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Local Repeaters  
GB3MH: 145.625/88.5(FM)  
GB7MH: 439.6375(D-Star/DMR/Fusion)  
GB3NX: 430.850/88.5(FM)  
GB3NS: 439.675/82.5(FM)  
GB7NS: 439.1625(DMR)  
GB3HO: 430.8875/88.5 (438.4875)(FM)  
GB3HY: 430.900/88.5 (438.500)(FM)  
Local DX Cluster GB7DXS : Telnet  
81.149.0.149 Port 7300



# Club newsletter



January 2022

Editor: Richard, G3ZIY

## From the Chair

Fellow members,

Thanks to everyone who joined us last night by Zoom for the club AGM. I'm delighted that your committee were all happy to stand for re-election and this was confirmed by online voting. Please look out for the minutes which should be shared with you all soon. At the AGM we set out the plans for the coming year including refurbishing the main room of Hut18 with a focus on providing ample storage for the club equipment. COVID restrictions permitting, we will be asking for your help to bring this about. We will also be looking carefully at our energy efficiency with a view to reducing our electric consumption. This is the second biggest cost to the club after the hut rent. There is little or no insulation in the hut and our only source of heat are the inefficient fan heaters which take a long time and considerable power to warm the room in the winter months. If any members have experience in this area, I would be very happy to hear from you.

We hope to resume meetings very soon but with COVID still rife in the community, there were three members online last night who are all currently suffering including two of the committee, the time doesn't feel quite right to reopen despite the changes to Government regulations. I'm sure you join me in wishing everyone a rapid and full recovery.

The AGM agreed with the committee proposal to maintain our membership subscription at last year's discounted level. This is £20 for adult members and £10 for junior and country members. We will again fund this discounted fee from the COVID grant which the club received in 2020. You should already have received a renewal email from the club which included our bank details. We will of course be happy to receive subs by cheque or cash but please do not post cash, rather wait until our meetings resume.

Radio wise, the first contest outing of the year is scheduled for the first weekend in March, weather permitting. We will be operating on 2m and 70cm from the site at Swingate near Dover. All members are welcome to come along. Do contact me via email or using the contest GROUPS.io if you are already subscribed to that forum.

We all hope that spring HF conditions will be as good or better than those in autumn 2021. The sunspot cycle is well on the way up so keep an eye on the bands.

I hope to see you all in person at Hut 18 very soon.

*Mike, G0KAD. CARC Chair.*

## Aerials

This article is about aerials – HF aerials in particular but not exclusively – and their requirements as receiving devices and transmitting devices.

Most Amateur stations use the same aerial for both transmitting and receiving HF signals – and that's often as much as we can manage given the size of many gardens. Many modern receivers/transceivers have separate receive sockets which are bridged across to the aerial changeover system, but this link can be removed giving access to the receiver path, without affecting the transmitter path at all.

Consider a 7MHz quarter wave vertical over a perfect ground plane – not possible in real life – but for the purposes of modelling, it will serve as a reference aerial. At resonance it will have an SWR of about 1.39:1 in a 50Ω system and a pattern as shown in Fig. 1. So a near match, and would radiate a useful amount at low elevation angles – up to about 5.15dB over an isotropic aerial (see the purple shading).

