

Turning on the home rig for the first time in three months, Laurie was more than a little surprised to hear the familiar voice of JY1 in QSO with a station in the USA. *"My first thought was to ask myself if I were the king of a country in the middle of a civil war, would I be on 20m chatting casually to people in the USA?"*, said Laurie. This was at a time when the country was completely cut off in communications terms from the outside world. He successfully established contact with JY1 who clearly remembered their earlier QSOs. Laurie asked him how it was going. *"Well, it's very difficult and we're fighting; but these are very difficult times and we're doing our best"*.

I quickly alerted my mother, in bed at the time, and she immediately rang a contact at the *Today* programme – and there was a BBC radio car outside our house at 7.00 the next morning."

It became a major news story in the days that followed: that the only communication between the

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Fig. 6: A BBC radio car outside the Margolis home in Ilford. Even getting a radio signal back to Broadcasting House was hi-tech in the early 1970s. Fig. 7: Laurie demonstrates amateur radio to the press. Fig. 8: In due course, BBC Television also arrive on the scene.

King of Jordan and the UK was on amateur radio via a 20-year-old student in East London, **Fig. 5**. The house was full of reporters for several days and every national newspaper carried the story as front-page news. In due course, BBC Television sent along a crew from Nationwide and to everyone's astonishment Laurie was able to make contact again with JY1 while the cameras were still rolling.

The sequel to the story is that Hussein, who had hardly slept for three months, was physically exhausted, came to a London clinic for treatment. My father and I were invited to visit him. *"I can see him now, in his dressing gown and pyjamas, perched on the edge of his bed in his little bedroom in Bryanston Square in the West End"*, said Laurie. *"It was a weird but moving experience"*.

About a year later, Laurie was operating a radio contest from the north of Israel, with lots of very loud stations coming through. Suddenly, he heard this booming signal: *"Hello, Laurie my very good friend, how are you? It's your friend from the East!"*

Although Laurie never met JY1 again, they had a number of QSOs and phone conversations over the subsequent years and Laurie was saddened to learn of his death in February 1999.

War in the Falklands

By 1982, Laurie had become a well-established foreign news journalist and at the end of March of that year he was working on a story on the Golan Heights in the Middle East. To his surprise he heard on the BBC World Service a bizarre report of a group of Argentine scrap merchants taking over the British dependency of South Georgia in the South Atlantic. Returning to London on 2 April, he encountered scenes of 'near panic' in the BBC newsroom at unconfirmed reports that the Argentines were now claiming to have invaded and taken over the Falkland Islands.

"One has to remember that this was back in the days before the internet and cellphones", said Laurie. *"My colleagues – who were aware of my interest in amateur radio – wondered if it might be possible to make contact with anyone in the Falklands by radio"*. The BBC amateur radio club had a shack conveniently located in the attic ('Room 701') in The Langham, a rather shabby building opposite Broadcasting House, which the BBC used for many years for overspill office accommodation. (I remember using the shack two or three times myself, as a newly-recruited outside broadcast engineer based in London, though a fear of breaking through on Radio 2 was always a source of some anxiety!). By the 1980s it had become very well-equipped station, with a Yaesu FT-200 valve transceiver, an FL-2100B linear and a Hy-Gain TH3 three-element tri-band beam. Mounted on the top of an 8-storey building at about 150ft, it performed very well.

So, Laurie set to work up in Room 701, listening carefully across the HF bands for any calls originating from VP8. After a few hours, he was delighted to hear the familiar voice of **Bob McLeod VP8LP**, a plumber living in the settlement of Goose Green on East Falkland. He confirmed that the Argentinians had landed at 9.30 that morning London time, there was an Argentine aircraft-carrier in the bay, the Governor was being held captive and there were heavy armoured vehicles in Stanley. *"We have been taken over"*, reported Bob. *"We're now under their control"*.

Within minutes, Laurie broke the dramatic news on the BBC *PM* programme, having had the pres-

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ence of mind to record the QSO on an old-fashioned tape recorder.

"The same evening, while I was still up in the dusty Room 701, the phone rang", said Laurie. *"It was someone – I believe from the Foreign Office – who wanted to know more about my conversation with Bob. I was then able to pass on further details as the story developed"*. Later the same afternoon **Lord Carrington**, then Foreign Secretary, confirmed in the House of Lords that the invasion had taken place.

"It was only later that it became apparent how crucial this information was at the time", said Laurie. *"I had wrongly assumed that my information was just confirming what they had from confidential sources, but we now know from published papers that this was the only hard information available to the Government at that time. Fortunately – and to his great credit – all the news passed on by Bob turned out to be absolutely spot-on"*.

DX and expeditions

A lifelong DX enthusiast, Laurie has achieved great results over the years, with all countries worked and re-worked on SSB with simple wire antennas, long before the days of FT8. He is the proud owner of the 'big four' plaques – DXCC Number One, Five Band DXCC, Five Band WAZ and Five Band WAS – and as of November 2023 is one of the top UK calls on the DXCC Honor Roll.

Laurie has also been very active in the expedition field. Among the highlights were J3/G3UML from Grenada (1983), J6/G3UML from St Lucia (1987), YN2EJ from Nicaragua (2002) and VK9LA from Lord Howe Island in the Tasman Sea (2004). Particularly memorable was the October 2011 T32C expedition to Christmas Island in the Pacific, organised by the Five Star DXers Association. *"It was the most successful DXpedition ever"*, said Laurie. *"I was one of the operators and made 4,600 contacts out of a total of 213,000"*.

G3UML today - and tomorrow

Located in Hendon, north London – just eight miles from Piccadilly Circus, Laurie claims to be one of the few DXers with a London address. He uses a Yaesu FTdx101D transceiver and an SPE Expert 1.5K-FA solid-state linear.

He exclusively uses wire antennas, all supported – and largely hidden – within numerous trees in his small garden. They include an 80m inverted-L that also works on 17m; a 40m delta loop that also works on 160m, 20m and 15m; an Alpha-Delta 10-15-20m dipole at 35ft; an EA Antennas 6-12-17-30m dipole at 35ft; and a 10-12m vertical dipole with the top at about 35ft above ground.

Laurie has never lost the wonder of worldwide radio communication from his living room, even in these days of instant internet contact. That, wonderful as it is, requires a vast technical infrastructure courtesy of Apple and Microsoft. Radio just needs whatever you have in the garden, plus whatever nature supplies up in the sky for free.

He's been an SWL since 1957 and licensed radio amateur since 1965. A few more years still to go, hopefully! **PW**

Fig. 9: Bob McLeod VP8LP lived at Goose Green, about 60 miles west of the Falklands capital Stanley. Fig. 10: Bob's home at Goose Green at the time of the invasion. Fig. 11: Laurie on the beach during the expedition to Christmas Island in 2011. Fig. 12: 'Somewhere up there' - but largely out of sight - is a comprehensive range of wire antennas operating on all bands from 160m to 6m.

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Steve Telenius-Lowe G4JVG
teleniuslowe@gmail.com

Books, QSLs, CDXC & more

Steve Telenius-Lowe G4JVG has quite a cornucopia of news.

Breaking news as we go to press is that another operation from Bouvet Island has become a good possibility, thanks to a large financial donation by the Northern California DX Foundation. Scheduled for February next year, the large and highly experienced team, led by **Kenneth LA7GIA**, plans to operate as 3Y0K from 'the most remote uninhabited place on earth' for three weeks. More information closer to the time and on their website:

3y0k.com

Atlas of QSL Cards

Last year I was asked by **Martti Laine OH2BH** if I could help with the production of a book being written by a friend of his, **Laura Piipari**. At the time I was in the throws of moving back to the UK after nearly two decades living abroad and I didn't want to take on any new projects, so had to decline. That book has now been published and I was sent a copy of the *Atlas of QSL Cards* for review purposes. The hardback version of the book is available from the online RSGB Shop and my review of the book will be published in the February (or perhaps March) *RadCom*.

I don't want to pre-empt the review here, but a look at **Fig. 1** gives a clue to the contents of this attractive and well-produced book.

rsgbshop.org

Singapore at 60

Singapore gained independence in August 1965 after being expelled by Malaysia from its Federation. To commemorate the 60th anniversary, all Singaporean amateurs may swap their 9V1 prefix for S60, e.g. 9V1YC (**Fig. 2**) would become S60YC, during the whole of this year.

www.sg60.gov.sg

Can WSPR find MH370?

On 20 December the Malaysian government announced that it is to resume the search for Malaysia Airlines flight MH370, which disappeared without trace in March 2014. What has this to do with HF amateur radio? Well, a firm called Ocean Infinity plans to use analysis of HF WSPR signals in an attempt to discover the location of the crash site. They stand to gain over £50m if their work provides clear evidence of the plane's location. The theory is that WSPR signals are 'disturbed' when aircraft pass through the transmission path although **Joe Taylor K1JT**, who developed WSPR as part of his WSJT suite of datamode programs, has said that analysis of old WSPR data would be of little or no use for this purpose.

QSL from Yesteryear

As I lived abroad between 1991 and 1994, and again from 2005 until 2024, most of my HF activity from England was in the 1980s and second half of the 1990s. My G4JVG QSL card collection, therefore, might best be described as 'historical'.

In December 1984 I had the pleasure of meeting **Father Marshall Moran 9N1MM**, **Fig. 3**, at an early meeting of the Chiltern DX Club (CDXC). Marshall was an American Jesuit missionary and educator in Nepal and in those days was one of the most well-known radio amateurs in the world. He was the first, and for decades the *only*, licensed amateur in Nepal and therefore a contact with 9N1MM was highly sought after. It was almost five years after that meeting before I was able to make a contact with 9N1MM: the QSL shown in **Fig. 4** is from my 14MHz SSB QSO on 18 August 1989.

Marshall had a fascinating life and the Wikipedia entry, which highlights his amateur radio activity, is well worth reading:

wikipedia.org/wiki/Marshall_D._Moran

CDXC news

I often mention CDXC, the UK DX Foundation, in passing in this column. I have been a member for 40 years but have just taken on the role of editing the club magazine, *CDXC Digest*, so I hope I may be forgiven for giving the club a bit of a 'plug'. Incidentally, CDXC's President wears another hat that may be better known by readers of this column for he is none other than *PW* editor, **Don Field G3XTT**! Membership of CDXC is open to anyone who has an interest in DX working, for further details see:

cdxc.org.uk

The month on the air

The S21DX operation from Dhal Char Island (IOTA AS-140) in Bangladesh caused a lot of interest among DXers in the UK and elsewhere in December. Most activity was on FT8 and SSB and an interesting write-up on the DXpedition by **Sabbir S21ACP** was carried on the Forums section of the QRZ.com website:

tinyurl.com/59b8sxx8

The Rebel DX Group returned to Christmas (Kiritimati) Island in Eastern Kiribati as T32TTT, operating mainly FT8/FT4 with some CW and SSB from mid-December until 1 January.

What to look for in February – March

After many Pacific operations in 2023 and 2024, the Rebel DX Group is heading to Nigeria for a two to three week activity as 5N9DTG in February. Look for them to be active mainly on FT8 and FT4.

The 'Next Generation' DX group – the same team that put on 8R7X from Guyana last year and which includes **Philipp DK6SP** and **Jamie M0SDV** (see *HF Highlights*, May and December 2024) – has announced an operation from the Marshall Islands as V73WW, between 11 and 23 February.

www.next-generation-dx.com

From Guinea-Bissau, J52EC was scheduled to be activated again by **Livio IZ3BUR** from the end of January until the beginning of March. Last year he was active from there, mainly on 28MHz SSB.

Bernhard DL2GAC plans activity as H44MS from Malaita Island in the Solomon Islands from early February for three months. He operates FT8 and SSB. The photo in **Fig. 5** was sent in by Bernhard when he operated from Malaita in April last year: note the bamboo pole supporting wire antennas and solar panel on the roof.

According to the *DX-World* website, **Fred G4XWM** will be active as V4/G4XWM on CW and SSB from V47JA's QTH at Frigate Bay on St Kitts (**Fig. 6**) between 8 and 29 March.

dx-world.net/v4-g4xwm-st-kitts-nevis

Look out for **Adrian G0KOM** to be operating as ZC4MK from the British Sovereign Base Area of Cyprus between 24 and 31 March.

Fig. 1: Fig. 1: A double-page spread from the *Atlas of QSL Cards* (photo courtesy Laura Piipari).

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Fig. 2: Antennas at 9V1YC in downtown Singapore: a KLM KT-34A tribander and a 40m rotatable dipole. Fig. 3: Marshall 9N1MM being presented with a CDXC Certificate of Merit by a youthful-looking Roger Balister G3KMA, December 1984. Fig. 4: 1989 QSL from 9N1MM.

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Readers' news

In the January *HF Highlights* I mentioned that I had once visited the Cocos (Keeling) Islands. I was therefore very pleased to receive an email from a new contributor, **Bruce Keeling G4EUW**, who wrote: *"You will note my surname and my lineage can be traced back to **Captain William Keeling**, discoverer of the Cocos (Keeling) Islands in 1609. Lucky man to have been there, although I have passed by, and over, during my 38 years travelling the world."* (Like his ancestor, Bruce has salt water in his veins and served in the Royal Navy, in his case as a Radio Operator.) He added: *"A quick note to record how much I enjoy and reap much information from your columns in* PW *each month. I particularly like that you give notice of DXpeditions, something* RadCom *is not very diligent with... I operate almost exclusively CW in contests now. Very moderate scores from my very small patch (45x45ft available for aerials) with a very bent 130ft doublet. Last weekend I had a go in the ARRL 10m contest (best was CE and XE) looking for DXCCs and CQ Zones as contributions to my local club's (Colchester Radio Amateurs) year-long activity. I stand at CW DXCC 112, Zones 31, but I will carry on into next year. I do enjoy the Latvian Mechanical Key activity but my manual CW is very ropey now, as I age."*

It has been a while since we heard from **Reg Williams G0OOF** so it was good to get his news: *"I have now bought an aluminium 10m telescopic mast and a six-band Cobweb antenna, yet to be assembled when we have some decent weather, hopefully in early spring. It will be interesting to compare to the Hustler vertical antenna which I have used for a good number of years. No doubt quieter on receive than the vertical."* Reg found *"Not too many unusual stations worked during the month. First one was Bangladesh's Dhal Char Island (IOTA AS-140) DXpedition. This was to train local youth radio amateurs to become a new generation of skilled radio operators and also celebrate the victory day of Bangladesh on 16 December. I managed to work them on 7MHz late evening and 18MHz mid-afternoon on FT8 on 18 December. Signal strengths were reasonable although I did not manage to work them on SSB.*

"The second DXpedition, by the Rebel DX Group, was T32TTT, Eastern Kiribati, Kiritimati Island (IOTA OC-024). This group appeared to concentrate on FT8 and FT4, operating around the clock." Unfortunately, Reg was unable to copy them on FT8 but, using *HamAlert* on his mobile phone he discovered that the team were operating on 14MHz FT4 early one afternoon: *"I changed to that band and worked them within 10 minutes with good signal reports in both directions, sent -10, received -7...*

"My other goal during the winter months is to work Antarctic stations. There are quite a few this season from different countries. Due generally to their work commitments leisure time is unpredictable which then relates to radio operating times. All part of the challenge. For some of the Antarctica radio awards QSL cards are required... That is the next challenge, receiving cards from stations worked. For example, unless a Russian operator you have worked has a QSL manager residing outside Russia, the chances of receiving a card following sending your own direct is very slim."

Owen Williams G0PHY also worked into Antarctica: his highlight of the month was a 14MHz SSB contact with DP0GVN at the German Neumayer III base on the Ekstroem Ice Shelf. *"He was a good signal, 58 on the S-meter. The last time I worked the Neumayer III base was in October 2012. There were openings to the Americas during the ARRL 10m contest with contacts in the USA, Costa Rica, Colombia, Argentina, Uruguay and India. I found conditions poor during the RAC Winter Contest with only three VE stations making it into the log. The bands are now buzzing with the World Wide Award activity during the remainder of January.*

"I've just received the February edition of PW *and your 'QSL from Yesteryear' reminded me of collecting QSL cards from broadcast band stations. I seem to recall that, apart from QSL cards, some Eastern Bloc stations such as Radio Prague would also send out pennants and a 7in disk of recordings of broadcasts made during the end of World War II."*

Tim Kirby GW4VXE usually operating as **GW4MM** writes, *"Perhaps 25 years ago, **Chris G3SJJ** told me about the 40m long-path opening in December around 1500 – 1600UTC to the west coast of the USA and Canada. Until now I've never tried the path, or at least remembered to try it. But this year I did and had a lot of fun, working a VE7 and a couple of W7 stations on CW. Signal levels varied, but were quite easy copy generally, although I heard one German station working one of the W7 stations giving an S9 report: more like S3 here! Great fun – I find long-path openings fascinating... The higher bands have been closing early but 10m has occasionally been open into the western USA just before the band closes."*

However, **Carl Gorse 2E0HPI/P** said that 10m had been his band of choice, running a Yaesu FT-891 at 100W to a 'T2LT' antenna (**Fig. 7**). Carl, from Hartlepool, recently visited London, where he activated nine parks, including Hyde Park (GB-0401), for the POTA programme and said: *"I was quite surprised to see my callsign in the top 10 of activations in 2024 with 688 activations, travelling mainly on public transport or on foot was a fantastic achievement."*

Etienne Vrebos OS8D had *"A great coincidence yesterday, a long QSO in Dutch with **Paul PJ4SON*** [Coincidence because PJ4SON was a neighbour of mine on Bonaire. Paul, along with other PJ4 amateurs, having helped to dismantle the PJ4DX/PJ4EVA antennas – ***Ed***]. *I really like meeting people on the radio by chance... About activities in the month of December: I got the award for 2024 concerning activating castles. That's the second year, sometimes I have in mind to lower my activation speed to give other activators a chance to gain an award too. I'm lucky of course: retired, with a lady who still*

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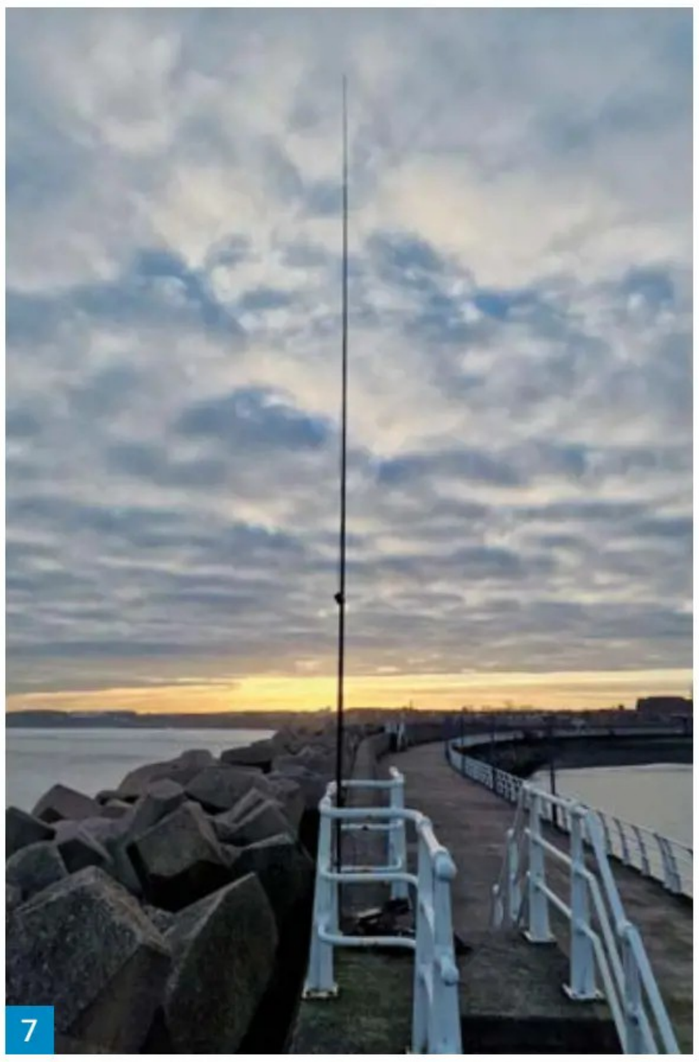

Fig. 5: H44MS location on Malaita, Solomon Islands. Fig. 6: Frigate Bay on St Kitts, close to the V47JA and V4/G4XWM QTH. Fig. 7: The 2E0HPI/P 10m Spiderbeam Mini Pole with T2LT antenna for 28MHz.

works and no kids at home, so plenty of time to make activations and get out in the nature with my equipment." In December Etienne made 520 QSOs from home and 550 while portable, activating castles, bunkers and Parks On The Air. All Etienne's contacts are made using SSB only.

28MHz beacons

Neil Clarke G0CAS brings us his 28MHz beacon report for the period from 1 to 31 December. The winter Sporadic E season during December was very poor compared to recent years, with only a small number of brief openings taking place. DK0TEN 28257 was heard on the morning of the 10th, while HA5BHA 28225 was heard also on the morning of the 16th. The next day, on the 17th, an opening took place to Spain with several Spanish beacons heard.

Now a summary of beacons heard during the year 2024, starting with Europe where SV5TEN 28189 was logged on 217 days of the year, making it the most heard beacon in Europe. From Australia VK8VF 28268 was heard on 77 days. However, VK6RBP 28200 was logged on 143 days. From South America, LU2DT 28193 was heard on 307 days, closely followed by LU4AA 28200 on 299 days. These two beacons were the most heard throughout 2024, followed by 4X6TU 28200 finding its way into the log on 242 days. Concentrating now on the USA, call areas 4 and 5 were the most heard, on 192 and 187 days respectively. Conversely, beacons logged in call areas further west became fewer and fewer, with the W7 call area only heard on 36 days. However, the W6 call area was heard on 113 days, thanks mainly to K6FRC 28300 which runs 100W, compared with W6WX 28200 which was heard on 83 days. Summing up, the total number of beacons heard via F2 or Sporadic E propagation was down compared to 2023, probably due to the higher number of large geomagnetic storms that we had to contend with in 2024.

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): 7MHz FT8: S21DX. **14MHz FT8:** JA2HGF. **14MHz FT4:** T32TTT. **18MHz FT8:** JA8RVP, S21DX. **21MHz FT8:** FR8TZ. **24MHz FT8:** TF3MH.

Owen G0PHY (HS): 14MHz SSB: DP0GVN, N1W, VE7RR. **28MHz SSB:** AZ1D, CX2TQ, HK1T, TI1T, TO9W (=FS), VU3XE, W4I (=KP4), W0PSY.

Tim GW4VXE / GW4MM (HS): 7MHz CW: J88BTI, RW9W, VE7FE, W7WA. **21MHz CW:** AI0Y (ND), S01WS, VE7ZO. **24MHz CW:** 5Z4VJ. **28MHz CW:** CE2SV, K6AR (CA), NR7T (UT), WP3C, ZA1F, ZD7BG.

Carl 2E0HPI/P (MS): 28MHz SSB: AA5EY, HJ3ESF, LU3DK, KP4TOP, PR8ZX, YV1GIY.

