

The newsletter of the

Crystal Palace Radio & Electronics Club

Affiliated to the Radio Society of Great Britain Established January 1956

Meetings are held on the first Friday of each month. The room opens 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 Admin: Club Technical:	<u>http://cprec.btck.co.uk/</u> http://cprec.btck.co.uk/OurTechnicalSite	
Email:	cprec.g2lw@gmail.com		
Club Net:	Each Wednesday at 20:00 on FM on 145.525MHz (S21) \pm QRM		
Twitter	@BobFBurns or <u>www.twitter.com/bobfburns</u>		

Next meeting: Friday 2nd November 2018

Network Radio by Martin Butler M1MRB

In this issue: Future Meetings & Events, Recent Event News, North is South and vice-versa by Theorist, Snipping Tool Update by Nick Stapley, Technical Snippets, Members News, Miscellaneous, Noticeboard, Diary of External Events, News from other Clubs, Local Training Courses and Club Contact Information.

Dear Reader

Future Club Meetings and Events

02 Nov 2018	Μ	Network Radio by Martin Butler M1MRB
07 Dec 2018	М	Christmas Social
04 Jan 2019	М	Video Evening
01 Feb 2019	Μ	Annual General Meeting - see Members section in this news- letter
01 Mar 2019	М	ТВС
05 Apr 2019	М	Construction Evening - Pixie QRP Transceiver
03 May 2019	М	CW Evening and Pixie Test & Maintenance

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

02 November 2018 - Network Radio by Martin Butler M1MRB

This is a talk I gave to Sutton and Cheam Radio Society earlier in the year on the hot topic of Network Radio. I talk about the various options of Network Radio and how it's affecting our hobby. I cover some of the histories of where it came from, it's uses and limitations.

The last part of the talk should become a group discussion on Network Radio and Amateur Radio. One way or another it's like Marmite, you love it or hate it.

Recent Event News

29 September - National Hamfest

Your scribe visited the Hamfest at the Newark & Nottingham Showground, travelling by train with no difficulties and a travel time of just over two hours each way. This is a large event with a number of the large sales outlets present together with the RSGB, club and private stands. I purchased a number of small components including binocular cores for RF transformers, 1/4 inch tuning cores, two 500mW audio amplifier kits, low voltage connectors and a 3-30v digital voltmeter.

The following photos show some of the commercial and homebrew equipment on display:

Homebrew 813 3.5MHz Transmitter

Topside View



This transmitter on the VMARS stand consisted of a Top Band VFO, 5763 Buffer, 5763 Doubler and 813 amplitude modulated power amplifier running 150W input power on a supply of 1000 volts. An associated power supply and modulator were not on display due to their weight.

The construction quality was excellent.

Underside View



RSGB Stand



Stitcher

This machine was busy during my entire visit stitching callsigns into hats and tshirts. The stand offered a variety of other pre stitched merchandise.



Yaesu FTDX101D



Tx: 160 to 6 meters, Rx: 30 kHz to 56 MHz, SDR technology, large colour touch screen, independent main & sub bands, 100W (200W on MP version), active band monitor, high-Q VC tuning front end, automatic tuner and USB Ports.

Cambridge Hams Communications Vehicle

This vehicle was fitted out with two operating positions for HF and VHF stations, adequate space for the operators and a pump up mast. Power was provided by a petrol electric generator.



Rig Expert Double Loop

The antenna consists of two loops 1 metre in diameter. The loop antenna element is constructed from 22mm high conductive copper pipe. Every joint is brazed to eliminate high resistance in contacts that reduce efficiency.

Antenna tuning is carried out through a wired unit with a power supply. The loop element Is tuned with a low-resistance, high current, variable butterfly capacitor. The capacitor is controlled by using variable speed motor remote control box The outdoor electrical and mechanical components are protected by a weather resistant moulded cover.



