

The newsletter of the  
**Crystal Palace Radio & Electronics Club**

Affiliated to the Radio Society of Great Britain

Meetings are held on the first Friday of each month at  
7:30pm for an 8pm start at: All Saints Parish Church,  
Beulah Hill, London, SE19 3LG  
(opposite the junction with Grange Road).  
Visitors are always welcome.

Web sites: Club: <http://www.g3oou.co.uk/>  
Technical: <http://www.gsl.net/g3oou/>  
Club Net: Each Wednesday at 20:00 on FM on 145.525MHz (S21) ± QRM  
Twitter @BobFBurns or [www.twitter.com/bobfburns](http://www.twitter.com/bobfburns)

Next meeting: 4th November 2016

**Club Construction Project - An Arduino Based  
Frequency Counter by Alan O'Donovan G8NKM**

In this issue: *Future & Most Recent Meetings, Succession Planning, by 'Theorist',  
Technical Snippets, , Miscellaneous, Noticeboard, Diary of External  
Events, News from other Clubs, Local Training Courses, Club Contact  
Information and List of equipment for sale.*

## Dear Reader

### Future Club Meetings and Events

4 <sup>th</sup> Nov	M	Club Project - An Arduino Based Frequency Counter by Alan G8NKM
2 <sup>nd</sup> Dec	M	Club Project and Christmas Social
6 <sup>th</sup> Jan 17	M	Digital Mode Radio by Damien 2E0EUI
3 <sup>rd</sup> Feb 17	M	Annual General Meeting

C = Contest, Co = Committee meeting, E = External event, M = club meeting, R = Rally, T = Training course, V = Visit.

#### **4<sup>th</sup> November - Club Project - An Arduino Based Frequency Counter by Alan G8NKM**

At our next meeting in November we will be constructing a frequency counter. The project is based upon an Arduino microcontroller and the device will measure frequencies between 10Khz and 70MHz.

To measure frequency the simplest technique is to count the number of cycles in a given period, this period is typically one second. The accuracy of the instrument is directly proportional to the quality of the instrument's internal clock and it was this part of the project that gave me most concern. I have seen numerous designs for frequency counters built by the amateur fraternity and to be frank the majority are very poor. Most seem to use some sort of microprocessor and use the microprocessor's clock crystal as the reference time source. The problem with this approach is that the clock crystal tends to be of rather poor quality and drifts with temperature. Typical accuracy of such crystals/resonators is 50 ppm (parts per million) or worse.

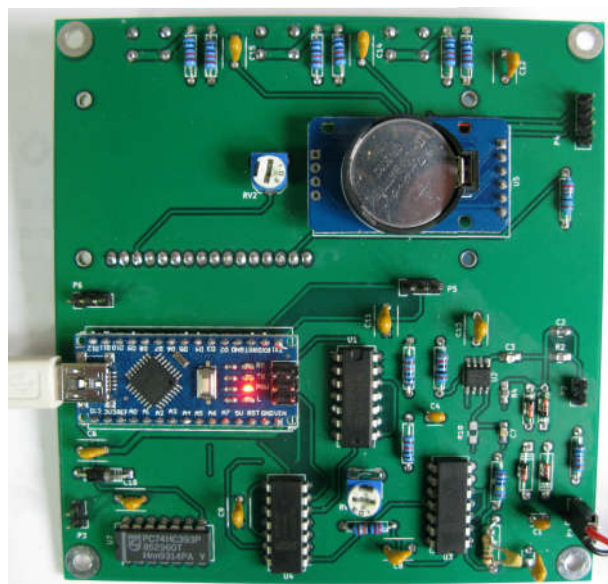
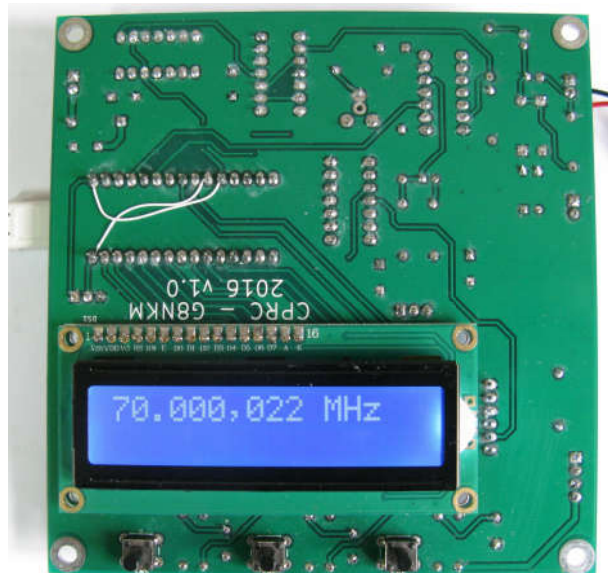
Designing a frequency counter that could be built by club members, provide accurate readings over a wide frequency range, be easily programmed, and be of low cost turned out to be more challenging than I initially anticipated. The device is based upon an Arduino Nano which is low cost and easily programmed by a PC via a USB cable. The use of the Arduino ensures updates can be simply uploaded to the frequency counter and should users wish to change the software then they can do so. The time reference is based upon a "real time clock" (RTC) module which I found on Ebay some time ago, it's cheap and uses the rather cleverly designed DS3231. The RTC was designed to provide time and date but by judicious software changes to the DS3231 internal registers it's possible for the device to provide a one second pulse. The DS3231 chip includes it's own temperature controlled crystal oscillator (TXO) all fabricated within the chips package. The accuracy of the RTC is quoted to be within 2ppm and although I would have preferred a clock source accuracy of 1ppm or better, the cost of using this DS3231 based RTC against a TXO module from say Farnell couldn't be matched.