Etienne OS8D (HB): 18MHz SSB: V47V. **21MHz SSB:** BY1RX, VK6NWF. **24MHz SSB:** 6Y8LV, BY8AA, HI8D*. **28MHz SSB:** 5K6RM, 9N1CA, BX4AN, CO6QK*, EX0DX, FR/F4JCF/P*, HI5PPH*, HI8AM*, HJ3ESF*, LU7YE, OA4DAG, PJ4SON, TI2CMM*, TO9W, UN7QBX, VK2SD, VP2ELR, XE1CQ, YN9H. *(* mostly low-power activators of Parks on the Air).*

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 May issue the deadline is 11 March. Photos of your station, antennas or you in the shack are always welcome. 73, Steve G4JVG. **PW**

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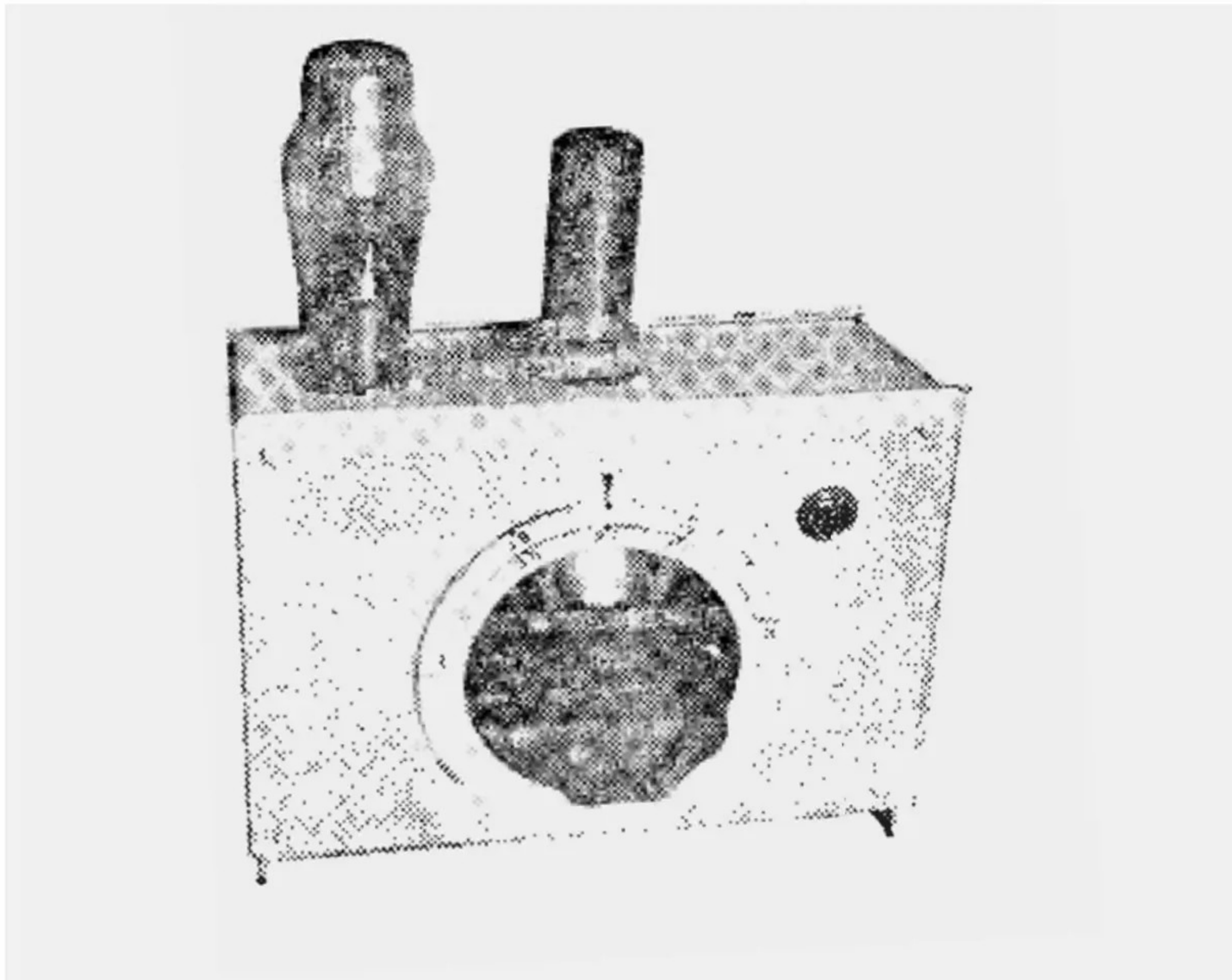
Don Field G3XTT
practicalwireless@warnersgroup.co.uk



A Voltage Stabilised VFO

Once again we dip into the PW archive, this time an article by the once ubiquitous F G Rayer G3OGR, dating from March 1965, 60 years ago.

The variable frequency oscillator described here may be used to control the two-band speech transmitter (January. 1965. P.W.) so that no crystals are needed. It enables the transmitter to be tuned to any frequency in the 1.8 or 3.5Mc/s amateur bands.

The v.f.o. may be employed with other transmitters. The fundamental operating frequency is 1.75-2Mc/s but output may be taken at 3.5- 3.8Mc/s if a different transmitter requires this.

Fig. 1 shows the circuit and the VR150 regulates the anode and screen supply for the 6AG7.

L1 the oscillator coil. is tuned by VC1 from 1.75- 2Mc/s. There is good isolation between L1 and the anode circuit and L2 is tuned to about 1.9Mc/s and needs no further adjustment. A coaxial lead takes r.f. to the transmitter.

Heater and h.t. currents are drawn from the companion transmitter. Heater drain is 0.65A, plus 0.3A for the indicator lamp. For h.t. about 25mA will be needed at 200-500V.

Construction

As the v.f.o. replaces the crystals, rigid construction is needed. An aluminium box about 7in. x 5in. x 3in. is used, completely enclosed, and with a 7in. x 3in. shelf bolted 2in. from the case top. The panel is screwed to this shelf and the box to increase rigidity. L1, TC1, C1 and VC1 are below the shelf with other components in the top compartment.

The valve and voltage regulator stand clear on top of the v.f.o. so that their heat does not cause unnecessary frequency drift in the circuit, Ll. All components are securely held with short leads and tag strips where needed. With these precautions the general stability of the unit was found satisfactory.

Fig. 2 shows all internal wiring, including the underside of the box top, to clarify valveholder connections. Stout wire such as 18s.w.g. is used throughout. Two leads pass through the shelf. These go to B on L1 and to R1 and C2. These wires are in thick insulated sleeving which is a push fit in the holes.

It will he seen that L2 is at right-angles to L1. L2 is attached to a bracket on the shelf and is horizontal. All construction must be perfectly solid to avoid random changes in frequency.

V.F.O.Coil

L1 is wound on a strong paxolin tube 1in. in diameter and about 2in. long. Drill two small holes at A (Fig. 2). About 1in. away drill two further holes for end C.

A length of 26s.w.g. enamelled wire is anchored to some convenient point and threaded through the holes at A. The centre 1in. of the tube is smeared thinly with an adhesive cement. The coil can then be wound by rotating the tube. walking slowly forwards and keeping the wire under tension. Turns are side by side. After winding 25 turns make the small loop B, then continue for a further ten turns, finishing at C. Scrape and tin B and the winding ends. A disc of wood is cemented in the tube and drilled for a fixing bolt.

Anode Coil

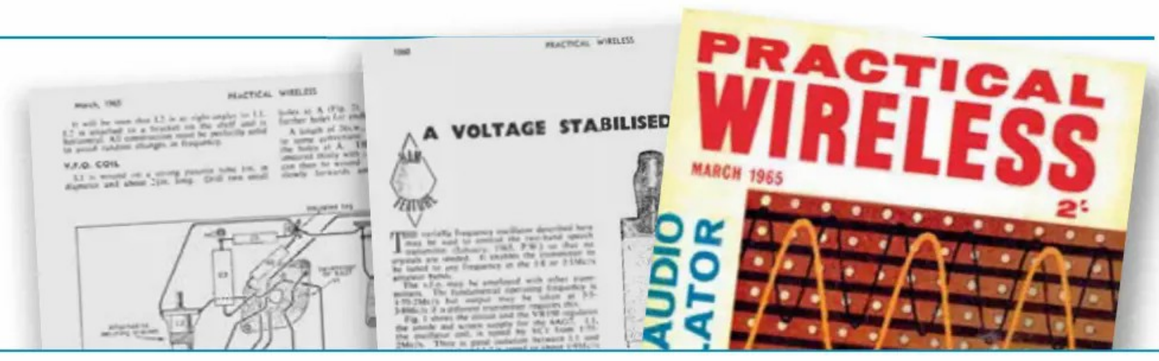
L2 was a small medium wave coil of unknown manufacture. Coils of this kind with adjustable cores can be tuned to about 1.9Mc/s. Tuning is by adjusting the core to suit stray circuit capacity.

The correct tuning of L2 can be found by placing a wavemeter near the coil or by observing grid current in the transmitter. For the latter purpose a 0-5mA meter is convenient. After calibrating the v.f.o. set it to about the middle of the band. When the core of L2 is rotated a broadly resonant peak will be found corresponding to maximum grid current. There is little change in grid drive when tuning the v.f.o. across the band, so L2 can be left peaked at about the middle of the band.

If a different transmitter requires an input in the 80m band L2 should be adjusted to about 3.65Mc/s. A suitable coil can be 65 turns of 32s.w.g. enamelled wire side by side on a 1in. diameter dust-cored former. For the 160/80m speech transmitter the v.f.o. output is 1.8-2Mc/s for 160m and 1.75-1.9Mc/s for 3.5-3.8Mc/s (80m band).

Should the v.f.o. be employed with a different transmitter it is generally best to have the v.f.o. output on one-half the frequency of the first stage of the transmitter as this avoids instability. The

This article appeared in the March 1965 issue of Practical Wireless and was yet another example of the substantial output from Francis George Rayer G3OGR.



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160m output is then used for 80m, but an 80m output would be handy for doubling to 40m. If a two-way switch is fitted in place of the lamp both 160m and 80m anode coils may be used to give output on either band.

Power Supplies

These are drawn from the transmitter, h.t. being required at net and transmit positions of the function switch but not at receive. To arrange this take the h.t. connection from S1 as in **Fig. 3**.

For easy interconnection a valveholder or three-way socket is fixed to the transmitter panel. A matching plug or old valve base wired to the tag strip in Fig. 2 allows the v.f.o. to be brought into use at once.

The coaxial cable is fitted with a plug which is inserted in the crystal socket going to R1 (Fig. 3). The other crystal socket is unused.

Resistor R3

For the 160/80m transmitter with a 250/0/250V transformer R3 is 4.7kΩ, 2W. This gives a. regulator current of about 20mA. In other transmitters the h.t. voltage may be greater and R3 must then be increased. This is readily done by taking 150V from the actual potential available, then using Ohm's Law to find R3 for this voltage drop with about 25-30mA flowing, e.g. 7kΩ would do for 350V supply, etc. Alternatively connect a meter in series with the voltage regulator and adjust R3 until the regulator draws about 25mA.

Transmitter Doubler

When operating on 160m the original crystal oscillator valve acts as an untuned buffer. No changes at all are needed except to plug the v.f.o. in instead of a crystal.

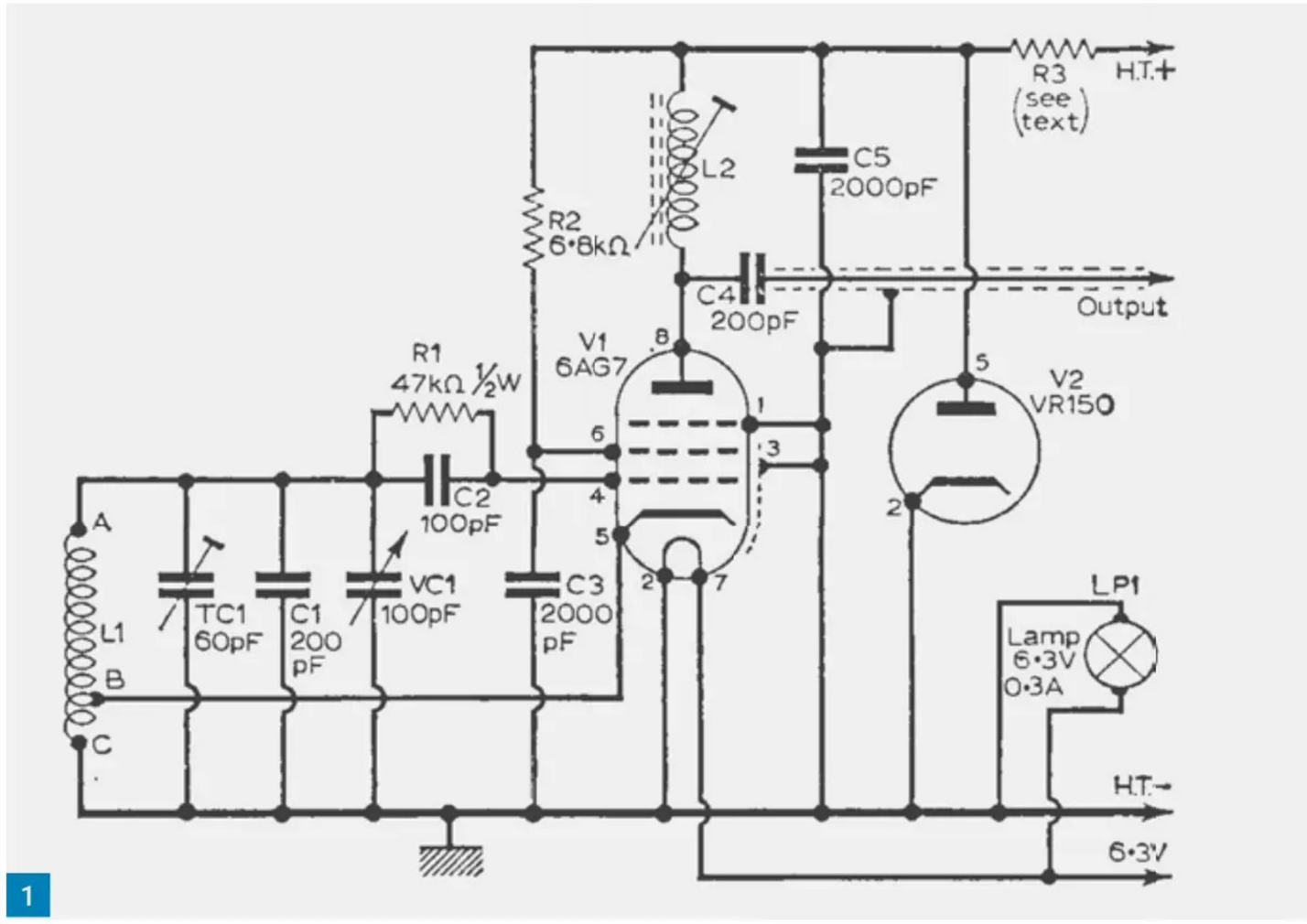
When working in the 80m band the first transmitter stage must operate as a doubler. This is done by fitting an on / off switch on the chassis and panel near the crystal socket and wiring it to a 3.65Mcis coil as in Fig. 3. This coil can be 65 turns of 32s.w.g. enamelled wire, side by side, on a 1in. diameter former provided with an adjustable dust core.

* For 160m the switch is left open. For 80m set the v.f.o. to roughly 1.8Mc/s and adjust the new coil core for maximum grid current with the switch closed. The switch must be open if crystals are inserted.

Grid/Anode Switch

For the above adjustments a fairly accurate indication of small changes in grid current will be necessary. It may thus be felt worth while to change the transmitter meter circuit to show grid and anode currents at will.

A three-way, two-pole rotary switch can be mounted on the transmitter panel near the meter and wired as in **Fig. 4**. With the switch in the position shown, grid current is read. The 470Ω resistor is only to complete the grid circuit when reading anode currents. The most convenient meter is a 0-5mA model.



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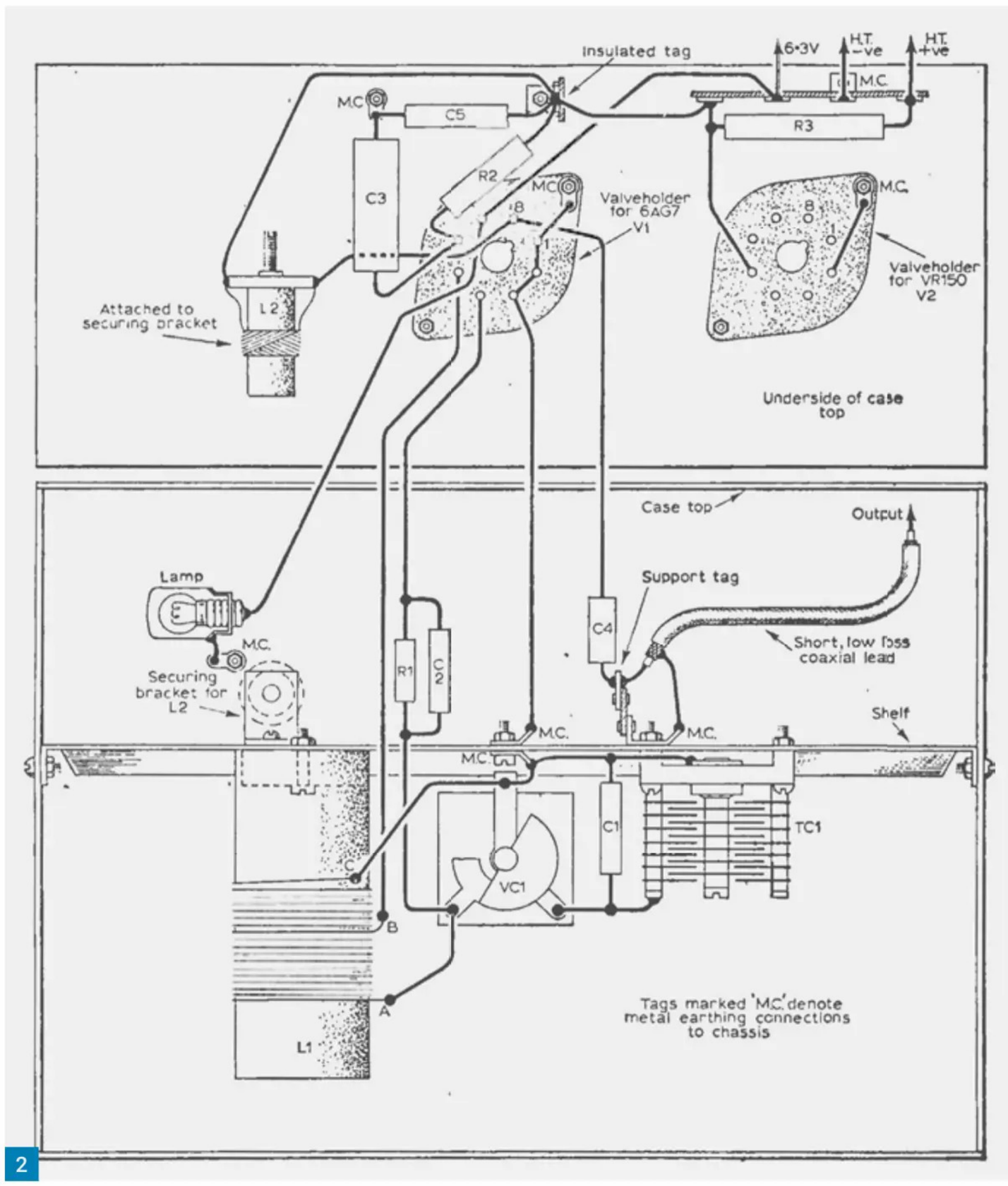

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Fig. 1: The v.f.o. circuit. The operation of this simple circuit is described in the text.
Fig. 2: The complete wiring diagram of the finished unit.

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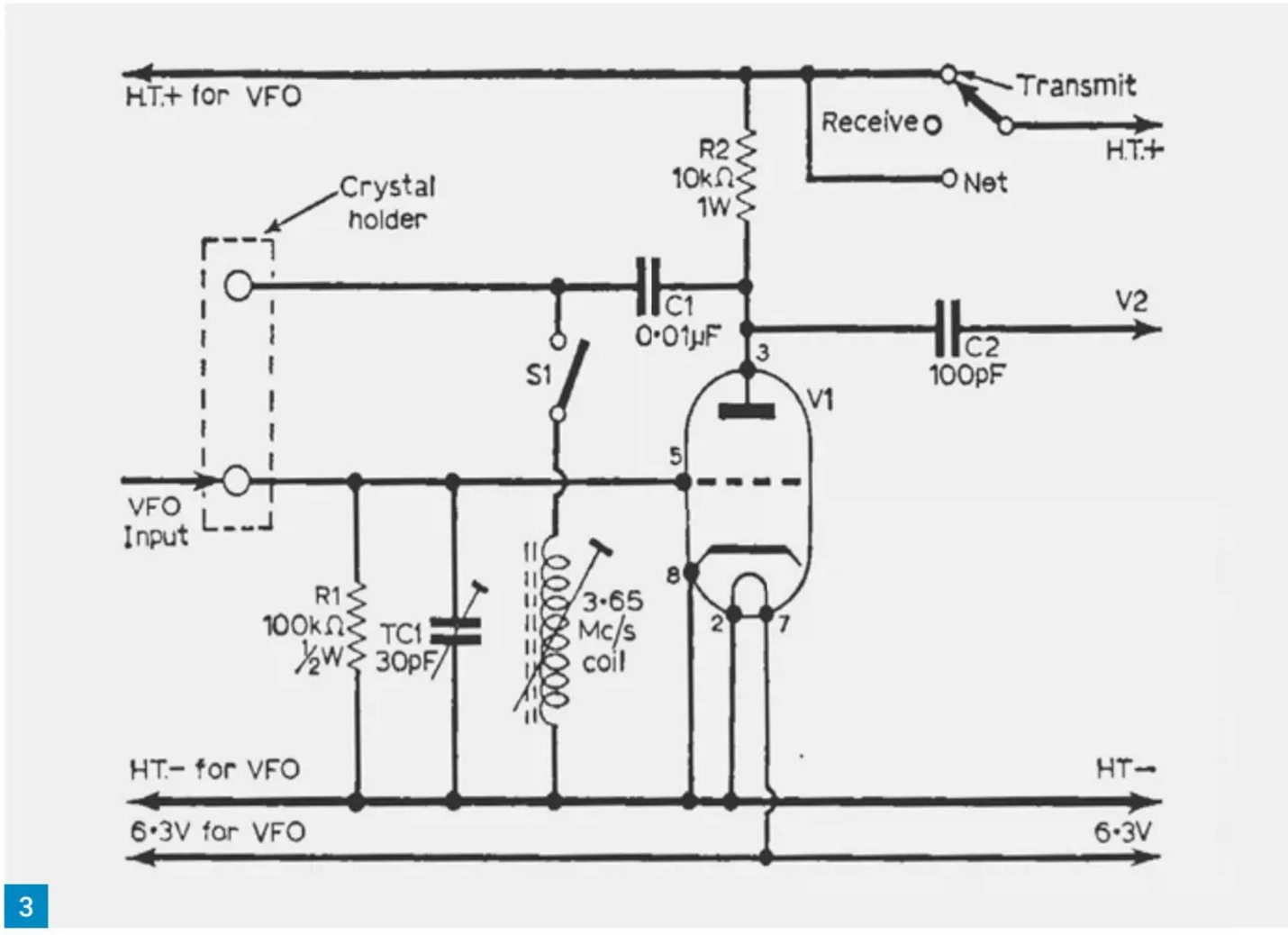
Component list

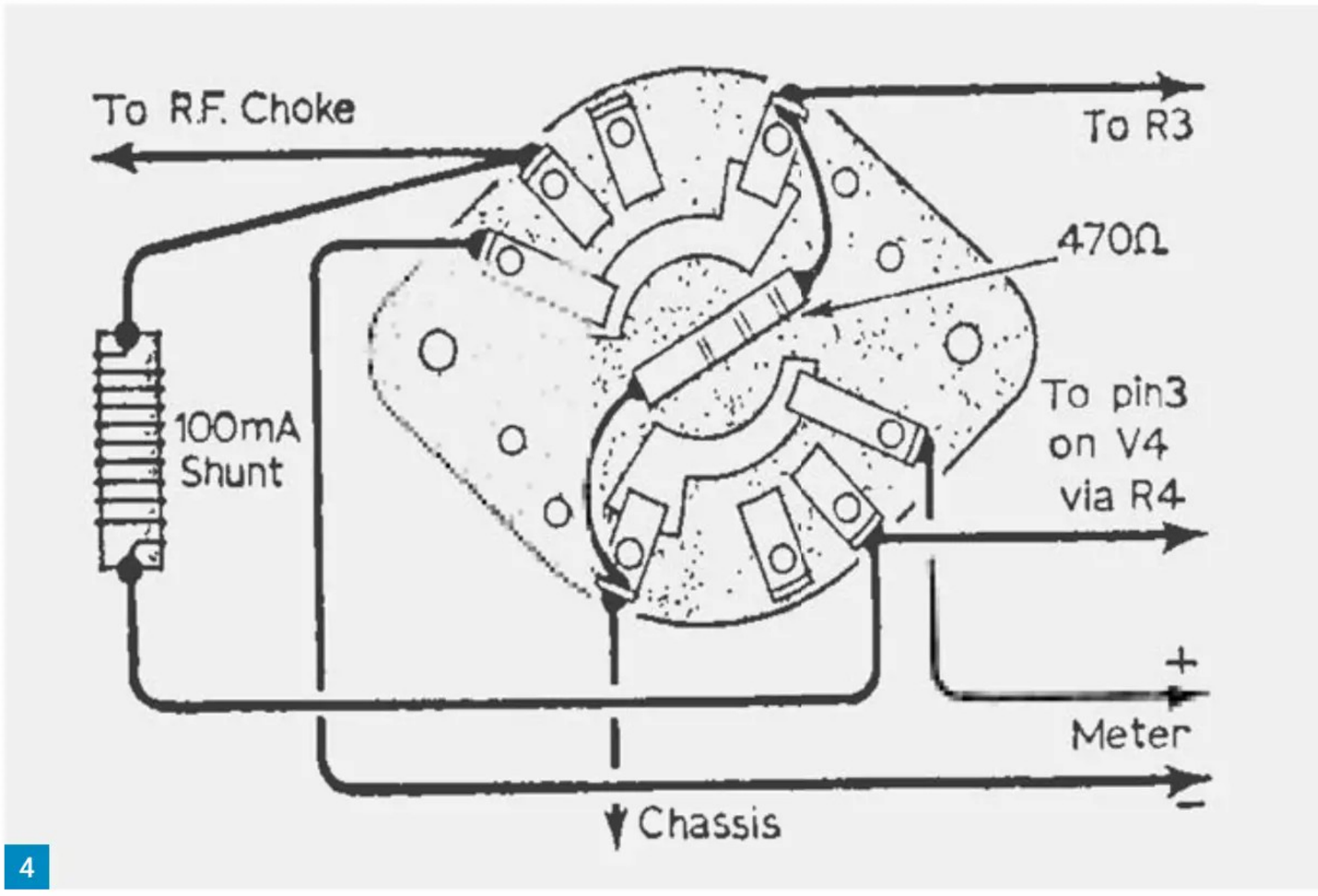
Resistors:
- R1 4.7kΩ 1/2W
- R2 6.8kΩ 1W
- R3 4.7kΩ 2W, see text

Capacitors:
- Cl 200pF silver mica
- C2 100pF silver mica
- C3 2,000pF silver mica
- C4 200pF silver mica
- C5 2,000pF silver mica
- TC1 50, 60, 75 or 10OpF air-spaced trimmer
- VC1 100pF s.w. variable; high quality

Miscellaneous:
- V1 6AG7
- V2 VRI50
- L1, L2 See text for details
- LP1 6.3V 0.3A lamp

Two octal valveholders and indicator lamp holder. Two insulated tags and tag strip. Universal chassis 5 in. x 7 in. x 3 in. with 5 in. x 7 in. plate and extra 7 in. x 3 in. runner (Home Radio). Paxolin tube, dial drive, wire, etc.





