STARLITE

THE JOURNAL FOR THE STOURBRIDGE AND DISTRICT A.R.S.

G6OI

G6SRS

G4CVK

ISSUE: MAY 2023

STOURBRIDGE & DISTRICT AMATEUR RADIO SOCIETY

INCORPORATING

OLDSWINFORD HOSPITAL SCHOOL RADIO CLUB

MEETINGS NORMALLY HELD AT

OLDSWINFORD HOSPITAL SCHOOL
HEATH LANE
STOURBRIDGE
[8:00 TO 10:00 PM]

VISITORS ALWAYS WELCOME

DURING COVID, THE SOCIETY HOLDS ITS MEETINGS
EVERY MONDAY AT NORTON SOCIAL CLUB,
OSMASTON ROAD, STOURBRIDGE

RSGB AFFILIATED SOCIETY

The views expressed in STARLITE may not be those of the Committee – Stourbridge and District Amateur Radio Society

STARLITE

Telephone Enquiries to:-

Hon. Secretary
John Clarke M1EJG
[01562] 700513

Or by Email to:-
honsec@g6oi.org.uk
johnclarke.m1ejg@btinternet.com

All correspondence/enquiries should be addressed to the Hon Secretary at:-

StARS
c/o The Mill House
21 Mill Lane
Blakedown
Kidderminster
DY10 3ND

StARS Website URLs:-
www.g6oi.org.uk

StARS Facebook Page:-
https://www.facebook.com/groups/stourbridge.ars/

Forthcoming Meetings

May 1st	**Bank Holiday: No Meeting?**
May 8th	**Bank Holiday: No Meeting?**
May 15th	Club Meeting at Norton Social Club. 8pm
May 22nd	Club Meeting at Norton Social Club. 8pm
May 29th	**Bank Holiday: No Meeting**
June 5th	Club Meeting at Norton Social Club. 8pm
June 12th	Club Meeting at Norton Social Club. 8pm
June 19th	Club Meeting at Norton Social Club. 8pm
June 26th	Club Meeting at Norton Social Club. 8pm
July 3rd	Club Meeting at Norton Social Club. 8pm
July 10th	Club Meeting at Norton Social Club. 8pm
July 17th	Club Meeting at Norton Social Club. 8pm
July 24th	Club Meeting at Norton Social Club. 8pm
July 31st	Club Meeting at Norton Social Club. 8pm

Editor's Comment [Editor: g4xom@g6oi.org.uk]

So, I understand that there was a recent visit to Woofferton. Isn't it a sorry state of affairs when members of the Society are not advised of, or invited to, a visit to an external site, but members of other clubs are? Is it because we are not part of an inner circle, or some form of a clique? For my own part, I know I haven't been to a meeting since March 2020, due to previously unforeseen circumstances, but I am a fully paid up member of the Society and would expect to be kept appraised of any news or upcoming events within the Society. To say I was disappointed would be an understatement, but I am not surprised at the lack of contact, as communication still appears to be a low priority within StARS. Were any other members not informed, either? Any response to this comment would be most welcome, but I won't hold my breath in anticipation!

In this issue:

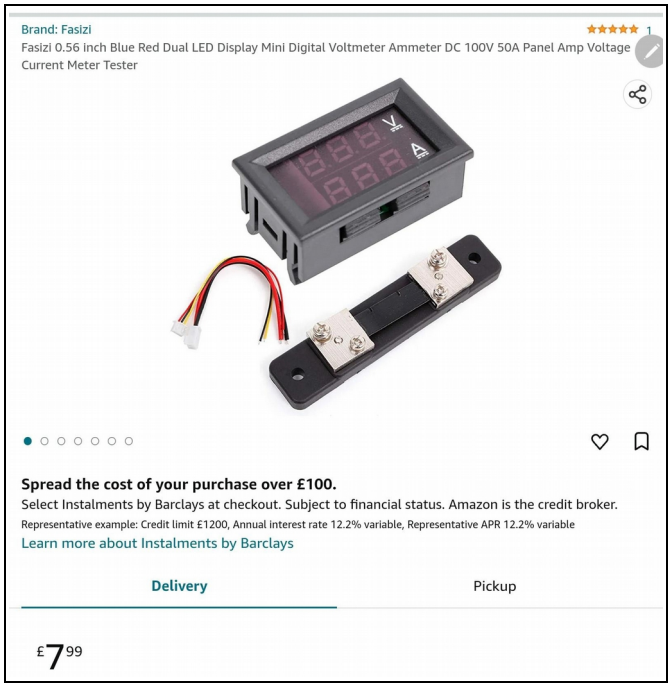
Martin G4VZO informs me that the cost of the KM3000 2m radio, in last month's issue, is just £20 + postage ... a bargain.

