

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

Next meeting: Friday 3rd November 2017

Millimetric Microwaves by Chris G0FDZ

In this issue: *Future Meetings & Events, Recent Event News, Wound Up by Theorist, Technical Snippets, Members News, Miscellaneous, Noticeboard - Wanted & For Sale, Diary of External Events, News from other Clubs, Local Training Courses and Club Contact Information.*

Dear Reader

Future Club Meetings and Events

03 Nov 17	M	Millimetric Microwaves – Chris G0FDZ
19 Nov 17	R	CATS 40th Bazaar
01 Dec 17	M	Christmas Social
05 Jan 18	M	Video Evening
02 Feb 18	M	Annual General Meeting
02 Mar 18	M	Club Projects
06 Apr 18	M	A talk on 'The British Vintage Wireless and Television Museum'
04 May 18	M	Whisper (WSPR) Evening
01 Jun 18	M	Introduction to Electronics - Power Supplies
06 Jul 18	M	Practical Evening

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

03 Nov 2017 - Millimetric Microwaves by Chris G0FDZ

The next meeting will be a talk on microwaves. Many of you will have glanced at the very highest frequencies shown on your licence schedule and thought to yourself "Who on earth uses these frequencies?" Well a small but dedicated group of microwave enthusiasts in the UK do and they regularly make contacts, sometimes at surprisingly long distances and with very low power.

Chris G0FDZ has been operational on these frequencies for many years and will tell us what goes on and the techniques used for equipment to use on the bands, where the wavelength is measured not in centimetres but in millimetres - the smallest being just 1.2mm.

Chris has operational equipment for all of the millimetre-wave bands and will be bringing it along to show us, along with his presentation. Come along and find out more.

19 November 2017 - 40th CATS Bazaar

The 2017 bazaar (the fortieth) will take place at the Oasis Academy in Coulsdon for the second year running. This venue has excellent parking and facilities and is located at: Homefield Road, Old Coulsdon, Coulsdon, Surrey CR5 1ES. It is served by three bus routes: the 466, 404 and 60. Doors open to the public at 10:00 hrs and the event is expected to finish at around 13:00 hrs.

We have booked two tables to sell the remaining radio equipment and components for which we will need assistance from club members during the event.

Recent Event News

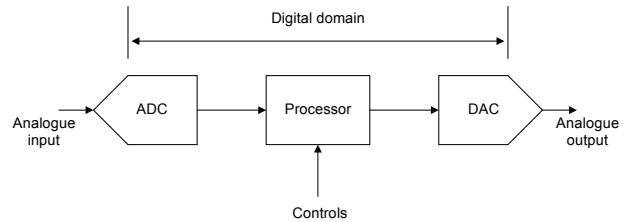
06 Oct 2017 - Digital Signal Processing (DSP) Without Maths by Alan G0TLK

Alan started off by saying that his talk would be at a very high level with little or no maths involved and we only saw a couple of formulae during his presentation.

Modern amateur radio receivers and transceivers have had some sort of DSP facility for at least the last decade. This commenced with receiver detection and transmitter signal generation/audio processing at relatively low frequencies, typically 20-30KHz, but much more recently

the complete receiver/transceiver (excluding the power amplifier) has been provided in DSP. This is known as Software Defined Radio or SDR.

The following block diagram provides an extremely simplified view of a digital signal processor:



The incoming analogue signals are fed into an Analogue to Digital Converter (ADC), processed by the Processor(s) and then converted back into analogue format by the Digital to Analogue Converter (DAC).

Each processor is specially optimised to provide the many functions required for DSP. The program code that runs in the processor takes the digitised input signal, carries out whatever functionality has been defined by the designer which may include amplification, detection, gain control, filtering etc. and provides the end result to the ADC. This happens almost in realtime i.e. very quickly but there is some delay from input to output which may typically be 10 - 100mS.