Icom IC-7851



Rx 40KHz - 60MHz, Tx 1.8 - 54MHz (amateur bands only), modes: USB, LSB, CW, RTTY, PSK31/63, AM, FM, 5-200w (AM 50w), dual conversion 64.455MHz/36kHz, internal automatic ATU.

Kenwood TS990



HF and 50MHz multimode base station, Tx 200W, Rx +40dBm intercept, sub-receiver, touch screen, 3 DSP processors, Built-in RTTY/FSK/PSK/QPSK Decoder/Encoder, CW keyer, USB and LAN ports.

The RSGB committees were present and and Martin M1MRB was recording interviews for his ICQ Podcast.

05 Oct 2018 - Introduction to Electronics - Power Supplies

This talk covered the following topics:

Risk Analysis

Consideration must be given to the risks of the power supply unit (PSU) failing and injuring the operator and/or damaging any equipment connected to it which may well cost a lot more than the PSU itself. These include the specification, adequate cooling and the operating environment.

Batteries

A useful source of DC power with some limitations dependant on the type of battery.

• Basic Power Supply

The simplest PSU consists of a mains transformer, rectifier and smoothing capacitor. This will provide a direct current (DC) output but it will not be stable - the output voltage will vary with the supply voltage and load current.

Stabilised PSUs

The simplest form of stabilisation is a zener diode and current limiting resistor but this will only provide a relatively low current to the load and the voltage is fixed at the working voltage of the zener diode. An emitter follower may be used as a current amplifier to increase the available current from the zener diode stabiliser but there will be a reduction in output voltage of approximately 700mV due to the emitter base diode.

• Linear Regulator PSUs

A simple linear regulator circuit was displayed using a zener diode reference voltage, linear voltage comparator and current amplifier that enabled the output voltage to be variable over a limited range.

An additional circuit was shown using the veenerable LM723 integrated circuit voltage regulator that provided a variable output voltage and a simple current limiting facility. If this was followed by one or more current amplifiers then the output current could be many amps. Another circuit was shown that could provide 13.5v at up to 25amps of load current using several 2N3055 emitter followers in parallel with current balancing resistors as the current amplifier.

Conventional integrated regulators like the 78xx series typically have a minimum voltage drop of 2.5 -3volts so for 12v output you would need a minimum supply of 15v at full load. Low drop out (LDO) versions usually use an opposite polarity current amplifier in order to reduce the minimum voltage drop. For example, a positive output regulator would use a PNP current amplifier to achieve a voltage drop of typically 0.3V.

• Protection Concepts

Multiple forms of protection were discussed including fusing, inrush current limiting, cooling, reverse polarity protection, output current limiting, connecting the output to a battery and a crowbar circuit to protect against short circuit failure of the regulator device(s) resulting in excessive output voltage.

• Switching Regulators

An overview of basic switching regulators was shown covering buck (step down), boost (step up), isolated circuits, noise filtering and screening. These type of PSUs can generate a lot of noise by conduction and radiation so adequate filtering and screening are critical requirements.

• Power Factor Correction

A facility to correct the condition where the supply current consumed by a PSU is not in phase with the supply voltage and to reduce the harmonic content of that current due to diode conduction only at the peak of the voltage cycle.

• Reforming Electrolytic Capacitors

The insulating layer in an electrolytic is produced by an electro-chemical process and with no use over time the working voltage reduces as the layer deforms. This is the major reason why old radios should not be powered up to "see if it works". The safe option is to do a visual inspection and replace anything that looks leaky, enlarged or over heated. Then check the electrolytic capacitor(s) and replace any that do not reform - then apply power.

The following picture shows a number of homemade power supplies, constructed in the style of the Heathkit SB-line units that were on display during the talk.



They included 2000v at 300mA, 13.5v at 25A, a multi-voltage unit for 1.4v valves and a regulated equivalent of

the Heathkit HP23 for use with an SB-101 transceiver. One PSU was opened up for inspection.