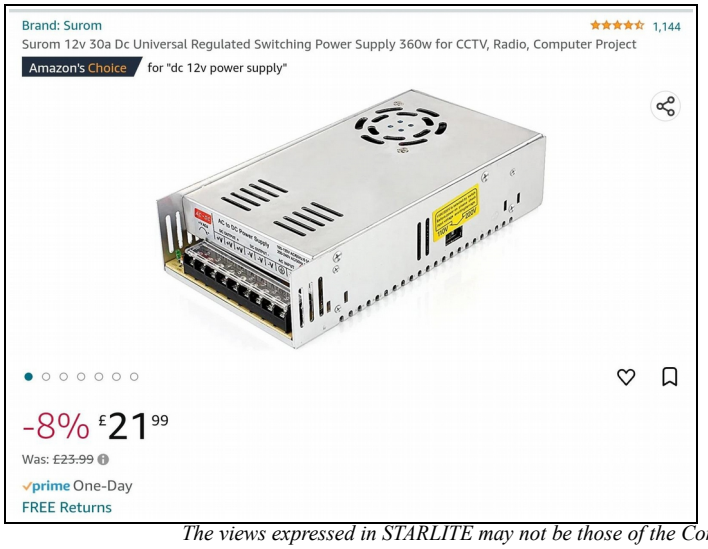
Building a cheap 30A Power Supply

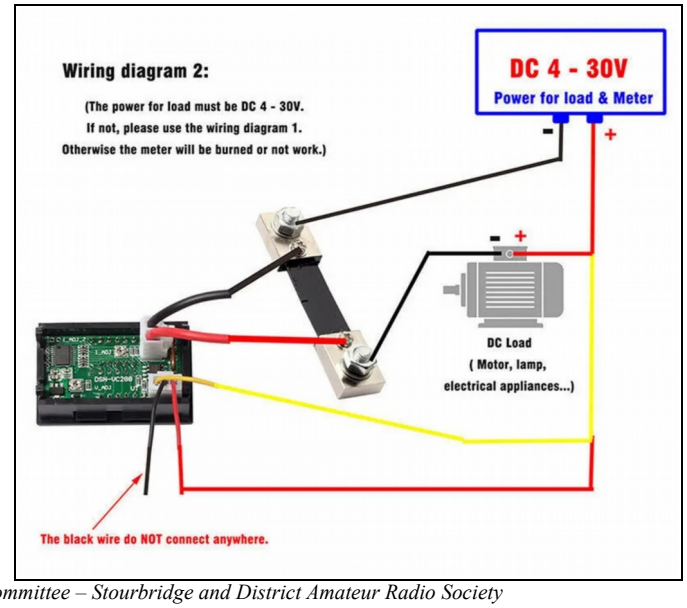
By Wayne Mocroft M5LLT

I had been watching this neat Chinese switched mode, bare bones power supply, on Amazon for a while. Prices ranged from £22 to £17, depending on deal at the time. I dropped lucky and jumped in when they dropped it to £17. When it arrived it was just in a branded cardboard box, no instructions, but it's not rocket science, is it?. It just has a row of screw terminals under a plastic cover, L.N.E. and 3 +ve DC, 3 -VE DC, a small trimmer pot for voltage adjustment and a green power on led. I checked it out for earth bonding and any possible leakage from mains to dc terminals - all clean. Made up some mains power leads and DC leads, set the voltage to 13.8 and fired up the FT991A - all OK. No strange whistles on the bands and no smoke as I slowly wound the power up to 100W. So all good. Reports on air were favourable, too, with no background noise.

Very pleased, but it was not safe with these connections and no indication of voltage and current drawn, all of which give advanced warning of possible problems happening. So the makeover was to begin. Some sort of cover over the live terminals, DC terminals to connect the output and metering. So the ordering began.....







The terminals were £1.60 for the 2, the rest are in stock for future projects.

The meter was a neat digital dual display, volts and amps, red and blue. £7.99

The case was £5 from a rally, intended for another project, but perfect size for this.

I added an i.e.c mains input socket and a power on/off switch, both salvaged from a defunct PC power supply, so zero cost along with the plug-in power lead. Recycling at its best. Other than a few screws and terminal tags from the parts trays, that's it.

