

Wythall Radio Club meets from 8pm every Tuesday and Friday evening at Wythall House, Wythall Park, Silver Street, Wythall, B47 6LZ, near Birmingham. Visitors are very welcome. **Wythall Radio Club** is affiliated to the Radio Society of Great Britain. Contact g0eyo@blueyonder.co.uk

Wythall Radio Club—as busy as ever!

It has been a very busy time at Wythall Radio Club since the Christmas contest. So first congratulations to David G7IBO for winning the Open section and David M0IFT for being a very (very close) runner up. Our treasurer Ian M0IDR won the FM section with our Chairman Anita 2E0DUO also coming a close second.

Given the challenge of re-building the radio room by our Chairman between mid December and January whilst there was no training planned, Ian M0IDR got himself a team together comprising, primarily Dave M0IFT, John M6KET and Roger M0GWM, with others helping out as and when, to tidy up the store, rebuild the floor in the radio room and paint the walls. Roger M0GWM put in a safety switch and extra power sockets and Lee G0MTN re-organised and updated the IT systems with new screens and PC's. We now have two positions one for HF based around the TS590 and the HF Doublet and Beam Antenna with a 400W linear and the other for VHF/UHF comprising the IC910 for 2m/70cm/23cm and the FT847 for 4m/6m. We even have a 400W linear for 2m and will be installing a 30W linear for 23cm. Space has been created for a row of chairs in the radio room so that visitors can watch the operators.

The training team headed by Chris G0EYO and Roger M0GWM and supported by Dave G3YXM, John G3VRF, Peter G4LWF, John G4OJL and David G0ICJ have been busy teaching and providing practical assessments and examinations for a classroom Foundation course which has 4 students and an on-line Foundation Course which also has 5 students. As explained elsewhere in this newsletter, we are also train-



ing our first blind candidate which requires special measures to assist him achieve his licence. Anita 2E0DUO has been appointed an official Reader for RSGB exams in the West Midlands. We have also hosted an Advanced exam for three candidates.

The results of the annual club calls con-

test on 160m in November came out in January and Wythall team A took 2nd place and Dave G3YXM was placed 3rd individually, so our congratulations to all who took part, perhaps 1st place next year?

The rally team headed by Mike G4VPD have been very busy organising the 2016 Wythall Hamfest which will be our 30th. The venue this year will again be Wythall Park and the amount of trading space has been increased by hiring the Archery Hall where there will be traders, RSGB book-stall, Club Stand and the Bring and Buy. We also have a lecture stream this year with 3 talks planned, on HF, DMR and Kite antennas! Full details of the traders and hall layouts can be found on the clubs website <http://www.wythallradioclub.co.uk/trader-list/>. We expect to run a shuttle from Phoenix Insurance in Middle Lane in the morning and afternoon to allow club members who are helping at the rally to park their cars there thus freeing up space in Wythall Park.

Lee G0MTN and Chris G7DDN are presently working on the Easter Contest which will run over the Easter holiday period and again give members the opportunity to work each other for points (and prizes)



Top; David G7IBO receiving his G7OJO Trophy from Lee G0MTN for Open Section of Xmas Contest. **Middle;** Ian M0IDR with the Trophy for the FM only section **Bottom;** 2016 Foundation Class doing their practical assessments

200W ALL MODE HF SET by Barry M0DGQ



Described here is a 200W all mode HF transceiver with good performance. Common cheap components are used throughout, alternatives are easily implemented. The design is flexible enough to allow the builder to tweak accordingly, for example the final RF PA can be omitted to give a 10W set. SSB can also be omitted to leave a CW only set.

OVERVIEW

The set employs a cheap DDS VFO module (Ebay,chinese - £3.00!) and a two PIC controllers as published on the ham radio India site. I have used this circuit in previous transceivers with excellent results - a credit to its designer.

A lot of the circuitry is based on a previous transceiver so will not be discussed here. In TX mode the user has the choice of 1W, 10W and 200W RF PA's selectable from the front controls. The only reason for a 1W PA output is so I can drive my HF twin 4CX250B linear to legal limit as it only requires 1W of drive. This feature can be omitted as it is only routing the output of the driver PA via a relay. Likewise the the 200W RF PA can also be omitted to give a 10W set.

The receiver is a single conversion superhet employing a 9MHz IF, as crystal filters for this frequency are readily available, other IF frequencies can be used for different crystal filters, it is just a matter of reprogramming the IF frequencies and

offsets into the DDS controller. Effective front end bandpass filtering is employed, each band has its own preamp/bandpass filter which is also utilised in TX mode after the TX mixer.