There is no doubt the performance of this project could have been improved had I used surface mount components, unfortunately there is a degree of skill required to solder such components, not to mention a steady hand and good eyesight. So to ease construction I deliberately chose to use through hole mounted components. This should enable all members to have a fighting chance of getting the frequency counter working. The kit of parts include a double sided through hole plated board. I designed the circuit board using a software package called

KiCad and got the boards fabricated by a Chinese company called PCBWAY ([www.pcbway.com](http://www.pcbway.com)). The company were excellent and great value, I will be using them again!

I had 20 PCBs made, however at the moment I only have enough Arduinos and clock modules to make up 9 kits. The cost of these 9 kits is £12 and currently 4 members have asked for them. If you would like to take part in November's construction night please let me know by Wednesday 2nd November, of course should you just want to make the kit up at home there is no deadline. After the 9 kits have gone the cost will increase as I've noticed that Hong Kong and Chinese prices on Ebay have risen since the devaluation of the pound. You wont complete the boards at November's meeting as it takes a couple of hours to complete the project. We will continue construction at our Christmas meeting and this will also give me time to put the finishing touches to the software. The software I developed is open source and will be made available along with other documentation on Github

Below are a couple of photos of my pre-production board.



All the best  
Alan

## Future Rallies

We have two tables booked at both of the following events:

**a) West London Radio & Electronics Fair - 6<sup>th</sup> November** at Staines Road East, Sunbury on Thames, Middlesex TW16 5AQ.

Web site: <http://www.radiofairs.org.uk/>

Public transport: Kempton Park rail station 200 yards from the event. Trains to and from Waterloo.

**b) CATS Bazaar - 20<sup>th</sup> November** at the Oasis Academy, Homefield Road, Old Coulsdon, Coulsdon, Surrey CR5 1ES.

Web site:

<http://www.sthost.co.uk/webpace/cats/bazaar.html>

Public transport: Buses 466, 404 and 60. Coulsdon South rail station is about two miles away.

There is plenty of free parking at both locations. Help is required in manning the stands and helping with sales and enquiries. These are ideal opportunities for enhancing club funds and keeping subs down so a well manned stand is important. Please contact Alan or another member of the committee if you are able to provide some time at either event.

## Recent Event News

**7<sup>th</sup> October - How to use Software Defined Radio (SDR) by Damien 2E0EI**

Damien presented an illustrated talk on the use of SDR together with a number of on-air receive demonstrations.

What is Software Defined Radio (SDR)? SDR is a radio communication system where components that have been typically implemented in hardware (e.g. mixers, filters, amplifiers, modulators/demodulators, detectors, etc.) are instead implemented by means of software on a personal computer or embedded system.

Most SDR system are implemented as a dongle that plugs into a USB port plus a software package that runs in the PC. The dongle has an aerial connector, usually SMA or SMB. Some dongles are small enough to plug directly into a USB port, others require an extra short lead and a few require two USB ports, one for data and one for power.

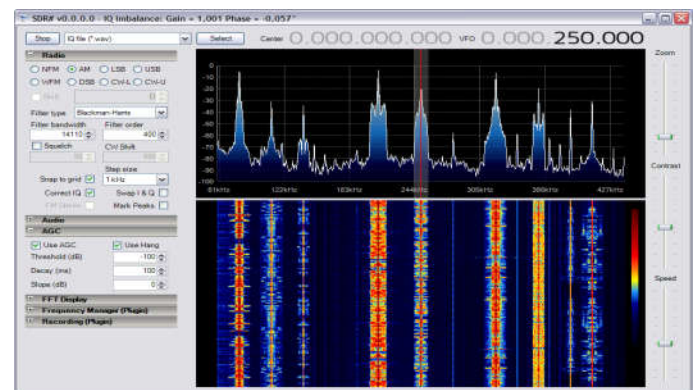
The benefits include:

- View entire band on the screen including noise, electrical storms and lightning
- Filtering free of any ringing
- Smaller equipment size
- Detecting signals close to the noise level

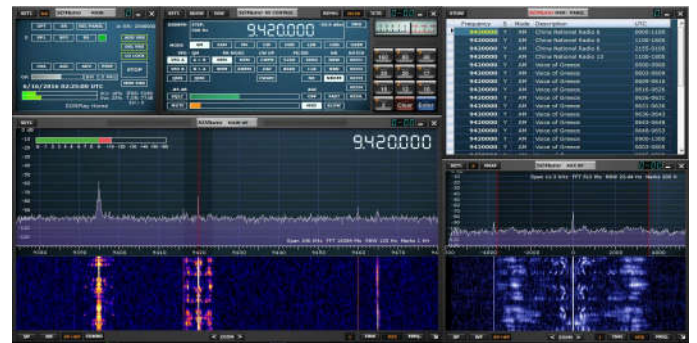
Available software includes HDSDR, SDR# and SDRUno (was Studio1). It is possible to run more than one instance of these packages on a single PC depending on the available processing power. One issue that Damien highlighted was that Windows will try and install a default driver for the chipset in the dongle whereas the manufacturer may have a better driver on their website.