With the switch fully turned to its other position the meter reads anode current, the shunt changing the range to 0-100mA. It is necessary to use a three-way switch so that the contacts clear the grid circuit before completing the anode circuit. But if a *break-before-make* two-way switch is to hand this is perfectly suitable.

In use grid current is checked as necessary and the meter is then used to show anode current as previously described.

V.F.O.Calibration

VC1 has a large knob with dial, a reduction drive being optional. It is only necessary to calibrate for one band as 80m coverage is obtained by the second harmonic.

A crystal calibrator or marker is ideal for calibration. Open VC1, tune a receiver to 2Mc/s from the marker and adjust TC1 until the v.f.o. is at zero beat. Mark the dial 2Mc/s. The process can then be repeated at 1.95, 1.9, 1.85, 1.8 and I.75Mc/s.

Divisions are filled in between the calibrated points. The 160m band is indicated from 1.8-2Mc/s on one scale. Each frequency is then multiplied by two and placed on a second scale for 80m. Only frequencies from 3.5-3.8Mc/s (1.75-1.9Mc/s fundamental) should be shown on the 80m range.

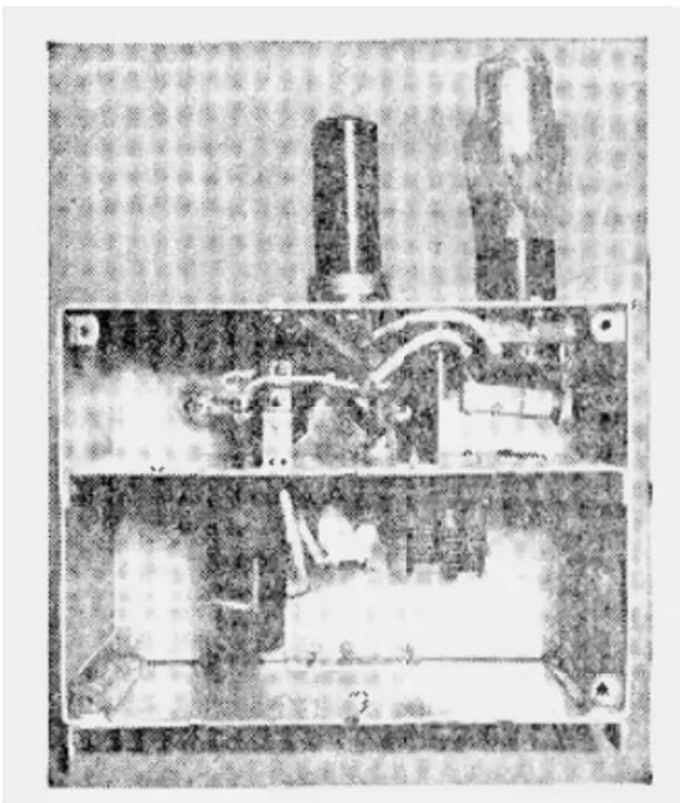
V.F.O.Working

The method of loading up and tuning the transmitter for crystal operation has already been described. V.F.O. working is similar except that any required frequency can be selected.

Fig. 3: Using V1 of the original transmitter circuit (page 855, January issue) as a frequency doubler. Fig. 4: Connections for a two-pole, three-way switch to be incorporated in the transmitter meter circuit to provide indications of grid and anode currents.

If a CQ call is to be made find a vacant channel with the receiver and tune the v.f.o. to this, using the net position of the switch. Then switch to transmit and tune the p.a. as described.

If a CQ is to be answered the v.f.o. is tuned to zero beat with the transmission heard, again using the net position. The p.a. is then quickly tuned with the function switch at transmit. The switch is then returned to receive until the calling station stands by for replies. The switch is then turned to transmit and a reply made. **PW**



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Billy McFarland GM6DX
gm6dx@outlook.com

Plug for Power

Billy McFarland GM6DX solves the problem of using a PC power supply for your transceiver without having to deal with high voltages.

Those regular readers out there will have seen my article in September 2023 called *Makeshift PSU* detailing the step-by-step guide of turning a PC PSU into a power supply for your transceiver. Recently a newly licensed amateur approached me discussing this article. They felt that they lacked the nerves and skills to open up a power supply and hard wire the transceiver's power leads but they had some soldering ability and had access to stock PSU's. This got me thinking of creating an adapter that allows you to plug and power your transceiver without opening up the PSU and dealing with high voltage components.

I started searching online a found the ideal item that could be altered to allow you to simply plug into the PSU, giving an electrical connection point for the transceiver's power leads. So, to get going with this project, the two main items you will need are:

- 1 x XH-M229 Desktop PC Chassis Power ATX Adapter board
- 1 x XH-M229 Desktop PC Chassis Power ATX Adapter board Shell
- The combined cost for these two items was £5.79 purchased from Aliexpress. **Fig. 2** shows these two items when they were delivered.

The build

Open up the packaging and you should have a PCB layout as in **Fig. 3**. You will notice that the post terminals are a bit rubbish quality so the first thing you need to do is remove the post terminals which you are not going to use, i.e. all of them except the 12V+ and the GND terminal. Once you have removed them don't chuck them in the bin as you will need to use some of the washers later. To the top left of the board you will see the power-on button, again this is cheap rubbish so you want to get a set of pliers and pull off the small rocker switch as seen in **Figs 4** and **5**. Now that you have pulled off the switch add a piece of solder between the centre pin and right pin as seen in **Fig. 6**. This will create an electrical connection allowing the board to get power when plugged into the PSU. To finish this off, add some hot glue over this connection to protect it.

Now let's look at the board, remove all the glass fuses and replace the glass fuse behind the 12V connection. For most radios you will need a 25A glass fuse. The physical size of the fuse is 20mm x 5mm and you can get a pack of ten on eBay for £2.80. Take off the two remaining terminal posts and get some of the washers that were on the other posts. Add a washer above and below the PCB and insert the power terminal post back through the board. Fit the nut and tighten up as much as you can to prevent the post from free turning. By adding these washers it will raise the height of the terminal post ever so slightly, which is needed to clear the plastic cover that you will install later. The complete altered PCB can be seen in **Fig. 7.**

The final stage of this project is to assemble the plastic cover. Now don't do what I did when opening the plastic bag containing the plastic cover and screws. I pulled the bag too hard and it burst open everywhere, so take your time. Add the large brass spacer to the corners of the top plastic cover and screw it in place. Now slide over the PCB and then add the smaller brass spacer underneath the PCB. Add the bottom plastic cover over these brass spaces and then add the final screws to hold it in place. That is the cover now assembled and the overall project now complete. It can be seen in **Fig. 1**.

Final notes

A few notes when doing this project. Taking the protective cover off the plastic housing cover is a nightmare. If you can use hot soapy water it might be easier doing that than just simply pealing it, like I did. The PSU that you use must be the ATX connector type, as the board you have bought is for an ATX connector. Add a ring connector to your transceiver's power leads as the length of the power terminal screw is short.

Overall, this is a simple project which can be used to allow a PC PSU to power a transceiver without the dangers of working inside a power supply. As always, any questions please email me at

gm6dx@outlook.com

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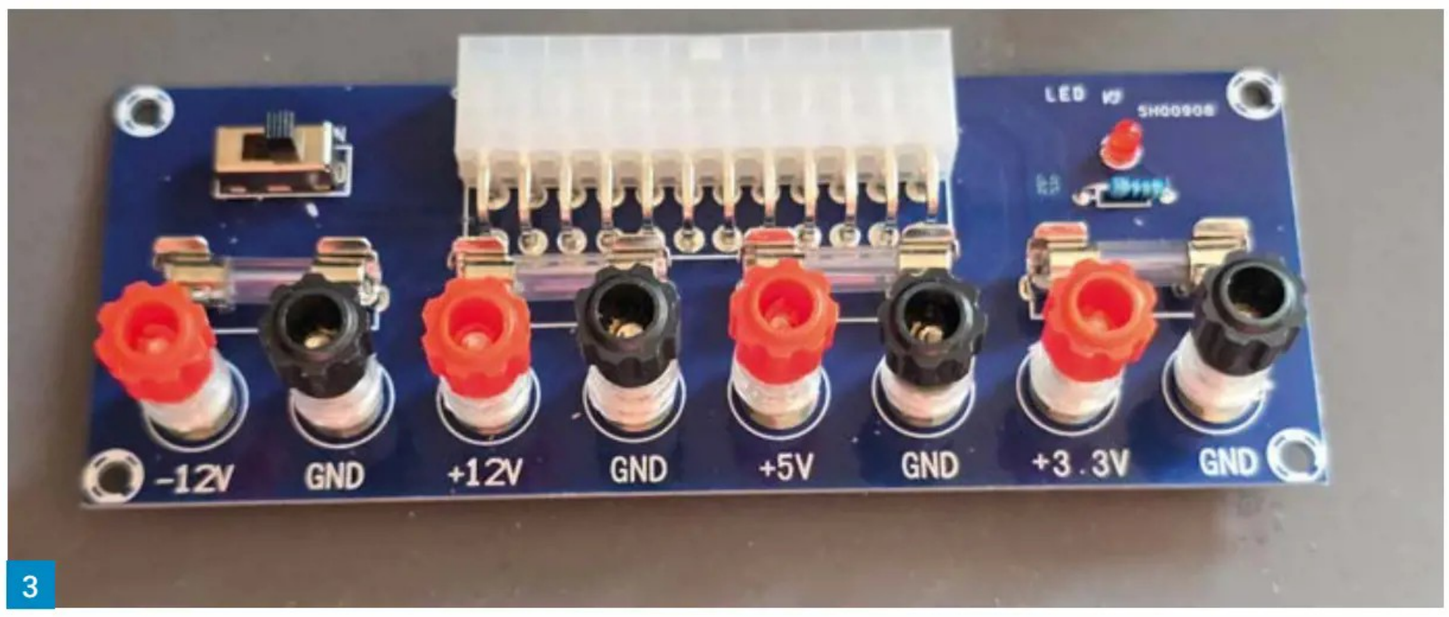

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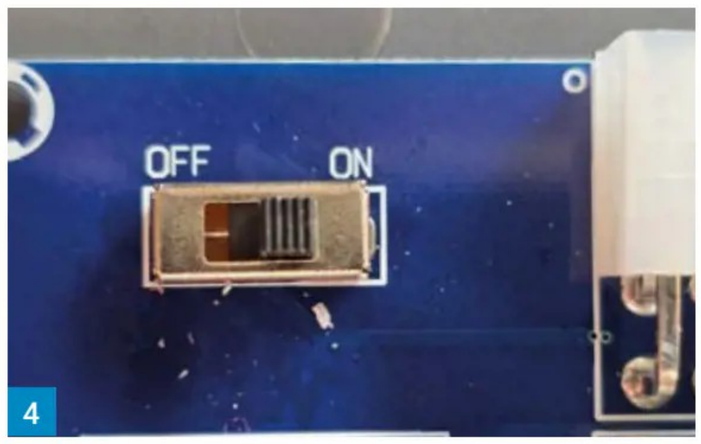
Fig. 1: The completed project. Fig. 2: The items as received from Aliexpress. Fig. 3: The PCB layout. Fig. 4: Before removal of rocker switch. Fig. 5: After removal of rocker switch. Fig. 6: Solder across terminals. Fig. 7: The PCB after modification.



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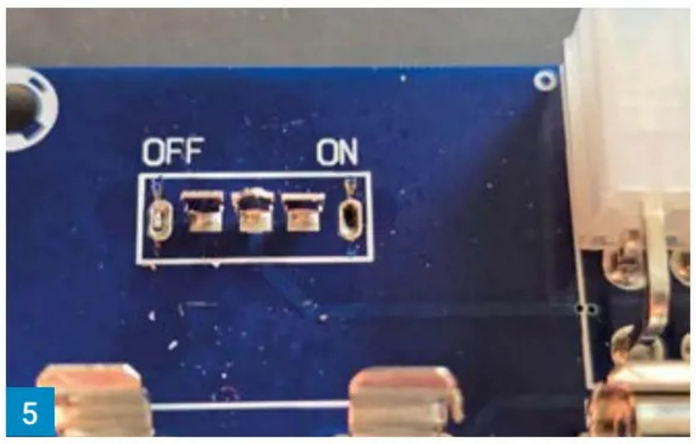

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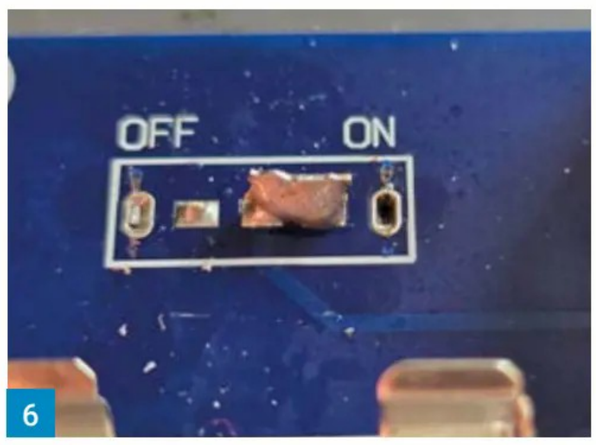

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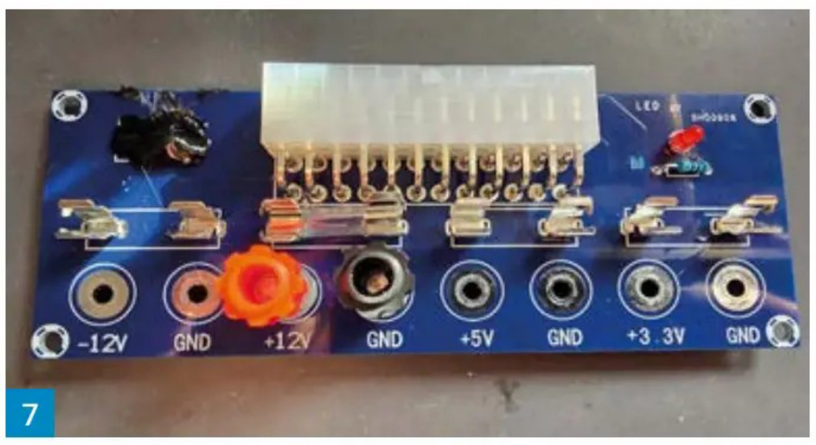

7

News Extra

YEAR-LONG SPECIAL EVENT CELEBRATES BRITAIN'S RAILWAYS: Train enthusiasts credit the modern railways with helping Britain's identity take shape over the decades. The British Railways Amateur Radio Society G4LMR has amplified that message on the air since it was formed in 1966 by a handful of railwaymen who were also amateur radio operators. Now its membership includes any amateurs with an interest in the railways.

A busy and active society with a full event calendar, the group is hosting a year-long special event station GB0LMR, to promote the message of celebration and mark 200 years of modern railway service. The station is on the air through to the end of 2025. If you have an interest in trains, or just in history, this is just the ticket.

More Information:
https://www.qrz.com/db/GB0LMR

HAM RADIO OPERATORS SERVING DURING CALIFORNIA FIRESTORMS: As the firestorms across Southern California continue to threaten millions of residents, trained amateur radio operators are serving critical volunteer roles to help officials spot fires before they get out of control. Dry conditions and wind gusts of up to 100 miles per hour have fuelled days of devastating wildfires. Entire neighbourhoods have been levelled by infernos.

The Eaton fire burned to the top of Mount Wilson, a critical logistical post for broadcast radio and television stations, as well as communications across the Southland. Federal agencies, air traffic control, local emergency responders, radio amateurs, and others all share tower space on the mountain.

While the main fires have been burning north and northwest of the central section of Los Angeles, just to the south, hams are standing watch. Orange County Fire Watch (OCFW) is a program locally organised by the Orange County Parks Department and the Irvine Conservancy. During severe fire weather, volunteers go to preassigned locations within parks and open spaces to report conditions. Many of them are hams, using the amateur radio bands to fill in mobile network weak zones.

ARRL National Instructor Gordon West WB6NOA is among the deployed volunteers. He said hams are stepping up. "We're all over the ARRL Orange Section on hilltops, reporting the wind and humidity, ash seen coming down, scanning for spot fires (none so far), smoke from the LA fires, guest activity at the parks, and being a presence at trailheads with reflective vests and vehicle signs indicating Fire Watch," he said.

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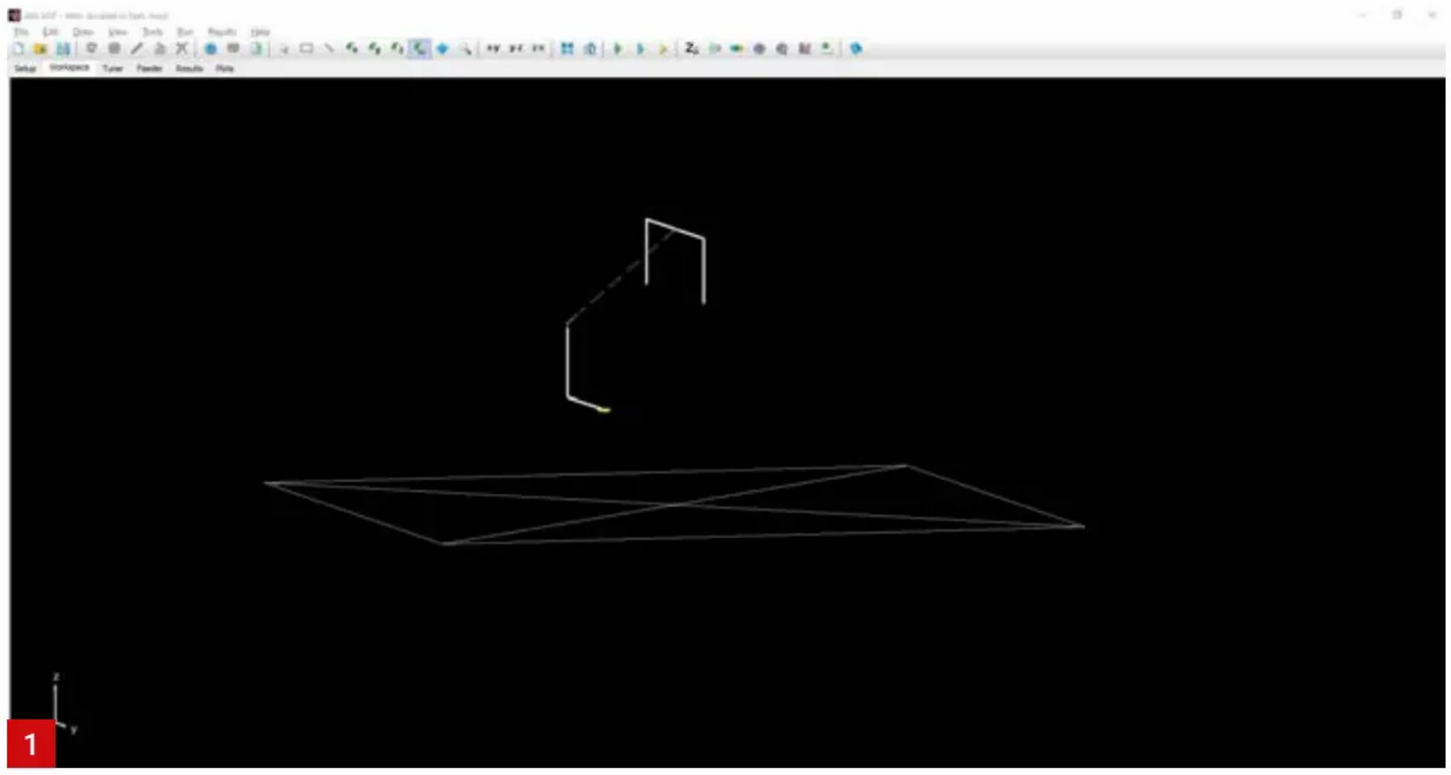
Keith Rawlings G4MIU
keith.g4miu@gmail.com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An indoor doublet

Keith Rawlings G4MIU creates an indoor doublet as a back-up antenna.

As I start to write this month's column it is 7 December 2024 and storm Darragh is raging. My recently installed attic flower Pot antenna for air band is working well and I have been listening to Stansted airport and Essex radar on my R532 receiver while monitoring numerous aircraft, as displayed on Global ADSB exchange, performing missed approaches due to the gales.

https://globe.adsbexchange.com

I have already taken down my HF OCFD due to last week's storm Bert, because as regular readers may remember, I cobbled together a couple of flimsy poles to mount it on and I have yet to improve them. So rather than have something break I have taken them down.

As today was a good day to sit on the radio I temporarily strung 33ft of wire out of the upstairs shack window and tied it to the branches of a holly tree in the garden. I fed it through my version of the ARRL Half-Wave End Fed transformer and it got me working on 20m and above OK, but not surprisingly performance wasn't sparkling due to its height and despite adding a counterpoise and common mode choke immediately after the transformer I suffered a degree of RF feedback when running 100W.

As I still don't want to install any permanent antennas outside my thoughts turned to trying out an experiment by mounting an HF dipole in the attic, which could act as a 'stand-by' for when the next, inevitable, storm arrives so that I could at least operate. The ridge of the roof of my house is about 30ft (9.1m) high. Inside, from end wall to end wall, I have a length of about 23ft (7m), and a height of 10ft (3m) from the apex to the flooring boards.

It did pass my mind that I could have run a loop around the floor but to get as much height as possible I elected to run a dipole just under the apex.

A 23ft dipole didn't sound too impressive but as it is acceptable practice to 'drop' the ends of a dipole down I decided that I could add 5ft (1.5m) to each leg and have them run down the inside of the end wall, this would give me 33ft (10m) for a 20m dipole.

The middle point of the attic would be at 11.5ft (3.5m) and I could easily run some coax down a rafter to the edge of the floor and feed it through an existing hole in the ceiling plasterboard that comes out in a fitted wardrobe in the spare room, which is also a shack!

So, this would give me a dipole that should work ok on 20m but I began to wonder that, if instead of coax, I used some open wire feeder and a tuner (matching unit), I might persuade the dipole to work on other bands.

I knew I had some 300Ω slotted ribbon feeder that would do the job. An issue is that it would mean running the feeder away at the angle of the roof (not too much of a problem) but then, though the hole, down the inside of the cupboard and along the back of the desk to the radio, a run of about 17ft (5.2m).

