

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.

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: <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

2017 subscriptions are unchanged from last year and are now due.
Please send your cheque for £12.00 made out to 'Crystal Palace Radio
& Electronics Club' to our Treasurer or pay at the next club meeting.

Next meeting: 3rd February 2017

Annual General Meeting

In this issue: *Future & Most Recent Meetings, Chairman's Notes, Shiny Side Down by 'Theorist', Technical Snippetts, , Miscellaneous, Noticeboard, Diary of External Events, News from other Clubs, AGM Agenda, Local Training Courses and Club Contact Information.*

Dear Reader

Future Club Meetings and Events

03 Feb	M	Annual General Meeting
03 Mar	M	Spectrum Utilisation Efficiency – 4G and Beyond by Ian Clark
07 Apr	M	Club project - Frequency Counter Design Considerations and the use of KiCad by Alan O'Donovan G8NKM
04 Aug	M	Summer Social
01 Sep	M	Antenna Modelling by Quin Collier (WRR)
06 Oct	M	SDR Without Maths by Alan G0TLK
01 Dec	M	Christmas Social

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

3rd February 2017 - Annual General Meeting

The AGM is our members opportunity to have their say on club activities and vote in a new committee for 2017. Our Chairman Jim and Treasurer Doris gave notice at the 2016 AGM that they will be standing down as both officers and committee members (having both served since AGM 2013) and we have two volunteers to take on those roles, subject to members approval.

An agenda is included in this newsletter.

Committee member Nick has been reviewing at the club constitution to bring it up to date with the RSGB child protection policy and our Treasurer Doris has requested a minor change to the Officers Roles and Responsibilities document which is referred to in the Constitution. Both of these changes will be presented to the AGM for approval by club members.

Our Treasurer reports that the club finances are in a healthy state and there is no need to increase the subscription or meeting fees in 2017.

Recent Event News

6th Jan 17 - DMR (Digital Mobile Radio) for Beginners by Damien 2E0EUI

This talk was presented as a beginners introduction to the world of DMR and the Phoenix network in the UK. Damien commenced with a list of the currently available DMR systems which are:

- Brandmeister
- D – Star
- Yaesu Fusion (C4FM)
- DMR+
- DMR (Phoenix network)

And then said that his talk would concentrate on the Phoenix network which is a network of DMR repeaters run, managed and operated by UK repeater keepers. The network also connects to the European DMR network and also the DMR-MARC network in the USA.

DMR Terminology:

Talkgroups – Each DMR repeater will have a series of talkgroups which could be local, regional, UK Wide or World Wide.

Time-Slots – DMR occupies a 12.5 kHz bandwidth that two channels share using Time Division Multiple Access (TDMA).

Time slot 1 and Time slot 2 – each channel can carry either voice and/or data at 6.25 kHz.

The simple part of all this is that you can access your local GB7XX repeater and have a QSO with an American on Time slot 1 while another local station is on Time slot 2 having a local QSO at the same time.

For example:

SLOT	TALKGROUP	NAME
1	TG1	VV CALLING
1	TG2	EUROPE CALLING
1	TG9	LOCAL S1
2	TG9	LOCAL S2

Customer Programming Software (CPS) is the software used to program the DMR Radios. Each manufacture has their own version of the CPS software but they all basically do the same job.

Example DMR Radios:

Tytera MD380



Retevis RT3

£80 - £120

Connect Systems CS750



Around £220

Hytera PD365



Around £180

Hytera MD785



Around £350

Connect Systems CS800



Around £250

Android Radio - price to be announced:

The first FM/DMR HT that is truly easy and intuitive!

RFinder Android Radio

Point and Click DMR

The image shows four different models of RFinder Android radios. To the left are two accessories: a speaker and a microphone. A red circle with a diagonal line through it and the text 'Code Plugins' is positioned to the right of the radios.

At present there are around 48 repeaters on the Phoenix network but that is changing daily. DMR repeaters have the GB7XX prefix.

