

HORSHAM AMATEUR RADIO CLUB

HARCNEWS

Coming Shortly

Jun 1/2nd Club Event HF (CW) NFD (CANCELLED)

Jun 6th Club Night Sailing And Radio by Peter Fry G4AKG

Jun 22/23rd Vallance by-ways

Jun 20th Club Event Midsummer DF Hunt

June 2002

Sponsored by:



***May 2002 Club Meeting:
The Best Thing Since Sliced Breadboards
by David Jones , G4FQR.***

This talk was about circuit simulation. In the past, it was necessary to build up a circuit and then test it to see if it worked. This took a long time as some components may have to be specially bought for the project, or it could be a long wait until the next HARC surplus equipment sale! Also it is sometimes difficult to determine exactly what value of component to order/find in the surplus sale. Often published circuits use values that just happened to be in the designer's junk box, so may or may not be the optimum value to do the intended job.

However, the circuit may work correctly with these component values but with small changes it may work even better. Test equipment might need to be built/borrowed/bought. Does the circuit need delicate adjustments? It all depends on the application.

As many readers already know, David has built a third method SSB transceiver. To help align its circuits for best performance

requires a low distortion audio oscillator. There are quite a few audio oscillator designs such as the twin-T ladder and Wien bridge which use a transistor and a small selection of resistors and capacitors.

David fed these designs into a free software simulator package to see what happened. The results were not very impressive for two reasons. Firstly the active device amplifies noise which is fed back through a frequency dependent network using positive feedback until the device limits the output amplitude by saturating or switching off, which generates harmonics. Secondly the Q of the network is so low that these harmonics are not highly attenuated.

The output of these oscillators was shown on an oscilloscope and fed into an audio amplifier so we were able to see and hear the waveforms. The waveforms looked like very smooth sine waves on the 'scope but sounded slightly dis-

torted because the second and third harmonics were obvious. The ear with its logarithmic response is good at detecting low levels of distortion. These results were almost exactly as predicted by the software simulation.

David fed the audio into a soundcard which was programmed to display the spectrum of the incoming audio.

Again the results matched theory. The conclusion was that these designs were not really good enough to set up the transceiver, so David looked elsewhere for a low distortion design and found a way of generating these tones digitally with shift registers.

A digital tone generator consists of a 4-bit shift register, an inverter, reset circuit and 4 resistors, very approximately. The resistor values have to be chosen correctly to produce a sine wave. It is simple, using the simulator software, to see exactly how the harmonic output varies as the resistor values are changed. If the resistors are accurately selected then all har-

monics can be at least 60-80dB below the fundamental output.

This is ideal for low distortion measurements. The circuit boards made by David had resistors matched by different methods and their distortion levels reflected this. One oscillator has a 2.4576MHz crystal oscillator divided down in octave steps.

The only thing to realise is that the 15th and 17th harmonics are only 20dB down on the fundamental. This is because the shift register is clocked at 16 times the fundamental frequency. It is simple to arrange a low pass filter to remove these.

David then built a two tone oscillator using a dual shift register chip. Two tone oscillators are used for setting up single sideband transmitters. This design was very neat.

Further information about these oscillators will appear in RadCom in the future. As I often say, you saw it in HARCNews first!

Foundation News:

May 2002

By the time you read this Newsletter, two members will have taken the RAE exam, three people will have taken the second HARC Foundation Licence course, and two class-B amateurs have passed the Morse Assessment.

We offer our congratulations in advance!

A question often asked is about the proper procedure to use during a contact. Of course there is no absolute answer to that; it depends on the band/mode/conditions etc.

On VHF, FM operation is on channels normally 25kHz apart. Operators tend to listen on one channel, but some receivers allow scanning of channels but this facility is not always used as sometimes it can be hard work reading the instruction manuals! In this case a short CQ call is all that is necessary.

Remember to listen out to make sure the channel is free before calling, and it is belt-and-braces policy to subsequently ask 'is this frequency in use?'. If not, then call as follows: 'M3### listening on 144.725', or 'M3### calling CQ on 144.725'.

If you are using a repeater, then your CQ call could change very slightly to 'M3AAA listening through 145.750'.

Of course you must first check your transmitter is set to send 600kHz lower than receive and secondly make sure you can access the repeater with a 1750Hz tone burst or whistle, or a CTSS sub-audible tone as required for the particular repeater you wish to access.

Conversly you can use a calling frequency such as 145500 to make initial contact, then QSY (change frequency) to another simplex channel.

On the HF bands, channels are not used so a CQ call has to be much longer to allow another person to not only detect your transmission but also to accurately tune in to prevent you sounding like a Mystron or Donald Duck! Check the frequency is clear, then ask as above.

A CQ call could be as follows: 'CQ CQ CQ CQ this is M3### calling CQ on 80 metres and standing by'. A while ago some operators used to end by saying 'standing by for any possible call!', but what is wrong with impossible calls!? If there is no reply within a few seconds then repeat the procedure until someone does reply.

Top tip is to pretend each 'over' as being like a gold-covered toffee where the twisty bits at each end are Their callsign followed by Your callsign, and the message itself is like the toffee in the middle. Do not release the transmit button until reaching the end i.e. 'Your callsign handing it back to Their callsign', otherwise the other person may take

that as his cue to transmit. If you both transmit simultaneously, no information will get passed. This is important when using SSB because a lack of carrier is not noticed by the other end, so you have to tell him/her explicitly that you are handing over transmission.

It is easier at first to reply to other operators who call CQ. If they are weak, then assume you are weak and repeat your callsign and use a phoenetic alphabet. It need not be NATO standard Alpha, Bravo etc as you are allowed to use anything such as Lumpy Rice Pudding for LRP, but this is not recommended for contacts with another country who do not understand the sentiments, in which case London Rome Paris may be better.

Nato words are still easily confused under bad conditions so a choice of phoenetic spelling is worth thinking about now rather than on the spur of the moment.



Here are the three candets that passed there foundation course
Callsigns to follow when I have them

Midsummer Foxhunt

The midsummer forhunt will be
held on 20th June

Start will be Wisbough Green
village green Time 19:30 Hrs

(Local time), Map Chichester &
The Downs. Transmissions will be
2 mins every 10mins. Hope all
will be able to atend