You can demonstrate an example of this delay if you listen to the same VHF FM broadcast on an old analogue FM receiver and a modern digital receiver at the same time where the delay can be one or more seconds.

DSP makes significant use of mathematical techniques known as Fourier Transforms (Jean-Baptiste Joseph Fourier 1768-1830) and Laplace Transforms (Pierre-Simon Laplace 1749-1827) which were developed in the late eighteenth century, well before electricity was even in use.

Analogue low pass (anti-aliasing) filters are used to restrict the spectrum bandwidth applied to the ADC and to remove any clock signals from the output of the DAC.

The main functions used in DSP are:

Sampling: this is the process of converting an analogue signal into a series of digitised signals. The sampling rate and the number of bits used in the ADC are a trade off between having sufficient samples and sampled bits to accurately represent the original signal and the amount of processing power required downstream to process that information.

For example, an eight bit ADC can only output amplitude steps from 0 - 255 whereas a sixteen bit ADC can output steps from 0 to 65535 so providing a higher accuracy. Ten and twelve bit ADCs are also available.

The Nyquist Shannon rule states that the sample rate must be at least twice the highest frequency component of the signal to be sampled.

A Fast Fourier Transform (FFT) uses a technique called Convolution to convert signals in the time domain to signals in the frequency domain.

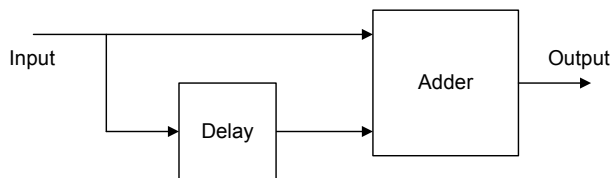
There are several types of FFT and the most common one is known as FFTW. The result of the FFT is a series of 'Bins' containing information on specified bands of

frequencies. Filtering is implemented by selecting only some of these bins and rejecting the rest.

The bins can overflow resulting in spectral leakage and this is fixed using digital windows of which Hamming and Bartlett are the most common examples.

Digital Filters

A basic digital filter consists of a delay mechanism and an adder as shown below:



If the delay is set to 0.5mS then due to cancellation in the adder there will be zero output at 1KHz, 2KHz etc where the two signals are exactly 180° out of phase. This filter has a frequency response consisting of a series of notches resembling a comb and is useful for removing discrete frequencies - with a suitable delay setting it could be used to remove 50Hz.

Additional digital filters include the Finite Impulse Response (FIR) and the Infinite Impulse Response (IIR) types.

Decimation is, simplistically, the process of reducing the sampling rate which in practice usually implies digitally lowpass filtering a signal, then throwing away some of its samples. This allows the resulting digital signal to be subsequently processed at a lower speed.

Alan showed some examples of DSP in operation using signals recorded on his laptop. These included a rolling waterfall display that showed the contents of the previously mentioned 'bins'.

Analogue Devices is one of the major suppliers of DSP hardware and software.

More information on DSP is available on the Internet from DSP Guru, Stack Exchange, Wikipedia, the latest RSGB Handbook and Audacity Software.

Wound Up by 'Theorist'

I seem to be following the editor lately in regards to the choice of topic for an article. Last month's Technical Snippet on the calculation of inductance caught my eye as it rang several bells. I recall being surprised when it was first pointed out to me that calculating inductance was difficult, and even more surprised by an electronics enthusiast when he talked about the difficulties with inductors in making tuned circuits. I also recalled something I had read.

An old physics text book I have states that inductance can only be calculated with any accuracy for a few special cases. One is for a close-packed coil with no Iron nearby, and the basic formula (derived from electromagnetic theory) is:

$$L = \mu_0 N^2 / A$$

where L is the inductance, μ_0 is the permeability of free space (a constant), N is the number of turns per unit

length, l is the length of the coil, and A is the cross-sectional area of the coil (and thus equal to π times the radius of the coil squared). This is the basic formula used by the 'website calculators' referred to in the Technical Snippet last month, although they jazz it up a bit, and modify it slightly in an attempt to give more accurate results, apparently not with great success.