You will require a DMR ID number before you can operate on DMR. This can be obtained from the DMR-MARC website and usually takes around 24 hrs to be activated. Please see the following links:

<http://dmr-marc.net/cgi-bin/trbo-database/register.cgi>

<http://www.dmr-marc.net/cgi-bin/trbo-database/userreg.cgi>

Additional DMR links:

<http://www.dmr-uk.net/>

<http://dmr-marc.net/>

Compatibility - unfortunately the different systems are not mutually compatible. However, it is possible to install a DMR Hotspot on your computer that gets around this limitation.

Two examples are:

DV4mini - see <https://uk.passion-radio.com/gb/sdr-transceivers/dv4-mini-316.html> and

OpenSPOT - see <https://www.sharkrf.com/products/openspot/>

Thank you Damien for a most interesting and informative talk.

Club Project Progress

Following on from November's construction evening Jim (2E0JFL) completed his frequency counter, however when switched on the initial splash screen came up showing the software version but then the device froze. I investigated and realised there was a software bug related to the initialization of the clock module. I updated the software and Jim's counter now works a treat! It just goes to show even I can make mistakes!

At our December meeting a number of members continued the construction of the Frequency Counter and we now have another three or so working properly (with updated software). We tested the counters using a frequency generator and Bob's frequency standard, all were accurate (within 1 or 2Hz at 10MHz) without the need to tweak the calibrate function and with the exception of Damien's (2E0EUI) all measured frequencies up to 75MHz. Damien's for some reason goes up to 85MHz although it may be due to different power supplies being used.

In the past few weeks I have been busy documenting the project and have put a lot of information on Github. If you go to <https://github.com/alan-od> you will see all the frequency counter information there.

After a lot of work I've managed to get the prescaler to work, this allows the frequency counter to measure frequencies up to (and beyond) 1GHz with 10Hz resolution. The prescaler uses a MC12080 which is rather expensive, however if we buy 10 chips the cost to upgrade the counter is £4. We can do a straw poll at the next meeting to see how many are interested in adding this additional functionality. An issue with the prescaler

is that it uses surface mounted components and most of you will probably baulk at the idea of soldering such tiny components. Luckily we have a talented soldering ace amongst us so if you ask Andrew Maish nicely he may help you out. I might also give you a hand for the price of a mince pie!

Happy New Year

Alan G8NKM

Shiny-Side Down - by 'Theorist'

Whilst wasting time on the internet recently I came across the following: "Until CDs were invented, music was typically stored on plastic LP (long-playing) records and cassette tapes" As I still listen to my old LPs, I found this explanatory comment rather amusing. However I also have a CD collection, and that technology is very interesting.

CDs (and DVDs for that matter) are made of three layers of metal and plastic. The plastic, from which most of a CD is made, is polycarbonate. This is a tough but slightly brittle substance, and when soft can be pressed in much the same way as an LP. A thin layer of aluminium is applied to this pressed side to make it reflective.

Lacquer is then spin coated on the reflective surface for protection, to form a third layer. A label is usually printed on the lacquer, so this could be regarded as a fourth layer. The label side is regarded as the 'top' of the CD, and being closer to the reflective layer of aluminium, this is the side of a CD you should avoid scratching. Scratches on the bottom, playable shiny side of the CD are usually less serious since, unless quite deep, are likely just to scratch the polycarbonate, and can usually be filled in to repair.

To make a CD an analogue signal is sampled 44,100 times a second. Technically it is 16 bit two-channel PCM (Pulse-code modulation) at a sampled rate of 44.1 KHz per channel. This means that the amplitude of both the left and right channels of a stereo recording are sampled 44,100 times a second, using 16 bits (the 'bit depth') to store the amplitudes as a binary number. The sampling rate and bit depth used determine the ultimate fidelity of the signal to the source material. The original specification for CDs by Sony and Phillips, known as 'The Red Book', also made allowance for quadrophonic sound, but this has never been implemented.

In manufacture a glass master is made and used to stamp out polycarbonate replicants, which are then coated and lacquered. Extremely clean conditions are needed since the disc holds information in a tight, continuous spiral of about 3-5 billion 'pits', each of which is 100nm deep, 500nm wide, and between 850nm and 3,500nm long. The length of the spiral is about 3.7miles. The cost of manufacture is a few pence, and the 'jewel case' box typically used to hold a CD is apparently more expensive to make than the CD itself.