18 Nov 2018 - CATS Bazaar

We have booked two tables with mains power at this event to sell any remaining silent key equipment and unwanted club or members' items. We will require help to manage the stand and the first four applicants will get free entry. If you can help or have items to sell please contact our Secretary Alan to let him know.

We have quite a lot to sell, all of which will contribute to club funds so this is a worthwhile event that will benefit all club members.

See the Diary of External Events for more information.

North is South and vice-versa by 'Theorist'

I went over to the dark side recently and bought a smartphone which, despite its name, is of course a pocket computer with the ability to make phone calls. The main reason for purchase was indeed so I could use it as a very quick way of browsing the internet, during TV ad-breaks for example, without having to pick up and sign in to my laptop. Yes even that is too arduous and time consuming these days. A more valid reason was to replace an ageing tablet device.

My regular reader(s?) will know that I have an interest in anything to do with GPS and mapping. Naturally the first thing I installed on the phone was a GPS app that I have used before on the tablet and which has a built-in compass feature, although I also installed a dedicated compass app.

Decades ago the BBC had a program called Young Scientist of the Year. Sometime around 1970 the winner had come up with an electronic compass that relied on the Hall effect. I don't remember any of the other winners or their projects but this stuck in the mind because it was the best. There was vague talk of patents and such like but at the time there was no interest from industry.

So how does my Smartphone GPS/compass app work? Well, it has a magnetometer chip and this relies on (you guessed it) the Hall effect. The Hall effect occurs when a wire or strip of metal carrying a current is placed in a magnetic field. Without going into details moving charges produce a magnetic field, and this will interact with other magnetic fields. If a current-carrying wire (or PCB track for example) is placed in a magnetic field then, depending on the field's orientation, the electrons will bunch up on one side of the wire. This produces a voltage across the width of the wire or strip which is dependent on the strength of the magnetic field, enabling it to be measured. The maximum 'Hall voltage' occurs when the magnetic field is perpendicular to the current, but note that the current and nature of the conducting material also affect the Hall voltage.

The strength of the Earth's field changes with location, which must therefore also be known to determine North, and in London is about 49 μ Tesla. For this purpose a GPS chip is very useful, although sufficient accuracy can be obtained just using the location as determined via the Internet. The best software uses GPS in combination with the sensor input and a model of the Earth's field. As



the screenshot shows (courtesy of the free Android CPU-Z app) my phone has an AK09918 Magnetometer chip [1]. This is a 3D/3-axis chip, and as you can see the measured value for the magnetic field when I took the picture was about 600 μ Teslawhich is about 12 times what it should be. Oops. I didn't expect that degree of difference.

OK then, I took the photo with the phone resting on my Hi-Fi amplifier right above the transformer. Not good. Going around the house and then outside the value dropped, but only to around 390 - 430 µTesla. The obvious problem is that the inside of a phone is a hostile environment with lots of stray fields to interfere with things, especially as the Earth's magnetic field is weak. I imagine that the positioning of the chip is well chosen, but the internal and unwanted extraneous fields (from your mains supply for example) must be be subtracted away in some fashion. This could be done by assuming that these are constant, at least over some reasonable time period, and that any variations experienced are due to the phone moving about and changing orientation with respect to the Earth's field. I think that clever software records the changes experienced as you, or rather the phone, moves about and works out what direction the phone is pointing and hence which direction is North.

An accelerometer is also needed for the compass then, to get the orientation of your phone. The photo shows that my phone also has a 3-axis accelerometer, in this case in the form of a BMI160 chip. The amplifier on which the phone was resting for the photo is approximately horizontal so as you would expect it is showing g as 9.8 m/s^2 in the Z direction, close to the correct value. Not surprisingly some chips combine both accelerometer and magnetometer in one package. The FXOS8700CQ chip is one such chip and is advertised as being for smartphones. It is contained in a $3 \times 3 \times 1.2 \text{ mm}$ package.