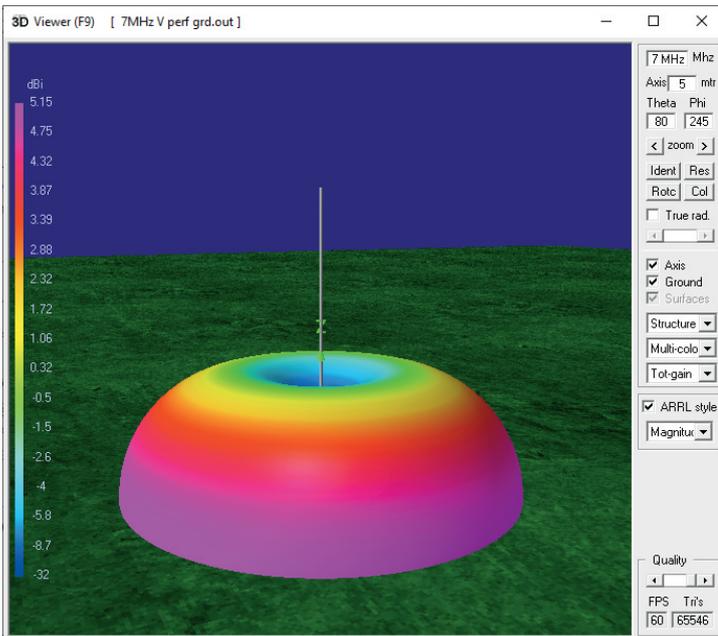


Fig. 1 - quarter wave vertical pattern over perfect ground

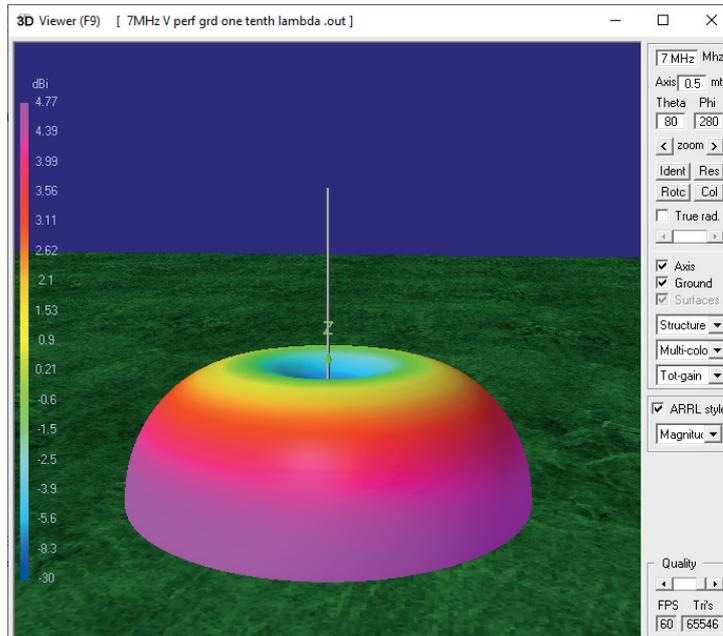


Fig. 2 - 1/10λ vertical pattern over perfect ground

Fig. 2 shows a one tenth size vertical height aerial operating on 7MHz. The SWR is about  $5 \times 10^5:1$  – a 0.25Ω resistance in series with about 9.4pF – a very reactive aerial indeed. But look at the radiation pattern compared to an isotropic aerial – barely changed from that of the quarter wave in Fig.1 but admittedly down by 0.38dB – a negligible amount on HF. But you couldn't draw any power from this aerial to speak of; the impedance is just far too high. Fig. 3 is the polar plot of a 30cm ( $\approx 1$  foot) long whip, and again the pattern hasn't changed; just the gain by a negligible amount.

This is where these short aerials effectively become voltage probes which can only be used when connected to very high impedance amplifiers, and the system becomes an active aerial. This 3D pattern remains essentially the same down to very short lengths, but with an appropriate amplifier the losses can easily be compensated for.

These days extremely high input impedance RF op-amps such as the venerable AD8067 (<https://www.analog.com/en/products/ad8067.html>) do an admirable job as part of an active aerial amplifier. The circuit can be configured to have an output impedance of 50Ω to feed the receiver input. I find these