The raised non-pit areas are called 'lands', and the laser/player can detect a transition from a land to a pit area, or pit to land. The signal is encoded using something called 'non-return to zero inverted' or NRZI coding. In this the lands and pits on the CD can represent either 0's or 1's, since it is the transition from land to pit or pit to land that is important. A change from

land to pit (or vice versa) represents a 1, and no change represents a string of zeros. A later article will deal with this and other signal codings.

Unlike an LP a CD is played from the inside, nearest the centre, to the outside edge. The information is read using a laser shining up through the bottom of the CD. As the angular velocity of the outside edge of a rotating disk is greater than the angular velocity near the middle, the speed of revolution of a CD must be varied as it is played, from about 500 RPM to 200 RPM. The information to control the speed is encoded with the audio signal, along with other control data used by the player to position the playback mechanism on the correct track, and enable functions like 'skip to the next track' to work. It is also used to display track number and times, and since 2010 can also process and display title and artist information, via an extension to the Red Book standard. The signal on the disc therefore consists of the audio signal plus control data.

Even that is not the end of the story. There is also a complex error coding algorithm (Reed-Soloman) used to code the audio plus control data, so the CD really has audio plus control plus error correction data.

CDs will no doubt eventually be replaced just as LPs were, so one day whilst wasting time on the internet I might read "Until (whatever) were invented, music was typically stored on plastic Compact Discs (CDs)".

Update: Two issues ago I mentioned the Gaia space telescope which is photographing the Galaxy. The first results have now been released and formed the basis for this month's Sky at Night programme on BBC4 on January 8th. This is well worth watching on iplayer if you have a spare half-hour.

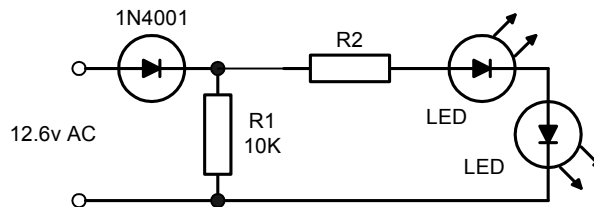
Technical Snippets

a) Operating LEDs on AC instead of DC supplies - a Heathkit forum member recently posed a question about replacing bulbs with LEDs and a current limiting resistor when powered from 12.6v AC. This is certainly possible but the reverse breakdown voltage of the LED must be considered. Most LEDs are specified with a maximum leakage current at 5v reverse voltage implying that the actual reverse breakdown voltage may not much higher than 5V. 12.6v rms AC is 17.8v peak to peak so the reverse voltage must be taken into account.

My preference would be to use a rectifier diode and 10K load resistor to remove any concerns about the reverse voltage and then a current limiting resistor to feed one or more (series connected) LEDs. The typical voltage drop across a forward biased LED is 1.8 - 3.3v depending on its colour.

The life of LEDs run within their specifications is extremely long whereas the life of a filament bulb can be very short. The latter can be significantly extended by reducing the operating voltage by 5-10% and limiting the inrush current. Both of these requirements may be met with a simple series resistor having a value of around 5-10% of the hot resistance of the bulb. Bulb manufacturers suggest that reducing the applied voltage by 10% multiplies the operational life by ten times.

The suggested circuit is shown below:



R2 should be selected for the required LED current and brightness. If any strobe effects are noted then an electrolytic smoothing capacitor will be required across R1.

b) VFO Construction - while working on a new QRP rig I recalled that a lot of constructors view the making of a stable VFO as a black art. In fact, most of it is the application of well established techniques and a large dose of common sense.

The type of oscillator is down to the constructor and there are many circuits that will provide adequate stability including but not limited to the high-C Colpitts, Clapp and Vackar - the latter being my personal preference using a J310 VHF JFET as the active device.

Mechanical and electronic stability are the major requirements so the structure and interconnections should be rigid and the enclosure generally sealed (but not to the extent of being air tight) so that drafts cannot get into the inner electronics.