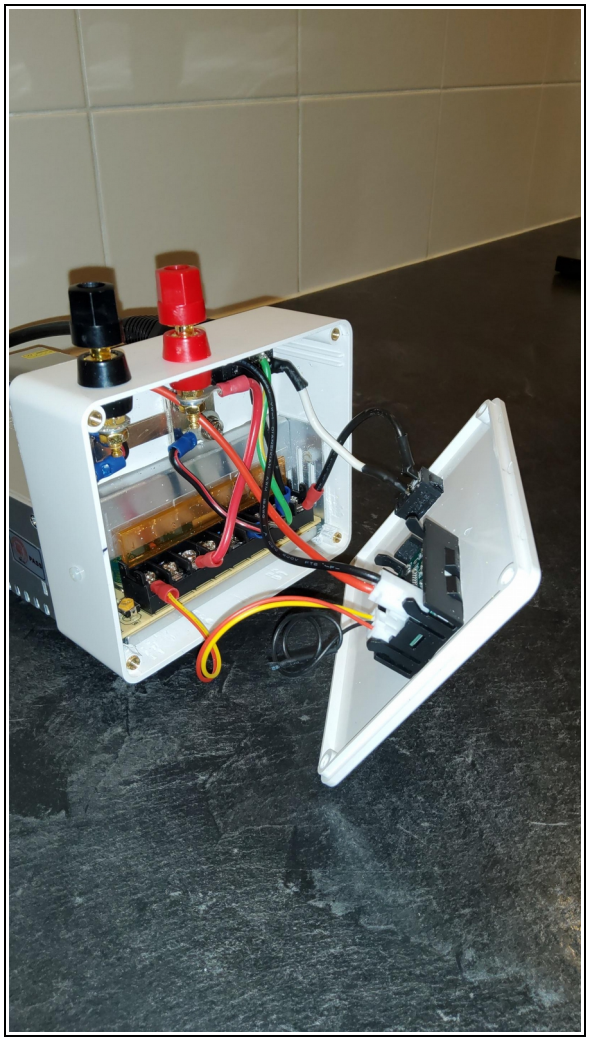
I cut out a slot in the back of the box, which neatly fitted over the case terminals. Holes cut for the power connector and the DC terminals. Meter cut out in the box lid and for the power switch. I didn't bother with a power indicator, if the meter is lit up its on, if its dark its off. Time to assemble the whole thing. Wiring was very tight for space, but as it is high current, I wanted the runs to be as short as possible.

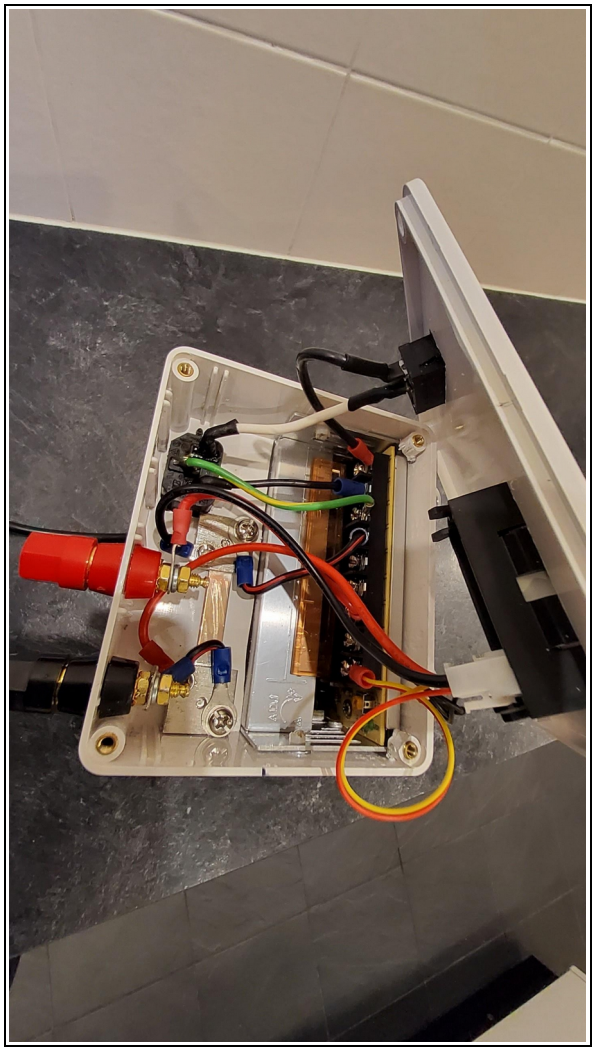
Power input socket fitted

Power lead with fused plug

Inside, the mains and low voltage separation is the best it gets. Shrink sleeve was fitted to all the 240V terminations on the switch and the socket. After all, this is not for production, but my personal use. Nontheless, I did ensure it was electrically safe before closing the box and again high voltage tests were done, nothing found.