Having the feeder close to and touching objects was probably not exactly ideal so I decided I would run a short length of ribbon feeder just under the roof, away from the dipole at an angle, and connect it to an air cored 1:1 BALUN. I could then run what would be a 17ft length of good quality RG213 through the hole and on to the radio.

The BALUN and coax would very likely have a very high VSWR placed upon them; hence the use of an air cored BALUN rather than one with a ferrite core, and with just a short run of RG213 the losses on the coax would not be too high, hopefully.

The basic layout can be seen in **Fig. 1** as an AN-SOF model.

A winter project, an attic doublet

The dipole had now morphed into what I suppose could be called a doublet and it would be mounted in the rafters as high as possible, achieving about 30ft above ground level.

It would have a top section λ/4 long at 20m, with 23ft of straight wire and 5ft drop at each end. There would be a run of open wire feeder of 13ft running away at an angle that matched the pitch of the roof. This feeder would terminate in the 1:1 Balun.

The layout is depicted in Fig. 1 where the part that looks like a goalpost is the dipole element with the ends dropping down. The section with dashed lines is the 300Ω feeder and the lower 'L' shape is the modelled RG213 50Ω feeder.

The Balun is at the intersection of the open wire feeder and RG213.

In the case of an attic antenna there are a lot of factors that will affect how well it works, at least in my case there are!

Firstly, I have a number of other antennas mounted up there. In the middle, right where the centre of the doublet would be is a VHF/UHF discone. Along from this are the airband flower pot and a few feet across from this a homebrew dual-band 2m/70cm vertical. Along from these two is an ADSB antenna and 137MHz Turnstile, at the other end of the roof space is a 5-element fixed 2m beam and, of course, a TV antenna! Along with nearly a quarter of a century of acquired junk piled up, things are rather cluttered.

Then there is the roof construction itself and the house ends are blocks rendered with cement over, I believe, galvanised wire mesh which adds another complication, would this interact with the ends of the wires hanging close to it?

Construction

I used some 1.24 mm 'lightweight' stranded hook up wire for the antenna. I have a large reel of it and would not usually utilise it for an antenna but as it would not suffer exposure to the outside weather I decided it would be adequate for my purposes.

After saying that I had some 300Ω slotted feeder I then realised that it was in the same place as my mast, stuck above the garage with an immovable vehicle in the way (I have at least bought a new fuel pump for it now) but what I did have to hand, left over from an earlier project, were some 3D-printed spacers with holes spaced 13mm for making up 300Ω line. So, I would use these spacers and the hook-up wire to make my own open wire line.

I cut two lengths of the wire at 16.5ft. for the dipole and two lengths at 13ft for the line, the latter being the measured length from the apex

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Fig. 1 AN-SOF layout of the Attic Doublet.
Fig. 2 Assembled antenna lying on the ground.
Fig. 3 Centre mounting point on the rafters.
Fig. 4 VSWR plot from 13-55MHz.
Fig. 5 PSK Reporter page showing signal coverage on 10m. Fig. 6 Combined PSK Reporter image showing coverage of 15m top, 17m middle and 20m bottom.

to the floor following the line of the rafters. I then threaded the 13ft wires through the spacers with one at about every 12 inches or so. **Fig. 2** shows the completed antenna.

Installation

I eventually found time to climb up into my attic just before the New Year and installing the antenna was simplicity itself. I used a heavy-duty stapler gun to fix some string to the rafters at the midpoint and both ends of the attic. The string was attached to a spacer at the midpoint and then the ends were strung out to the end walls and fixed in the same way, see **Fig. 3**.

With some contortions that would have made an Olympic gymnast envious, I strung the feeder down to the point where the roof met the house wall to attach the balun and to solder on a connector to the RG213, which I had already put in place in the shack and also fed though the hole in the cupboard ceiling.

Out of interest I ran a sweep of the VSWR from 13MHz to 55MHz, which can be seen in **Fig. 4**.

Clearly, with the exception of 17m, the lowest VSWR points are not close to any amateur band but as long as a matching unit could cope this wasn't a worry.

Fortunately both the internal matching unit of my FT-990 and also my manual FC-707 were able to match the antenna on all bands from 20m and up with a VSWR of 1:1. I chanced my arm to try and match the antenna on 60, 40, 30m and I was pleased to find I could get a match of 1.6:1 or less on these bands although when using the manual FC-707 tuning was extremely tricky.

I was also pleased to find that, unlike the OCFD and the temporary end-fed; I had no RF feedback even when not using the Common Mode Choke.

Initial evaluation

I don't have a data cable for my FT-990 (yet) but I do for my FT-857D so I pressed this into service on FT8 using the FC-707 matching unit.

Starting off on 14MHz in the late afternoon within a short space of time I had worked a number of stations across Europe. A quick change to 21MHz brought me Greece and Bulgaria and then, after swapping to 18MHz, a couple of Ukrainian stations, UX3HX and EM7YOTA. I tried 28MHz but despite calling a number of stations stateside I had no success even though my signals were being heard over a lot of the USA, Fig. 5.

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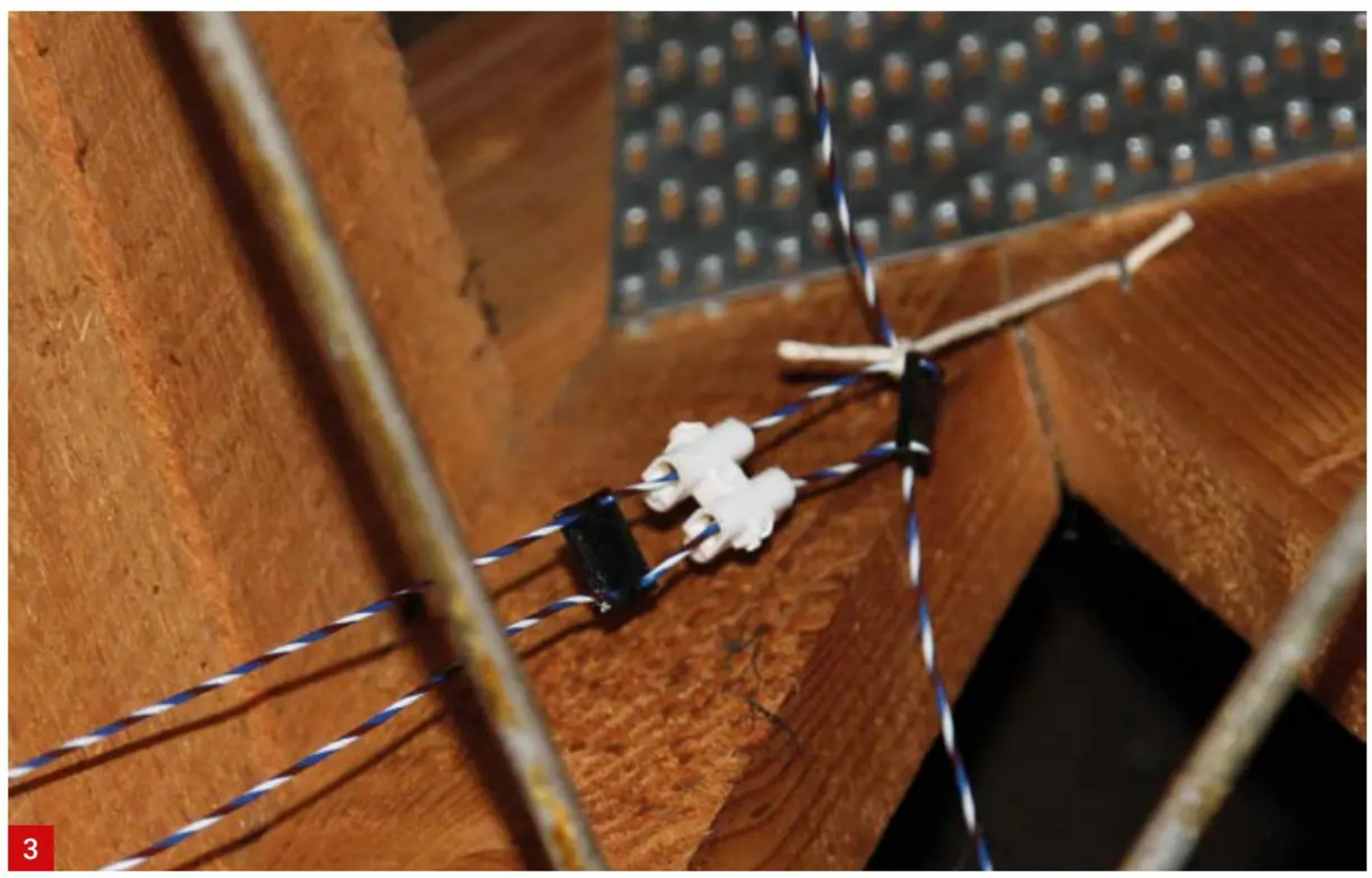

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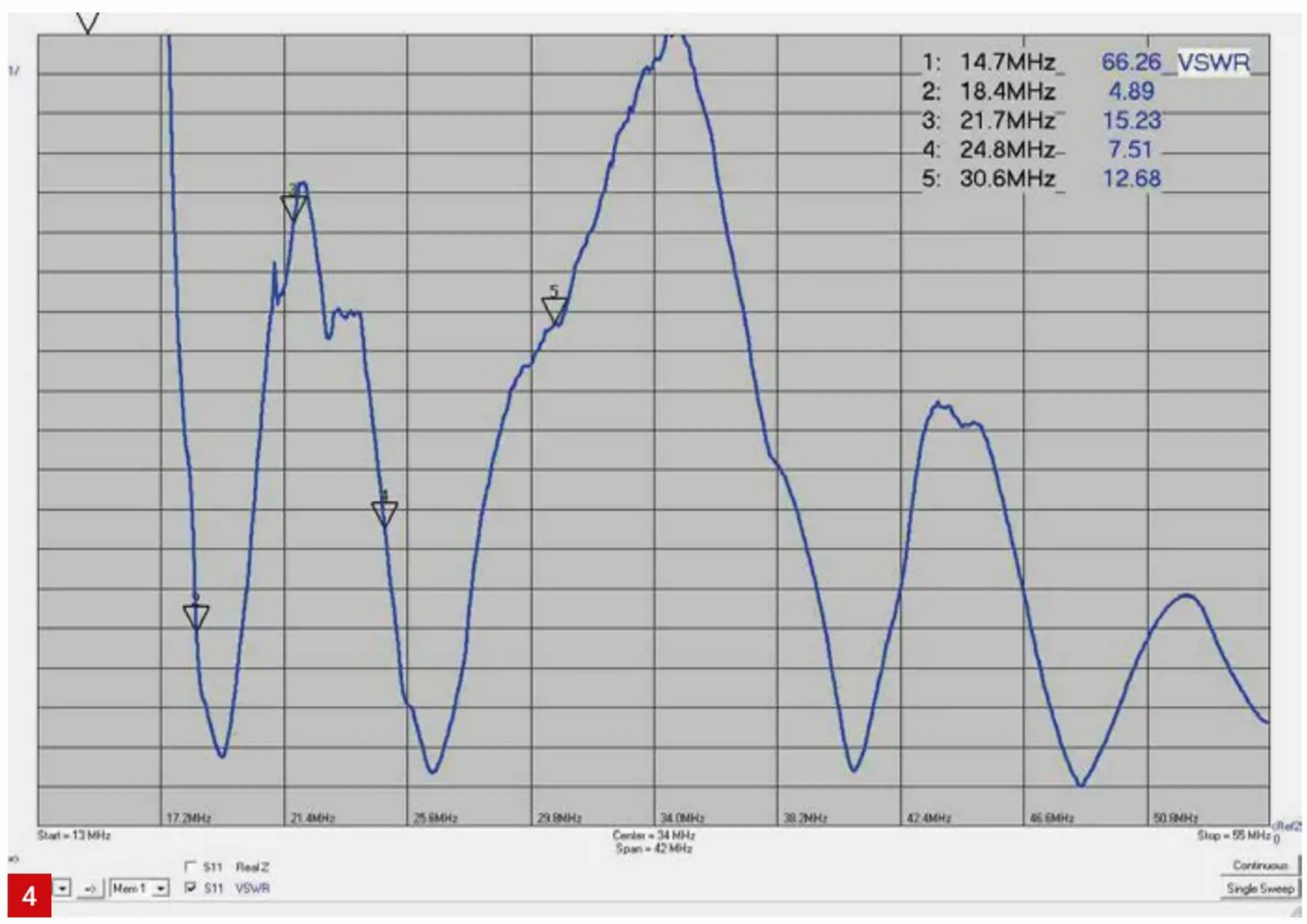

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As darkness was approaching I tried the lower bands. 7MHz brought me 8S2A, 9A3AUH, F5MYH, DA1MHH and SP5AA in quick order. 5MHz gave QSO's with Germany and Poland. I then went on to 10MHz to work 5B4AMM.

On the lower bands (With the exception of 80m where I could not get the FC-707 to provide a decent match) PSK reporter 'reported' large clusters of stations in Europe that had heard my signals.

All of these contacts occurred within an hour and a half of installing the antenna and with pauses to take notes and drink a cup of tea!

After using the antenna over a couple of weeks I'm quite happy with it and have made many contacts on all bands from 40m to 10m.

Like many amateurs I am restricted by very high noise levels. On the OCFD the minimum noise floor is S9 on all bands except 21-24-28 where it is slightly lower, but not by much. To negate this I have to use noise cancelling, which helps.

The attic doublet suffers similar levels and I presently do not have a noise canceller in circuit with the FT-857D.

That I have only been able to work the stronger signals is an indication of how limited my operation is thanks to noise.

Looking at PSK Reporter plots, **Fig. 6**, it can be seen that my signals are being heard across a number of continents on the upper HF bands at least, so this simple antenna seems to work well, I am just not hearing many stations coming the other way due to QRM.

Considerations

There are some considerations for attic antennas.

The roof structure and nearby objects will affect the antenna. EMF levels need to be considered as people may be closer to the antenna than they would be when it is located outside in the clear. There are possible issues of loss due to the roof tiles being wet or covered in snow, although at HF this may be minimal.

Another issue may be a risk of fire if running high power, although I've never heard of this happening.

I should add that although I used 13mm spaced feeder, wider spacing can be used.

For the small effort involved I now have a good back-up antenna, which is unaffected by weather, unless a storm blows the roof off!

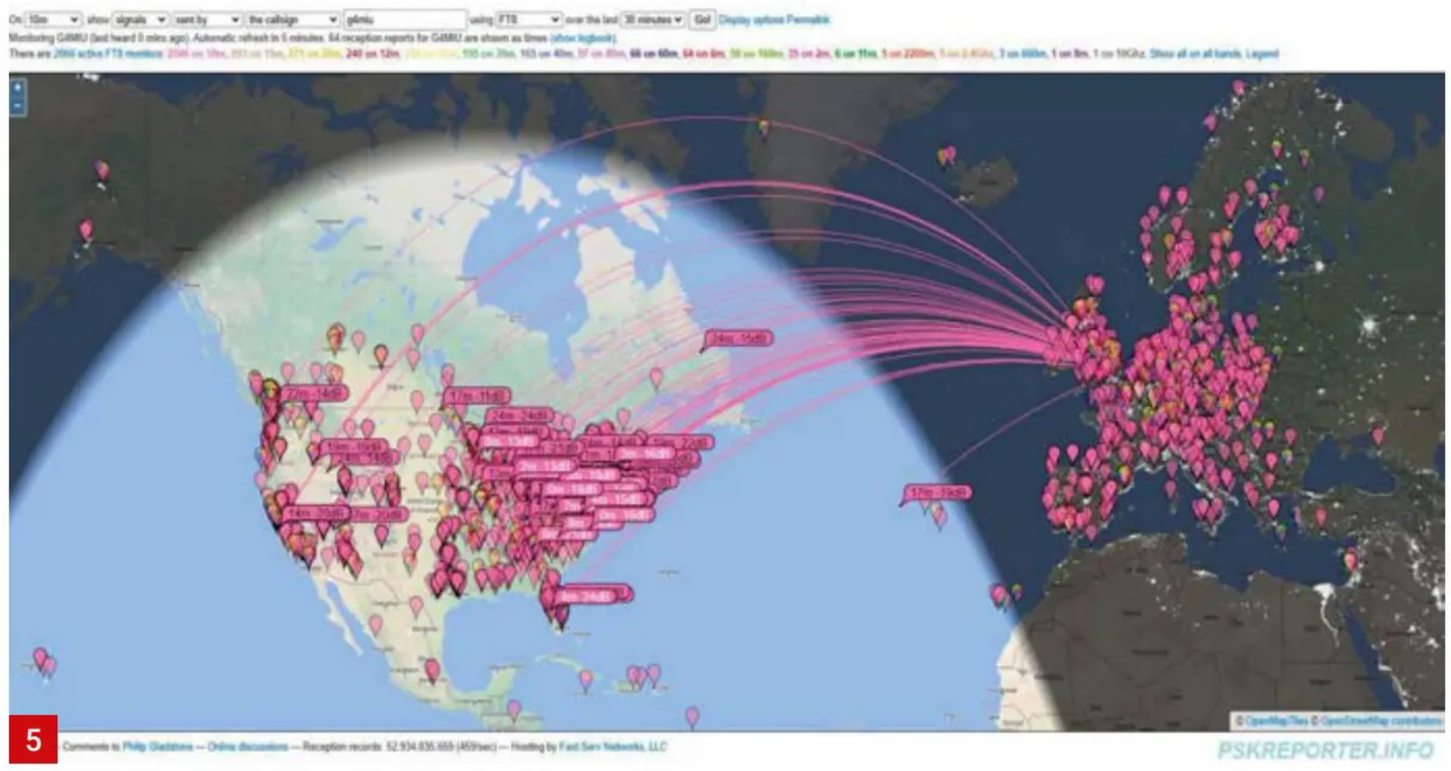
I would be interested to hear from other readers with their experiences of attic antennas.

One last sad piece of news as I write this is that I have learned that **Frits PA0FRI** became SK in October 2024. Frits ran an excellent website with a lot of homebrew content including a detailed description of an Active Loop.

I understand the website will be kept running despite his passing.

https://www.pa0fri.com/

See you next month. **PW**



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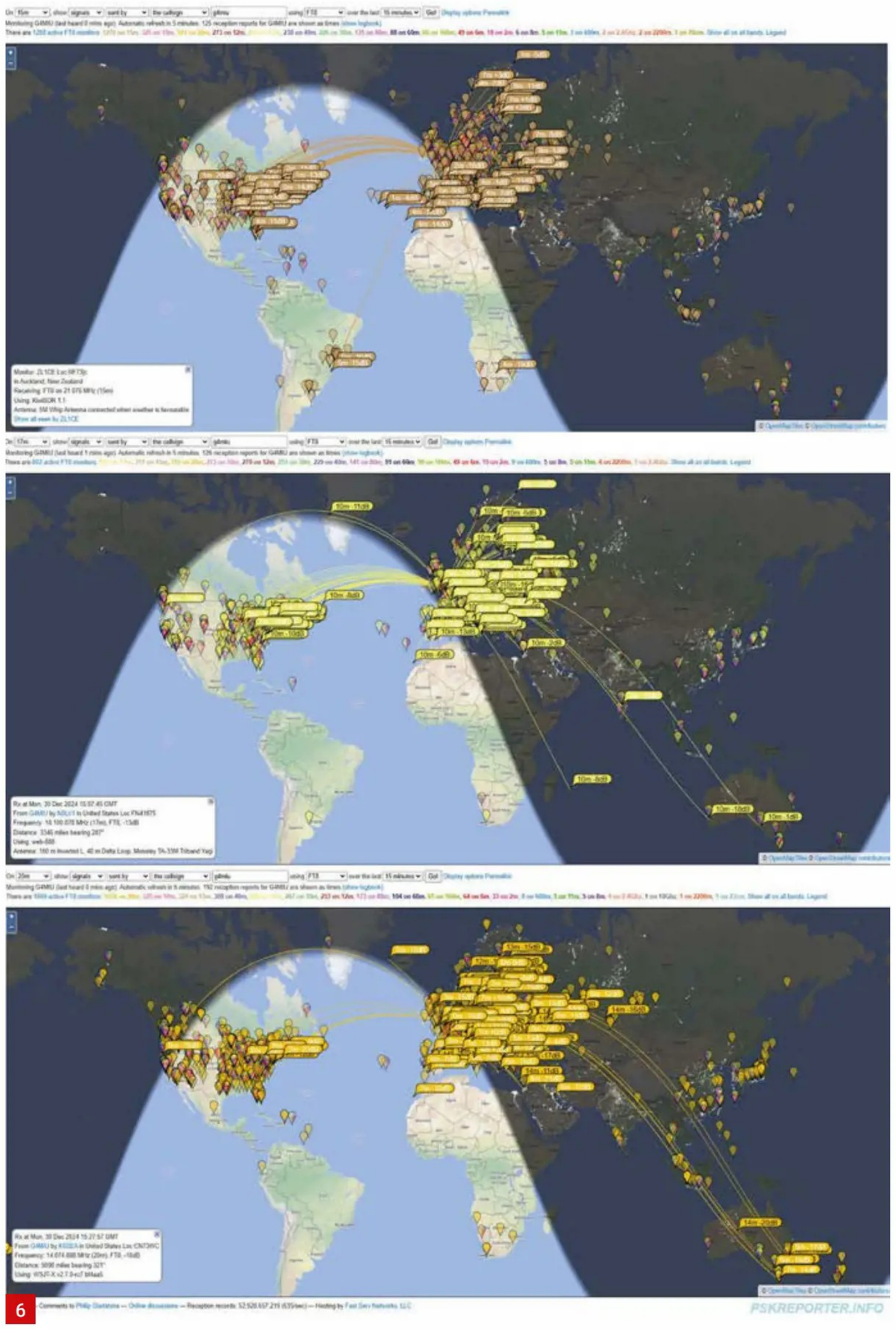

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Tim Kirby GW4VXE
gw4vxe@icloud.com

1

Much ado about meteor scatter!

Tim Kirby GW4VXE has a packed column, starting with news about meteor scatter.

Later on in the column, you'll read a lot about meteor scatter, including some information which certainly made me stop and think and I've been enjoying operating meteor scatter since the mid-1980s! But lest you think that very complicated equipment is needed to find out about meteor scatter, I connected my 2m receiver, linked to my PC running the WSJT-X software to my V-2000 vertical during the Geminids meteor shower in December and was very surprised just how many stations I logged! I've included a map, **Fig. 1**, of the stations I logged. I did the same in the Quadrantids shower in January too, although the results were not quite so good. Perhaps I missed the peak of the shower.

Remembering Gaston Bertels ON4WF

Jef Vanraepenbusch ON8NT writes, *"From 25 December 2024 to 5 January 2025 the Expedition 72 Series 23 SSTV experiment consisted in 12 pictures celebrating ARISS memories of 2024.*

*"One of the pictures was a tribute to **Gaston Bertels ON4WF** who became a SK in December 2024 at the age of 97 years. Gaston received his licence in 1955 and was awarded the **Roy Stevens G2BVN Memorial Trophy** of IARU Region 1 in 2014 for his invaluable inspiration and contribution to amateur radio. Gaston was the founder of the ARISS-project (Amateur Radio on the International Space Station). For his contribution to hamradio in space projects Gaston ON4WF received in 2008 the Horkheimer trophy from the DARC (German amateur radio society). His knowledge of radio telecommunications was respected in Europe and elsewhere, allowing him to lecture on amateur radio in space to members of the European Parliament. His personality radiated hospitality to all. He was a friend, a leader and an inspiration to us all".*

The 8m band

Roger Lapthorn G3XBM (Cambridge) has modified his QMX+ transceiver to operate on 8m and with 2W and a low dipole has been spotted in the Dominican Republic, Puerto Rico, USA and Greenland.

Kelvin Weaver F4VPC (Brittany) has installed a modified CB vertical to listen on the band and has already heard the ZS6WAB beacon over the festive period as well as hearing XE1KK at very good strength over the first few days of the New Year. He writes, *"I'm using an SDRPlay RSPdx as a panadapter with a smallish span covering 40MHz looking at beacons etc"*.