The tuning capacitor rotor should have ball bearing based supports and clean, tensioned rotor wiping contacts at the back and front of the body. I use a single gang 75pF variable capacitor (similar to those in WWII RF26 and RF27 units) which are available from a number of sources including rallies at reasonable prices, typically £2 to £4 each. As they are made from silver plated brass a good wash in mildly soapy water and a rinse followed by immersion in a silver dip for up to a minute and another good rinse will return them to a nearly new condition. Dry them well and lubricate the bearings and sliding contacts. Wear some rubber gloves when handling the silver dip and read the label before use.

The coil former should be ceramic and if an iron dust core is required then it must be capable of being firmly locked in position. All capacitors that may have an effect on frequency must be high quality silver mica or polystyrene types.

The DC supplies to the oscillator and following buffer(s) must be regulated, low noise and well decoupled. I use the LP2951 low drop out adjustable regulator to provide 6v for the oscillator and 9v for the buffer amplifier stages. This Micrel 8 pin DIL regulator has a dropout voltage at 25°C that varies from 40mV with light loads to 380mV at a 100mA load (the well known 78xx series of regulators have a minimum dropout voltage of 2.5V). It also features a simple capacitive feedback mechanism to reduce the output rail noise level and costs less than £1 each in small quantities.

The tuning mechanism consists of two cascaded epicyclic reduction drives giving a total ratio of 80:1 i.e. 40 turns from one end of the 500KHz tuning range to the other or 12.5KHz per turn. To avoid the tuning shaft catching on the front panel no panel bush is used but sufficient mechanical support is provided from the

reduction drives back to the VFO housing. There is no calibrated frequency dial as a PIC based frequency counter will display the actual transmit and receive frequency.

Cleaning the tuning capacitor

The cleaning process described above has the following results on a similar two gang capacitor:

Prior to cleaning:

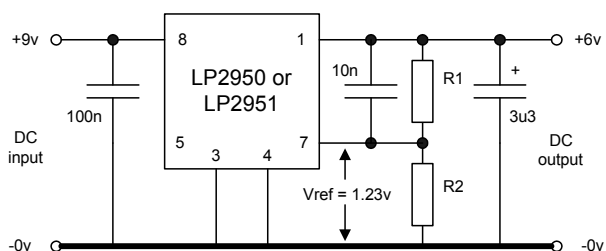
After cleaning:



The silver dip has removed all of the surface tarnish which is silver oxide or silver sulphide. Depending on the sulphur content in the air it will return over the next few years.

An example Vackar VFO is shown on the technical website at www.qsl.net/g3oou/vackarvfo.html

Basic LP2950/LP2951 Regulator Circuit



LP2951 only: Pin 3 is the shutdown input, pin 5 is the error output which requires a pull-up resistor to use.

Both versions: pins 2 & 6 are left open.

$$V_{out} = V_{ref} \times (1 + R1/R2) \text{ or } R1/R2 = (V_{out}/V_{ref}) - 1$$

The LP2950 is the simpler of the two devices and does not provide the functionality shown above on pins 3 & 5.

The current into pin 7 is nominally 20nA so R1 and R2 may be relatively high value with R2 having a recommended maximum value of 100K for best accuracy of calculated values.

c) Hard drives - I have recently purchased a new 1TB SATA hard drive for my desktop PC at a delivered cost of £48 in order to increase the amount of space available to the partition holding the Windows operating system. As this drive runs at 7200rpm which is faster than the previous drive, the Windows startup time is noticeably quicker. Hard drive capacities up to 8TB are now easily available and 12TB and 16TB are on the horizon.

To accommodate the now spare 500GB SATA drive I purchased a drive caddy for £14 that will hold and power this drive outside of the computer and connect via a USB port.

While researching hard drive reliability issues I found an article by an Internet Cloud provider who has in excess of 64,000 hard drives continuously running in banks in their server farm with capacities between 2 and 8GB in each

drive. They collect and publish failure figures and purchase hard drives in lots of 5,000 - 10,000 to get competitive prices. Now that is mind boggling!