Detector modes include narrow band and broadcast FM, conventional and synchronous AM, CW and SSB.

The SDR# signal display screen is shown below displaying signal amplitude by frequency in the top section and the waterfall display in the lower section:



The equivalent screen from SDRUno is shown below:



Bandwidths can be adjusted down to 1Hz on most applications.

Available dongles include:

- RTL Dongle model RTL2832U which has a frequency coverage of 24 - 1766MHz, an 8 bit ADC (analog to digital converter), 3.2MHz maximum bandwidth receive only with a price ranging from £6 - £18. Version 3 includes the HF bands and typically costs £25.
- SDR Play model RSP1 has a frequency coverage of 100KHz - 2GHz, a 12 bit ADC, 8MHz maximum bandwidth, eight switched front end filters and is receive only.

Additional issues in setting up include the installation routines:

- not setting the HF/VHF frequency shift for up-converters
- not copying the DLL file to the applications folder on a Windows PC

Damien rounded off his talk by referring to a small number of self contained SDR units including the Icom 7300 transceiver at £1500, SUNsdr MB1 transceiver at £4950 and Titus 2 receiver currently in development and belived to cost about \$100.

Damien can supply a list of useful web links on request.



## Succession Planning

Our Treasurer Doris and Chairman Jim announced at the 2016 AGM that they would be standing down from their posts including committee memberships at the next AGM in 2017. These are important posts in the management of the club and we will need to have replacement members in post.

If any club member would like to volunteer for one of these posts to assist in the running of our club then please contact our Chairman to make arrangements to attend a future committee meeting. Formal elections take place for officers and committee members at each AGM.

## On the Line by 'Theorist'

The long tube in the photo below that looks like an old artillery piece is in fact a special kind of telescope called a meridian circle. Its axis of rotation is fixed, and aligned



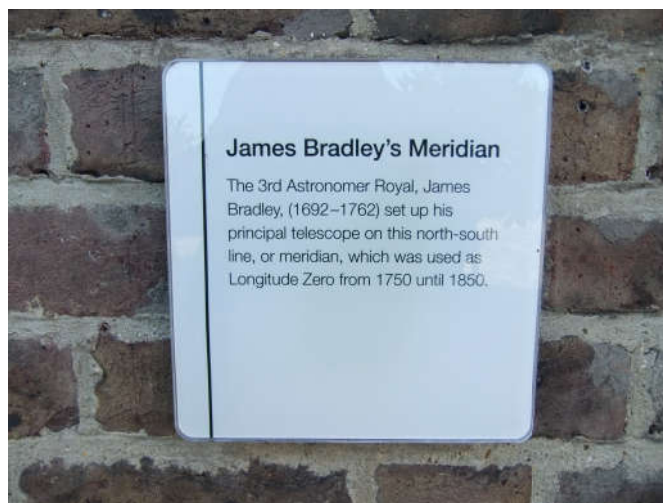
precisely east-west. The tube is therefore aligned with a meridian, or line of longitude, exactly north-south. The telescope can rotate about the axis but not from side to side.

"What use is this?" I hear you ask, and the answer is that such telescopes were essential in fixing the position of stars and other astronomical objects, and in so doing were also the basis for accurate timekeeping, at least until comparatively recently. Meridian telescopes rely on the Earth's rotation to bring objects, especially stars, into view. The positions of stars are defined in terms of right ascension and declination, a sort of east/west and north/south for stars. The idea of a meridian circle is that it can accurately measure the position of a star by measuring the time it takes for it to do a complete

revolution around the sky, or transit. If you know the position of a reference star, and at some moment in time get it in the cross-hairs of the telescope's eyepiece, then by measuring the time it takes to bring another star into the cross-hairs, you can measure its right ascension. Measuring the angle above the celestial equator of the star gives its declination. Explaining this properly would take at least two articles, so just go along with the idea that these instruments were really really useful for fixing positions.

Incidentally the photo is one I took recently of the Troughton 10-foot Transit telescope made in 1816, at the old Royal Observatory at Greenwich. I had taken myself there as a result of the excellent September club talk on maps and mapping, to test one of the claims made during the talk, of which more later.

As we all know the line of zero degrees longitude (the prime meridian) runs through Greenwich, and Greenwich Mean Time is based on astronomic measurements at this location. At Greenwich, a number of meridian circle instruments were made and installed during the 17th to 19th centuries, and their location taken as lying on the prime meridian. As each new telescope was usually mounted next to an earlier one, the prime meridian was moved to its location, because each new telescope was a better, more accurate instrument than its predecessor. There are at least four prime meridians marked at the



observatory as a result, within about 30 feet of each other, and the photo shows the Bradley meridian marker of 1750. This is still used by the Ordnance Survey as their prime meridian, marked by the Troughton instrument.

Unsurprisingly it was the later, more accurate Airy Transit Circle telescope of 1850 that was the one that was accepted by international agreement in 1884 as lying on the prime meridian. Specifically the cross-hairs of the eyepiece of that instrument were taken as marking it! This instrument was in use as late as 1954 and not superseded. Around 1900 a power station was built on the Thames riverside, and as it happened it lay precisely in the line-of-sight, exactly on the meridian, as this telescope. The problem was that the chimneys of the power station, which was built to provide electricity for London's newfangled tram and tube network, would pump out enough smoke and enough heat to obscure the view and disturb the atmosphere. A campaign was run

by a newspaper which resulted in the height of the chimneys being reduced significantly, no doubt to the detriment of the health of local citizens, but to the benefit of astronomy and the ships of the empire that relied on accurate stellar measurements for navigation.