Paul Farley G7PUV (Sussex) operating as **G9PUV** says that the conditions have been quite quiet on the band with a lot of the strong F2 backscatter gone and the trial access for the Italian stations having ended on 31 December. Paul says he kept a note of the activity from Italy and worked 64, part worked another two and in total, he noted that 125 stations had been active on the band. Let's hope they will return! Paul worked another new country, Galapagos, thanks to HD8FG (EI49) on 30 December and says that in the last few days, OX3HI (GP47) has put a Web-888 receiver online, which Paul says has been flagging his signal as the path opens to North America. On Saturday 11 January, Paul noticed several hours of Es and besides logging the S55ZMS beacon he worked **Joze S51ZO** on SSB.

The 6m band

Jef ON8NT (Aalter) caught an opening on 3 December, working UN7LZ (MO13), UN9LEI (MO22) and UN9LCW (MO13).

Ian Bontoft G4ELW (Bridgwater) worked VE2XK on 30 December, while running 25W to a loft mounted HB9CV.

Roger G3XBM was heard in Canada using QRP FT8 on 8 January and says that it was his first time 'across the pond' in 2025.

Kelvin F4VPC was active during the New Year's Day Aurora and was surprised to find it reaching so far south. Kelvin says it wasn't as good to the East as the 11 May aurora, when he worked S59A, it was good to the north and he made a number of excellent QSOs into the SM5 and SM6 region.

Kelvin also sends his DX loggings, and it's fascinating to see how propagation can be stronger just a comparatively short distance south of the UK. 20 December, PY8WW (GI58) was very loud, so they QSYed from FT8 to SSB where signals were 59 both ways; 24 December 9K2GR (LL49); 25 December 4E1FKB (PK04); 26 December XV9T (OK33), 9V1XX (OJ11), DU0A (PK03), ZL3NW (RE66) (one decode, likely MS assist), 4X & 9K stations loud, VK5XDX, VK5PJ VK5SFA (PF95) and VK5AKK (PF94); 27 December DU0A (PK03), W1 and VE1 – the start of almost daily openings into January; 29 December - many pings on 50.145 with the beam towards North America – Kelvin says there is a USA-wide ragchew net on this frequency which can give clues that the transatlantic path is about to open. From 1315 to 1816UTC Kelvin found the band open to W0, W1, W3, W4, W5, W8, W9, VE1, VE2 and VE3 and heard many North American beacons. He spent most time calling CQ on CW but with little success until 1803 when he worked AC4TO (EM70) on both CW and SSB; 30 December once again there were many pings on 50.145 and the band was open between 1426 and 1803UTC to W0, W1, W2, W3, W8, W9, VE1, VE2, VE3, VE4, VE9 and UT1FG/MM (FO60); 31 December the band was open between 1248 and 1648 to W0, W1, VO1, VE1, VE2, VE9, UT1FG/MM (FO60) and HC1 – Kelvin worked W1MU (FN53) on CW at 1529UTC; 1 January 9K2 stations and a short North American opening to the East Coast, Quadrantids MS and an

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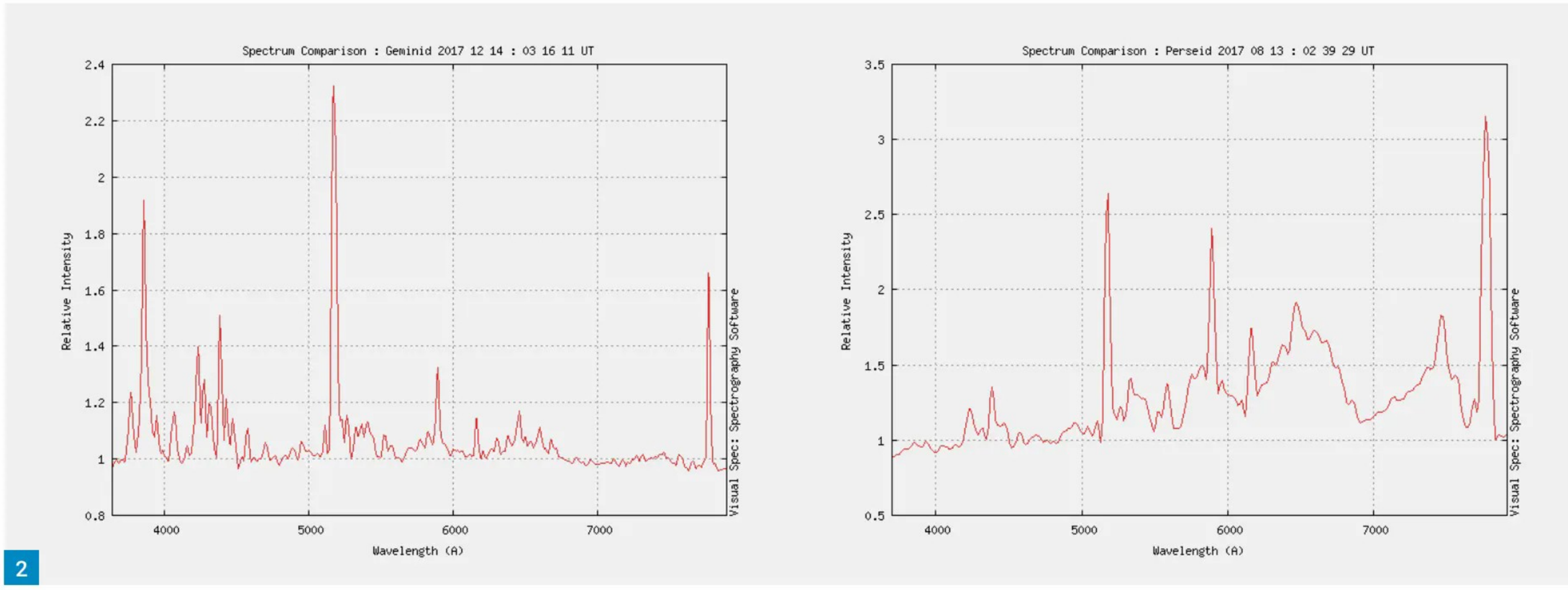


East Coast US opening in the afternoon. From 1439 to 1804 there was Aurora, Kelvin made 34 QSOs to G/GM/GI/EI/F/PA and DL with the best DX SM5EPO at 1837km; 3 January many stations received via MSK144 MS, SM4AXY (JO79) on CW MS, M0XXQ (IO94) via SSB MS as well as DU/PE1NSQ (PK10), 9K2GR 9K2YD (LL49), VK6KXW (OF87), VK6IR (OF77), VK6OX , VK6DU an TZ6HY beacon (IK52), Afternoon NA opening VE9 thru W5; 4 January many MSK144 stations, HK3W (FJ34), TI2AA (EJ79), NP2EI (FK68), KP4EIT (FK68), TG9AJR (EK44), XE3N (EL60) and a late afternoon short NA opening to the East Coast; 5 January VK3FZ (QF22), VK3OTR (QF02), 3W9T (OK33) and a short afternoon opening to the East Coast North America.

Phil Oakley G0BVD (Great Torrington) had a quiet month, working a solitary MW station. Phil missed a brief opening to Australia which had faded by the time his amplifier had warmed up.

Roger Greengrass EI8KN (Co Waterford) worked UK8FF (MN60), VU4A (NK62), RN4HIN (LO52) and UA4CC (LO31) along with a couple of W1 stations on 3 December. Roger also made a good number of MS QSOs during both Geminids and Quadrantids showers, although he found the Geminids the better shower.

Here at **GW4VXE** (Goodwick) it was fun to make my first Auroral CW QSOs in many years on 1 January, working GM3WOJ (IO77) and SM6LJU (JO58). I was pleased to catch a brief F2 opening on 10 January, working a few W1 and VE1 stations on FT8.

The 4m band

The only person to mention the band is Roger EI8KN who made meteor scatter QSOs with DK2GOX (JN49) on 2 January and with OZ400POST (JO55) on 3 January.

The 2m band

Jef ON8NT enjoyed the Christmas tropo, working F6DBI (IN88), DK1FG (JN59), G7RAU (IN79), EI4ACB (IO62), OZ400POST (JO55) and G0JCC (IO82) on Christmas Day. Next day, Jef worked OZ1BEF (JO46) and then on the 28 December, GW4HDF (IO81).

Fig. 1: Stations received on a simple vertical via 2m meteor scatter by GW4VXE. Fig. 2: Screenshot of a 70cm meteor burst from OK1TEH as received by Bill GM0ICF. Fig. 3: Contrasting the energy of two different meteor showers, the Geminids and the Perseids. Fig. 4: The full set of pictures transmitted during the recent ISS SSTV experiment, received by Dave M0GIW.

Ian G4ELW says that the Aurora on New Year's Day, 2025 was his first experience of auroral CW, hearing G4KUX (IO94) with a strong CW signal but with a raspy tone rather than the usual T9 note. As Ian notes, in this case, it's usual to send an RST report of 59A (for example) with the A standing for 'Auroral'. Ian says that, unfortunately, the opening faded quickly after he switched on the rig, but he is looking forward to making an Auroral QSO in the future.

Stewart Cooper G4AFF (Norfolk) caught the tropo on 26 December, working EU6AX, LY2R, LY3BRA, SP2ERX, LY2LE and UA1WCF as well as assorted SP, GU, PA, SM and F. Stewart heard an RA3 but could not work him.

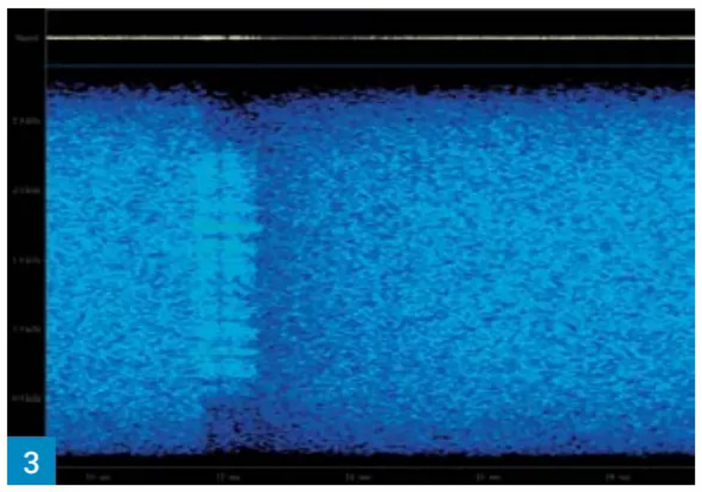
Roger EI8KN was active during the tropo on 10 December with QSOs with SM, LA, OZ, GM as well as ES5GI (KO38).

It was good to hear from **Peter Atkins G4DOL** (Dorset) who has been busy getting going on the digital modes with his FT-847 and has been working FT8 as well as MSK144 during the Geminids and Quadrantids. Stations worked in the Geminids include F6HRE (IN93), CT7BIZ (IN60), EA4GDA (IM68) and CT7BJG (IM57) and CT7ABA (IN60) during the Quadrantids.

The 70cm band

Bill Ward GM0ICF writes, *"I exchanged a few more emails with **Ingolf SM6FHZ** (JO67) (1039km), and he agreed to try another 70cm MS QSO to see what the differences would be between the streams.*

"I was looking to see if there would be any more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of the long bursts like the Perseids but it was not to be. With the velocity of the Geminids being approximately half of the Perseids the kinetic energy, mass for mass, available for ionisation is only a quarter. Therefore, the scattering characteristics are completely different and this was obvious!

"The bursts were very short, lasting only a few hundred milliseconds and a few dB above the noise. It was a real struggle and the QSO took 2 hours and 5 mins to complete.

"Another contributing factor to the difficulty was the path geometry. Due to the position of the radiant, the fall of meteors was not optimal for our relative positions.

*"Shortly after, I had a sked with **Matej OK1TEH** (JO70). Things were much better path geometry/ radiant wise and the QSO was completed in 1 hour 25min. The bursts were of similar durations but a few dB stronger and slightly more frequent. There was one burst of note that was the final RRRR's. This lasted around 1 second and was at +8dB. This is now my best DX on 70cm MS at 1419km. I've attached a pic of that burst from the audiogramme software".* (**Fig. 3**)

I was interested in Bill's statement about the varying levels of kinetic energy available from the two showers. I had always thought that, radiant direction and hourly rate aside, one meteor shower would be like another, but this made me think again!

Bill kindly wrote a little more, *"I was browsing through older meteor observations and I came across these graphics.* (**Fig. 2**) *They sum up quite nicely the point I was making about the energy*

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deposited in the atmosphere due to the difference in velocities of the various meteor streams. These are spectrum graphs and normally I'd be more interested in the 'blue/green end' that is toward the left, however in our case the thing to look at are the huge differences in atmospheric emissions towards the right-hand side of the plots. the first is a Perseid Spectrum and the second is a Geminid spectrum.

"This illustrates the considerable additional energy dumped into the atmosphere causing the large amounts of atmospheric emissions in the red and near infra-red by faster meteors giving proportionally more ionisation. In reality, though, almost all of the energy, approximately 90 - 95%, is dissipated as heat, with the atmospheric gases getting up to thousands of degrees. It's absolutely fascinating stuff".

Perhaps this was obvious to other readers and I am behind the curve, but I learned something here – thank you, Bill!

It was really good to hear from **Reg Woolley G8VHI** (Nuneaton). Reg writes, *"Well to say 432 has been good the last months would be putting it mildly. Over the past year or so I have done a few major upgrades to 432. It definitely has paid off!"*

Back at the end of October, Reg worked SP9EMF (JN99) and SP8K (KO10) for grids 186 and 187 respectively. On 11 December, Reg worked LY1CR (KO15) for 188. Then on Boxing Day 2024, EW6FS (KO35) for 189 and a new DXCC (#27) and EW6D (KO55) for 190. Reg worked RA3LBW on 2m FT8 and wondering whether he might have 70cm, sent 432??? for a couple of periods. Shortly, after, back on 70cm, Reg had a single decode from RA3LBW – and then nothing. However, about 20 minutes later, Reg was delighted to work RA3LBW (KO64) for grid 191 and another new DXCC, at a distance of 2204km. Even better, RA3LBK (KO64) came up as well and was just a little further away at 2291km. Reg also worked LY2J (KO14) for grid 192 around the same time. He says there were many SP, LY, DL, SM and OZ stations around. One of Reg's radio 'neighbours', G8SEI also worked into UA3 on the band, but other stations to the east of Reg could not see the DX – a case of a duct passing over areas and breaking around Reg's location, perhaps.

All the QSOs were on FT8. Reg runs an FT-897 with 250W to 2 x 23el elements and a masthead preamp.

Dave Ackrill G0DJA went out portable on 70cm FM on 28 December 2024 running 25 Watts to an X-200 (4 x 5/8th wave on 70cm) vertical at 4m AGL from a spot near Owler Bar in the Peak district. Dave made 12 contacts, with the best DX being M0IID (JO02) at 210km, but with a number of stations at a good distance.

Dave says that the next **433 Alive** event is planned for Saturday 22 February between 1200 and 1500UTC but those are only guideline times, it's not a contest so people can operate outside those times if they wish.

Stewart G4AFF found a good opening on 10 December, working various SM, ON, OZ, DL and EI3KD, SO3Z and OK1OTM on FT8.

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Roger EI8KN worked OZ7KJ (JO46), OZ9ZZ (JO46) and OZ1IIL (JO47) on FT8 as well as a number of UK stations in the UK Activity contest on 10 December.

Satellites

Jef ON8NT monitored ARISS QSOs on 4 and 9 December. Using FT8, Jef worked W2GDJ (FN32), LB2WG (JO59), G1YEF (IO83) and LY1R (KO14) on RS-44; LB2WG (JO59) on MO-122 and LB2WG (JO59) once again on JO-97.

Dave Ryan M0GIW (Doncaster) enjoyed the ARISS SSTV event over Christmas and New Year and received all 12 pictures in the set, **Fig. 4**.

Patrick Stoddard WD9EWK (Phoenix) writes, *"It is wintertime here, finally. Still working satellites, and there are still stations going out and operating from different places.* ***Mark VO1ONE*** *(also licensed as N8TLV in the States) was working FM satellites from Newfoundland during the holiday period, including working some European stations on SO-50 from grid GN37.* ***Jonathan N4AKV*** *and* ***Jerry W8LR*** *have also been driving around to activate different grids.* ***Endaf N6UTC/MW1BQO*** *and I made our annual December run to the edge of California's Mojave Desert to activate some grids out there.*

"In mid-December, I made a multi-day road trip to Las Vegas and southern California. I first went to Las Vegas, visiting rover ***Phil AK8CW*** *and his wife, operating from the DM25/DM35 grid line in northwestern Arizona on the way to Las Vegas, and then from the DM25/DM26 grid line in Las Vegas as I left the city. In California, Endaf N6UTC/MW1BQO and I went to the DM15/DM16 grid line near the north end of the Mojave Desert for a few hours of operating. N6UTC and I made a packet contact through NO-44, while we were both standing on the DM15/DM16 grid line. We also made terrestrial contacts on five bands (2m, 222MHz or 1.25m, 70cm, 900MHz or 33cm, and 23cm). Later that Saturday afternoon, we stopped in the town of Trona, where N6UTC worked a couple of passes.*

On the next day, a Sunday morning, we drove to the DM14/DM15 grid line near the town of Boron, next to Edwards AFB northeast of Los Angeles. Around this grid line, we worked satellites, and made terrestrial contacts on bands from 2m up to 23cm, putting grids DM14 and DM15 in our logs for those bands, as well as via satellite - including NO-44! Even with fewer satellites available, this was a successful trip for us. I drove over 1500 miles in four days, operating from six grids in three states (Arizona, California, and Nevada), while N6UTC operated from three grids".

D-STAR

Jef ON8NT took part in the D-STAR QSO Party held between 27 December 2024 and 5 January 2025 organised by Icom. Jef exchanged 59 pictures on REF055D worth 10 points each and also made seven phone D-STAR QSOs. Jef says that he had a lot of fun, with many new stations trying picture exchange for the very first time and receiving help from more experienced hams.

UKFMDXWatchdogs

If like me, you enjoy listening to the low VHF bands, between 30 and 50MHz as well as FM DX, you might be interested in the 'UK FM DX Watchdogs' Facebook group. You'll find plenty of interest, including FM loggings but interesting frequencies to listen to, for example from the US (eg 33.860, 33.880) and 38.325 and 38.525 from Russia.

FM and DAB DX

Simon Evans (Twyning, Gloucestershire) writes, *"I checked for FM DX in the recent meteor showers but no luck. At the end of 2024 on 27 December there was a tropo opening with FM from Quiros in Spain on 92.2 and 94.4MHz 1023km away.*

On 27 December the tropo also affected DAB reception with my best DX 7A LeMans ET from Nogent (472km). On 28 December the lift moved to the East of me allowing 5C DR Deutchland to appear from Osnabruck and Lingen (694km)".

That's it for this month! Thanks to everyone who's contributed – see you again next time. **PW**

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My Tower Saga

Roger Cooke G3LDI narrates the story of his tower collapse and (challenging!) repair.

Roger Cooke G3LDI
roger@g3ldi.co.uk

It all started with a failing of an EHU (element housing unit) on my SteppIR. It had been up for about 14 years, with the tower itself even surviving the hurricane of 1987, when this happened. It occurred at around the Covid time and some locals came over and helped me lower and luff the tower. We then left it and self isolated, hence I was effectively off HF. I managed to haul a couple of old dipoles up a short tower at around 25ft, doing quite well with those in the event.

It is a UK tower, made in Louth by Western Electronics, and is essentially a three-section crank-up with 40ft sections and a 22ft ground post. I cannot handle it alone now that I am 86. We dismantled the beam and I looked for a spare EHU. I found the last one in the UK, £510.00, ouch! While I waited for it I thought about it. If I replace this one, how long would it before another one bit the dust? I decided that discretion was the better part of valour, so I sold the SteppIR and invested in a 4-el Ultrabeam. This was going to be my last beam so I became a SKIer (spending the kids' inheritance).

It duly arrived and a friend came over and helped me assemble it. It is a big beam – and heavy! To make things easy, I also bought an electric winch to crank the tower back up.

We had several antenna parties here to do the work with a lot of the local club members coming along to give a hand, with a promise of chilli and apple pie, with me demoted these days to tea-boy and cook. After putting the beam on the top with the tilt-plate etc we used the electric winch to crank it up. I was really looking forward to this, being active again after about three years of Covid absence and not being able to socialise.

(I did think that perhaps P5, North Korea, might appear while I was QRT!)

The saga begins

However, this was where all the problems began. This reads slightly like the Bricklayer's Story by **Gerard Hoffnung**. This is British humour by the way, but you can see the connection!

www.youtube.com/watch?v=vFUj6LH4FSI

Unfortunately, the top rope got caught out of the pulley and jammed. The winch, however, kept on winching, the upper cable snapped and the tower collapsed vertically when almost fully cranked up. This happened in less than one second! There was a huge bang when it hit the concrete at the bottom and there was a pregnant pause. None of us could believe it! Looking up the new Ultrabeam was like a banana. On inspection there was damage to the top and bottom of the top two sections. I was as sick as a pig! However, I remained resolute!

Next was a big job in disassembly and the major help with this was from **Peter M0RYB** and his range of mechanical help and **Chris G0TZZ** with **Robert G4TUK** doing the video job. I won't describe the effort required; suffice it to say it took about four weekend visits to take the tower apart. Various mechanical methods were employed, together with numerous cups of tea and chocolate biscuits. I had investigated hiring some scaffolding to do the job but the estimate for hire was over £2000.00. I was looking at scrap value…….

We managed in the end to disassemble the three sections and lay them on the grass. It was not a pretty sight.

And continues…

My son luckily is a fully qualified welder and he came up from Loughton and spent a whole

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Photo 1: After the collapse showing damage to the boom of the antenna.
Photo 2: Showing some of the damage to the tower.
Photo 3: Showing more of the damage (but still only a fraction of the total damage).
Photo 4: My son Robert repairing the damage.
Photo 5: The finished job!!

weekend fixing and repairing and welding the tower back to its normal state. Re-assembling the three sections involved several weekends and more hard work, tea and biscuits!

We luffed it back to vertical after double checking everything. I had to buy a new top rope and order a new centre boom section and other bits for the beam and await delivery. I also had to arrange for **Chris G0DWV** to come over to re-rope the tower. I have been banned from climbing by the way, another disadvantage of growing old!

All looked well. We checked the guys were not snagged, the feeders and control cables were free and we had reached the final stages so I went and made a celebratory cuppa and we started hoisting it.

Two feet off the ground there was a huge bang and it fell two feet very quickly! We stared at one another in disbelief!

We had forgotten that we had put TWO chains on the bottoms of each section for extra security. Chris had taken one off thinking it was the only one! The bottom cable had snapped this time. Was this tower EVER going back up again?

Luckily the tower itself did not suffer any damage. I then had to order a new bottom rope and arrange yet another weekend for the guys to come over. The rope arrived, Chris G0DWV came over and re-roped it and we finally cranked it up very, very slowly, checking every six inches or so that all was well. All was well and it is now – at %$£"££ last – fully cranked up and guyed with a beautiful repaired Ultrabeam as you see from the pictures!

My eternal thanks go to members of the Norfolk ARC for the original help in the early SteppIR days and latterly to Peter M0RYB, the main man, Chris G0TZZ, Chris G0DWV, **Robert** my son (not an amateur) who fixed the damage and Robert G4TUK who produced the main video of assembly.

I had a very good friend a long time ago, **Harry G3HXM** who is now SK I am sorry to say. He said to me once: *"This hobby would be the best ever if we did not have to have antennas!"*

If you are interested in watching some of this, take a look at these videos.

www.youtube.com/watch?v=dVk_48SWJPw
www.youtube.com/watch?v=7WdVQDXiKP4
www.youtube.com/watch?v=syMcY-G1_us
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Ken Ginn G8NDL
practicalwireless@warnersgroup.co.uk

Adding protection to SMPSUs

Ken Ginn G8NDL describes a suitable protection circuit for general purpose SMPSUs.

Power supplies are an essential part of the shack's equipment. Using one power supply to power a radio or several radios usually requires either a linear power supply or a switched mode power supply to be bought or made. In this case the choice of a linear power supply, albeit an easier design, was not considered for the shack due to the total component cost. The transformers alone would probably need to be specially wound and the total project cost would be prohibitive.

The target was to build a 13.2V 20A power supply to power two rigs in the shack, with sufficient power to run one in transmit and the second in receive. Generally the maximum running RF power to the antenna is 50 watts, this equates to about 8A drawn from the power supply, at 100 watts – 15A.