Note that μ_0 is more or less the magnetic equivalent of electric permittivity, which was defined in last month's article. Adding a dielectric material between the plates of a capacitor will increase the capacitance. Likewise adding a ferromagnetic material in a coil will increase the inductance. Whereas the permittivity of a material is a measure of its ability to be polarised in response to an electric field, permeability is the degree of magnetization of a material in response to a magnetic field. An electric field will polarise the molecules of a dielectric, while a magnetic field will align or "polarise" the magnetic dipoles of a magnetic material. 'Free space' just means a vacuum.

Why, though, should it depend on the *square* of the number of turns per unit length, rather than just the number per unit length? The answer is that if the number of turns/length is doubled, not only the total number of turns is doubled, but the flux through each turn is also doubled, giving a factor of four for the increase in inductance. To see this, suppose there was just one loop of wire with a current going through it. The magnetic flux through the loop would be whatever it was, proportional to the current. Adding a second identical loop next to the first loop would double the flux through both loops, as well as adding an extra loop, which in this case would double the number of loops. There are now two loops each with double the flux, hence the factor of four.

The inductance is also proportional to the length and cross-sectional area of the coil. This is logical in that a wider coil needs more wire in its construction, as does a longer coil. Note that as lA is the volume enclosed by the coil, the formula could be written as:

$L = \mu_0 N^2 V$, so that the inductance is proportional to the volume enclosed.

The SI unit of inductance is named after Joseph Henry (1797-1878), who was an American physicist and a contemporary of Michael Faraday. He independently discovered the law of induction at about the same time as Faraday, although Faraday discovered it first and was the first to publish, and is therefore given the credit. The Wikipedia article on Henry implies that Henry should given more credit, but appears somewhat biased.

What is clear is that both Faraday and Henry came from families that were not well off. Faraday had only a basic education and was self taught as a result of being a bookbinder's apprentice (he would read the books at night). Henry did go to school until he was 13, when he was apprenticed to a watchmaker and silversmith, but had no scientific education. He is credited with the development of the electromagnet, and an ore separator which is sometimes claimed as the world's first commercial electric product.

Clarification: Having read last month's article a club member asked me about the energy stored in a capacitor, and if that was stored in the dielectric. The answer is that the energy is stored in the electric field between the plates, but not in the dielectric as such.

Technical Snippets

a) Folded Unipole

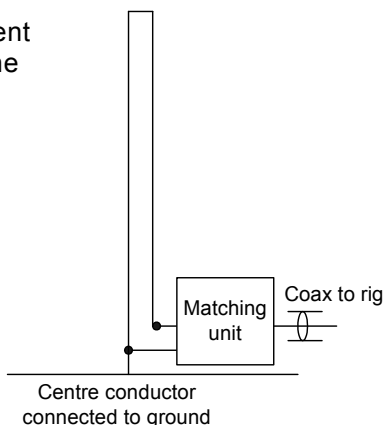
This aerial is a folded version of a vertical and is the aerial of choice for medium wave AM transmitters because:

- it has a wider bandwidth compared to a simple vertical
- it has a higher feed impedance
- The centre section is grounded providing a short route to earth in the event of a lightning strike

Commercial broadcast stations would normally use a quarter wave long tower length which on Top Band would be some 128 feet. However, most amateur radio operators would have planning or neighbour problems so would use a shorter structure. As the length is reduced, the feed impedance will fall and a typical height of 33 feet would allow operation from Top Band to a maximum frequency of 18MHz where the electrical length would be around $5/8\lambda$ of a wavelength (λ). A vertical radiator longer than $5/8\lambda$ will have an increasing angle of radiation and be less used for working long distance stations. A weatherproof matching unit will be required at the base which can be automatic or remotely controlled.

Equivalent Circuit:

A simplified equivalent circuit is shown in the diagram to the right.