Miscellaneous

a) The club net did not take place on Wednesday 28th December 2016 as no other club members were on the channel. What was interesting and unusual was that all of the FM simplex channels were busy. It transpired that there was a lift on the band that evening and better conditions were allowing greater QSO distances than normal.

At least 60% of our members hold a transmitting licence and yet we get only two or three present on the weekly 2m net. Why is this? Is the time or band inconvenient or impossible to use? Jim 2E0JFL and myself have undertaken tests on 70cms, 6m and 10m and obtained adequate communication results. We have not yet tried the lower bands as Jim's current rig only goes down to 21MHz.

b) Adjacent Club Newsletters - I receive a number of other club's newsletters, mainly for the purpose of updating their entries in our newsletter. If anyone would like to read these newsletters I can forward them on or bring copies to a meeting - please let me know what you would like.

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

- HP1741A 100MHz dual beam storage scope £60
- Dell Inspiron Mini10 10inch notebook running Windows XP SP3, 149GB hard drive, 1GB of RAM, HDMI, Ethernet and 3 USB ports, WiFi, mains charger, no CD/DVD £50 ono
- Heathkit HW-101 HF transceiver with PSU, LS & mic £120
- Precision permeability tuned solid state VFO with built-in reduction drive, 7.6 - 8.8MHz £75. A photo may be seen at <http://www.qsl.net/g3oou/pto.html>
- 1.4MHz crystal filters for AM, USB, LSB & CW all tested £15 each
- Pye 455KHz LC filter, 15KHz wide, £3
- ARRL 2009 Handbook in good condition £10

All excl P&P, Bob G3OOU 01737 552170 or [g3oou\(at\)aol.com](mailto:g3oou(at)aol.com)

- Acer 19" - VGA and DVI inputs tested at 1280 x 1024 - £15
- IBM 17" - VGA and DVI inputs tested at 1280 x 1024 - nice stand - £15
- AOC 17" - VGA inputs tested at 12080 x 1024 - £15
- DIX 19" - VGA input, Wide screen, tested at 1440 X 900 - menu button problem but works ok £10.

All excl P&P, Alan G8NMK 020 8778 9660 or [alan.odonovan\(at\)btinternet.com](mailto:alan.odonovan(at)btinternet.com)

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 £2 each to non members plus P&P.

73



G300U

Diary of External Events

12 Feb 2017 - HARWELL AMATEUR RADIO SOCIETY RADIO AND ELECTRONICS RALLY

Didcot Leisure Centre, Mereland Road, Didcot, OX11 8AY. Talk-in on 145.550. Free parking. Opens at 10am entry £3 (children under 12 free). Details from Ann G8NVI on ann.stevens@btinternet.com or www.g3pia.org.uk

26 Feb 2017 - (BRATS) RAINHAM RADIO RALLY

Rainham School for Girls, Derwent Way, Rainham, Kent, ME8 0BX. Just off the A2 and M2 J4. Talk in on 145.550MHz. Opens 10am, entry £2.50. Information from Trev@wig1.co.uk or www.brats-qth.org

12 Mar 2017 - Dover Radio Rally

Whitfield Village hall, Sandwich Road, Whitfield, Dover, CT16 3LY. Doors open at 10.00am. The auction starts at 12.30pm. The rally ends at 1pm. Entrance is £2.00. Talk in on GB3KS, Bring & Buy table. Selection of Hot and cold refreshments and good parking facilities. Information from Peter G0KOK, email - events@dar.org.uk

30 Apr 2017 - WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally)

Kempton Park Racecourse, Staines Road East, Sunbury on Thames, TW16 5AQ. Talk in and on site car parking. Opens 10am. Trade stations, Bring & Buy and special interest groups. Details from Paul, M0CJX on 0845 165 0351, info@radiofairs.co.uk. www.radiofairs.co.uk

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 our 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 of any last minute changes .