There are several other types of magnetometer such as those using the 'Giant Magneto-resistance effect' or GMR. Compared to these the Hall effect has a lower output, lower sensitivity and poorer temperature stability. However the chips are cheap to make, use little power and have a small size (about 0.8 mm on a side and 0.5 mm thickness for the one in my phone according to the datasheet) hence their popularity.

A traditional compass pointer is of course a magnetised 'needle' of metal carefully mounted so it can freely spin about its balance point. The North pointing bit always seems to have a red mark (I have never seen anything else) although older compasses might have an N on the needle. This red half of the needle is actually the north pole of the pointer magnet, and since opposite poles attract it means that the magnetic North Pole is actually a south pole, and the magnetic South Pole is actually a north pole.

[1] Purely for interest I have included a photo of this chip. The editor reliably informs me that it is a 'four connection surface mount IC with four blobs of solder ready to fix to a PCB. They screen print the flux paste, place the IC and then use an infra-red or hot air solder system.' I hadn't seen that before.



Members News

a) Annual General Meeting: In previous years we have held a construction contest at the AGM with a modest prize for the winner but this has not been the case in recent years due to lack of entries. If you would like it reinstated for the 2019 AGM please let the committee know as soon as possible and get building.

Construction evenings have always been popular and well attended events so are there enough home constructors among our members to make it worthwhile? Entries may be home designed products or commercial kits but they must have been constructed by the entrant who must be a paid up club member.

b) The Club Committee meets four times each year with the last meeting on Monday 15th October 2018. All other business is carried out by email and telephone. The next meeting is planned for Monday 7th January 2019 to prepare for the AGM.

c) Power Supply Failure: In an interesting coincidence of timing my Daiwa PS-120M (3-15v at 10A) bench power supply has just failed. It was supplying 0.5A to charge four D cells via a current limiting resistor and isolating diode and now just provides a variable output of 8-9v at very little current for a reason yet to be determined. Luckily no damage occurred to the connected items. More to follow when time allows.

d) Temperature Test Box: work continues on this project to construct a small enclosed environment that can be heated and cooled in order to test electronic modules during their development. The enclosed air is circulated over a heater and optional freezer blocks by a small fan driven by a synchronous motor. The electric motor is outside the circulating air environment.

The heater uses 25W 500V rated aluminium clad wirewound resistors mounted on a finned heatsink and run at half their maximum rated dissipation or less. The cooling is achieved by one or two small freezer blocks on a mounting frame.

Planned temperature range is 0°C to +55°C. Anything lower will use a kitchen fridge or freezer.

Temperature control uses a negative temperature coefficient thermistor sensor driving some simple electronics to turn the heater on and off. A simple calibrated control allows the temperature to be set and a digital thermometer provides more accurate measurement capability.

Another use of this box is for baking inductor or PCB assemblies that have been varnished.

Snipping Tool Update by Nick Stapley

The Snipping tool I mentioned last month is being replaced in the October Win10 update by a 'Snip and Sketch' app that has more functionality. The October update still has Snipping tool (which will be removed in future updates) but if you try and use it you get the suggestion to use the new Snip and Sketch. This has several advantages: you can freely draw a loop around what you want to capture, although you can still use a rectangle if you want, and you can also annotate and highlight anything you have captured. A limitation is that you can only save a cutting as a png file. Nonetheless this is a good improvement, and I happen to know that Theorist will be using it for the images in his articles.