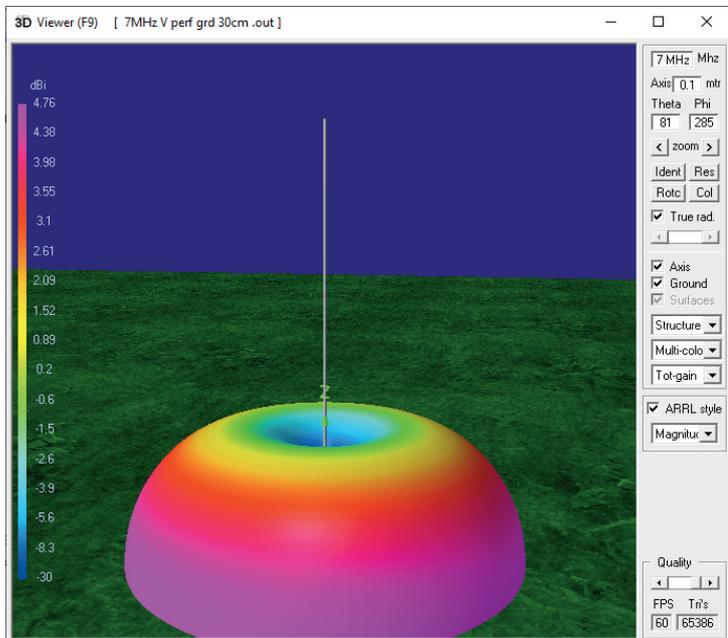


Fig. 3 - 30cm vertical pattern over perfect ground

active aerials pick up less man made noise if located as far as possible from the house, and they take up negligible real estate as well!

Being omnidirectional does mean that they are useful for spotting stations that may be off the beam on the main station aerial. They don't need any tuning and pickup right across the HF spectrum. Depending on which amplifier circuit you use, they can work well up to VHF. Eric, KL7AJ, describes active aerials using AD8067 in his ARRL copyright book about receiving antennas. This particular op-amp has a quoted input impedance of 1000GΩ in parallel with 1.5pF so is eminently suitable for amplifying high source impedance

whips. I found they work well, even being sited under my HF main transmitting aerial, which I thought might damage them, but hasn't happened.

Richard, G3ZII

### What Does a HAM do while the country is in lock down for the second year?

Well what a year it has been, our second year (2021) of the COVID pandemic. Now the booster jab is protecting us from the new variant "Omicron" as much as it can.

For me, no working from home as a product support engineer for a communications company. I need to be at the office. After my last article, which was published in the CARC newsletter back in 2020, regarding the building of MMDVM repeaters, I received a couple of contacts wanting to find out more about the homebrew repeaters.

It seems that a few UK repeater groups wanted to update and also install new multimode repeaters on air. It would seem that due to people being in lockdown the interest in using repeaters has grown slightly. Whether this trend will continue time will tell.

I had been asked to put together a BOM and cost to build/setup a couple of MMDVM repeaters. These repeaters are all UHF and setup for DMR, D-star and Fusion. Not all modes are enabled due to the NOV details. They all run using Pi-star on a raspberry PI. The UHF radios are mostly Motorola GMs which are still readily available on EBay at between £40 and £100 each. Getting hold of the software and programming leads are also available on-line. Most of the other components are available from EBay or Amazon at really good prices.

With the updates for Pi-star it's now possible to add FM analogue.

Pi-star also now offers the following modes:

