

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: <a href="http://cprec.btck.co.uk/">http://cprec.btck.co.uk/</a>
	Club Technical: <a href="http://cprec.btck.co.uk/OurTechnicalSite">http://cprec.btck.co.uk/OurTechnicalSite</a>
Email:	<a href="mailto:cprec.g2lw@gmail.com">cprec.g2lw@gmail.com</a>
Club Net:	Each Wednesday at 20:00 on FM on 145.525MHz (S21) ± QRM
Twitter	@BobFBurns or <a href="http://www.twitter.com/bobfburns">www.twitter.com/bobfburns</a>

***Merry Christmas & Happy New Year***

Next meeting: Friday 7th January 2019

## ***Video Evening***

In this issue: *Future Meetings & Events, Recent Event News, Aristotle? Newton?? Zen??? by Theorist, Technical Snippets, Members News, Miscellaneous, Noticeboard, Diary of External Events, News from other Clubs, Local Training Courses and Club Contact Information.*

See page 8 for club contact information

Dear Reader

## Future Club Meetings and Events

04 Jan 2019	M	Video Evening
01 Feb 2019	M	Annual General Meeting - see Members section in this news-letter
01 Mar 2019	M	TBC
05 Apr 2019	M	Construction Evening - Pixie QRP Transceiver
03 May 2019	M	CW Evening and Pixie Test & Maintenance

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

**01 January 2019 - Club Subscriptions:** These become due on this date and our Treasurer will take the payment of £12.00 by cash or cheque. If you are going to send cash please use registered post.

### 04 January 2019 - Video Evening

We plan to show at least one episode of TX Factor, the amateur radio based series of videos, the latest one being number 22. We also have some video CDs in the club cupboard.

**01 February 2019 - AGM:** The Club Annual General Meeting will take place on Friday 1<sup>st</sup> February 2019 at the regular club meeting venue at All Saints Church. This is your opportunity to review the past year and advise the meeting of any thoughts or suggestions on club activities for the coming year.

If you would like to propose a formal motion at the meeting under Any Other Business please put it in writing to the Hon Secretary.

Whilst we welcome all visitors, only paid up club members may vote at this meeting. An agenda will be published in the February newsletter which is due out ten days prior to the meeting.

## Recent Event News

### 07 December 2018 - Christmas Social

We enjoyed an informal meeting and buffet but were not able to get the radio station on the air.

Thank you to all those who contributed to the event including Doris whose trifle disappeared in very short order.

Damien brought along some more donated items for sale.

### Aristotle? Newton?? Zen??? by 'Theorist'

Although this is the January newsletter it is really the Christmas edition (or Newtonmas edition, since Newton was famously born on Christmas day), and you should get it in time to read after the turkey for a bit of light relief. For that reason I am turning to a more philosophical frame of mind this month.....well that's my excuse

anyway, for I want to write a bit about the Philosophy of Science. Yes, there is such a thing. In fact it is a huge subject so I am going to confine myself to a whistle-stop tour of more modern ideas, mercifully you might think if you get to the end.

In the 20<sup>th</sup> century there were two notable Philosophers of Science. One was Karl Popper (1902-1994), later Sir Karl, and the other was Thomas Kuhn (1922- 1996), a theoretical physicist who made the mistake of reading Aristotle's book called 'Physics', and decided to switch trades and become a Philosopher [1]. Yes it seems that 'read this book and it will change your life' does actually happen. It hasn't happened to me yet though, not even when I read 'Zen and the Art of Motorcycle Maintenance' in 1977, and that book made big claims along those lines.

Starting with Popper, he came up with the idea of 'Falsification'. He first observed that it is impossible to prove that a scientific theory is true, and that you can only ever disprove it. No matter how many experimental tests your theory passes, it only means that you haven't done the right experiment to prove your theory wrong just yet. Building on that he decided that it is a *requirement* of a scientific theory that it *be* falsifiable. If a theory is not capable of being falsified it cannot be considered a scientific theory. To that end he declared that psychoanalysis was not a scientific theory as there was no way of falsifying it. As a refugee from Vienna before the outbreak of WW2 you can see why he might know something about it. Note that homeopathy is a scientific theory by this definition (even though you hopefully reject its conclusions and validity) as it is falsifiable by experiment.

His view of science in general was that it works by conjectures and refutations, with scientists forming hypotheses and then working to refute them. Indeed he insisted that the only purpose of scientific research was to falsify theories. This view was not generally or wholeheartedly accepted by scientists who read Popper as it is a very rigid and narrow view of what science is about.

For a while he had a problem with mathematics. If you consider a statement like '2+2=4' then it is not falsifiable. It is something that is taken as true by definition. Mathematics works like this: there are a number of axioms or postulates that are taken as being self-evidently true, and you see what you can deduce assuming they are true. The classic example of this is Euclidean geometry. But if mathematics is not falsifiable how can it say anything about the real world? He got round this problem by considering the statement '2 apples plus 2 apples = 4 apples'. You can take 2 apples and then you can take another 2 apples, and if you find you only have 3 ..... you have falsified it! By 'objectifying' mathematical axioms you can make them falsifiable.