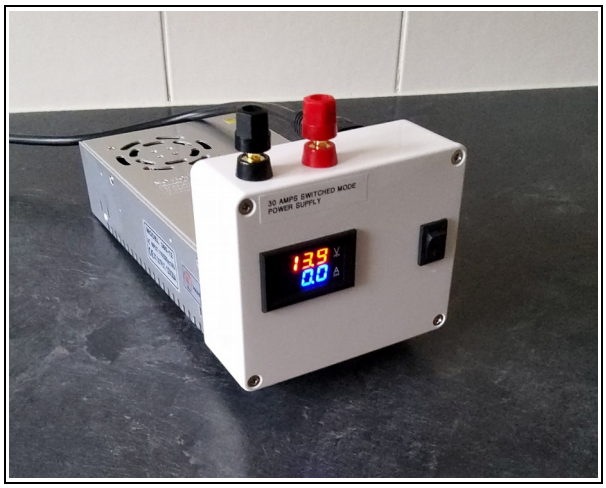
You can see the 50Amp meter shunt in the bottom of the box. The sampling leads go to a plug that fits on the 2 pins on the meter board. The yellow, red and black wires power the meter, with the yellow being the voltage measurement wire. In this configuration the black is not required.

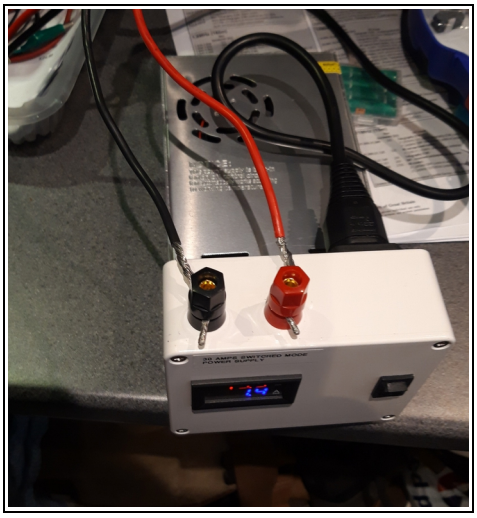


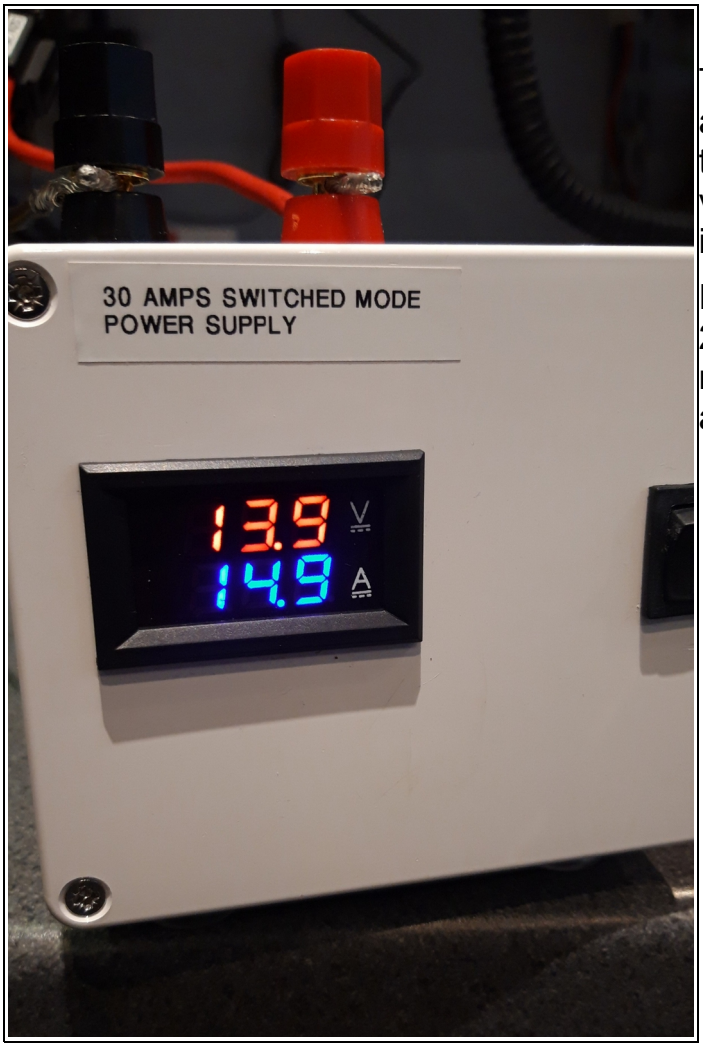


It was a tight squeeze to connect it up, but manageable. I have left space to fit a multi-turn pot on the front panel. The plan was to bring the trimmer off the board on 3 fly leads and make the voltage adjustable. The problem was the pot measured to be 200 Ohms and at the moment I could not get a multi turn 200 ohm pot anywhere. So decided to preset the voltage to 13.9 V and leave it (why 13.9 not 13.8.....just thought I'd be different!). If one becomes available I may fit it, but its not vital.