- 1) Fusion
- 2) FM analogue
- 3) D-Star
- 4) DMR
- 5) P25

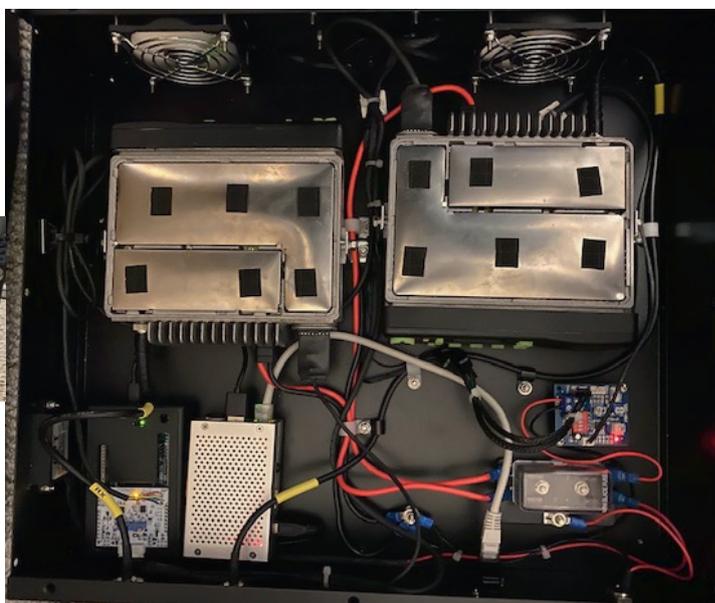
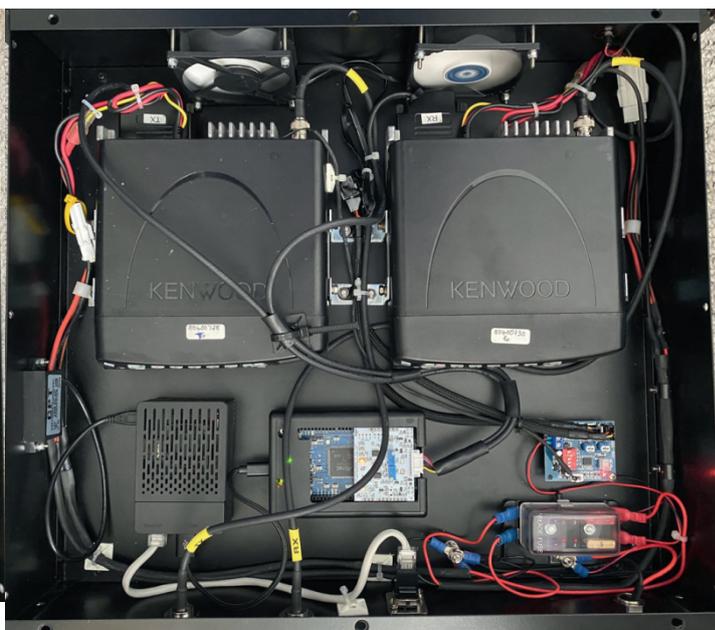
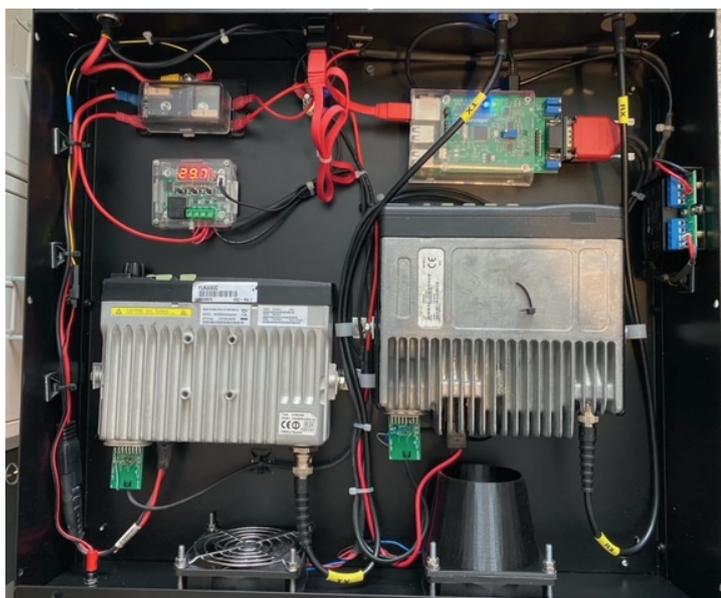
- 6) NXDN
- 7) POCSAG

My current MMDVM repeater build is for a VHF system with FM analogue and Fusion. For this I am using two VHF GM340s and the standard BOM, which I have put together previously, this hasn't really changed. If the current systems are all still giving 100% service then why change it.

On a side note, unfortunately the users on GB7MH are still down and even offering Fusion, DMR and D-star we barely get one local user a day. Not sure why this is as the repeater covers a large area.

So it has been a busy 2021 and the start of 2022 is looking like it will also be a busy one..

*Paul Phillips, G7KBR*



## HP 8557A SPECTRUM ANALYSER REPAIR

I was asked to have a look at this analyser for a club member.