Both Popper and Kuhn drew on physics for their examples, unsurprisingly as most of the 20<sup>th</sup> century was a golden age for physics, and of course Kuhn was an ex-physicist. Kuhn is really the gold standard in this field. He wrote a book called 'The Structure of Scientific Revolutions' in 1962 which has sold more than 1.4 million copies, an astonishing amount given its topic, and which

is still in print. The word 'paradigm', which just means 'model' was an obscure word until Kuhn used it repeatedly in his book and introduced it to a wider audience, so if you are fed up hearing politicians using the word blame Kuhn.

The impact the book had was astonishing. In it he analysed how he thought science worked. Initially in any field there is a period of uncertainty, a pre-paradigm phase, where there are a lot of ideas and conflicting hypotheses floating about but no real consensus as to what is really going on. Out of this emerges a model that is generally accepted and developed further. 'Normal science' begins, which is what scientists do most of the time. This involves working within the existing model(s); an example is the building of the LHC and the detection of the Higgs boson. Spectacular it might be, but it is normal science because it involves working within accepted models – the standard model of particle physics in this case.

Sometimes though anomalous results occur. Most of these disappear when further investigated. Remember all the fuss about cold fusion in the 90s? That was caused by an incorrect use of neutron detectors which are apparently very tricky things to use properly. Yet occasionally anomalies won't go away, and new anomalies appear which continue to undermine a paradigm. Science then enters a period of crisis out of which (hopefully) a new model emerges after a period of revolution. Normal science can then resume, working within the new paradigm. A recent revolution was the introduction of plate tectonics in geology.

One interesting thing that Kuhn identified and which he called 'incommensurability' is that the same words are often used before and after a revolution, but change meaning. For example the words mass and gravity do not mean the same things pre and post Einstein. Before Einstein, in Newton's world, 'gravity' meant a sort of mysterious force that emanates from an object with mass, that causes it to attract other masses. Precisely how that works is not explained. Post Einstein gravity becomes a fictitious force that is a manifestation of the fact that a mass bends the space-time around itself. These two concepts of gravity are incommensurable (i.e. completely different and irreconcilable). The same word is still being used but has completely different connotations.

The century we are now in is likely to be one where the great developments in science come from the molecular biological sciences. Physics has stalled. The philosophers of science in this century may well draw exclusively from genetics and molecular biology, and draw very conclusions about the nature of science.

Merry Newtonmas.

[1] Aristotle's use of the word Physics was of course different from ours, and he meant something like "the principles of natural or moving things, both living and non-living, rather than physical theories" to quote Wikipedia. Nobody did experiments back then, but Aristotle noticed that when you push a cart it moves, and if you push it harder it moves faster. Having no concept of (e.g.) friction some of his conclusions were rather like assuming a modern law of physics along the lines of

$F=mv$  rather than  $F=ma$  which you should remember from school – it is one of the most famous equations in physics for heavens sake. Anyway you can see why his deductions were wildly incorrect.

## Technical Snippets

**a) When designing a receiver** the designer is faced with a number of mutually exclusive requirements for which significant compromises or additional technology (and costs) may be needed. Two of these issues are:

- Automatic Gain Control (AGC) response time versus selectivity
- signal to noise ratio versus selectivity

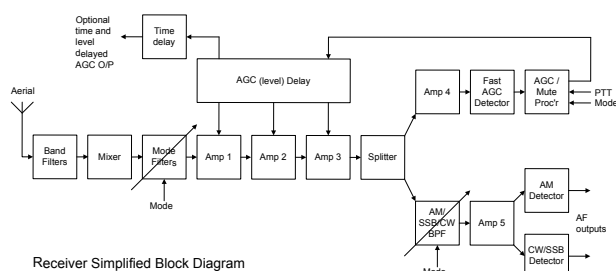
The narrower the selectivity the better is the signal to noise ratio for a given mode but the longer is the delay in signals passing through the various circuits.

This means that significant demands are made on the AGC system for signal modes like SSB and CW where the signal level continuously changes. You would also hear an initial loud click when tuning in to an AM signal as the AGC tries to respond to the initial change in signal amplitude.

Good receiver design requires the channel selectivity to be placed as near to the front end as possible and with as little gain as possible (if any) used ahead of the first mixer. This means that the gain after the mixer and selective filters must be very high - typically 110-120dB for 1uV sensitivity or better which raises possible problems of instability and the need for very good screening. In addition, to minimise the AGC response time, the IF bandwidth should be wide, leading to excessive noise at the detector and a resulting degradation in signal to noise ratio.