Technical Snippets

a) Broad Band Amplifiers:

NXP have introduced the MRFX1K80H, a 65v 1800W CW output dual LDMOS device for use from 1.8 - 400MHz. The typical one-off price was around £250.

https://www.nxp.com/products/rf/rf-power/rf-ism-andbroadcast/1-600-mhz-broadcast-and-ism/1800-w-cwover-1.8-400-mhz-65-v-wideband-rf-power-ldmostransistor:MRFX1K80H

b) Keysight Technologies has just announced a new oscilloscope with an analogue bandwidth of 110GHz.

https://www.keysight.com/en/pcx-

x2015004/oscilloscopes?gclid=EAIaIQobChMI8fyOic7 23QIVWed3Ch14CAaxEAAYASAAEgL7B_D_BwE&cc =GB&lc=eng&s_kwcid=AL!4166!3!277350693536!p!!g !!oscilloscopes&ef_id=W7ncYgAAAL2UY2m3:201810 08101402:s

c) Pickering have just announced a series of RF reed relays up to 20W.

https://www.pickeringrelay.com/applications/rf-fast-digital/

Miscellaneous

a) M7 callsigns: The RSGB have just announced that Ofcom has commenced issuing calsigns with the M7 prefix.

b) Invisible Superheroes exhibition

For the The Institution of Civil Engineers' 200th anniversary we are celebrating the role civil engineers play in transforming lives and safeguarding our future. Invisible Superheroes is our year long exhibition at One Great George Street, London, SW1P 3AA, focusing on the unsung heroes behind some of the world's most amazing engineering projects.

Using state-of-the-art technology the exhibition brings to life the best examples of civil engineering. The

unique comic book look will help inspire the next generation of engineers and create a memorable experience for everyone who visits. Join us in celebrating the crucial role engineers have played for society throughout the past 200 years.

Due to the Global Engineering Congress, the exhibition will be closed on 22 - 26 Oct. We will reopen as normal from 29 October and the Exhibition will run until 22 February 2019. Open Monday to Friday 10am to 5pm, closed weekends and public holidays. More information from:

https://www.ice.org.uk/events/exhibitions/iceinvisible-superheroes-exhibition#visit-superheroesexhibition

c) Large Amateur Radio Shacks

During a recent search for amateur

amateur radio shacks I found two that were almost unbelie vable in



size. The first one on the right belongs to George Ulm W9EVT. Google his callsign for more details. More to follow.

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. Some of the current list of items may be viewed at:

http://cprec.btck.co.uk/SaleofClubEquipment All excl P&P.

For Sale

a) Remaining items donated for club use or club funds by two Norbury residents:

- Four text books: '*HF Communications A Systems Approach*' by Nicholas Maslin, '*Communications Systems*' by Simon Haykin, '*Telecommunications Engineering*' by Dunlop & Smith, '*Introductory Topics in Electronics and Telecommunications - Modulation*' by F R Connor. £1 each.
- Gould Digital dual beam 20MHz solid state storage scope type 4035 with manual on CD, working, £30 ono.

Offers to our Chairman Damien on 07900 242541 or email <u>Gorby928(at)gmail.com</u>.

b) Mast sections: One 14 foot section and up to six approximately 4 foot 6 inch sections of two inch nominal diameter aluminium scaffold poles with 5 internal steel couplers. £40 the lot - buyer collects. Contact Bob on 01737 552170 or g3oou(at)aol.com.

CPREC has a large bank of fundamental and overtone quartz crystals, from 1.0 - 99.91MHz. The list, which is on the club website as a downloadable PDF file, has

recently been updated with new frequencies and case classifications and sorted in frequency order. Prices are £1 each to club members and £2 each to non members, excluding P&P.

73

G3OOU

Diary of External Events

27 Oct - Essex CW Club Boot Camp

3rd Witham Scout & Guide HQ (rear of Spring Lodge Community Centre), Powers Hall End, Witham, Essex, CM8 2HE. Opens 8.30am for registration, session runs 9am-4.30pm. Free parking, entry £10, free snacks. Contact Andy, G0IBN, 0745 342 6087 or info@essexcw.org.uk Web: [www.essexcw.org.uk]

18 Nov - 41st CATS Bazaar

Oasis Academy Coulsdon, Homefield Rd, CR5 1ES Coulsdon. Features of the bazaar include: secondhand equipment, flea market, traders' stalls, new equipment, refreshments, disabled access/ toilet, free plenty of free parking. Admission £1.50 which includes a free cup of tea or coffee. It is served by three bus routes: the 466, 404 and 60. Applications from traders, clubs and private sellers most welcome. Contact bazaar@catsradio.org or ring Andy G0KZT on 07729 866600.