Separate USB, LSB and CW crystal filters are used in the set, the only reason for this was they were obtained cheaply from Ebay. A single SSB filter can be used by employing the usual two LSB and USB carrier crystals if desired.

ERGONOMICS

I wanted easy to use / easy to see front controls, hence a telephone keypad is used along with the other DDS function buttons. The rest of the controls are also easy to see and use.

RECEIVE PATH

In receive the HF signal passes through the antenna changeover relay, through a switched 20dB attenuator and then to the RX signal routing relay board.

The purpose of the RX routing board is to route the pre-selector input to the incoming HF signal or to one of two transverter options, this is selected via a front panel rotary switch. I plan to build two VHF transverters for use with this HF set.

The HF signal enters the pre-selector module via DC wetted relays. Each HF

band has its own pre-selector and pre-amp. AGC and TX power control is applied to gate 2 of the mosfet for each preamplifier

From the pre-selector the RX signal enters the receive mixer, a SBL 1H is employed here. This double balanced mixer has excellent large signal handling qualities but it is a level 17 mixer, i.e. it requires +17dBm (50 mW) of local oscillator drive. As the DDS VFO output level is +20dBm (100mW) a 3dB pad is used to bring the local oscillator level down to the correct level for the SBL 1H.

The 9MHz IF signal is then passed through one of three crystal filters; CW, LSB and USB depending on the mode required. A mosfet three stage IF amplifier follows the crystal filters and a simple diode product detector produces the demodulated audio signal. A audio mixer/ preamp follows and finally a audio power amplifier to drive the speaker. CW side tone is also injected to the audio mixer.

TRANSMIT PATH

In SSB mode a 9MHz DSB signal is fed to the mixer / filter module where the required sideband is passed by the crystal filter. The SSB signal is then mixed with the local oscillator by the TX mixer to produce sum and difference frequencies, the required final frequency is filtered and amplified by the pre-selector

200W ALL MODE HF SET by Barry M0DGQ cont'd

module.

In CW mode much the same occurs, a 9MHz oscillator is fed to the TX mixer to produce CW at the final frequency. CW keying takes place at the TX mixer.

The TX output from the pre-selector is approximately 0dBm (1mW). This is fed to the TX signal relay routing board, a front panel rotary switch determines if the TX signal is routed to the RF PA chain or one of two transverter outputs.

The low level TX signal leaves the Tx routing board to be fed into a 1W HF driver amplifier. The output of this driver amplifier is available on the rear of the set if required, a front panel toggle switch energises a relay to route the TX signal to the rear RCA socket or the following 10W HF amplifier.

A front panel toggle switch energises a relay which selects either the 10W RF pa output or the 200W pa output which is then passed through the harmonic antenna filter, antenna change over relay and finally to the antenna.

A FEW NOTES / OBSERVATIONS

Several HF final power amplifiers were designed and tried. The one shown in the circuit diagram is the one in use now. It easily produces 200W pep output with a supply voltage of 28V. On 160m only 120W is produced due to a

lower drive level from the pre-selector on 160m. Initially I had problems trying to get a flat response from the preselector on 160m. Eventually i came up with a circuit where the 160m bandpass filter and pre-amp is different to the 80m - 10m circuits, however it does produce a reasonably flat response across the 160m band.

The mosfets used in the PA are MRF150's, also I have used a broadband transmission line transformer from a commercial Yaesu radio as I had it to hand. If you intend to run the PA at full power then use the core given in the circuit diagram - it will work quite happily at 200W without saturation. I run mine at the 100W level as the core starts to saturate above this level - at this power the PA should prove to be bombproof.

A much larger heatsink will be required than the one used here if running at the 200W level

The MRF150's were purchased from a chinese supplier, five cost \$98.00 US which is roughly £70.00 sterling. Later a solid state linear is planned using four of the five MRF150's so a PA using a MRF186 will be built giving just over 100W with 28V DC supply, watch this space.

The rotary encoder used in the DDS is a bit "clicky" - similar to the tuning control on a FT480 so a smoother feeling encoder will be made at a later date.