Initial reseach

I started by looking at a number of additional SMPSUs I have laying around to see how they perfomed with aspects of output voltage range, over-voltage protection and noise characteristics. Firstly I looked at the 12V 30A unit I bought off eBay. A second was a 12V 10A SMPSU, the third a 24V 3.13A SMPSU recently bought to be used for antenna switching relays. Lastly a commercial unit; a Watson Power Mite which is 13 years old and still in good working order.

I was interested in how the various power supplies worked, noting their output voltage, noise levels and if they have any protection such as over-voltage. **Table 1** shows the findings of the four power supplies.

The readings were recorded with a DVM and an oscilloscope where each power supply was loaded with the current drawn, in each case of approximately 900mA. A load current of 900mA was chosen to simulate the current drawn from a power supply with a radio in receive. The nominal voltage of each 12V power supply was set to 13.2V during testing, the 24V power supply to 24.0V.

The noise level recorded with each SMPSU was measured on an oscilloscope with a frequency limit of 20MHz. The noise was measured to ascertain which of the 12V power supplies was the quietest. The noisiest was the AC-DC S-360-12 purchased from eBay. This was not a surprise since I believe this power supply was not primarily designed to power radios. However, from the start the idea was to make comparisons of various SMPSUs and see how to reduce the noise and see what actions each had with regard to protection of the proposed loads.

The Traco SMPSU appeared to an excellent unit, with comparativly low noise and a facility which would cut the output supply voltage should for some reason the power supply develop a fault and deliver a higher voltage to the load (crowbar protection). Looking at the specification of my HF and UHF rigs I see that they will tolerate a maximum supply voltage of 15.8V. Not that I would ever run the radios at this level, 13.2V is adequate.

Likewise the Watson Power Mite, this has the same action limiting the output voltage before it will shut down.

The 12V 20A SMPSU Protection circuit

My choice was to use a commercially available switched mode power supply (SMPSU), which was bought about eight years ago off eBay, costing then no more than £25. This SMPSU was recently considered to be part of my ever decreasing junk box.

Having decided the 12V 30A SMPSU from eBay was going to be used, the noise emanating from the SMPSU had to reduced for the sake of the radios. In addition as the original SMPSU had little or no protection to the radio, protection circuitry had to be designed into the power supply with an additional circuit. This circuit is shown in **Fig. 1**.

How it works

The current from the SMPSU is supplied to terminals 1 and 2, the output is present at terminals 3 and 4. Positive supply at terminal 1 and the negative connection terminal 2. Under normal operating conditions TR1 and TR2 (P-channnel MOSFETs) are held in conduction (their gate voltage being held at zero volts) with R4 and TR4 being conducting. TR4 is conducting and pulls down the gate of TR1 and TR2 to zero volts, this causes TR1 and TR2 to conduct current from the source to the drain connections. The voltage drop across TR1 and TR2 is negligable under low and high currents drawn. TR4 is held in conduction with the series combination of R5, R6, R7 and R8. The gate terminal of the Silicon Controlled Rectifier SCR1 has not been triggered (held at 0V) and thus remains in a non-conducting state. When less than 20A of current flowing through the coil of RLA1 there is insufficient magnetic flux to cause the relay contacts to close. The relay contacts will close momentarily should an over-current situation occur. LED2 will illuminate when the output voltage is stable above 10V. This will indicate a healthy output voltage is present. The voltage drop across the coil of RLA1 is minimal, even at high current conditions. The winding resistance of the relay and the drain to source voltage of TR1 and TR2 are minimal under pre-fault conditions. Neglecting wire resistance the drop in voltage across the input to output is less than 500mV. TR1 and TR2 are P-channel MOSFETS (SPP80P06P) whose Rds value each is 0.023Ω.

In the event of an over-current being drawn through the circuit, from the input to the output, the relay contacts of RLA1 will momentarily close. In this over-curent situation sufficient current,

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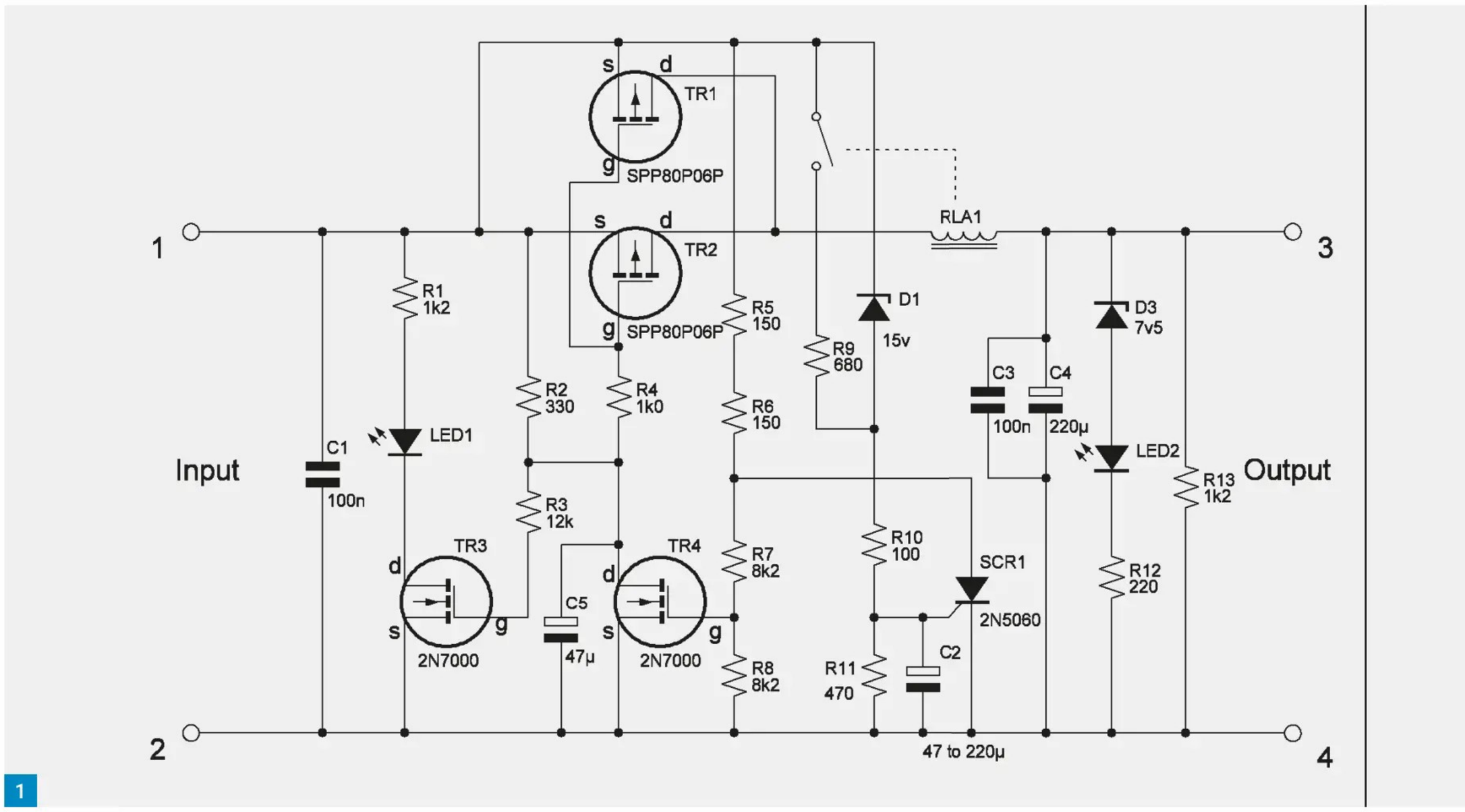
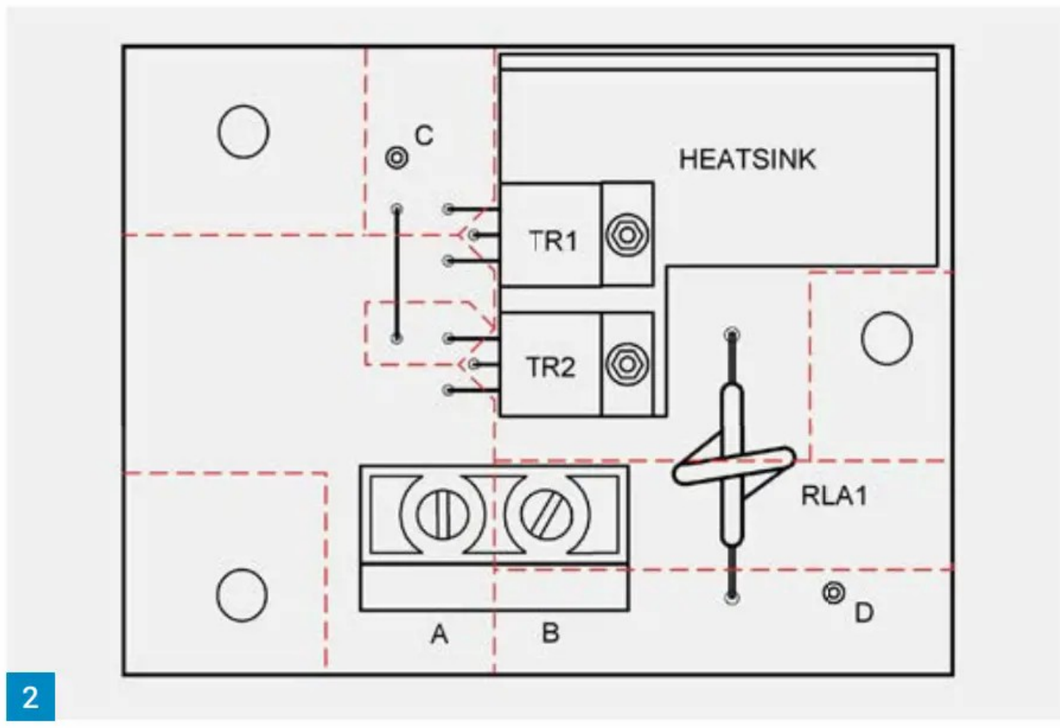




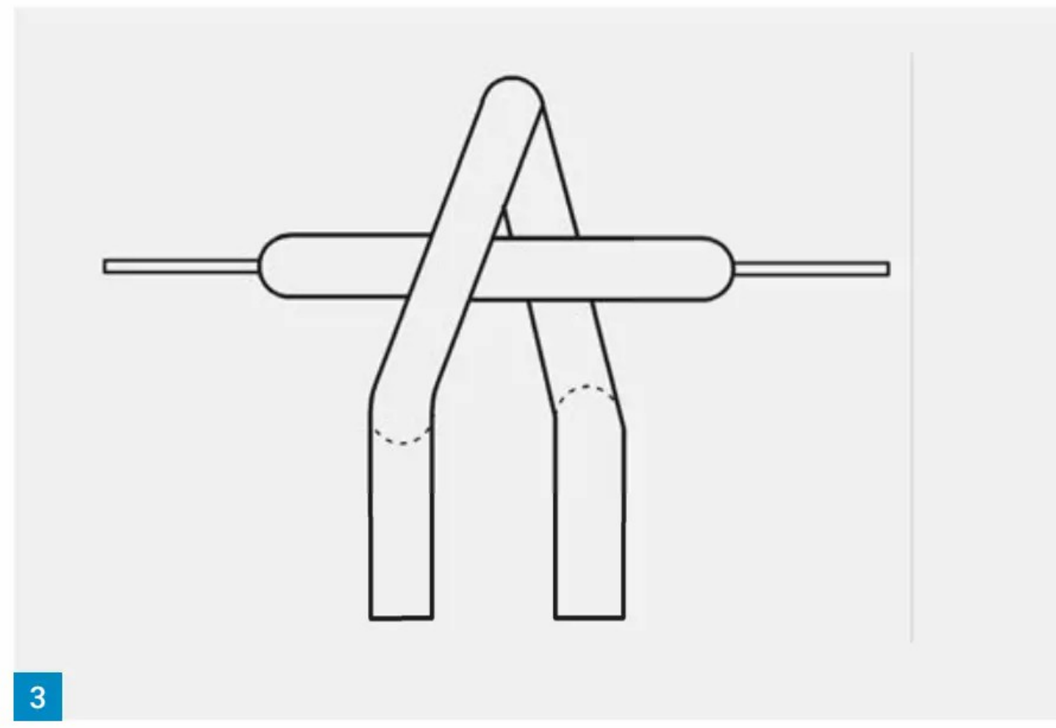
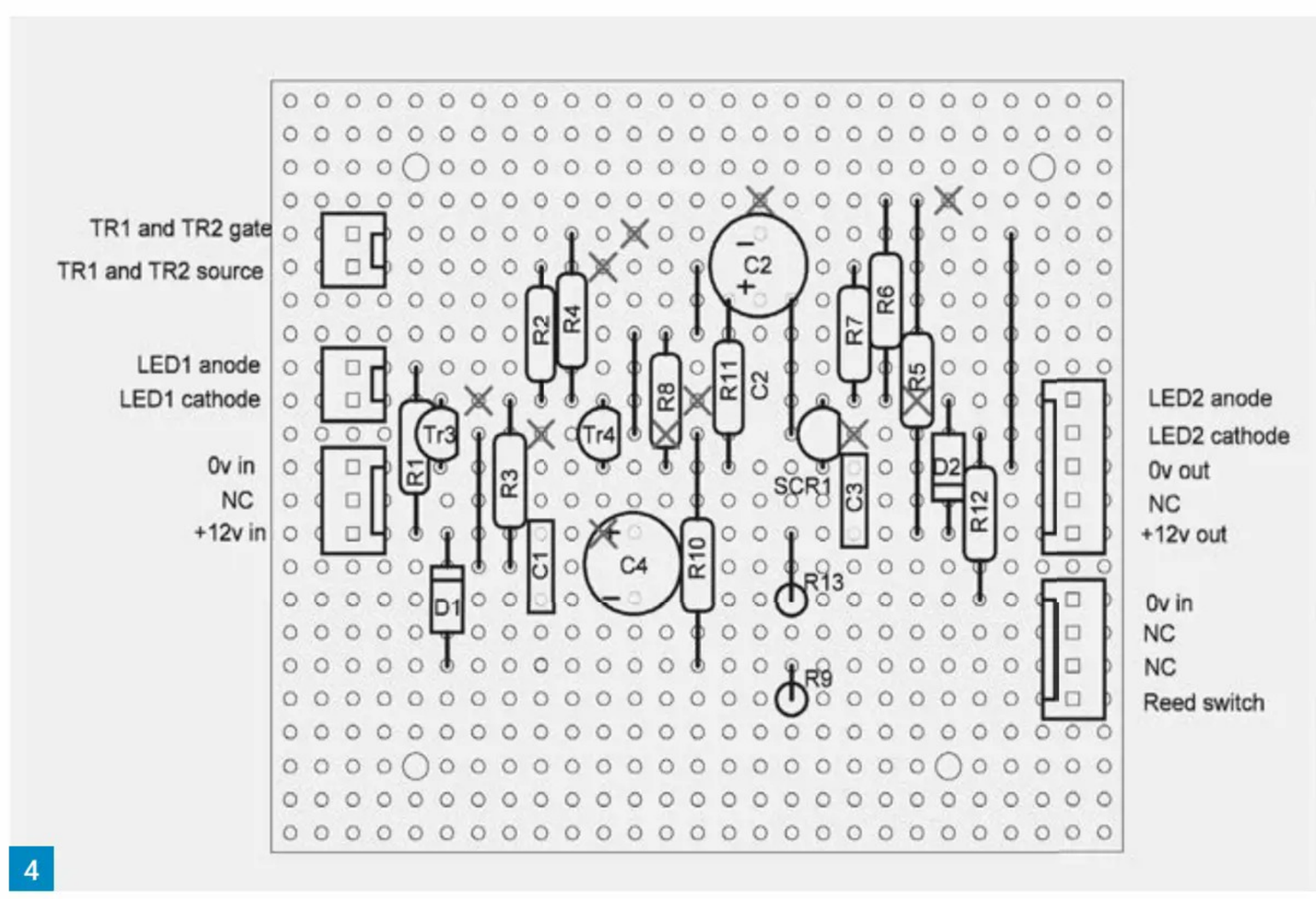


Fig. 1: The circuit.
Fig. 2: PCB layout.
Fig. 3: Relay coil and reed switch.
Fig. 4: Stripboard layout.



albeit a short pulse, drives the gate of SCR1 through R9, R10 and R11. This causes SCR1 to conduct and latch on in the conducting state, as long as SCR1's minimum holding current is exceeded. The action of SCR1 conducting and latching causes essentally TR4 to turn off, and the drain of TR4 rises to 13.2V. This action turns TR1 and TR2 out of conduction when their gate voltage rises towards 13.2V. The output voltage will reduce to zero and remain so until the power is reset by switching the mains input off and back on again. During a fault condition LED1 will illuminate.

Should an over-voltage situation occur, where the supply voltage rises above 15.7V, Zener diode

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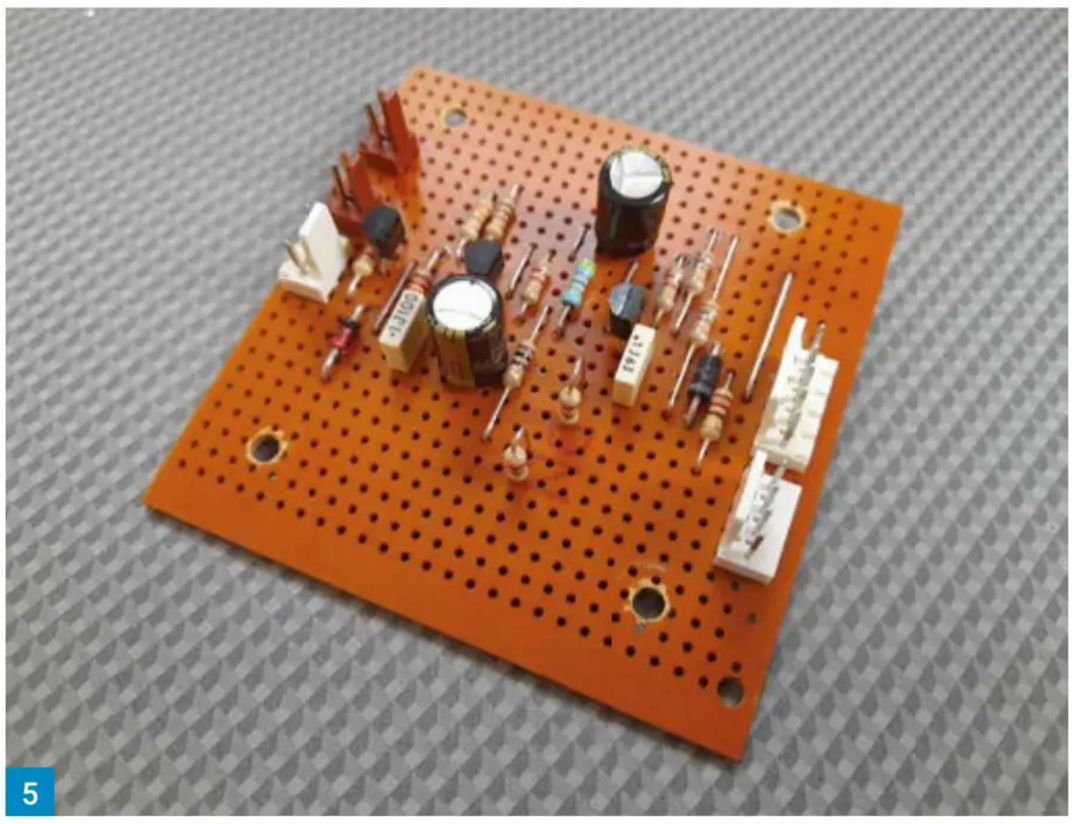

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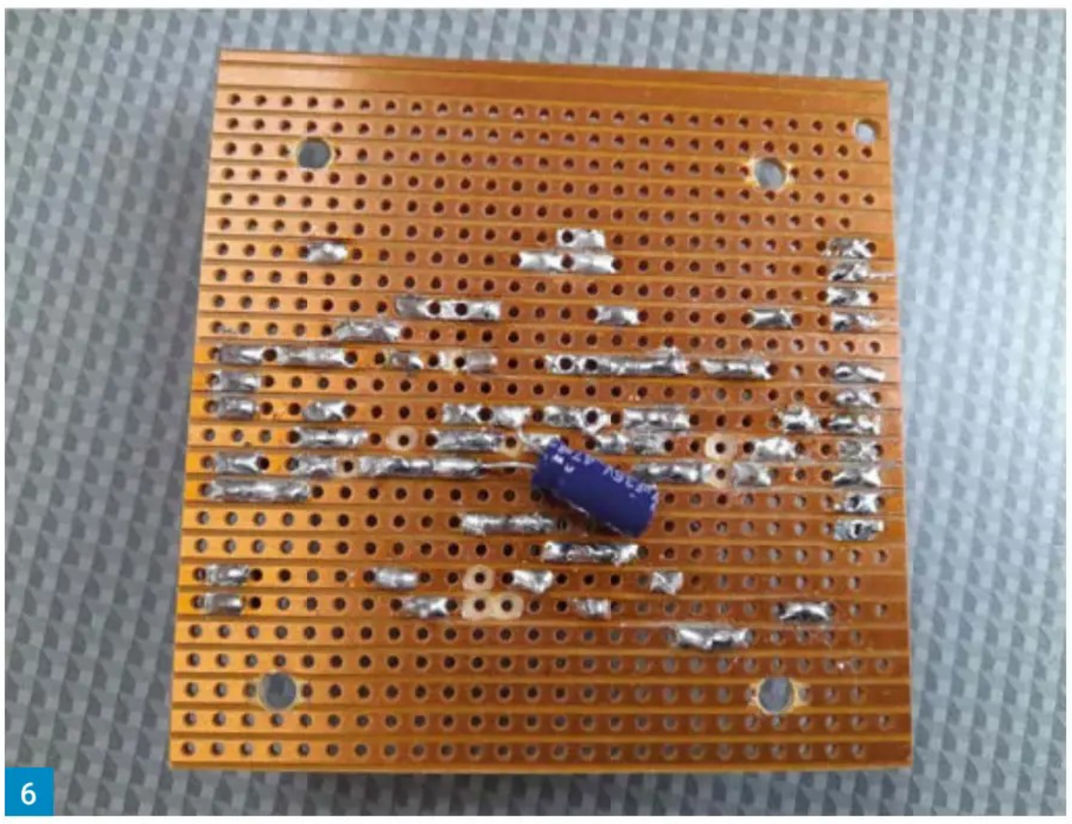

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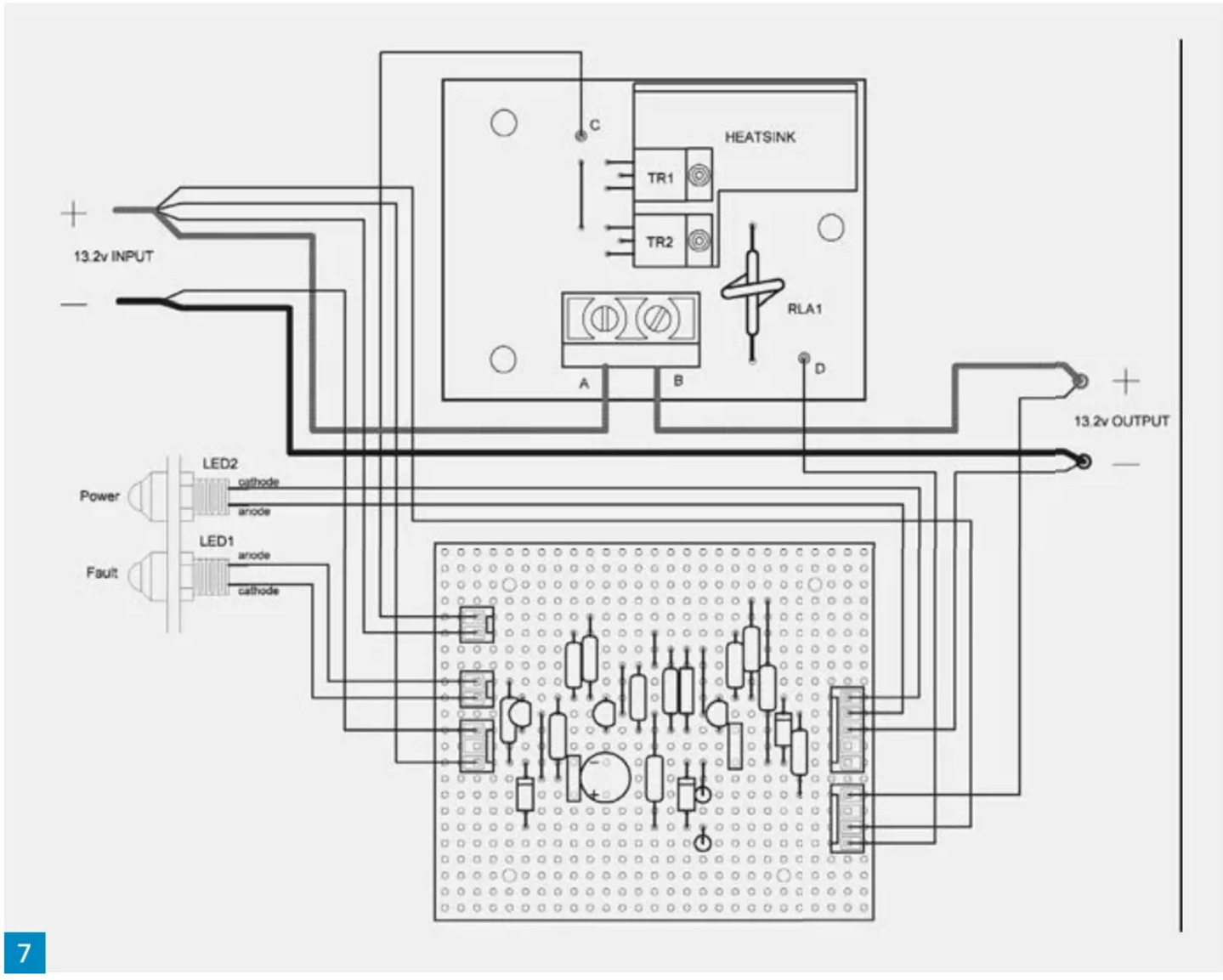
Fig. 5: Stripboard construction.
Fig. 6: Position of C5.
Fig. 7: Overall layout.
Fig. 8: Schematic.
Fig. 9: Inside of completed PSU.