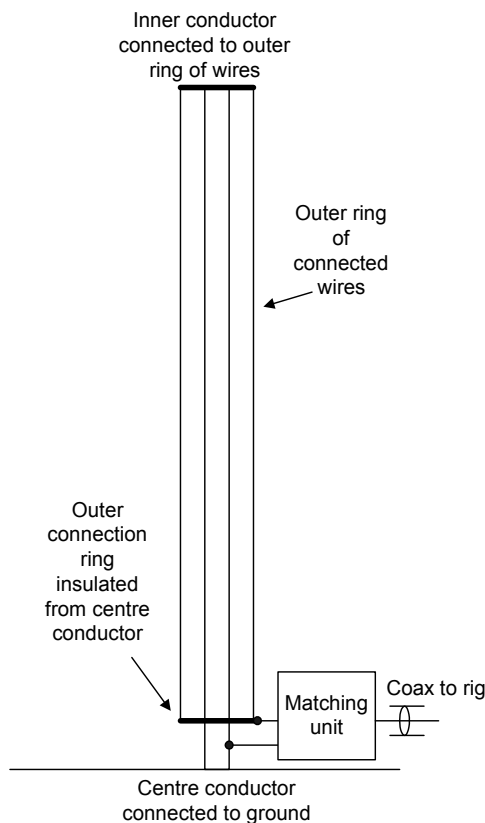
Detailed Construction:

The complete structure can be seen in the following diagram - please note that the supporting guy ropes have been omitted in the interests of simplicity.

The centre supporting structure for amateur applications can be a multi-section metal or fibreglass mast typically 30-50 feet in height and 1.5 - 2.5 inches in diameter. If metal, the individual sections must be electrically connected together or, for either type of mast, a substantial solid conductor may be fixed to the outer surface from top to bottom. The outer set of wires are electrically connected to the top and bottom rings and held under tension to prevent them touching the centre conductor. It would be possible to use a single outer wire or metal tube but

this may lead to increased resistive losses and a narrower bandwidth.

The centre conductor must be grounded at the bottom using a ground mat, radials, earth stakes or a combination of all three - the more the better to minimise the earth resistance.

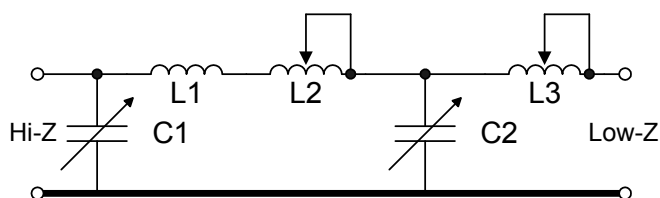


As the feed impedance of this type of aerial on Top Band with a 33ft height will be in the region of 2-4 ohms the earth resistance should be made as low as possible to maximise the overall efficiency.

Google 'Folded Unipole' for web sites offering more information including calculators or formulae to work out the feed impedance, bandwidth, radiation pattern, frequency of resonance etc.

b) High Power Inductors

Following on from the article last month on inductors, I have completed the Pi-L matching network inductors for my new PA.



L1 is used on its own on the 28MHz band. L2 consists of the inductor shown below which is used on the 5 - 24.9MHz bands and two additional toroidal inductors (not shown) for 1.8 and 3.5MHz. L3 is used on all bands.

As you can see from the inductor in the following photo, small single turn loops have been used to provide easily accessible tapping points for each band. The inductor is wound on a ceramic former

from a Heathkit HF transmitter with 18SWG tinned copper wire and has an unloaded Q in excess of 200.

The benefit of the Pi-L network is a significant increase in harmonic attenuation compared to a conventional Pi network.



The Pi-L network is actually two matching networks in series, a Pi network followed by an L network and the impedance at the connection point of the two networks is normally the geometric mean of the anode load impedance and the output load impedance, typically about 300ohms.