It's not the prettiest of constructions, but it does its job admirably and is much lighter than my shack PSU. The idea was if I took the rig with me anywhere, this PSU would be much lighter and more portable. The Shack PSU weighs a ton!!







This was while testing with 100W SSB it actually peaked at about 16Amps (there are trimmers on the back of the meter for both voltage and current. I used a 21W 12v indicator bulb - 14V x 1.5 A =21W)

Fitted 2 rubber feet under the front edge and 2 smaller ones at the back, angled it up nicely and stopped it scratching or moving about.

I will run this power supply in the shack for a while to see how it behaves, and whether the cooling fan cuts in in response to temperature rises with use. I could have used the 20Amp version, but then it would have been running close to its limit. With the 30Amp unit it has more in reserve before it breaks into a sweat.

In conclusion, for £31.59 I am very pleased with the outcome and it was fun putting it all together - but that's all part of the game....isn't it.

Valves

By Geoff Cooper G0KVK

When I left school at fifteen (1958) I went for a job at a small radio and tv repair company. It was run by three partners, one was a radio amateur (Ken G3BFQ). This raised my interest in amateur radio. In those times valves were the only device to be used as rectifiers, oscillators and amplifiers.

Valve History

The Edison Effect

This was a name given to a phenomenon that Edison observed while he was trying to improve his incandescent lamp. The effect was that, in a vacuum, electrons flow from a heated lamp filament to a cooler metal plate. Edison saw no special value in it, but he patented anyway. (Today we call it thermionic emission).

Now, the Edison effect has an interesting feature. The electrons can only flow in one direction, from the hot element to the cool plate, but never the other way. Today we call these devices that let electrons flow one way Diodes.

In 1904 the Edison effect was finally put to use, radio was in its infancy and the British physicist John Fleming was working for the British Wireless Telegraph company. He faced the problem of converting a weak alternating current into a direct current that could actuate a meter or a telephone receiver. Fleming realised that an Edison effect lamp would convert alternating current into direct current because it let the electricity flow only one way. Fleming, in other words, had invented the first vacuum tube. This two electrode device consisting of a filament and a cold plate was called a diode. In early valves the filament was made of tungsten, which had to be heated up to 2200 degrees centigrade be for electrons were emitted. This consumed a large amount of power and these were called directly heated valves. The great breakthrough came when oxide coated filaments (and soon after separate cathodes) became available. A cathode is a cylinder made of nickel or molybdenum with a coating of metal barium or strontium. This delicate oxide coating emits electrons at a lower temperature of about 750 degrees, this then allows the heater to be placed inside the cylinder. These became known as indirectly heated valves

The next major development occurred when Lee De Forest added a third electrode. This was a metal wire mesh and was placed between the filament and the anode. This was called the control grid and, by varying the voltage on this third electrode, it can produce a much greater change in current passing through the valve. By the addition of this third electrode, the valve became known as a Triode and can be used for the amplification of signals.

Later on other grids were added to improve the function of the valve for different jobs

In the early type of valve the vacuum was drawn from the bottom and the tube was sealed over and a paxolin base with the pin connections was added to the bottom of the valve. This had a keyway in the spigot, so that the valve could be slotted into the valve base and rotated until it lined with the keyway in the base and pushed home. This lined up the valve connections to the base. Later on, the connecting pins to the electrode of the valve were brought out on the bottom of the valve, with a gap between two pins. Either seven or nine pins were used. The glass seal was now at the top. If you look at the top of the valve, it looks like it is burnt inside the glass. This is where a tray of Magnesium has been ignited externally to burn off any air that has been left inside the valve envelope. Valve electrodes

have become smaller, so two or three valves can be placed in one envelope, i.e. 3 Diodes or 2 Triode or 1 Triode and 1 Pentode all fed with their own heater. And, of course, there was the advantage of it always keeping the shack warm on a cold night!

YouTube Videos

HAM - Official Documentary (2022)

A film by Grace Wolcott, who is a film-maker based in Missoula, MT, with a BFA in Media Arts - Digital Filmmaking from the University of Montana.

https://www.youtube.com/watch?v=wt5wZhC5crI

Here is another one from **Jim G4WAO**, who says, "*This will be well worth seeing. It only happens every 5th Wednesday and this is the best ever, apparently. You'll see how they decide who wins what towards the end. Dick Smith is a very well known man who has a licence and, also, ran a big string of electronic shops. He is, of course, a club member here at VK2MB.*"

See this recording of the wonderful show and tell evening at the club …

https://youtu.be/KKEYAdXEW-M

Now we have another couple, which you may be interested to view.