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D1 will conduct, and supply current through R10 to the gate of SCR1. SCR1 will conduct causing TR3 to turn off through R7 and R8. The gate voltage of TR1 and TR2 will rise and have the same effect as the over-current situation previously described. The gate voltage will rise to 13.2V and turn off. This is something akin to a crowbar circuit, but the action is different in that the output is not shorted out as happens in conventional crowbar circuits.

Decoupling is provided by C1 on the input side and C3 and C4 on the output of the circuit. C2 provides a degree of noise immunity, which will stop the SCR from triggering erroneously; this value can be selected between 47µF and 220µF. C5 is essential as this causes current to be drawn through R2 at switch-on, causing TR1 and TR2 to conduct. If this were omitted, the power supply circuit would not spark into life. Note, applying power slowly to the circuit will cause the protection circuit to remain in a non-conducting state, it won't turn on.

The effective stability under load will depend upon the donor SMPSU and the high current portion of the wiring, since this will have an effective output impedance. The over-current protection circuitry will add to that, albeit very small.

SMPSUs are noisy

In an effort to reduce the noise to a more acceptable level, filtering was used to good effect. I wound a toroid with 12 turns bifilar wound around an FT240-31 core and positioned it between the SMPSU output and the protection circuit. This provided a significant reduction in the electrical noise at the output of the whole power supply by a factor of five. This arrangement is shown in **Fig. 6**.

Construction

See the various Figures. The critical components in this circuit are the MOSFETs – TR1, TR2 and the relay RLA1. TR1 and TR2 are P-channel MOSFETs. The SPP80P06P MOSFET has an extremely low on resistance in the order of 0.023Ω at 40A. The relay RLA1 is fabricated from wire capable of carrying the full load current, a single turn of 2.0mm diameter enamelled copper wire with an internal diameter of 15mm was made. The reed switch is mounted centrally along the axis of the coil. This arrangement limited the current to approximately 20A.

The relay and the two power MOSFETs are mounted in a small printed circuit board as shown in **Fig. 2**. The high current paths of the circuit board were built up with additional solder to reduce track resistance.

The whole power supply fits very snuggly into the enclosure. The SMPSU is mounted onto a base to which the majority of the components are mounted. The integrated SMPSU fan was removed and positioned on the sidewall of the enclosure. This ventilates the enclosure and the heatsink fabricated for TR1 and TR2. Holes were drilled on the base plate opposite the fan to provide a path for cooling air to pass from through the enclosure.

Setting up and testing

The safest way with which to check the operation of the protection circuit is to disconnect the SMPSU from the protection circuit and feed the circuit with a current limited rising DC voltage from zero to 12V, the power supply current limit set to about 120mA. In this condition the fault LED1 will illuminate. LED2 should not be lit. Note the current, this should be less than 50mA drawn

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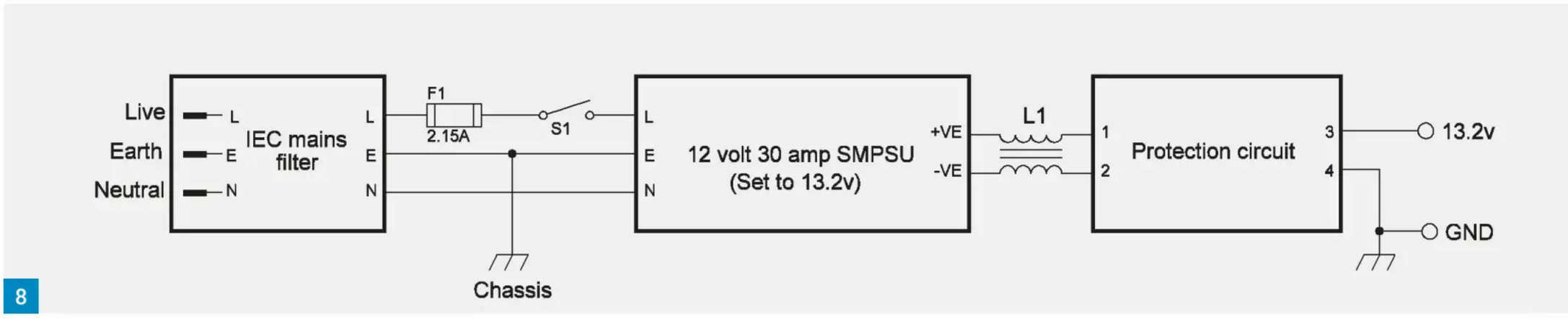

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from the power supply. The output voltage should be less than 2V. Switch off the power supply and set the output voltage of the power supply to 12V. Switch on the supply to the protection circuit, LED1 should not be lit, but LED2 will be illuminated. Check the output voltage. If the input voltage is 12.0V, the output voltage will be the same.

To check the over-voltage circuit, increase the output voltage of the current limited DC power supply to 15.8V, the over voltage action of the circuit will operate causing the output voltage to fall below 2V with no load. LED1 will illuminate and LED2 will extinguish.

Lower the voltage of the DC power supply to 13.2V and switch off power to reset the protection circuit. Switch the power supply back on.

To check the over-current circuit, momentarily short out the contacts of the reed relay switch. The output voltage will drop immediately to below 2V as the over-current sense operates. LED1 will illuminate and LED2 will extinguish.

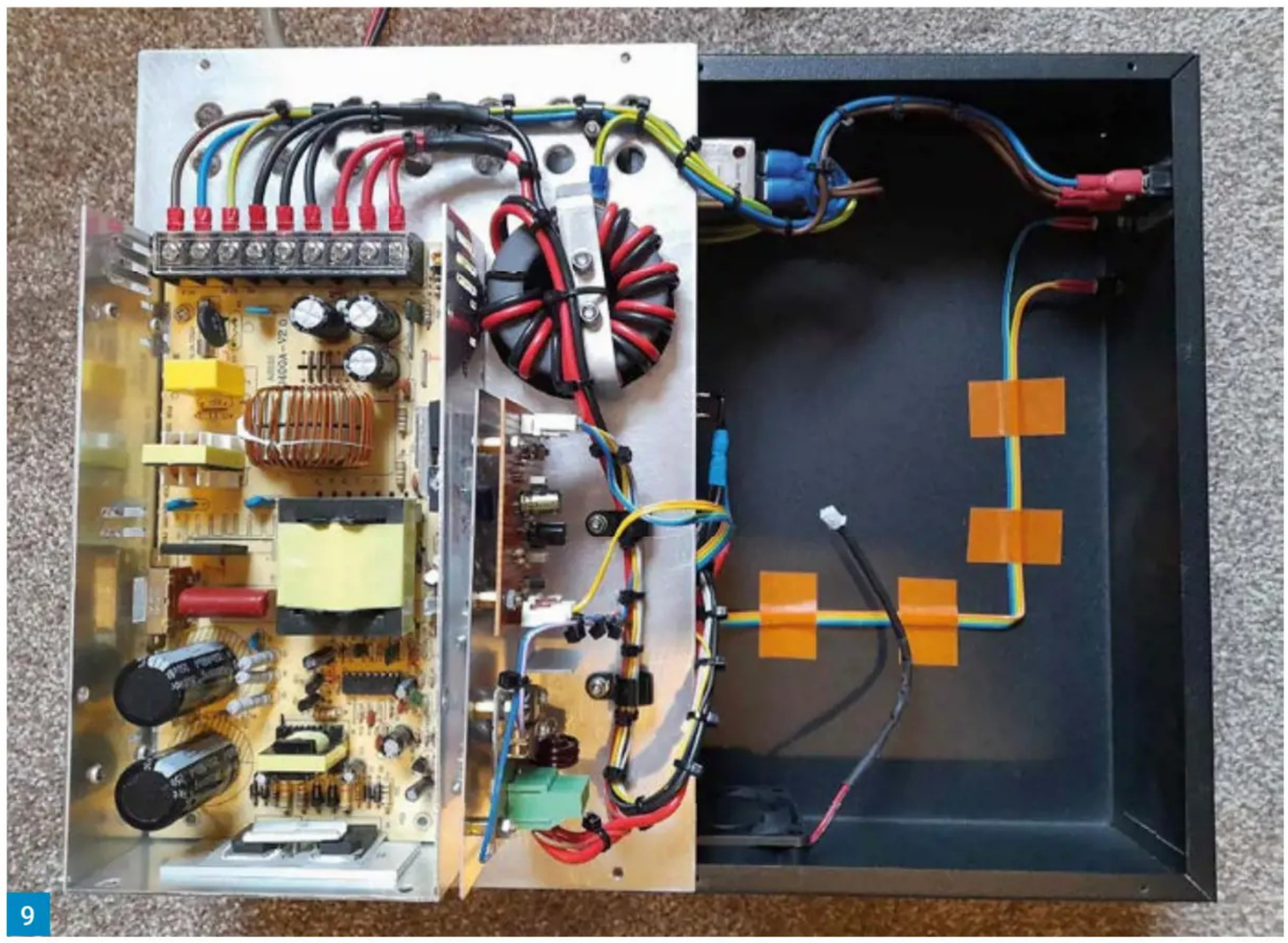
Check the output voltage from the SPMSU with the mains switched on, and adjust this to 13.2V. Switch off the SMPSU and disconnect the power supply from the mains electricity. Connect the protection circuit to the SMPSU, and switch on the power supply. The output voltage of the protection circuit should read 13.2V.

Conclusion

The noise measured at full power from the PSU was less than 50mV rms at VHF and at UHF (50 watts) and less than 150mV rms at HF frequencies (100 watts). I have run the two transceivers, one at 100 watts and the second at 20 watts and the cicuit appears to cope well with the load drawn from it. The internal fan of the power supply runs faster and draws a lot more air through the enclosure to cool the power supply under a heavy load; this is to be expected.

A word on safety.

As with all mains powered equipment it is wise to ensure that electical isolation is made between the AC mains input, ground and the DC output of the power supply. Also that good electrical continuity is evident between the mains earth input and the metal chassis of the power supply. **PW**



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Component list

- R1 1.2kΩ, all resistors are 250mW carbon film unless otherwise stated
- R2 330Ω
- R3 12kΩ
- R4 1kΩ
- R5,R6 150Ω, 500mW metal or carbon film
- R7, R8 8.2kΩ
- R9 680Ω
- R12 220Ω
- R10 100Ω
- R11 470Ω
- R13 1.2kΩ
- C1, C3 100nF 63V polyester
- C2 47 to 220µF 10V PCB mounting elect * see text
- C4 220µF 25V PCB mounting elect
- C5 47µF 35V PCB mounting elect
- D1 15V zener diode BZX85C-15
- D3 7.5V zener diode 400mW (eg. 1N5236B)
- LED1 5mm panel mounted red LED
- LED2 5mm panel mounted green LED
- TR1, TR2 SPP80P06P (p-channel MOSFET)
- TR3, TR4 2N7000
- L1 FT240-31
- RLA1 2mm dia meter enamelled copper wire, SPST reed switch – Comus 2502-3717-020 (Rapidonline stock no 60-0528)

Make/source	Output voltage Min	Max	Noise	Comments
AC-DC S-360-12 (eBay)	9.76V	14.46V	110mV pk-pk (35mV rms)	Internal fan actuated with load drawn. No over voltage protection.
Traco TXL 100-12S	9.86V	14.3V	60mV pk-pk (25mV rms)	Maximum voltage limited by internal circuitry.
Watson Power Mite	11.6V	16.0V	50mV pk-pk (30mV rms)	Maximum voltage limited by internal circuitry.
StontronicsSRS75-24	20.39V	27.11V	50mV pk-pk (25mV rms)	

Table 1: The four power supplies investigated

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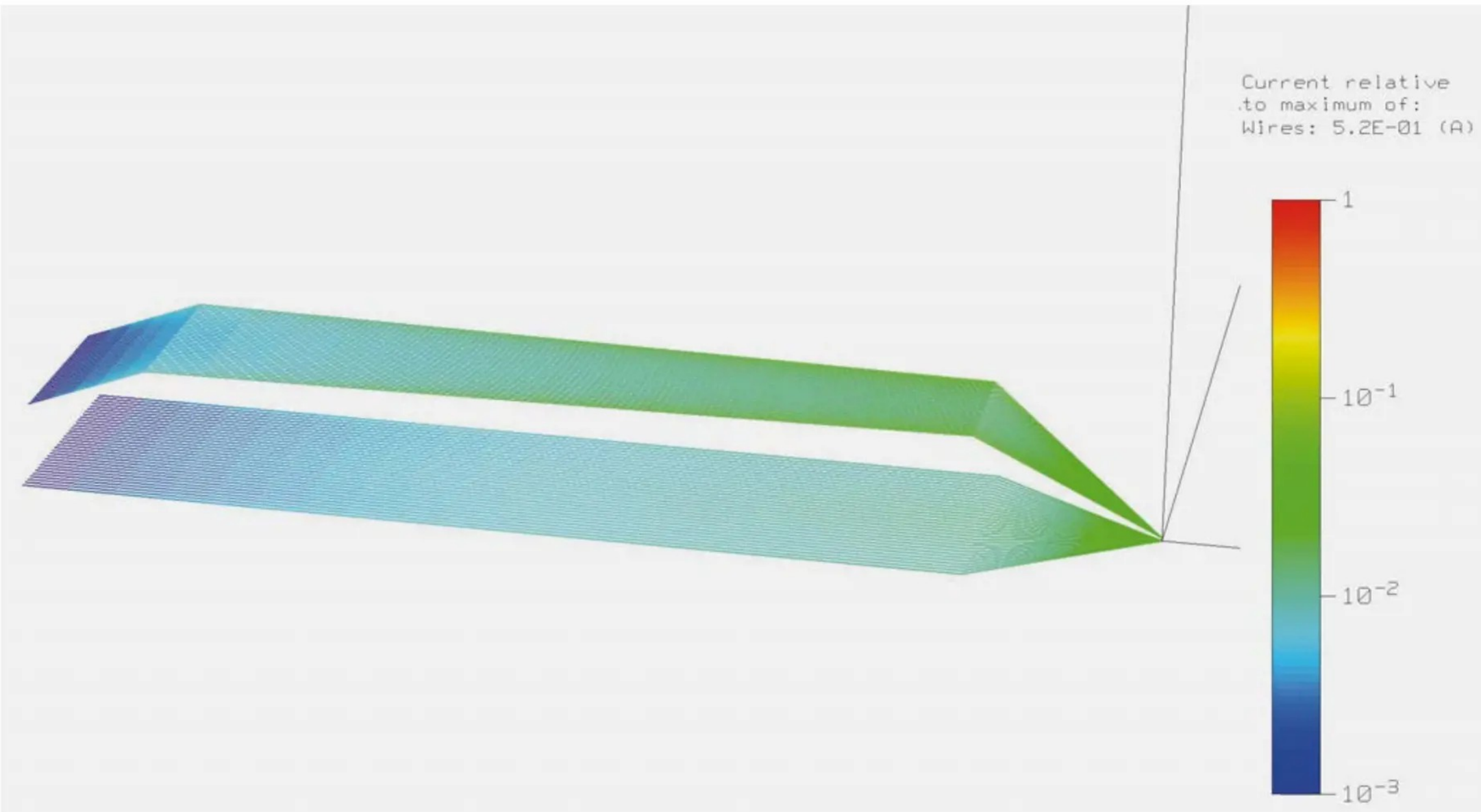


Marconi antenna modelled, 110 years on

John Rowlands MW1CFN sheds new light on Marconi's inverted-L antenna.

John Rowlands MW1CFN
practicalwireless@warnersgroup.co.uk

Back in the very early days of the 'Imperial Scheme' of antennas spanning the industrialised globe, the inverted-L design he used was repeatedly claimed by Marconi to be directional. This comes as a surprise to any amateur enthusiast who has ever used the same design of antenna.

Now, **John Rowlands MW1CFN** who wrote the history of 'Carnarvon', one of Marconi's trans-oceanic VLF stations, has teamed-up with **Fred Chumaceiro** to produce the first-ever NEC-5 computer model of the first iteration of the 1.1km-long antenna that operated, at the time, at around 21kHz from the windswept north Wales mountain slope of Cefn Du.

The two researchers learned of each other when texts they had written – Chumaceiro about Curaçao receiver 'Daniel' – appeared in a recent IEEE newsletter. Remarkably, Chumaceiro's work included a mention and image of Carnarvon!

"Any claim by Marconi – which has been repeated right up to the present day in some texts – has to undergo more than just a modern assertion it was wrong. I've done some very basic modelling that showed almost perfect omnidirectionality, but someone with more ability was needed to create a more detailed assessment.

"Having seen the beautiful modelling work on his antennas of interest, Fred has been incredibly kind to devote some time to producing the most accurate computer model of Carnarvon to date", says Rowlands.

The model is built on primary archive sources and represents accurate dimensions, antenna resistance and ground constants. The ring of grounding plates around the station has not been included due to the complexity of modelling, but that is not expected to have made any significant difference to the overall outcome.

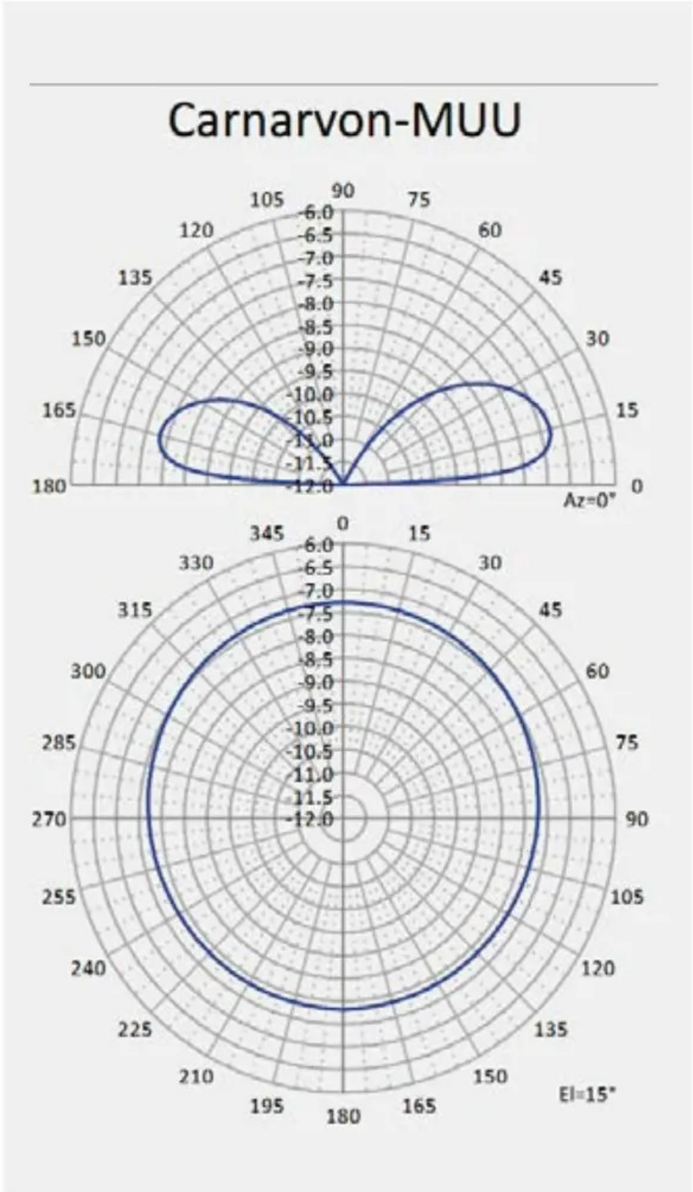
Chumaceiro's model confirms that Carnarvon's antenna had no meaningful directivity, with only 0.53dB gain more in the intended direction of the eastern US than to its rear. The overall gain was around minus 7.3dBi.

Rowlands says he was, however, surprised to see the elevation pattern turn out much more akin to a true vertical, with a relatively low peak radiation angle of some 15° above the horizon.

Fred Chumaceiro's work can be accessed, free of charge, at:

https://dcdp.uoc.cw/AA00008154/00001/pdf

The images, courtesy of Fred M Chumaceiro, show Fred's modelling of the Marconi antenna at Carnarvon. **PW**



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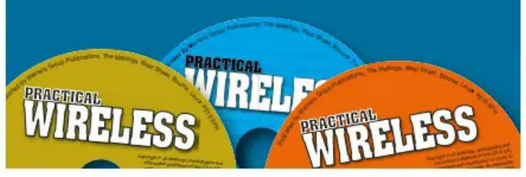

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HP PROGRAMMING CARD Hewlett Packard Educational BASIC and also assembler. Look like punch cards, but are optically marked. No calls before 10am or on Sunday morning at all, thanks.
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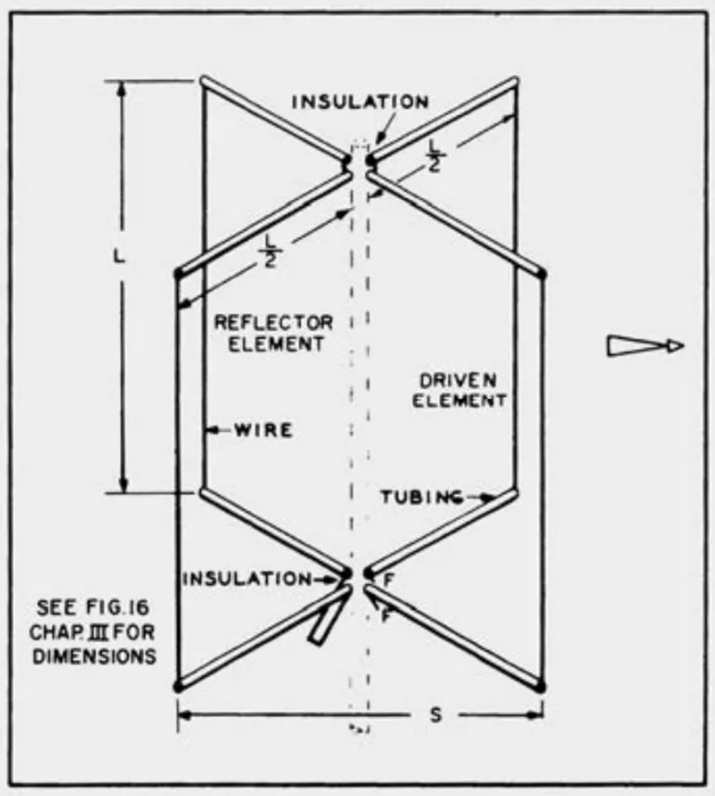

Fig. 5 The G4ZU Birdcage Quad uses two Quad loops folded back at the center so that the top sections act as supports for the vertical wires. Reflector and driven element loops are individually insulated from the supporting mast. The reflector loop uses a stub, or may be made oversize. Driven element is fed from a balun and coaxial transmission line.