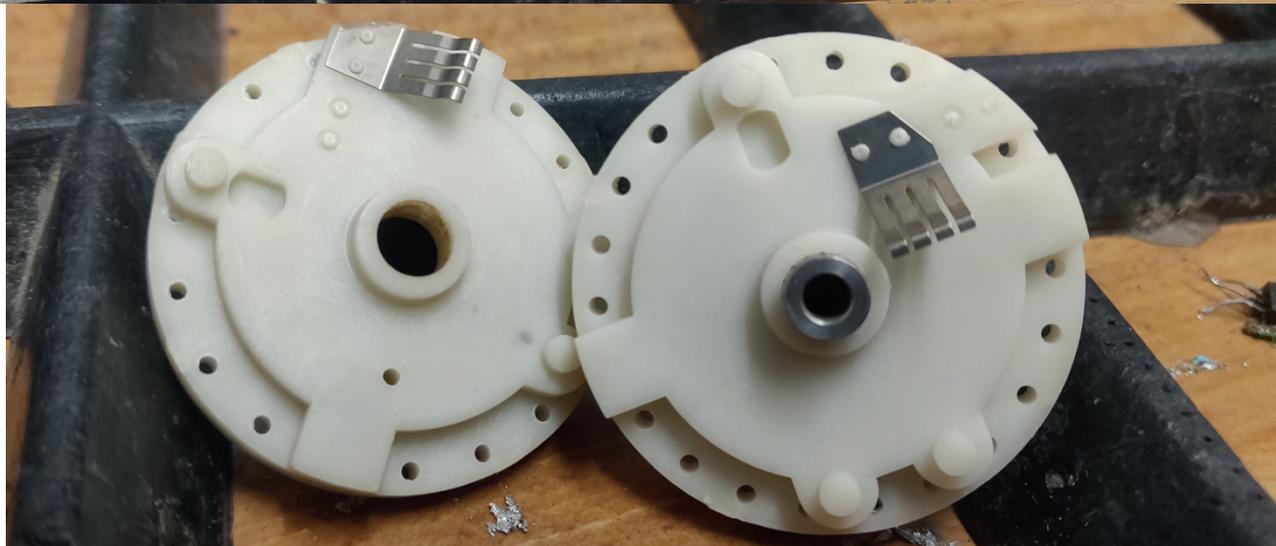
The first obvious problem was that although there was a baseline, no signals were displayed; this was traced to the second convertor, where there is a 250 MHz signal generated for the calibrator which is then doubled to 500 MHz for the second convertor or mixer, and this had a fault. I'm not sure exactly where the fault was, as it's impossible to work on without all the extenders so had to resort to checking all the associated components and re-soldering all the joints which fixed it and it has been working ok for some time.

Then the vertical display went off the screen; this was found to be a transistor array, which was ordered and replaced. Two down and one to go!

The next problem was that the reference level control had no effect when switching from say 30dBm to 40dBm as well as other ranges. After some head scratching and research, it looked like the switch rotors had missing contacts, so I took the switch assembly apart, which was quite a job (I'm going to have fun getting it all back together) and sure enough there were missing contacts, see picture.

So stuck at the moment, probably the only solution would be to get hold of another scrap one and rob the parts from it.