From: Timeline - World History Documentaries

Inside Britain's Top Secret Codebreaking Organisation That Cracked Enigma | Station X

During WWII, the fate of the world depended on the codebreakers at Bletchley Park, Britain's super-secret headquarters for cracking the "unbreakable* Enigma machine. Against the odds, these schoolboys, academics, and crossword fanatics turned Germany's greatest weapon into its greatest liability. This fascinating documentary offers first-hand accounts of "Station X" and how they cracked the code.

https://www.youtube.com/watch?v=8FDeLnxCOXA&t=3s

From: PBS America

Thomas Edison FULL DOCUMENTARY

Edison explores the complex alchemy that accounts for the enduring celebrity of America's most famous inventor, offering new perspectives and revealing not only the true nature of invention, but its role in America's rush into the future.

https://www.youtube.com/watch?v=wol2rnUbzNc

Foundations of Amateur Radio

When I said Parrot Repeater ... I likely had a different picture in mind

A little while ago I mentioned in passing that I was considering implementing a parrot repeater to help determine how your radio is performing. Discussion afterwards revealed that not everyone had the same picture in mind, so I thought I'd share with you some of what I'm considering and why.

Most of the modern radio landscape revolves around hooking a computer up to some type of radio frequency capable device. Commonly it's the audio and control signals that travel between computer and radio, but there are plenty of examples where raw data makes the journey, like in the case of an RTL-SDR dongle.

That journey is increasingly made using USB, the cable, not the sideband, and limits are based around the maximum speed that a Universal Serial Bus has. Essentially the amount of data that you can process is limited by how fast your computer can talk to the radio.

For my parrot repeater, I'm imagining a device that can receive RF from any radio and process that signal to determine what the centre frequency is, the deviation, stability, the mode, what ever parameters I end up being able to determine, a whole other discussion on its own. In response, the idea is that the device generates a report and either presents that using text to speech, or as a web-page, or both.

Using traditional methods, this would involve a radio, a computer, some software, connections between the radio and the computer, not to mention power for both the computer and the radio, an antenna and perhaps an amplifier. The picture I have in mind is not anything like that. I'm imagining a single device that takes power and does all I've described inside the one device. No external computer, no audio cables, no control cables, no hard drives, not anything, just a PlutoSDR and a power source connected to an antenna or two.

You might think that's fanciful. As it happens, we already have some of that today. When I run dump1090 on my PlutoSDR, it presents itself to the world as a website that I can visit to see which aeroplanes are within range, where they are exactly on a map, what messages they're sending and where they're going. All of the processing is done inside the PlutoSDR. All I have to do is give it power and an internet connection.

This is possible because the PlutoSDR is essentially a computer with RF. It runs Linux and you can write software for it. Unlike my Yaesu FT-857d, which also has a computer on board, rudimentary to be sure, but a computer none the less, it cannot be altered. I cannot load my own piece of software, launch a web browser and point it at my Yaesu, not without connecting an external computer that in turn needs to be connected to the radio. I might add, that this is is how many repeaters work and how devices that implement AllStar and Echolink manage to make the jump between the Internet and the world of RF.

If your eyes are not lighting up right now, let me see if I can put it in different terms.

The PlutoSDR has the ability to access signals between 70 MHz and 6 GHz. It can do so in chunks of 56 MHz. Said differently, if you were able to consider all of the amateur HF spectrum, from zero to 54 MHz, you could fit all of it inside one chunk of 56 MHz that the PlutoSDR is capable of. You couldn't send it anywhere, since you're limited to how fast a USB cable is, but you could technically process that inside the PlutoSDR itself.

To get the PlutoSDR to see the amateur HF bands you could connect it to a transverter, in

much the same way that today many 2m handheld radio owners use a transverter to get to 23cm, except in this case, we're going the other way.

In order to actually use this massive amount of information, you're going to need to do some serious signal processing. Accessing 56 MHz of raw data is hard work, even if you don't have to get it across a serial connection. As it happens, the PlutoSDR also comes with an FPGA. As I've mentioned previously, it's like having a programmable circuit board, which can be programmed to do that signal processing for you. It has the capability to massage that massive chunk of data into something more reasonable. For example, you might be able to use it to extract each of the amateur bands individually and represent them as an image that you might show to the world as a waterfall on a web browser.

Now to be clear, I'm not saying that any of this exists just yet, or fits within the existing hardware constraints. I'm only starting on this journey. I'll be learning much along the way. No doubt I'll be using existing examples, tweaking them to the point that I understand what they do and how they work. I've already been talking about some of this for years. As you might have discovered, this adventure is long with many different side quests and at the rate I'm going I'm confident that this represents the breadth and depth of what amateur radio means to me.

So, if you're wondering why I'm excited, it's because the amateur radio world of opportunity is getting bigger, not smaller.