A loaded Q of about ten is the target for the Pi section so that the circulating current is not excessive otherwise the losses would be too high. However, this is sometime very difficult to achieve as the tuning capacitance required on the 28MHz is often too low to be practical after taking into account the valve anode capacitance and strays. As the Pi network is recalculated for a higher tuning capacitance on 28MHz the loaded Q increases.

The loaded Q of the L section can be less than ten.

c) High Power Transistors

NXP manufacture the high power LDMOS transistor MRFX1K80H which is capable of 1800W continuous output power from 1.8 - 400MHz on a 65v supply line. It is validated for no degradation at a VSWR of 65:1 at all phase angles with a 65V supply and also for performance over the supply range of 30 - 65V.

This device is unmatched internally and therefore may be used in broadband applications. A data sheet is available online.

Members News

Congratulations to Len Sutherland who has passed his Foundation examination and now has the callsign M6KVV.

Miscellaneous

a) Silent Key

Those who knew Pat Newton G0BRV (the widow of Dave Newton G3JJZ) will be saddened to hear that she has passed away. Her death took place peacefully on the

morning of 20th September at Guy's Hospital in London, as a result of complications arising during treatment for cancer of the throat. In accordance with the wishes of Pat and her family, the funeral was a small family one and took place at Hither Green Crematorium on October 16th.

b) Jamboree On The Air 20-22 October 2017: We were approached at very short notice by a Scout Group at Crystal Palace to provide a station for a minimum of one day. Unfortunately, insufficient club members were willing to help so we had to decline for this year. We have however, put the event in the diary for next year and offered a presentation on amateur radio to the group next Spring.

c) National Hamfest: Your scribe attended this event on Saturday 30th September at the Notting & Newark Showground. This is a popular annual event organised by the Newark Short Wave Club and the RSGB with large numbers of visitors during the two days.

In addition to the larger dealers the RSGB had a sales outlet plus a number of committee stands and there were smaller component suppliers, a number of club stands and a supplier from Ukraine selling a range of high power ex Russian military transmitting components including capacitors up to 20KV.

The following units were seen on display:

Icom IC7610



HF - 50MHz transceiver, SSB/CW/AM/FM/RTTY/PSK, DSP, 100W Tx, Spectrum Scope

Icom ICR8600



10KHz - 3GHz receiver excluding cellular allocations, AM/FM/SSB/CW and an internal data decoder. Requires a 12v DC PSU.

Kenwood TS990



HF-50MHz transceiver, 200W, SSB/CW/AM/FM/FSK & PSK, Keyer.

Yaesu FTdx5000MP



HF-50MHz transceiver, 200W, SSB/CW/AM/FM/RTTY & Packet, keyer, external display option.

Please see the respective manufacturers / distributors web sites or data sheets for the full specifications and prices.

This event features many club, private and surplus sellers so there is always something of interest for sale.

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://www.g3oou.co.uk/> in the “Notice Board – Wanted and For Sale” section. All excl P&P.

For Sale

a) From the shack of Victor G1PKS:

- RF dummy load and watt meter
- SEM Z match £60
- Yaesu FT 101ZD HF transceiver £150
- SWR meter
- Trio R2000 receiver with HF & VHF £250
- Alinco 6m DR-M06 20W FM transceiver £75
- Heathkit Oscilloscope
- PSU with variable output
- Advanced Morse Trainer MM2 by Microwave Modules Ltd plus power supply £60
- 2 Morse keys with sounders for training Cubs and Brownies £25
- Boxes of components i.e. variable capacitors, low voltage transformer, valves, etc. £10

Offers to Alan G8NKM on 020 8778 9660 or email [alan.odonovan\(at\)btinternet.com](mailto:alan.odonovan(at)btinternet.com).

b) From the shack of Trevor M0DIA

- Realistic DX394 mains powered HF multimode communications receiver £60
- Tronix 13.5v 5A fan cooled power supply £20
- AKD 2001 144MHz 3/25W channelised transceiver, (requires a 13.5v DC supply) £50