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
17 Jan Programme Planning & AGM
20 Jun Direction Finding

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
07 Feb Talk on Diplomatic Wireless - by Peter Grimshaw, M0HSG
07 Mar Classic Computers - Andy Chapman, G7TKK

Couldson 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/>
09 Jan Annual Dinner – Le Chateau, Croydon
13 Feb GB3XP and the addition of Yaesu Fusion by Martin Rothwell

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/>
25 Jan 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](mailto:secretary[at]cvrs.org). Web www.cvrs.org
16 Feb Radio Astronomy – Paul G4CSD
02 Mar Construction Contest
16 Mar Signal Generator and Spectrum Analyser demos by Bob G300U

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>
28 Feb Practical evening, part 2
28 Mar "Dead bug" construction by Bob G300U

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](mailto:jho_g4gsc(at)btinternet.com) or 01784 451898. Web site: <http://www.qsl.net/g3ues/index.htm>
26 Jan 'The Cassini Mission to Saturn & the landing of Huygens on Titan' - Prof David Southwell
09 Feb 'The ZL7G DX-pedition to Chatham Island' - Justin Snow, G4TSH

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: [sionet3344\(at\)hotmail.co.uk](mailto:sionet3344(at)hotmail.co.uk) Web: <http://herc-hastings.org.uk/>
22 Feb AGM
22 Mar Forum Discussion on Amateur Radio

Hereford Amateur Radio Society

Meets on the first Friday of each month at Hill House, Newton, Nr Leominster, HR6 0PF. Contact: enquiries@hars.wagnet.co.uk
01 Apr AGM

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\(at\)hotmail.com](mailto:g3zbu(at)hotmail.com) or <http://www.harc.org.uk/>
02 Feb Software Defined Radio - G3ZBU
26 Feb Sunday Morning Fox Hunt - Robin G3OGP

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(at)msars.org.uk) or www.msars.org.uk
27 Jan Britain's Most Spectacular Backyard Build. 'The Breakfast Machine' by Merv 2E0WVE

03 Feb Air Ambulance Talk

South East Essex Amateur Radio Society (SEARS)

Contact Dave G4UVJ on: 01268 697978 or secretary(at)southessex-ars.co.uk or <http://www.southessex-ars.co.uk/>

Meetings: 7pm 2nd Tuesday each month at Swans Green Hall in Hart Road, SS7 3PE.

14 Feb Confessions of a Radio and TV Engineer, Part 2 - PMR Radio with Dave G4UVJ

14 Mar SteppIR and other antennas by Peter Walters from W&S

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. Web: <http://g3src.org.uk/>

05 Feb How not to win NFD by Quin G3WRR

06 Mar Spring Surplus Equipment Sale

Sutton & Cheam RS

8pm on 3rd Thursday every month. Contact John Puttock G0BWV on 020 8644 9945 or email info(at)scrs.org.uk Web: <http://scrs.org.uk/>. SCRS run a practical group most Monday evenings at the Bandstead Scout Hut.

16 Feb 17 What to look for in choosing a VHF/UHF Radio' – Professor Alwyn Seeds – G8DOH

Wimbledon & District Amateur Radio Society

Meets 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

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

CPREC AGM 2017 Agenda, 8pm on 3rd February 2017

- 1 Apologies for Absence
- 2 Minutes of 2016 AGM
- 3 Chairman's Report
- 4 Secretary's Report
- 5 Treasurer's Report
- 6 Changes to Constitution
- 7 Election of Officers and Committee Members
- 8 Appointment of Auditor
- 9 Club Programme for 2017
- 10 Palace Pulse newsletter
- 11 Any Other Business

Local Training Courses					
Licence Level	Dates	Location	Club Provider	Format	Further details
Foundation	4 & 11 Feb 2017	Eltham, SE9	Cray Valley RS	2 days (Sat)	www.cvrs.org
Intermediate	5 & 19 Mar, 2 Apr 2017	Bromley, Kent	Bromley & District ARS	3 days (Sun)	www.bdars.org
Foundation	17 Sep & 8 Oct 2017	Bromley Kent	Bromley & District ARS	2 days (Sun)	www.bdars.org
Full	2, 9, 14 Oct & 4, 11, 18 Nov 2017	Eltham, SE9	Cray Valley RS	2 evenings (Mon) + 4 days (Sat)	www.cvrs.org
	= course commenced				

CPREC Committee Contact Information

Officers:

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