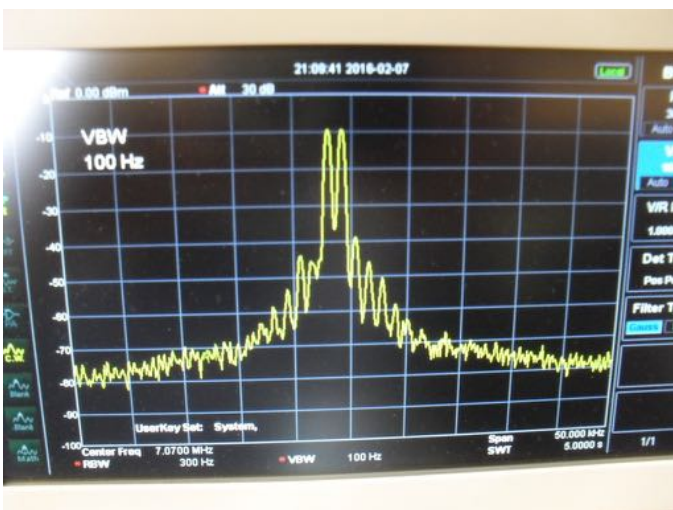
As no aluminium was to hand a wooden case lined with foil containers was deployed, a metal case would be preferred.

In use the set has proved to be enjoyable and easy to use. CW keying waveform sounds nice as does TX audio. The AGC circuit performs very well for such a simple circuit, no AGC pumping could be detected on strong signals.

A VSWR bridge is used in line with the TX output. Spectral purity is excellent on all bands, have yet to conduct two tone linearity tests but indications are very promising - very clean sounding TX audio and no detectable splatter when a receiver is tuning through the TX signal.

UPDATE ; IMD3 test shows good results, see photo. tested at 100w pep two tone test, 7.07MHz. IMD3 product - 30dBc - not bad for homebrew junk!

Barry M0DGQ



IMD3 results



200W PA stage

One I made earlier! - A look back over a project from my SWL days



Way back in the early 1980's with more cash than sense, I bought from Icom UK an IC-R7000 receiver which covered 25Mhz to 2Ghz , a AH7000 Discone, an RC12 remote control and a TVR7000 FM & TV receiver.

The TVR7000 never worked apparently being designed for NTSC TV (Never the same colour twice), so I got my money back on that one. The RC12, I still have for some strange reason, the Discone I sold at our 2012 Rally.

Having got tired of hearing IQ0 behaviour through the Leicester Repeater and the Laughing Policeman from nearer home, I decided to look around for a converter that



housing to keep it all neat. No expense was spared, I even made up a fancy front panel from a printing supplies shop and used letraset to add functions to the controls.

According to an age faded label on the back panel, it up converts your selected 2Mhz wide portion of HF between 1Mhz and 31Mhz to 144-146Mhz. A switched attenuator to save overload and an external 12v supply complete the package.

The Datong UC/1 had been available for a while and this did the same task, but was more comprehensively specified (covering 0.1 MHz to 30MHz and having 30 selectable 1 MHz bands) but it was expensive at £137 in 1980. This equates to £620 at today's prices.

The up converter described here was, I recall, only available as a kit with a very high quality double sided silver plated pcb and top quality components. The pcb was populated with the back plane uppermost. Taking the top off for the first time since it was built I notice I made a small pcb to interface the multi-way switch to the main board. Using TA78L voltage regulators and BB204 varicap diodes together with 2 IC's and a 3 more transistors, it worked very well indeed and was very stable.

Produced in response to demand and to provide a "home brew" competitor to the Datong I expect, but by who and at what cost is not known.

What I do recall is that it came with very comprehensive build instructions, all the inductors were pre-aligned and there were a few simple adjustments to make which could be done using a standard digital multi-meter as the measuring instrument. Precise alignment needed a digital frequency meter, but having built it and got it running, a subsequent check on the appropriate test point showed the alignment was spot on.

MODEL UC/1 UP CONVERTER
 If you already own a good quality ten-metre or two-metre receiver or transceiver you are only £118 away from a really high performance general coverage receiver. Just add the magic ingredient, MODEL UC/1 from DATONG!
 You get full coverage in thirty synthesised 1 MHz segments from 60kHz (Rugby MSF) to 30MHz, at high sensitivity and with all the facilities and high performance of your existing rig!
 For good measure UC/1 also adds two-metre coverage to ten-metre receivers. Price: £119.00 plus VAT (£136.85 total).

would allow me to use the rather expensive Icom as a HF receiver. I could then find real signals to listen to.