View at a club meeting. Offers to Bob G3OOU on 01737 552170 or email [g3oou\(at\)aol.com](mailto:g3oou(at)aol.com)

c) From the shack of Bob G3OOU:

- Commercially designed and made precision permeability tuned solid state VFO with built-in reduction drive, 7.6 - 8.8MHz, £75 ono. A photo may be seen at <http://www.qsl.net/g3oou/pto.html>
- 1.4MHz crystal filters for USB & LSB, all tested, £15 each
- Pye 455KHz LC filter, 15KHz wide, £3

Offers to Bob G3OOU on 01737 552170 or email [g3oou\(at\)aol.com](mailto:g3oou(at)aol.com)

d) Donated to the club:

- 19" Acer VGA + DVI inputs Okay but a few pixels have faded - £15
- IBM 17" VGA + DVI inputs. Excellent display - nice stand - £15
- 19" Manufacturer unknown VGA input, Note aspect ratio is 16:9 Okay but problem with on screen menu display - £10.
- Racal 9918 frequency counter covering 10Hz to 560MHz in two ranges with a temperature controlled crystal oven frequency standard and VLF phase locked multiplier that speeds up very low frequency measurements - £55.
- Damien has a low frequency analyser full of useful parts which will be removed and sold separately.

Mains Transformers - all made by Gardeners – untested:

- T1: 250v – 0 – 250v @ 50mA, 6.3V @ 4A, 600V @ 5mA, 1KV probably in the low milliamp range
- T2: 1 – 3 – 9 – 20V current unknown but greater than 1A, 90V current unknown
- T3: 0 – 450V @ 140mA, 0 – 1150 @ 180mA, 6.3V at 0.3A

Offers to Alan G8NMK on 020 8778 9660 or email [alan.odonovan\(at\)btinternet.com](mailto:alan.odonovan(at)btinternet.com).

From the shack of Kim G6JXA:

- Icom IC-F41GT UHF ex-Commercial Handheld with keypad, (suitable for 70 cms FM) known to be CTCSS / DTCS / DTMF capable, 4 watts. Includes BC-144N Charger, BP-210N battery, rubber duck antenna. £25
- Yaesu VX-10 2m VHF handheld. Includes rubber duck antenna and charger unit. South London repeater frequencies programmed in. £25
- Microwave Modules 432Mhz Linear PA and receive preamp, untested, BNC input, N output, leads very short, no fuse, marks on case. £25
- TECH TRADIPER TE-15 vintage 1970's Grid Dip Meter with [2] coils, untested. £10
- PSU BT ex-commercial 15VA output, has “Telecom Steel Charger 1”, “british telecom” on front. Moulded UK mains plug on cable. No fuse or fuse cover on plug. Untested. Has handle. £5
- PSU Watson W10SM 13.8V DC. Switched mode, gives 13.8V out tested with DVM only, not under load. £15

All items bought as seen by pre arranged appointment only. Payment in full only by cash. Contact:

g6jxabrs34540 at gmail dot com, 24hr Answerphone or text to 07812735507, packet: g6jxa at gb7cip.

CPREC has a large bank of fundamental and overtone quartz crystals, from 1.0 – 99.91MHz. The list has now been completely updated with enclosure classifications, 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, both plus P&P.

73



G300U

Diary of External Events

05 Nov - WEST LONDON RADIO & ELECTRONICS SHOW (Kempton Rally)

Kempton Park Racecourse, Staines Road East, Sunbury on Thames, TW16 5AQ. Talk in station and on site car parking is free. Open at 10am with disabled visitors gaining access 10 minutes earlier. Trade stations, a Bring & Buy and special interest groups, lectures, a raffle and catering on site. Details from Paul, M0CJX on 0845 165 0351, info@radiofairs.co.uk.