I'm Onno VK6FLAB

SOS Radio Week is one month of fun, operating, an opportunity for amateur radio to celebrate the work of the Royal National Lifeboat Institution and to raise much needed awareness and funds for them. Any licensed Amateur Radio operator, or Amateur Radio club, based within the United Kingdom, Ireland, Guernsey, Jersey and the Isle of Man can register to run an official SOS Radio Week station. All you need to do is let us know what callsign you will be using during the event, together with your location, and you will become an official Registered SOS Radio Week Station, promoting the work of the RNLI and NCI throughout the event.

SOS Radio Week takes place during the month of May every year to coincide with the (RNLI's) own Mayday fund -raising event. It starts at **00:00 on the 1st May and ends at 23:59 on the 31st May 2023**. Basically you can elect to operate your station any time within the month of May. Registered SOS will be on the air at various times during the event will be on the air at various times during the event. There is always a large number of stations on the air supporting this event and a list of these may be found at https://www.sosradioweek.org.uk/registered- stations/sos-radio-week-stations/ it is possible to register your station at https://www.sosradioweek.org.uk/about/sos-radio-week-registration/ basically it remains to promote your part in the event and where possible raise funds for the lifeboat organisation.

OJ0/LA1UW OJ0/LA3WAA OJ0/LB5SH OJ0/LB0VG Market Reef

OJ0/LA1UW, OJ0/LA3WAA, OJ0/LB5SH and OJ0/LB0VG will be active from Market Reef, IOTA EU - 053, 20 - 27 May 2023.

They will operate on 80 – 4m. QSL via home calls.

8Q7KB Meedhupparu Island Maldives

DL2SBY will be active again from Maldives, IOTA AS - 013, 27 April - 7 May 2023. QTH - on Mushimas Migili Island.

He will operate on 80 - 6m, CW, SSB, Digital modes.

QSL via DL2SBY direct, LOTW, ClubLog OQRS.

Address for direct QSL: Kasimir Bastian, Gruenaecker Str. 39, 71069, Sindelfingen, Germany.

V47JA Saint Kitts Island

W5JON will be active again as V47JA from Saint Kitts Island, IOTA NA-104, 23 May - 7 June 2023.

He will operate on 160 - 6 m (Including 60m), SSB, FT8.

QSL via home call direct, LOTW.

Address for direct QSL: JOHN V ABBRUSCATO, 22199 PINE TREE LN, HOCKLEY, TX 77447, USA.

9X2AW Rwanda

Harold, DF2WO will be active again as 9X2AW from Rwanda, starting 23 May 2023. He will operate on 160 - 10m, CW, SSB, Digital modes and QO-100 satellite.

QSL via M0OXO, OQRS.

Address for direct QSL: Charles Wilmott, 60 Church Hill, Royston, Barnsley, South Yorkshire. S71 4NG, England.

DX0NE Spratly Islands

4F2KWT will be active as DX0NE from Spratly Islands, IOTA AS - 051, 30 April - 9 May 2023.
He will operate on 160 - 6m, using 100 watts.

QSL via IZ8CCW. QTH - Kalayaan Island.

5X2I Uganda

Pista, HA5AO will be active as 5X2I from Uganda, 24 April - 10 May 2023.

He will operate on 40 - 10m, CW, SSB, FT8, using FT710 transceiver with KPA500 amplifier and DX Commander antenna.

QSL via OQRS on ha5ao website. QTH – Busabala.

HK0/PY8WW HK0/PY7RP HK0/PY7XC San Andres Island

HK0/PY8WW, HK0/PY7RP, HK0/PY7XC will be active from San Andres Island, IOTA NA - 033, 2 - 20 May 2023.

They will operate on 80 - 6m, CW, SSB, FT8.

QSL via home calls, ClubLog OQRS, LOTW.

FO/F6BCW Huahine Island French Polynesia

Didier, F6BCW will be active from Huahine Island, IOTA OC - 067, French Polynesia, May - October 2023.

He will operate on 160 - 6m, CW, SSB.

QSL via F6BCW, LOTW. DXCC Country - French Polynesia.

Address for direct QSL: Didier CADOT, 180 rue du Moulin de la coudre - 71440, TRONCHY, FRANCE.

VK0AW Davis Base Antarctica

Allan, VK0AW will be active from Davis Base, IOTA AN - 016, Antarctica starting 14 February 2023.

He will operate on HF Bands.

QSL via EB7DX.

Address for direct QSL: DAVID LIANEZ FERNANDEZ, P.O.BOX 163, 21080, HUELVA, Spain.

FH4VVK Mayotte

Marek, F4VVJ ex SQ6WR will be active as FH4VVK from Mayotte, IOTA AF - 027, 1 September 2022 - 1 April 2024.

He will operate on HF Bands.

He is planning to activate Le Petite-Terre, FH – 002. DXCC Country - Mayotte, FH.

QSL direct or via eQSL.