24th March 2019 - Hamzilla Radio Fest hosted by Dover Amateur Radio Club

Discovery Science Park, Gateway House, Ramsgate Road, Sandwich, Kent CT13 9FF. RSGB exams, lectures and demonstrations, bring & buy, entry tickets available via the website. Sellers tables available. Web: http://www.hamzilla.uk

News from other Clubs

Club Secretaries – <u>please ensure</u> that your future meeting details are present in your newsletters, on your websites or sent to our newsletter editor Bob G3OOU. Palace Pulse is published about ten days before our club meeting which is on the first Friday of each month and closes for editorial contributions a few days before publication. Due to differing publication dates and short lead times it is getting <u>increasingly difficult</u> to include other clubs' events although we will endeavor to do so if advised in time. If we are regularly unable to obtain the information then that club entry will be removed from this newsletter.

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

Bredhurst Receiving and Transmitting society

Meet on Thursday night from 8:30pm at the Parkwood Community Centre, Long Catlis Road, Rainham, Kent, ME8 9PN. Contact secretary@brats-qth.org or http://www.brats-gth.org/brats/

25 Oct	Component I	Recognition	Competition
25 001	Componenti	Recognition	Competition

- 08 Nov Junk Sale
- 15 Nov Ordnance Survey Ancient and Modern Talk by Mr Colin Brown

13 Dec BRATS Christmas Party 2018

Bromley & District Amateur Radio Society

Meets at 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. Web: www.bdars.co.uk

20 Nov TRF Construction by M0YRG

18 Dec Quiz and Mince Pies by G0HIQ

15 Jan AGM and Programme

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 Web:

www.g0mwt.org.uk

- 06 Nov Propagation by Gwyn Williams G4FKH
- 04 Dec Xmas Social
- 08 Jan My Interest in Offshore Radio by Jim Salmon 2E0RMI
- 05 Feb 19 Sub-Surface Comms in tunnels etc by Peter Bridgeman G3SUY

Coulsdon Amateur Transmitting Society (CATS) 8:15pm on 2nd Monday each month. Contact: Andy Briers G0KZT on 07729 866600 or secretary(at)catsradio.org. Web site: http://www.catsradio.org/

12 Nov Apollo 13 - Terry G4CDY

121101	ripolio lo lolly o lob
18 Nov	CATS Bazaar
10 Dec	CATS AGM

Crawley Amateur Radio Club (CARC)

Every Wednesday 20:00 – 22:00, every Sunday 11:00 – 13:00. Formal events are on the fourth Wednesday of the month, 7-30pm for 8pm. Phil M0TZZ on 07557 735265 or secretary(at)carc.org.uk or Web: http://www.carc.org.uk/

- 24 Oct FPGA's by Alister G3ZBU (TBC)
- 28 Nov HARC/CARC Challenge
- 07 Dec Annual Fish and Chip Supper
- 23 Jan 19 Club AGM

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 .Web www.cvrs.org

- 01 Nov Australia, open to the world Nigel G1BUO 15 Nov Mini talk evening
- 20 Dec Christmas drinks and buffet at the Park Tavern

Dorking & District Radio Society

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

http://www.ddrs.org.uk

- 27 Nov AGM & RSGB Video
- 07 Dec Christmas Dinner

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

- 26 Oct 'Hernia Cup' Quiz night St Mary's Church, Sunbury - <u>Note that this is in place of the</u> <u>normal Thursday night meeting</u>.
 08 Nov Weather Satellites & Earth Images - David
- Simmons, G1MAL & Francis Bell, G7CND 13 Dec Christmas Party - in the bar at the Vandals