Finally, during the September talk it was stated that the GPS system uses a slightly different prime meridian than that agreed internationally in 1884. To test this I took a GPS device (actually an app on my tablet device) and stood on the Greenwich prime meridian and attempted to photograph the app display and the 'prime meridian' sign at the observatory simultaneously, to prove I was indeed 'on the line'. This proved difficult, but although a bit out of focus, I think you can see that the app is showing a longitude of 5.322 arc seconds west. This indicates that according to the app I was about 102m west of the GPS prime meridian. The accuracy of the measurement was within about 3 metres. This backs up the claim made at the talk.

### **Steel Tubes for Gardening and Transport**

Steel tubes have featured quite large in my doings of late. I have two tubular projects on the go at present, one is a fruit cage for D, the other is another sidecar outfit with frame and chassis as a unit rather than being clamped together, as it more usual. This is for lightness and rigidity.

I thought a few words on common types of steel tube and methods of manufacture may be of interest to fellow members. I realize that alloy tube is the norm for aerial masts, usually scaffold poles of just under 2" diameter.

These are made by extrusion, just like squeezing toothpaste but they would have to squeeze impossibly hard for steel.

Starting at the cheapest tube we have electrical conduit. Some of it is merely plate formed into a circular shape with the two edges butted together. It's very difficult to bend as it flattens but it's quite adequate to protect cables in a wall. In torsion it is no stronger than the flat plate from which it was formed.

I'll be using conduit for D's fruit cage but I'll be buying the grade with a welded seam and galvanized. She's worth it. Water pipe falls into this category too.

So the cheapest mechanical steel tube is welded. Its proper name if you are buying is Electrically Resistance Welded or ERW for short. Due to the welding process it is usually served up in the soft condition and has a yield strength of about 220N / mm. sq. This is the grade for you if you intend to do much cold working like bending or swaging. The outside is usually bright with a darker line running along the length where it was welded. Inside, the weld flash is very obvious.

The strength figures I'm quoting are for mild steel. There are many grades of higher tensile and stainless steel tubes, some of which are very expensive although the lower grades of stainless are not too dear.

The next grade is cold drawn ERW (CDERW) Here they take the ERW and cold work it by drawing it through a die. This has a dramatic effect on the tensile strength, taking it to about 320N / mm sq. at yield. It also improves dimensional accuracy and eliminates the weld flash on the inside. This is useful if you need one tube to slide inside another.

The highest strength and most expensive type is the cold drawn seamless.

With enormous forces involved a billet of MS with a hole in the centre is dragged through a series of dies to produce the tube, all done cold. I would love to see this process, it must look formidable. The process produces a tube of very good dimensional accuracy with a yield strength of about 380N/ mm sq.

I've chosen the above types to write about as they are what I am using at present. The main chassis tubes of my new sidecar outfit are CDS for strength with the lightest wall thickness. The odd bits and pieces on the outfit are in ERW.

An odd quirk of the regulations is that the sidecar chassis must be detachable from the bike so my integral chassis and frame make the outfit legally a tricycle. It will thus require re-registering which will be fun. I wonder if detachment by angle grinder is allowed, don't see why not.

### **73, Jim. (M6BXL)**

### **Technical Snippets**

**a) Press Button Processors** - I have now got both keypad processors working correctly using the PIC16F876A processor. All of the push button illumination, latching and logic is handled by the PIC using about 150 lines of assembler code with 2N7000 FETs used to control the external circuitry.

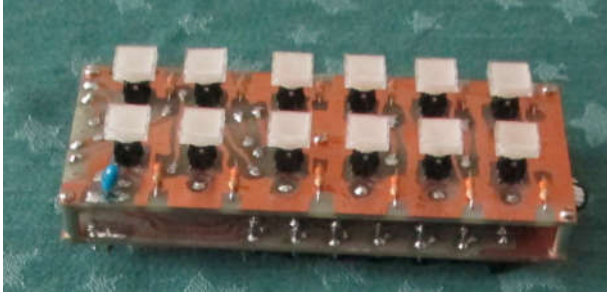
Each PIC runs at about 40KHz using the internal RC oscillator facility with just two external components so minimal RF interference is expected. Each set of push



buttons is scanned at about 800Hz and debouncing is carried out in software with a 300mS delay.

Although still available, the 16F87x family is not recommended for new designs and the replacement series is the 16F88x. Photos of one of the two the completed module are shown below.