Address for direct QSL: DLEM - CCL - BML, DZAOUDZI, Quartier CABARIBERE, DLEM 97615, Mayotte

Foundations of Amateur Radio

Bringing an upconverter into your life

A couple of days ago, after months of anticipation, an unassuming little box arrived on my doorstep. Inside the box was a nondescript electronic device with two SMA connectors and a USB socket. Other than the branding, there were no markings on the device and it came without any instructions.

It did come with a couple of SMA adaptors, which came in handy.

A little research later determined which of the two SMA adaptors connected to an antenna and which connected to a radio.

The gadget itself is called an upconverter.

It's an interesting little device that essentially mixes two frequencies together, creating two new ones, start with say 720 kHz and mix it with 120 MHz and you end up with 120.720 MHz and 119.28 MHz. In other words, if you mix two frequencies together, you end up with both the sum and the difference of those frequencies.

If you have a radio that can listen to 120 MHz, but cannot listen to 720 kHz, then using an upconverter, you can, as it were, expand the frequency range of your radio to hear different signals.

I purchased the upconverter with the intent of connecting it to my PlutoSDR, since the lowest frequency it can do is 70 MHz. Combine the two and I should be able to listen to all of the amateur HF frequencies at once.

Given that my PlutoSDR is currently doing something else, I had a look at using the upconverter with my WSPR beacon monitor that uses an RTL-SDR dongle. Technically it's not required, since my particular dongle can be used to tune to HF frequencies, but as an experiment, it works well enough.

So, I connected the antenna to the upconverter, the upconverter to the dongle and the dongle to a Raspberry Pi, a single board computer that runs Linux. Essentially the exact same setup I've been running for years, except that I inserted the upconverter between the dongle and the antenna.

That and some power took care of the hardware.

The software initially gave me some challenges. After discovering that the tool I'm using, rtlsdr_wsprd, has an option for an upconverter, I was up and running in minutes.

So, at the moment, and for the next foreseeable little while, my WSPR monitor is using an upconverter to scan HF. Technically this should increase the sensitivity by a significant amount, since the dongle is better suited to tuning to higher frequencies than it is to lower ones, but only time will tell.

I updated my monitoring scripts to take into account if the frequency I was monitoring was out of range, so it currently won't report on anything above 60 MHz, but then that's fine for what I'm working on.

I've updated the script on github if you want to have a look. It's nothing fancy, it essentially checks to see if there's a file called upconverter and if so, it calls a slightly different monitoring script.

Given that I have existing logging data associated with this monitor, I should be able to

discover if there's any significant difference between what I've been monitoring to date and what's coming in now that an upconverter is in the listening chain. Theoretically, I should be able to hear weaker signals, but time will tell.

One thing that was interesting whilst I was discovering how this all works and hangs together is that it wasn't immediately obvious how to set it all up in software. I tried several tools to make sense of the data. In the end the combination of gqrx, setting the local oscillator offset to a negative frequency, in my case 120 MHz, got me to the point where I could set the frequency to 720 kHz and hear my local broadcast station, whilst the software actually, secretly behind the scenes, added 120 MHz to that and tuned the radio to 120.720 MHz.

Once I got my head around that, things started falling into place.

The same is true for rtlsdr_wsprd, adding the upconverter flag with the value of 120MHz, got my monitoring station up and running.

This is a pretty user friendly way of getting started with frequency mixers. You might recall my exploration into components apparently made from unobtainium. The intent is to use a variable frequency to achieve a similar thing, but that's a project still on the drawing board, for now, I have a fixed frequency, 120 MHz, which is plenty to get started.

If you're curious why I'd want a stable variable frequency, consider for example, what might happen if you transmit from a HF frequency into an upconverter. Perhaps you could use your HF capable WSPR beacon to make a signal on 2m or 70cm. 120 MHz won't cut it, but perhaps you can work out what's needed to get from the 10m WSPR band to the 2m WSPR band, or the 70cm WSPR band.

I'm Onno VK6FLAB

• *This article is the transcript of the weekly 'Foundations of Amateur Radio' podcast, produced by Onno Benschop, VK6FLAB who was licensed as radio amateur in Perth, Western Australia in 2010. For other episodes, visit http://vk6flab.com/. Feel free to get in touch directly via email: cq@vk6flab.com*

YOUR COMMITTEE

PRESIDENT	Alan Stanley	M7ALS
VICE PRESIDENT	Nick Moss	G6DQN
SECRETARY	John Clarke	M1EJG
TREASURER	John Scott	G8UAE

COMMITTEE MEMBERS

Wayne Mocroft	M5LLT
Geoff Cooper	G0KVK
Keith Dixon	M0HPY
Ross Lewis	2E0RLX

STARLITE EDITOR	Bob Egan	G4XOM
	Email:	g4xom@g6oi.org.uk