*Richard G4ANN*

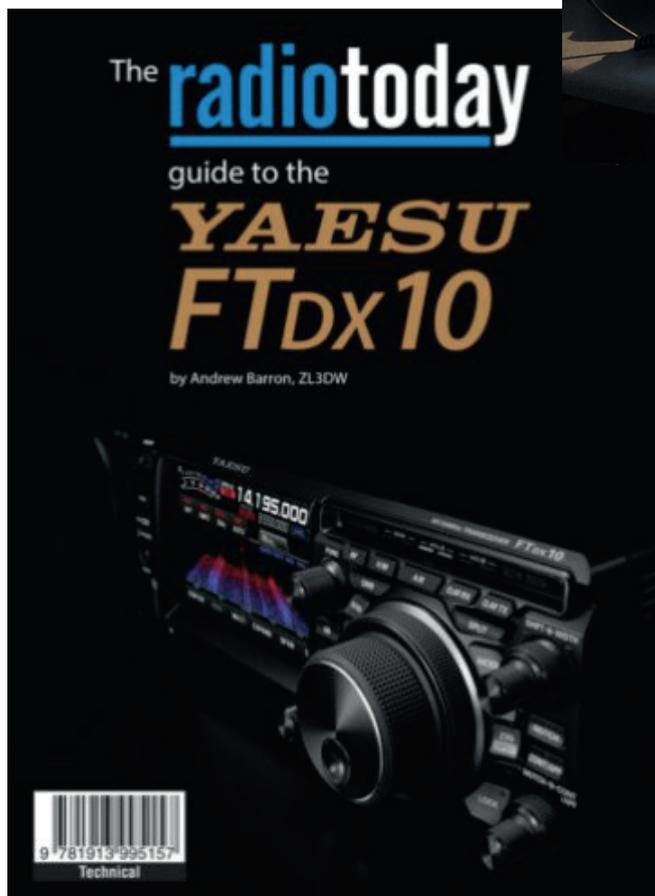


## Enhancing use of the FTdx10

I have in the past few weeks been trying to improve my shack by adding a VHF/UHF yagi antenna to my Yaesu FT897 so that I can do 2m SSB, which has been very successful by having QSOs well into Europe.

However the main improvement was to fix a monitor to my Yaesu FTDX10; this has made the control of the radio much easier especially as I use a mouse to control the rig as big fingers on a little screen proves difficult and in the long term will damage the radio; however I found that only a wired mouse will work on the radio and I have not quite worked out why this should be.

The monitor I went for was a Huawei 23.8 inch, and I connected it using a DVI/D lead from the HDMI port on the monitor to the external monitor port on the radio. My first thoughts were that's all



there is to it, but it was not that simple. You have to go into the function menu, then to the display menu, then to external monitor and turn the setting on. The pixel setting is preset and should not need to be changed and this is all explained very well in the book *The Radiotoday guide to the Yaesu FTdx10* by Andrew Barron, ZL3DW, which can be purchased from the RSGB shop and is, in my opinion, a much easier book to read than the manual.

This has made using the DX10 much easier and even more fun.

*Graham Parsons, 2E0XDZ*

## Snippets

**From QRZ.com:** The FCC announced the conclusion of the 3.45-3.55 GHz band frequency auction. This band will be used for "flexible use" and 5G. They have taken the 3.45-3.50GHz range away from amateur radio, forever. The amount of money the FCC is selling this 100 MHz of spectrum for is staggering. It looks like the auction totals to over 22.4 BILLION dollars. AT&T Holdings is the highest bidder for some of the spectrum at \$9,079,177,491. Yes, this is over 9 BILLION dollars from a single bidder.

We have 275 MHz of bandwidth in the 5650 MHz band, 500 MHz in the 10 GHz band, and 250 MHz of bandwidth in the 24 GHz band.

I wonder how long it will be before all of our lower microwave bands are taken.  
*Ed, KI6R*

**The** RSGB National Radio Centre (NRC) will re-open to visitors from Monday, 31<sup>st</sup> January and will be open seven days a week.

Visitors will be encouraged to wear face masks although this will not be mandatory.

The number of people accessing the radio room will be limited and, for the time being, visiting radio amateurs will not be able to operate the GB3RS station.

The voucher system for RSGB Members to gain free admission to the NRC will be available again from midday on 30<sup>th</sup> January 2022 and you will no longer need to book an arrival time at Bletchley Park.

**Ofcom** has kindly agreed to an RSGB request that radio amateurs licensed by Ofcom may celebrate the Platinum Jubilee of Her Majesty The Queen by using the special RSL 'Q'. This will be available for use throughout June 2022 and *will require a Notice of Variation* that will be available via the RSGB website shortly, <https://rsgb.org/main/>.

**The** Society is also working on other events and activities that it hopes will appeal to a wide range of people. Further details will be released over the coming weeks.

**Eight** RSGB Regional Rep vacancies as current post holders have completed 3-yr terms/they were co-opted to fill vacancy after last AGM. Could you support radio amateurs in your region? Completed applications must be received by 2359UTC on 31<sup>st</sup> Jan: <http://rsgb.org/election #hamr>

### Take Care on 60m FT8!

The recommended frequency for FT8 on the 60m band is 5357kHz. The UK allocation for this segment of 60m is **5354-5358kHz**. Thus one should not set the transmit offset to greater than 1kHz, and to allow for sidebands from the modulation, probably 900Hz maximum.

Twice this week I have observed UK stations transmitting well into the 5358+ kHz area which could interfere with military stations in the UK. This band is effectively a gift from the military and could be rescinded at any time!

### Deadline for contributions to the next Newsletter 15<sup>th</sup> March

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