A Rotatable Quad

Dear Don,
Not so much a letter but to say I made this rotatable quad from two 4-way conduit boxes and 8 lengths of cut 20mm conduit and short length of wood (simple and cheap as chips) and hung it off my 80m dipole wire antenna. I am surprised at the gain on 10m. Also easy to rotate. The design is from *All About Cubical Quad Antennas* by **William Orr W6SAI**.
73 Doug G4VZR
Coaley, Glos.

(***Editor's comment***: *This takes me back to my own first 'gain' antenna Doug, also a quad from that book (albeit a different one) and also for 10m. I couldn't believe how much difference it made compared to my previous dipole. And it cost a magnificent total of 2/6 (12½p) using garden canes and a wooden centre)*

LF antennas

Dear Don,
You have two matters in this month's issue, the Marconi antenna on the *RMS Titanic* and the history of 200kc/s transmitters. The 'mother of all long wave TX's' is, of course, Droitwitch. the antenna there is the mother of all long-wave Marconi antennas. So, the two items are linked.

The Droitwich antenna had a *Q* of about 22, this made it just slightly too narrow for an AM signal because the load on the final (linear) amplifier was reactive at the sideband edges. This was sorted by a **W P Wilson**, a great advocate of matrix algebra, and the load on the PA was then resistive from one sideband edge to the other, some 6% of centre frequency. A full account can be found at the end of **Sandeman E. K.** *Radio Engineering*, Volume One (page 711).

In my childhood the long wave Light programme sounded superior to the medium wave offering. there was a reason, the MW modulator was a 'war emergency' push-pull lash-up and the long waves used a 'small' TX modulated by a class A stage followed by, yes, 'the mother of all big linears' with, of course, no cross over distortion on the audio.

Having a carrier frequency of 200kc/s it was very useful as a frequency standard, 198kHz less so.... 'The Day The Music Died'.
William Blankley G8CMK
St. Leonards on Sea

Nostalgia and more

Dear Don,
It's often been said, that the need for nostalgia is inherent in human nature. So, the remembrance of nostalgia is indeed a need for many of us with very long memories to access those times when things were, how can I say, well, different.

As **Eric GW8LJJ** points out, *"Many hams think that home-brewing is on the decline"*. But home-brewing went on the decline when hams no longer needed to build their own equipment - and that was way back in the 50's and 60's, as factory manufactured transmitters and receivers began to appear on ham-radio dealers' shelves. And what's more, as I've written elsewhere, these rigs were subsequently bought in huge numbers - even by the die-hard DIY brigade. If I said it was a stampede, I wouldn't be telling porkies.

The thing is, as far as ham-radio is concerned, home-brewing is inversely proportional to where, at any one time, technology is. As the manufacture of ham equipment becomes ever more cost-effective to produce - a consequence of technological advances in factory procedures, becoming cheaper by way of economy of scale, less people will deem it necessary to spend days or

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weeks home-brewing. They buy it instead. And why wouldn't they in many instances.

Home-brewing has definitely declined - not because in general, people can't be bothered, or are unable to do so, but because unlike yesteryear they have a choice. Build or buy. As Eric says, *"it was a necessity in the earlier years"*.

I agree that building your gear and using it on-air is very satisfactory. You can repair it yourself too. And yes, building an AM transmitter is usually better than buying one - with all the other modes the rig will inevitably come with. In passing, the only ancillary equipment I built were ATU's and power supplies. And the odd switch or two. Oh, and linear amplifiers.

It could be argued that a lack of 'electronic groundings' etc might be the cause of why there is a lot less home-brew nowadays. Although that premise does have legs, today, the pull of all those glitzy rig ads tends to steer a lot of people away from getting out the soldering iron to build something substantial. Nevertheless, all things being equal, given the curiosity of what we do, it's unlikely that the urge to build something - be it substantial or not, will go away any time soon.

Again, it was nice to hop and skip down the road of electronic wonderland with Jeff & Natalie (February 2025). Whenever I read about their adventures, I feel a mutual resonance. For me, their nostalgic travels with things electric bring back many memories. Like when I was still in short trousers trying to get to grips with inductance and reactance etc - and more importantly getting my young head around the equations that one needs to understand and use. It brings into sharp focus just how difficult it once was for me back then. But persistence was the key element, of course. And I used to know many of the equations off the top of my head. Nowadays, I have to sit and think a bit before the correct equation tumbles into place. When I need one, that is.

Another trip down memory lane was **Nils Schiffhauer's** piece about our hobby's best friend, the ionosphere. Without it, we'd be snookered HF-wise. Imagine if our hobby had to exclusively depend on line-of-sight communications or those very efficient metal boxes that circumnavigate (or stationary) the Earth 24 hours a day. A good thing then,

Rallies & Events

All information published here reflects the situation up to and including **22nd January 2024**. 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**

23 February
RED ROSE WINTER RALLY: Location: Mather Hall, Mather Lane, Leigh, Lancs. WN7 2PJ. Open: 10:00 (Exhibition opens at 08:30). Please note that maximum number of 5ft tables per trader has had to be reduced from 6 to 5. On a brighter note, the price remains as it has been for a number of years, £10 per table.
Enquiries lesjackson@ntlworld.com
WMRC.CO.UK

16 March
RIPON AND DISTRICT AMATEUR RADIO SOCIETY RALLY: Great Ouseburn Village Hall, Lightmire Ln, Great Ouseburn, York YO26 9RL. Doors open for traders at 7.30am and to the public at 10am. (admission £3.)
Free parking. Refreshments and bacon butties available. Tables will be available at a cost of £10 each, please book early.
For enquiries or to book one or more tables, please email:
radars.rally@gmail.com

23 March
CALLINGTON RADIO AND ELECTRONICS RALLY: The Callington Radio and Electronics Rally will be held in the Town Hall, New Road, Callington, Cornwall, PL17 7BD. The venue is booked from 07.30am until 2.00pm with public access from 10.00am until 1.00 pm.
Entry is £2 each with no charge for those under the age of 16.
A comprehensive selection of traders, clubs and societies from the Southwest will be present along with a 'Bring and Buy' stall and our usual excellent catering service.
As an improvement from last year, The Bring and Buy stall now accepts payment by all major debit and credit cards using contactless, chip and pin or by phone.
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Although the main hall is now fully booked, tables are still available in an adjacent room at £5 for the large size (6ftx2ft) and £3 for the smaller one (4ftx2ft).
Pre-booking is essential, so please contact Alastair M0KRR with your requirements as soon as possible
alastair.kerr1@btinternet.com
01503 262755.

23 March
DOVER AMATEUR RADIO CLUB 2025 RALLY: St Radigunds Community Centre, Poulton Close, Dover CT17 0HL. Sunday March 23rd 10:00 – 14:00.
Entrance fee £3. Tea, coffee and bacon rolls available onsite.
Tables are £15 each, maximum 2 tables per vendor. Bring and buy at the rally.
Let us sell it for you, 10% of the sale price goes to the club. Table bookings and latest news via website:
darc.online/rally

11 to 13 April
INTERNATIONAL DX CONVENTION: Visalia, California
https://dxconvention.com

12 April
2025 QRP CONVENTION: Digby Hall, Sherborne. Doors open 09.30. Darren Mallinson 2E0EVU, Yeovil ARC club secretary

13 April
NARSA, BLACKPOOL RALLY: Northern Amateur Radio Societies Association Exhibition, Norbreck Castle Exhibition Centre, Blackpool, FY2 9AA. Details from Dave M0OBW:
01270 761 608, 07720 656542
dwilson@btinternet.com
www.narsa.org.uk

16 to 18 May
DAYTON HAMVENTION: Greene County Fair & Expo Center, Xenia, Ohio. 2025 theme is Radio Independence
https://hamvention.org

18 May
LOUGH ERNE AMATEUR RADIO CLUB, 41ST ANNUAL RADIO RALLY: Share Discovery Village, 221 Lisnaskea Rd, Lisnaskea, Enniskillen BT92 0JZ. Usual facilities - Food and Drink, Bring & Buy. Doors Open 11:00 Hrs (Traders to arrive around 09:00 Hrs).
£/Euro 5 Admission to include Draw Ticket, Usual Draw. RSGB Books/QSL Bureau, IRTS, All our usual variety of traders
Contact Alan at to arrange a table
argault91@gmail.com

15th June
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 interests groups, GB4SWR HF station and an RSGB bookstall. Catering is available on site.
Contact Kevin G8MXV:
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that the mechanism of free electrons within the ionosphere keeps on doing what we expect them to do. Which makes so many HF operators deliriously happy (including me). Without an ionosphere and the benefits it has bestowed to amateur radio, it might be the case that ham-radio as we know it may not have survived predatory commercial interests? There again, perhaps ham-radio would have taken a far different trajectory without traditional HF communications? Oh, and no Aurora Borealis. An ionosphere is needed for that to happen.

However, DK8OK's very descriptive article amply illustrates the fact that the ionosphere is alive and still kicking. The centenary of the discovery of the 'mirror-in-the-sky' was a prelude for jubilation in many ways. And the strange thing was, although **Gauss**, **Heaviside**, **Watson-Watt** and **Appleton** and his side-kick **Barnett** brought the idea of an ionosphere into the scientific arena (**Marconi** was on the right track but went off on a tangent), as Nils points out, it was radio amateurs who demonstrated the practical usefulness of frequencies above 1.5MHz at the end of 1923 (it may have been as early as 1922. I won't quibble over a year). If it wasn't for the fact that hams had done the initial ground work to show that the short-wave frequencies were capable of global two-way communication, that it was amateurs not professionals who practically pioneered the use of short-waves - when the then scientific establishment had (even though they had contrary evidence) dismissed the idea of short-waves as being useless - it begs the question of how long it would have taken if it had been left solely to the professional propagation 'experts' to discover what amateurs had discovered? **Lee de Forest's** idea of a 'cloud' during 1913 had been a huge clue as to what was actually occurring regarding radio propagation.

Nowadays, all gun-sights are aimed at prediction/forecasting wise. Trouble is, Mother Nature is predominantly chaos. Hence all those 'propagation anomalies' that continue to confound the patience and scientific data of those who seek an explanation of what is actually happening with solar activity and so on. So, I think it might be better to pay a lot more attention to what the Sun is doing or not doing. After all, it's the 'Uncle-Sol' radiation that creates, ionises and determines the extent of the ionosphere. Not the other way round.

I'm not sure whether Appleton would be 'amazed' at how software etc has helped to model and visualise the ionosphere today. Considering the technology aspect, I think he'd be more amazed as to why it has taken so long to get where we are now.

Ray Howes G4OWY/G6AUW
Weymouth

Conservation

Dear Don,

I favour conserving older equipment, just as does **Stuart M0SGV** (*PW*, February 2025 page 24 *The Art of building Junk Box projects*). When labelling items for storage, don't write Tested, Untested or Not Tested. Labels that deteriorate, get folded or just read in a hurry can cause mistakes. For unknown status, label as 'Test first'. If working, it's 'Serviceable'. Not working, perhaps to strip for spares, 'U/S' (not Unserviceable in full). If you think that's obsessional, try working in aviation.

Tags that won't take solder can usually be restored by keying the surface with a fibre-glass scratch brush (illustrated). Don't get fibres on skin.

Don't scrape enamel off copper wires with a blade. Wire is round, blade is straight, contact area hence small. The blade will abrade the copper. Even a tiny nick will weaken the copper leading to failure at a later date.

Godfrey Manning G4GLM
Edgware

Next Month

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USING MMANA-GAL TO DESIGN AN END-FED CFR DIPOLE: John McDonald G8PJC shows how to design your own Controlled Feeder Radiation antenna.
4m BAND QUAD WITH TWIN FEEDER - A UNIVERSAL VHF ANTENNA: Jonathan Hare G1EXG offers another innovative antenna design.
RESTORING AN ICOM 290A: Tony Jones G7ETW gets a real 'oldie' working again.
HAMMER IT WITH MSHV: Billy McFarland GM6DX explains how to set up the MSHV software to increase your QSO rate during a DXpedition or similar.

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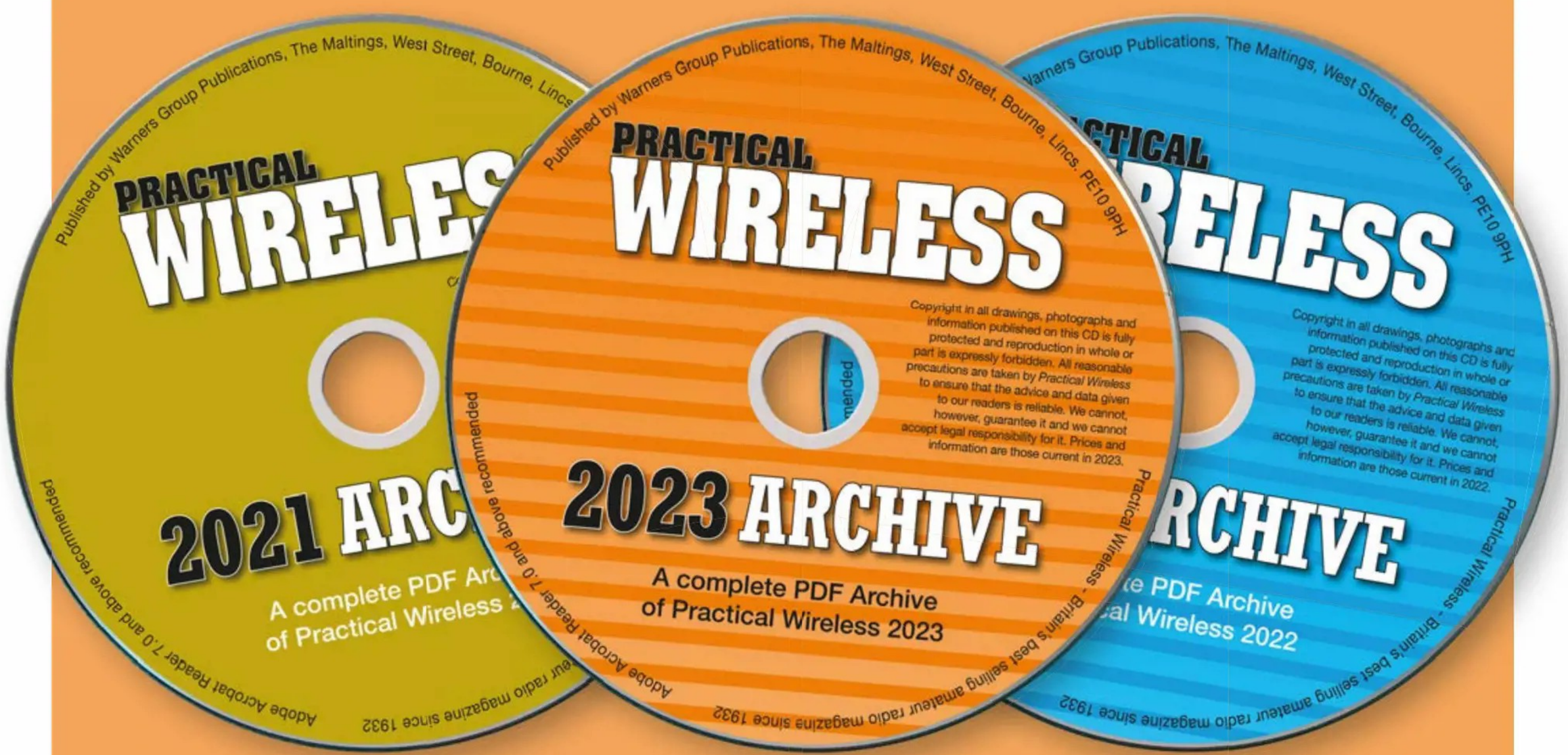

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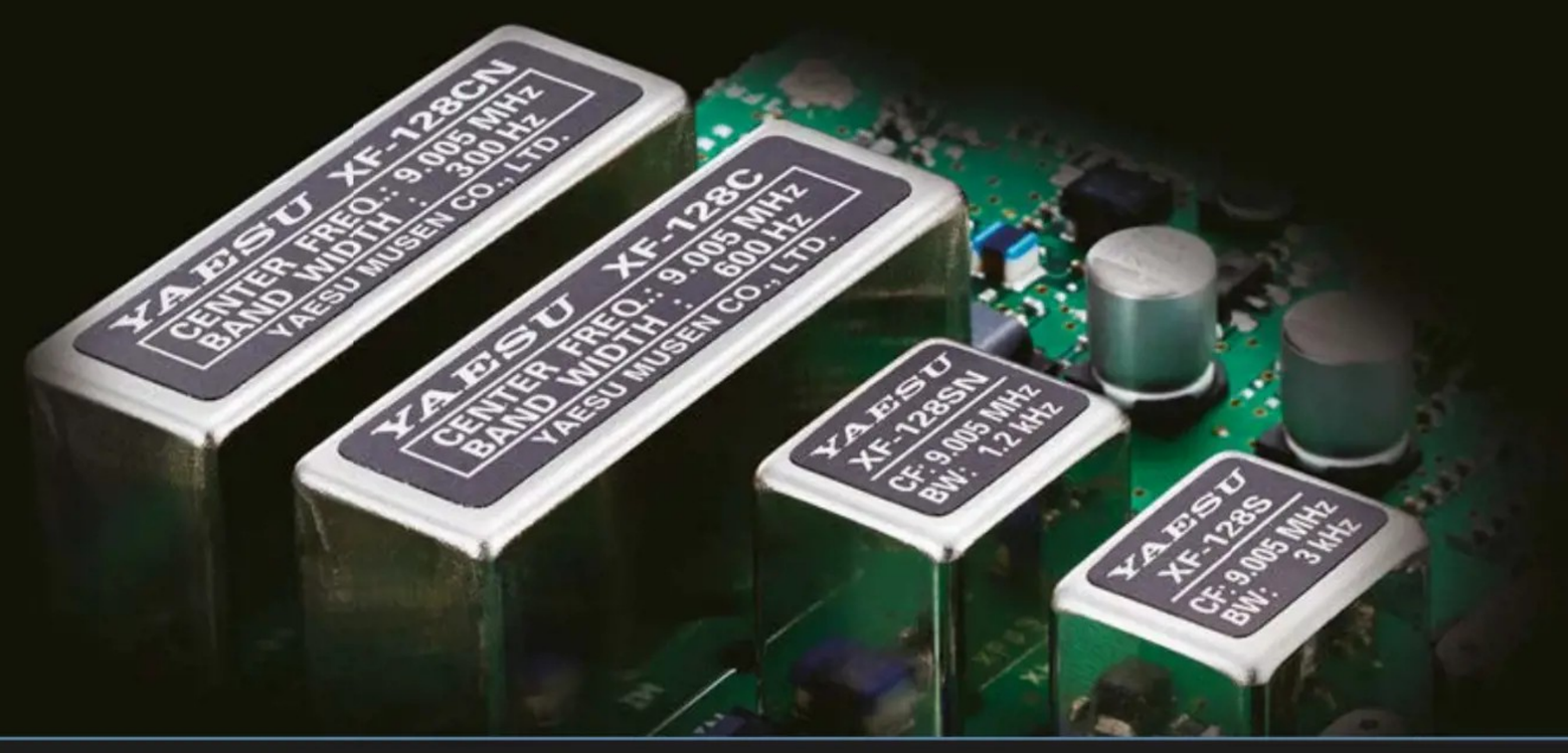
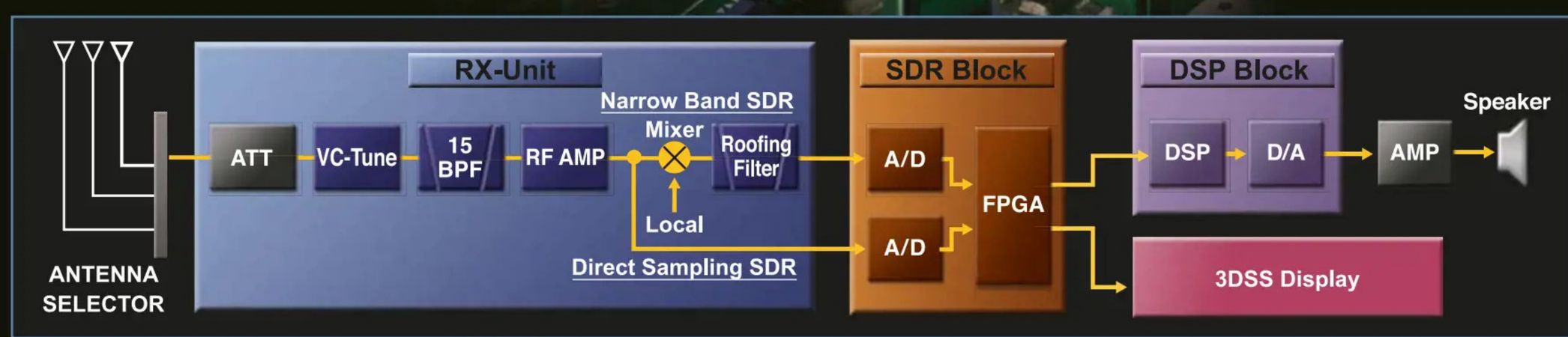
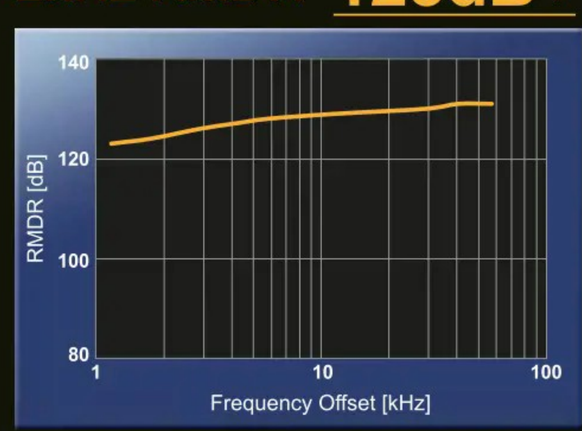
Hybrid SDR Configuration

The Hybrid SDR Configuration combines the excellent performance of a Narrow Band SDR receiver with the wide band sampling of a Direct Sampling SDR receiver that simultaneously provides a wide bandwidth real time display of band activity



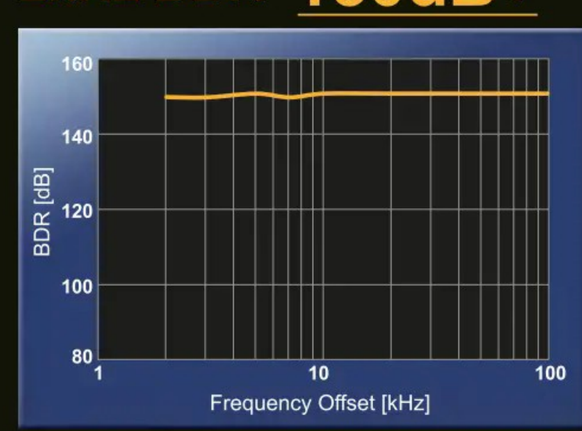


2kHz RMDR 123dB+



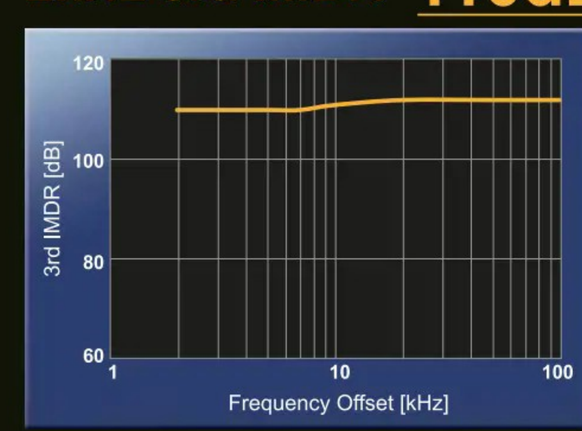
14MHz Band Reciprocal Mixing Dynamic Range (RMDR)

2kHz BDR 150dB+



14MHz Band Blocking Dynamic Range (BDR)

2kHz 3rd IMDR 110dB+



3rd IM Dynamic Range (IMDR)

HF/50MHz TRANSCEIVER
FTDX101MP 200W

HF/50MHz TRANSCEIVER
FTDX101D 100W

* Microphone M-1: Optional

YAESU
Radio for Professionals

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Fareham, Hampshire PO15 5FG

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Specifications subject to change without notice. Some accessories and/or options may only be standard in some areas. Check with your local Yaesu Dealer for specific details.