From the pages of Practical Wireless, I ordered a converter kit (HF to 2m) and used a suitable metal

Ian M01DR

Training

Our classroom Foundation Course started in early February followed by the on-line version a week later. We have four students in the classroom and five on line. The exams will be in March and April. One of our classroom candidates, David Simmons, has a disability, being registered as blind. This is the first time the club has taught someone with such a disability and we had to find out what rules, regulations and facilities are available to him to assist him in passing the Foundation exam. The RSGB who run our examination structure on behalf of Ofcom are keen to remove many of the obstacles that are in the way of a disabled candidate taking the exam, whilst at the same time keeping it a challenge for them.

Clearly for a course that requires you to be able to read the book, course notes, exam reference data and the exam paper itself, being un-sighted poses many problems. Not all blind students will wish or be able to read Braille, also, much of the material that needs to be read is not available in Braille format. When class room training we do have the advantage of being able to repeat the information on the slide and add further explanation. The Foundation Now book has been transcribed into an audio tape by the RAIBC

although it won't always be the most up to date version of the book. When it comes to the Practical Assessments, we have to obtain prior approval for what it is reasonable for David to be able to do from the RSGB Exams Office and at least 28 days notice is required. This requires discussion, investigation and agreement with David and also takes time. Prior to all this we have to prove to RSGB Exams office that the student has the disability which can be a letter from a medical or educational professional. In our case David's Registered Blind pass was accepted without query.

Having established the extent of the candidate's disability we also have to ask RSGB for a reader for the examination. They have a new system in place to ensure that readers will work to a required standard which doesn't give the candidate an advantage in the way the reader puts the question. At Foundation and Intermediate level knowing the mH means milli-henry or kV means kilovolts is part of the knowledge being examined, so the reader has to say small m, capital h or small k, capital V. This requires good discipline by the reader and they are tested by the RSGB Examinations Standards Manager before they are approved as a reader. Each examination

candidate is given the exam reference data booklet relevant to the exam they are taking. For a foundation exam this is a 4 page document containing cover, licence parameters for each band, band plans and notes for 2m and 20m plus a frequency to wavelength conversion chart and a frequency allocation table of other users on the VHF bands. The candidate is required to have learnt what is in this document and on what page and will ask the reader to look up the entry on the licence parameters page for 430.0 to 431.0MHz to identify whether the allocation is primary or secondary. The reader cannot look at the question and then look up the answer in the exam reference data booklet for them. I am pleased to report that Anita 2E0DUO has been accepted by the RSGB as a reader for the West Midlands

So you can see a fair amount of work goes into organising a course and exam for a disabled candidate but it is encouraging that the RSGB and RAIBC have found an acceptable way for clubs such as ours to be able to do this.

Chris G0EYO

Hamfest Sunday 20th March at Wythall Park

The biggest event each year that the club organises is the Wythall Radio Rally, now known as the Wythall Hamfest. This event funds the bulk of the club's other activities with the membership fees just covering the basic rent, insurance and other essential costs.

This year the event takes place on Sunday 20th of March and Mike



G4VPD and the team have been busy in signing up traders, caterers and helpers.

If you can give your support to the club contact Anita 2E0DUO. This year we will

be using not only the Park Hall, Britannia Room and Scout Hut but the new Archery Hall. This year Martin Lynch and Son will also be present to show off the latest in radio ham goodies for you to spend your hard earned cash on. We also have an RSGB bookstall, Club stand and the Bring and Buy stand will be back. Full details on the Wythall Radio Club website.

Chris G0EYO



I fondly remember as a teenager, taking a Midland Red bus into Birmingham and browsing the emporiums in Corporation Street and Hurst Street and it was from components sourced from one of the Hurst Street shops that I built and enjoyed my first valve short wave receiver. Having purchased a copy of "Short Wave Magazine" I wanted to find out more about these "mobile Rallies" as they were described then and the first Mobile Rally I drove to myself was the Derby one at the Rykneld School. I was hooked of course and The image above is from the 1975 Rally which was always well regarded.

For various reasons the Amateur Radio operators, SWL's and constructors have seen the loss of Longleat, Woburn, Cranfield, Drayton Manor, Elvaston Castle and Granby Halls. Gone.. yes but certainly not forgotten!

Take a nostalgic trip through the Mobile Rally scene as captured by my Camera and a couple of the Organising Club's photo archives.

Enjoy
Ian M0ID

A nostalgic trip around some favourite radio Rallies page 2



A nostalgic trip around some favourite radio Rallies page 3