19 Nov - 40th CATS Bazaar

Oasis Academy Coulsdon, Homefield Road Coulsdon. Open 10am to 1pm, entry £1.50. Car parking and disabled facilities are available. Bring & Buy and flea market. Catering on site. Details from Andy Briers, G0KZT on 0772 986 6600 or email bazaar@catsradio.org.

News from other Clubs

Club Secretaries – please ensure that your future meeting details are present in your newsletters, on your websites or sent to our newsletter editor Bob G300U. 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 increasingly difficult to include other clubs' events although we will endeavour to do so if advised in time. We do not have time to go chasing each club for the information.

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-qth.org/brats/>

09 Nov Junk Sale

14 Dec BRATS Christmas Party

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

21 Nov Regeative Receivers by M0YRG

19 Dec Quiz & Mince Pies

Chelmsford Amateur Rado 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

07 Nov "Urban Noise & SDRs" - William Poel G8CYK

05 Dec "Xmas Social"

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/>

13 Nov CATS Quiz v Sutton & Cheam

11 Dec Annual General Meeting

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/>

02 Nov HARC/CARC Challenge

22 Nov Talk on transmission lines by Richard, G3ZIY

08 Dec Annual Fish & chips Dinner

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

02 Nov Noise in Radio Systems

01 Dec Christmas Dinner

07 Dec Amateur Radio in the Movies

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 Nov AGM & RSGB film

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](mailto:jho_g4gsc(at)btinternet.com) or 01784 451898. Web site: <http://www.qsl.net/g3ues/index.htm>

14 Dec Christmas Party

28 Dec No meeting

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

Web: <http://herc-hastings.org.uk/>

22 Nov Forum Discussion on Amateur Radio

27 Dec No meeting

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/>

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 Nov The HARC/CARC Challenge
16 Nov Social at the Royal Oak
26 Nov Sunday Morning Fox Hunt

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

03 Nov Surplus Equipment Sale UPSTAIRS
10 Nov Radio Night
17 Nov Radio Night and Table Top Sale
24 Nov How I became a Radio Amateur - Members input
01 Dec Christmas Dinner - In house UPSTAIRS

South East Essex Amateur Radio Society (SEARS)

Contact Dave G4UVJ on: 01268 697978 or [secretary\(at\)southessex-ars.co.uk](mailto: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 Nov AGM - Members only
12 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(at)g3src.org.uk). Web: <http://g3src.org.uk/>

06 Nov The Metropolitan Police Communications System
20 Nov Fix-It, Chat, Move-it-On + Advice Clinic

Sutton & Cheam Radio Society

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

16 Nov Getting started with data modes – Alexander Zigar M0SUV.
14 Dec Christmas Junk Sale
18 Jan 18 An introduction to morse code – Dan Romanchik KB6NU.
15 Feb 18 Digital Voice – Martin Rothwell M0SGL and Chris Howard M0TCH.

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](mailto:andrew.maish(at)ntlworld.com)

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

Local Training Courses					
Licence Level	Dates	Location	Club Provider	Format	Further details
Intermediate	30 Sep - 28 Oct	Bidborough, Kent	West Kent Amateur ARS	3 days (Sat)	www.wkars.org.uk/
Full	2, 9, 14 Oct & 4, 11, 18 Nov 2017	Eltham, SE9	Cray Valley RS	2 evenings (Mon) + 4 days (Sat)	www.cvrs.org
Foundation	3 & 10 Feb 2018	Eltham, SE9	Cray Valley RS	2 days (Sat)	www.cvrs.org
Intermediate	28 Feb, 11, 18 Mar 2018	Bromley	Bromley & District ARS	3 days (Sunday)	www.bdars.org
Foundation	Sep 2018 dates TBC	Bromley	Bromley & District ARS	2 days (Sun)	www.bdars.org
Intermediate	Nov 2018 dates TBC	Eltham, SE9	Cray Valley RS	3 days (Sat)	www.cvrs.org
	= course commenced				

CPREC Committee Contact Information**Officers:**

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