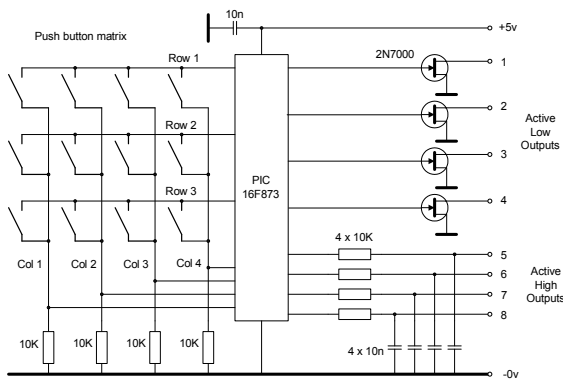
Front side:



Rear side:



Simplified circuit diagram:



- Notes:
1. Depending on the required logic, there will be at least as many outputs as there are push buttons.
  2. The outputs shown are only examples.
  3. The active low outputs may be used to pull down external control lines and also illuminate LEDs in the respective push buttons (via a current limiting resistor and isolating diode).
  4. The active high outputs provide a current limited output voltage of slightly less than 5v to drive external circuits.
  5. The processor clock only needs to run at low speed using the internal RC oscillator in the PIC with 10K and 10n timing components.

Overall size is determined by the button layout on the front panel of the host equipment. However, these particular push buttons are small enough to allow the overall size to be reduced if appropriate to the design.

The PC boards are interconnected by a simple cableform. A significant improvement would be to redesign the track layout to use a PCB connector.

The PIC microcontroller is a very low cost method of providing the required scanning, logic processing and output controls.

### b) Ceramic Resonators

These components exhibit similar series and parallel resonance characteristics to quartz crystals but with lower Q and poorer frequency stability. They are available in the

frequency range of typically 400KHz to 40MHz and may be used in oscillators and filters.

Both products make use of the piezo electrical effect to convert mechanical movement to and from an alternating voltage and their resonant frequency is determined by the mechanical properties of the base material. Crystal slices are cut from a block of natural or man made quartz at a specific angle to the natural grain depending on the required frequency and temperature characteristics.

Filters based on ceramic resonators may be designed in the same way as for quartz crystal filters but the minimum and maximum bandwidths will be much wider. For example, a ladder filter based on 12MHz crystals would have a maximum bandwidth of about 12.5KHz whereas the equivalent filter using ceramic resonators would have a maximum bandwidth of about 378KHz. At frequencies around 455KHz the typical maximum bandwidth would be 11.5KHz.

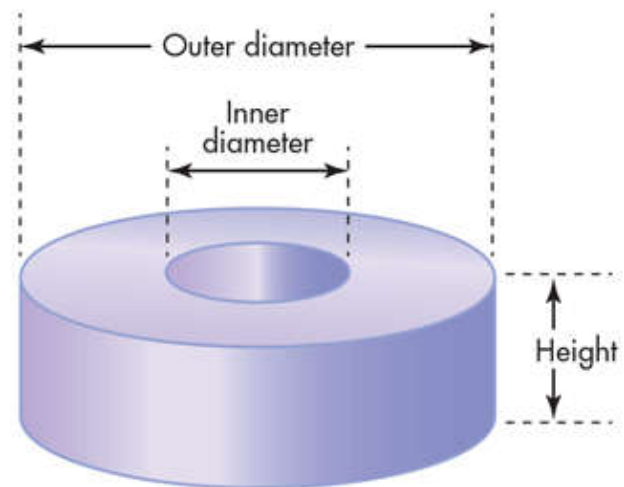
Ladder filters based on third or fifth overtone crystals have a much lower maximum bandwidth than fundamental types. For example, a ladder filter based on a 40MHz third overtone crystal would have a maximum bandwidth of about 2.8KHz. There is a table of measurements on the club technical website.

A useful website for ladder filter design is located at <http://www.giangrandi.ch/electronics/crystalfilters/xtalfilters.shtml> and shows how to first measure the crystal or resonator electronic characteristics and then use those to design the required filter. An adjustable frequency source, RF detector or scope and a frequency counter are required for these measurements.

The frequency pulling range of a ceramic resonator will be significantly greater than a crystal and at 455KHz will be at least 5KHz.

Ceramic may also be used to create dielectric resonators which may be used as tuned circuits at VHF, UHF and microwaves. They may also be combined to form band pass filters.

An example dielectric resonator:



The inside and outside surfaces and the lower end in the above diagram are silver plated but not the upper end. The resulting product behaves as a parallel resonant circuit with

the outer surface being grounded and the upper end of the inner surface being the 'hot' end. A limited tuning range is possible with a trimmer connected between the inner and outer surfaces at the 'hot' end. Finished structures may also be rectangular. The typical frequency range is 300MHz - 6GHz. These are in common use in mobile phones as filters or diplexers.

## Miscellaneous

**a) RSGB Convention** - I attended this event at Milton Keynes on Sunday 9<sup>th</sup> October having been invited to present a talk on 'Home Design, Construction and Finishing' together with a display of some of my home built equipment shown below. I understand that some talks were filmed and will be available in due course on the RSGB web site.



## b) Crystal Bank

I currently hold my own quartz crystal bank, one for the club and another one for an adjacent club so if anyone needs a crystal or two at reasonable prices please contact me. The adjacent club's crystal bank will be on sale at Kempton Park and the CATS Bazaar. The crystals span a frequency range of 17KHz to 122MHz in a variety of case styles from 10AX to HC25/U.

Our club crystal bank list is already present on the club website.

## Notice Board – Wanted and For Sale

The Notice Board is for all club members to use so if you have one or more items that you wish to buy or sell then please send in the details. The current list of items may be viewed at: <http://www.g3oou.co.uk/> in the "Notice Board – Wanted and For Sale" section.

## For Sale

CPREC has a large bank of fundamental and overtone quartz crystals, from 1.0 – 99.91MHz. The list has now been updated, sorted in frequency order and placed on the club web site notice board. Prices are £1 each to club members and £3 each to non members.