Hastings Electronics & Radio ClubMeetings held at the Taplin Centre, Upper Maze Hill, StLeonards on sea, TN38 0LQ, 7pm for 7:30 on the fourthWednesday of each month. Information from GordonSweet M3YXH on 01424 431909, email:sionet3344(at)hotmail.co.ukWeb: http://herc-hastings.org.uk/24 OctOn air operating and chat28 NovDVD Show by Tony Lunn G0EYEDecNo meeting	07 DecChristmas Dinner in house14 DecChristmas QuizSouth East Essex Amateur Radio Society (SEARS)Contact Mark Callow 2E0RMT on 07842 336444 orsecretary(at)southessex-ars.co.uk orhttp://www.southessex-ars.co.uk/Meetings: 7pm 2nd Tuesday each month at The WhiteHouse, Kiln Road, Benfleet, Essex, SS7 1BU.13 NovClub AGM		
Hereford Amateur Radio Society Meets on the first Friday of each month at Hill House, Newton, Nr Leominster, HR6 0PF. Contact: enquiries@herefordradioclub.uk or http://herefordradioclub.uk/ 02 Nov The 'L' Band Matrix – Mike G3LZM.	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 orsecretary(at)g3src.org.uk. Web: http://g3src.org.uk/05 NovInter-club Quiz03 DecConstruction evening17 DecInformal pre-Christmas get-together		
Horsham Amateur Radio Clubmeets on the first Thursday of each month at the GuideHall, 20 Denne Road, Horsham, West Sussex, RH121JF. NRQ TQ172304 at 20.00hrs local time. ContactAlister Watt G3ZBU at g3zbu(at)hotmail.com orhttp://www.harc.org.uk/25 OctHARC/CARC Challenge - Crawley Club (Provisional – TBC)01 NovFrom Key to TV – Robin G3OGP15 NovSocial - The Star - Rusper	Sutton & Cheam Radio Society8pm on 3rd Thursday every month. Contact John PuttockG0BWV on 020 8644 9945 or email info(at)scrs.org.ukWeb: http://scrs.org.uk/. SCRS run a practical groupmost Monday evenings at the Bandstead Scout Hut.18 OctSolar power for Radio Amateurs MiltonG1RUV15 NovReceivers Over the Ages by Bob G3OOU13 DecSocial evening and friendly quiz		
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. ContactStella on 01273 844511, M6ZRJ(at)msars.org.uk orwww.msars.org.uk02 NovSurplus Equipment Sale - UPSTAIRS23 NovConstruction Contest	Please replace the (at) with @ when using any email addresses shown in this newsletter.		
Crystal Palace Radio & Electronics Club is a me	mber of the South East Tutors training group.		

Local Training Courses					
Licence Level	Dates	Location	Club Provider	Format	Further details
Intermediate	03 - 17 Nov	Eltham, SE9 2SD	Cray Valley RS	3 days (Sat)	www.cvrs.org
Foundation	02 - 09 Feb 2019	Eltham, SE9 2SD	Cray Valley RS	2 days (Sat)	www.cvrs.org
Intermediate	17 Feb - 17 Mar 2019	Bromley BR2 7NH	Bromley & District ARS	3 days (Sun)	www.bdars.org
Full	Nov 2019	Eltham, SE9 2SD	Cray Valley RS	ТВА	www.cvrs.org
	= course commenced				

CPREC Committee Information			
Officers:			
Chairman:	Secretary:	Treasurer:	
Damien Nolan 2E0EUI	Alan O'Donovan G8NKM	lan Skeggs M6FZC	
E: cprec.g2lw(at)gmail.com	E: cprec.g2lw(at)gmail.com	E: cprec.g2lw(at)gmail.com	
Committee Members:			
Bob Burns G3OOU	Newsletter Editor	T: 01737 552170 E: g3oou(at)aol.com	
Nick Stapley	Web Manager		