73

G300U

## Diary of External Events

### 06 Nov - West London Radio & Electronics Show (Kempton Rally)

Kempton Park Racecourse, Staines Road East, Sunbury on Thames, TW16 5AQ. Opens 9.50/10am. Details from Paul, M0CJX on 08451 650 351 or by email to [info@radiofairs.co.uk](mailto:info@radiofairs.co.uk) or [www.radiofairs.co.uk](http://www.radiofairs.co.uk)

## 20 Nov - CATS 39th Radio & Electronics Bazaar

Location: Oasis Academy Coulsdon, Homefield Road, Old Coulsdon, CR5 1ES. Entry £1.50 which still includes a free tea/coffee! Second Hand Equipment, Flea Market Tables, Refreshments, Trader Stalls, Fully accessible facilities, CATS Bring & Buy. Contact [enquiries@catsradio.org](mailto:enquiries@catsradio.org) or visit [www.catsradio.org](http://www.catsradio.org) for more information.

## News from other Clubs

**Club Secretaries** – please send your meeting programs to our newsletter editor Bob G300U. This newsletter is published about ten days before the club meeting and closes for editorial contributions a few days before publication. Due to differing publication dates and short lead times it is sometimes difficult to include other clubs' specific events although we will endeavour to do so if advised in time.

If you plan to visit one of these club meetings please check with the club concerned in case any last minute changes have been made.

## Bromley & District Amateur Radio Society

19:30 on the third Tuesday of each month at the Victory Social Club, Kechill Gardens, Hayes, Bromley, BR2 7NH. Contact Andy G4WGZ on 01689 878089 or [enquiries\(at\)bdars.co.uk](mailto:enquiries(at)bdars.co.uk). Web: [www.bdars.co.uk](http://www.bdars.co.uk)  
15 Nov "Toilet-roll TRF" (Construction)

## Chelmsford Amateur Radio Society (CARS)

19:30 on the first Tuesday of each month at Oaklands Museum, Moulsham Street, Chelmsford, Essex, CM2 9AQ.

Contact: [secretary\(at\)g0mwt.org.uk](mailto:secretary(at)g0mwt.org.uk) Web: [www.g0mwt.org.uk](http://www.g0mwt.org.uk)

01 Nov Three 25 minute long chats  
06 Dec Christmas Social  
03 Jan 17 Riding the radio waves - Jane Humphreys  
07 Feb 17 Talk on Diplomatic Wireless - by Peter Grimshaw, M0HSG

## Coulsdon Amateur Transmitting Society (CATS)

8:15pm on 2nd Monday each month. Contact: Mike Buckley, M1CCF on 020 8654 2582, [m1ccf\(at\)talktalk.net](mailto:m1ccf(at)talktalk.net) or [secretary\(at\)catsradio.org](mailto:secretary(at)catsradio.org). Web site:

<http://www.catsradio.org/>

14 Nov ICQ Podcast by Martin Butler M1MRB/W9ICQ

## Crawley Amateur Radio Club (CARC)

Every Wednesday 20:00 – 22:00, every Sunday 11:00 – 13:00. Formal events are on the last Wednesday of the month, 7-30pm for 8pm. Phil M0TZZ on 07557 735265 or

[secretary\(at\)carc.org.uk](mailto:secretary(at)carc.org.uk) or Web: <http://www.carc.org.uk/>

26 Oct Choosing a VHF/UHF Radio - Alwyn Seeds G8DOH

23 Nov CARC / HARC Challenge

## Cray Valley Radio Society (CVRS)

Meets at 8pm on the 1st and 3rd Thursday of each month at 1st Royal Eltham Scouts HQ, Rear of 61 - 71 Southend Crescent, Eltham, London, SE9 2SD. Contact: Richard on

[secretary\[at\]cvrs.org](mailto:secretary[at]cvrs.org). Web [www.cvrs.org](http://www.cvrs.org)

03 Nov An Evening of Mini Talks

01 Dec Technical Aspects of London Underground

15 Dec Christmas Social

## Dorking & District Radio Society

Meetings at 7.45pm. Contact: David Browning (M6DJB) at [djb.abraxas\(at\)btinternet.com](mailto:djb.abraxas(at)btinternet.com). Web site:

<http://www.ddrs.org.uk>

27 Oct On Air/CW Practice/Bring & Buy/Natter Night

22 Nov AGM and an RSGB Film

02 Dec Christmas Dinner (no meeting later in the month)

**Echelford Amateur Radio Society**

Meetings on 2nd and 4th Thursdays of each month at the Weybridge Vandals Rugby Football Club. Enquiries to John at jho\_g4gsc(at)btinternet.com or 01784 451898. Web site: <http://www.qsl.net/g3ues/index.htm>

**Hastings Electronics & Radio Club**

Meetings held at the Taplin Centre, Upper Maze Hill, St Leonards on sea, TN38 0LQ, 7pm for 7:30 on the fourth Wednesday of each month. Information from Gordon Sweet M3YXH on 01424 431909, email at sionet3344(at)hotmail.co.uk or <http://herc-hastings.org.uk/>  
 29 Oct Autumn Auction  
 23 Nov Digital 2m EME success – it COULD be you' by Peter G4URT

**Horsham Amateur Radio Club**

meets on the first Thursday of each month at the Guide Hall, 20 Denne Road, Horsham, West Sussex, RH12 1JF. NRQ TQ172304 at 20.00hrs local time. Contact Alister Watt G3ZBU at [g3zbu@hotmail.com](mailto:g3zbu@hotmail.com) or <http://www.harc.org.uk/>  
 03 Nov Graham Somerville of bhi - Noise cancelling  
 01 Dec Club AGM

**Mid-Sussex Amateur Radio Society (MSARS)**

Meet most Fridays in the Millfield Suite, Cyprus Hall, Burgess Hill, RH15 8DX from 7.30pm till 10.00. Contact Stella on 01273 844511, [M6ZRJ\(at\)msars.org.uk](mailto:M6ZRJ@msars.org.uk) or [www.msars.org.uk](http://www.msars.org.uk)  
 04 Nov Surplus Equipment Sale  
 25 Nov Talk by Chris Saunders G4ZCS about Smart Phones

**South East Essex Amateur Radio Society (SEARS)**

Contact Dave G4UVJ on: 01268 697978 or email: [secretary\(at\)southessex-ars.co.uk](mailto:secretary@southessex-ars.co.uk). Web: <http://www.southessex-ars.co.uk/>  
 Meetings: 7pm 2nd Tuesday each month at Swans Green Hall in Hart Road, SS7 3PE. See web site.  
 08 Nov AGM  
 13 Dec Christmas Social

**Surrey Radio Contact Club (SRCC)**

7.30 for 7.45pm on 1st. and 3rd. Mondays every Month. Contact John Kennedy G3MCX on 020 8688 3322 or [secretary\(at\)g3src.org.uk](mailto:secretary@g3src.org.uk). Web: <http://g3src.org.uk/>  
 07 Nov The GB3XP Repeater Project by Neil, M0ZEY  
 05 Dec Construction Contest

**Sutton & Cheam RS**

8pm on 3rd Thursday every month. Contact John Puttock G0BWV on 020 8644 9945 or email [info\(at\)scrs.org.uk](mailto:info@scrs.org.uk) Web: <http://scrs.org.uk/>. SCRS run a practical group most Monday evenings at the Bandstead Scout Hut.  
 17 Nov Millimetric Microwaves, Chris Whitmarsh – G0FDZ  
 08 Dec Christmas Junk Sale (2nd Thursday of the month, this month only)  
 19 Jan SCRS Big Radio Quiz of the Year 2017

**Wimbledon & District Amateur Radio Society**

Meet on the 2nd and last Friday in the month at Matin Way Methodist Church Hall, Martin Way Merton Park, London, SW19 9JZ at 19:30hrs for 20:00hrs. Contact: Andrew G4ADM on 020 8335 3434 or [andrew.maish\(at\)ntlworld.com](mailto:andrew.maish@ntlworld.com)

Please replace the (at) with @ when using any email addresses shown in this newsletter.

Local Training Courses						
Licence Level	Start	End	Location	Club Provider	Format	Further details
Intermediate	5 Nov 2016	19 November 2016	Eltham, SE9	Cray Valley RS	3 days (Sat)	<a href="http://www.cvrs.org">www.cvrs.org</a>
Foundation	4 Feb 2017	11 Feb 2017	Eltham, SE9	Cray Valley RS	2 days (Sat)	<a href="http://www.cvrs.org">www.cvrs.org</a>
Intermediate	tba Mar 2017		Bromley, Kent	Bromley & District ARS	3 days (Sun)	<a href="http://www.bdars.org">www.bdars.org</a>
Full	2 Oct 2017	25 Nov 2017	Eltham, SE9	Cray Valley RS	2 evenings (Mon) + 4 days (Sat)	<a href="http://www.cvrs.org">www.cvrs.org</a>
= course commenced						

**CPREC Committee Contact Information Officers:**

<b>Chairman:</b> Jim Lugsden M6BXL 21 Overhill Way Beckenham Kent BR3 6SN 020 8650 7758 <a href="mailto:james.lugsden531@btinternet.com">james.lugsden531(at)btinternet.com</a>	<b>Secretary:</b> Alan O'Donovan G8NKM 2 Mackenzie Road Beckenham Kent BR3 4RU 020 8778 9660 <a href="mailto:alan.odonovan@btinternet.com">alan.odonovan(at)btinternet.com</a>	<b>Treasurer:</b> Doris Bailey 21 Overhill Way Beckenham Kent BR3 6SN 020 8650 7758 <a href="mailto:doris.bailey531@gmail.com">doris.bailey531(at)gmail.com</a>
<b>Committee Members:</b> Bob Burns G3OOU Damien Nolan 2E0EUI Nick Stapley	Newsletter Editor	01737 552170 or <a href="mailto:G3OOU@AOL.COM">G3OOU(at)AOL.COM</a>



The following equipment is now available for sale and anything that remains unsold will be taken to Kempton Park and the CATS Bazaar events later in the year. Please contact Jim M6BXL if you are interested in any items. Jim will bring some of these along to the next meeting.

Description	Model or Part No	Manufacturer	Est'd Price
Aerial - 4ft telescopic whip mounted on a PL259 plug			£2.00
Aerial base - Mag mount plus approx 3m of coax and PL259, no whip.			£10.00
ATU - 300W HF type	AT300CN	Palstar	£80.00
ATU - Home made tuner with two large variable capacitors			£2.00
ATU - QRP HF type in black plastic box with 2 x SO-239 connectors			£10.00
ATU - Versa Tuner II, HF type	969	MFJ	£100.00
Batteries - 2 x 12v 7Ah sealed lead acid gel rechargeable type, £5 each			£10.00
Battery charger – large solar type			£5.00
Bench magnifier			£5.00
Bench viewer – swivel type			£5.00
Bhi noise eliminating speaker	NES 10-2 Mk3		£40.00
Books - 24 assorted at £1 each minimum			£24.00
Buried cable finder			£5.00
Cable - Approx 20ft of 50ohm coax	RG58		£3.00
Cable - Approx 7m of 300ohm ribbon in 2 lengths			£3.00
Charger 14v 800mA			£5.00
Compass – Lensatic in metal case			£5.00
Components – Blue box of new and used Rs and Cs			£5.00
Components – Grey box of components and small tools			£20.00
Connector – BNC coaxial splitter	TE114949 PNS-F2		£10.00
Connector – CDX coaxial lightening surge protector			£5.00
Connectors – box of approx 40 assorted jack plugs and sockets			£10.00
Connectors – box of approx 50 assorted coax connectors BNC, PL259 few B&Lee			£15.00
CRT - 1inch type with socket	CV2302		£5.00
Digital caliper, looks new		Powerfix	£5.00
Drawing compasses, 5 in metal case			£10.00
Drill stand, drill and assorted drill bits			£20.00
Feeder and cable ties			
Ferrite rings - 2 x 1.5inch			£2.00
Frequency Counter - 500MHz with LED display		Microwave Modules	£25.00
Headphones – low impedance old style			£5.00
Helping hand tool with magnifier			£6.00
L & C meter			£10.00
LCR meter with LCD display	Atlas LCR40	Peak	£40.00
Log Amp kit of three ICs incl AD8307			£10.00
LPF - 30MHz and small	FL-30		£5.00
LPF - HF type in long case		KW ?	£10.00
LPF - HF type with SO239	TVI-30	Vanco	£5.00
LPF – small, HF bands	FL-30	Palstar	£5.00
Magnifier – Folding magnifier			
Magnifier – folding type on stand Good lens			£6.00
Microcode DSP with LCD readout		Cumbria	£15.00
Micrometer (new)		M & W	£12.00

Description	Model or Part No	Manufacturer	Est'd Price
Microphone – Desktop	444	Shure	£30.00
Microphone - Dynamic type, MH-31 a8j			£10.00
Microphone - fist type	MH-31		£5.00
Microphone – old style with cable (looks like a D104)			£10.00
Miniature drill complete with burrs and grinding discs and stand.( Similar to the Dremmel )		Minicraft	£30.00
Miscellaneous components and small tools priced from £1 each upwards	Misc		
Mitre saw			£10.00
Morse Key - black fully enclosed			£5.00
Morse Key - brass on wooden base			£10.00
Morse Key - Marconi			£25.00
Morse Key - miniature on marble base			£5.00
Multimeter – Analogue type in box	TP-5S	TMK	£5.00
Multimeter – digital type with probes	DD6010	Altai	£10.00
Multimeter – digital type with probes	DT-830B	Hilic	£3.00
Multimeter – Very old V & A, AC & DC			£5.00
Multimeter with LCD display			
Nuts, screws, bolts and washers, assorted in plastic case. Looks new			£5.00
Paddles – Electronic key paddles		Bencher	£80.00
Picaxe micro-controller project with pcb and box			£5.00
Power meter – HF 1-200W FSD		Spectrum Communications	£10.00
Project box – Alloybox			£1.00
Project box – steel with unknown project			£1.00
PSU 0-24v 0.5A in blue steel case – regulator fault			£3.00
PSU 13.8v 3A		Selmar	£3.00
Receiver – unknown condition, has 4 gang variable capacitor and epicyclic drive		Green ECE Ltd	£3.00
RF Analyst with LCD display	RF-1	Autek Research	£30.00
RF Field Indicator tunable with telescopic whip			£3.00
Solder - 1 large and one small reels of 60/40 solder			£8.00
Solder - Reel of 60/40			£10.00
Soldering Iron - 230v		Henley Solon	£5.00
Soldering iron – 230v		Rawl Plug	£5.00
Soldering Irons - 2 x 230v irons with 3 spare bits and iron holder		Antex	£15.00
Soldering irons – assorted			
Soldering Station - 50W	N78AR	Maplin	£12.00
Soldering station – precision			
Swivel vice with 3” clamp			£5.00
SWR meter SO239 connectors	SWR-3	Hansen	£12.00
Tap and die set Metric New			£7.00
Test leads			
Tone dialler – pocket type		Tandy	£5.00
Transceiver – 100W HF with PSU	KW-2000A	KW	£100.00
Transceiver – QRP HF bands, looks complete	HW-9	Heathkit	£40.00
Vacuum cleaner – mini type			£5.00
Valve 1	ECL80		£1.00
Valve 1	EF85		£1.00
valve, 1 with no matching base	QQVO3-20A	Mullard	£4.00
Valves - 2 with bases, £6 each	832		£12.00
Wire – 3 reels solderable enamelled copper, £2 each			£6.00
Wire - 4 reels assorted tinned copper £1 each			£4.00