The solution to these particular issues is to use a wide band IF system and split the signal path into two with one going to the fast AGC detector and one going to a simple set of mode filters prior to the AM, SSB and CW detectors which would reduce the wideband noise. Since there is a limit to the signal level that may be applied to crystal filters, the split would normally be at a lower signal level than that applied to the detectors, with some additional gain after the split and prior to the various detectors. The block diagram shows one possible solution for a single superhet HF receiver with no RF stage.

### Simplified Block Diagram:



The above diagram has been repeated in a larger size on the last page of this newsletter.

Receivers from the 1950s and 1960s era typically applied AGC to all RF and IF stages at the same time resulting in loss of signal to noise ratio as the AGC operated at relatively low signal levels. To optimise the signal to noise ratio across the AGC characteristic it is best to delay the AGC to the early stages (nearest the aerial) until well after the onset of AGC to the later stages. The box marked 'AGC (level) Delay' in the block diagram achieves this by applying AGC first to Amplifier 3 then to Amplifier 2 and finally to Amplifier 1 as the signal level increases.

If AGC is required for a stage before the mode filters then a slower control line would need to be provided for that particular stage.

AGC may be implemented using a variety of control mechanisms including for example:

- bespoke integrated circuits like the AD600 series, TL026 or MC1349/1350,
- PIN diodes like the BA479
- discrete devices like the BF173.

Each has its pros and cons so the designer must decide which is the most appropriate for a given application.

**b) Overtone Oscillators** are notoriously difficult to pull (move) in frequency compared to fundamental mode oscillators of a similar frequency. This is because the ratio of the motional inductance to motional capacitance is much higher for a given frequency and the smaller the motional capacitance the smaller is the amount by which the frequency may be pulled.

However, it is possible to increase the pulling range of such an oscillator to a usable amount before the frequency stability suffers or the oscillator free runs. I have managed to design a network that provides more than 3.5KHz of frequency movement in a 34MHz third overtone glass crystal with good frequency stability. The same technique used with a 25MHz third overtone crystal provides about 2.5KHz of pulling range. More next month.....

**c) High Voltage Interconnect:** Belgian energy supplier Elia and the UK's National Grid have opened the first submarine high voltage DC (HVDC) electricity interconnector between the two countries. Ten years in development, the 400kV Nemo Link is the first interconnector between Belgium and the UK and will enable electricity to flow in both directions between the two countries. Following a test phase, Nemo Link will start supplying energy in Q1 2019. The 140km long cable, designed and built in Japan uses XLPE (cross-linked polyethylene) as insulation material. [Source eeNews.]

## **Miscellaneous**

**a) The club crystal bank** has been significantly expanded following a donation of crystals from the estate of David Eaton G3TAO. There are now sufficient crystals at several frequencies in the HF bands to construct AM/SSB/CW filters for a receiver or transceiver. There are a few remaining crystals to add to the list which will

then be placed on the club web site as a downloadable PDF file.

**b) The David Lean Cinema** in the Croydon Clocktower, Katherine Street, CR9 1ET is screening Peterloo on Wednesday 9<sup>th</sup> January 2019 at 7pm and Wednesday 30<sup>th</sup> January at 2:30pm. This is the story of the 1819 Peterloo Massacre where British forces attacked a peaceful pro-democracy rally in Manchester. Tickets £7.50, Concessions £6.00, 26s and under are £5.00.

See [www.davidleancinema.org.uk](http://www.davidleancinema.org.uk)

## **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.

### **Wanted**

Quartz crystals on 25.10MHz and 34.10MHz in HC6/u, HC18/u or HC25/u package. Contact Bob on 01737 552170 or g3oou(at)aol.com.

### **For Sale**

**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. Prices are £1 each to club members and £2 each to non members, excluding P&P. Contact Bob on 01737 552170 or g3oou(at)aol.com.

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G3OOU

## **Diary of External Events**

### **03 February 2019 - SEARS 35th Canvey Radio & Electronics Rally**

Cornelius Vermuyden School, Dinant Avenue, Canvey Island, Essex SS8 9QS. A new venue for 2019, open at 10am, disabled visitors 9:45am. Free car parking, easy level ground floor access to 2 large halls. Admission £3. Tea, coffee and soft drinks will be available, as well as bacon butties. Radio, computing and electronics traders and special interest groups. More details from the rally co-ordinator on [tony@tonystreet.net](mailto:tony@tonystreet.net)

### **10 February 2019 - Harwell Radio and Electronics Rally**

Didcot Leisure Centre, Mereland Road, Didcot, Oxon, OX11 8AY (3 miles from Milton Interchange on A34). Open 10am to 3pm, admittance £3.00 (under 12s Free). Free car parking, disabled parking and facilities. Traders, Special Interest Groups and RSGB Bookstand. Refreshments available all day. Talk in on 145.550MHz, using G3PIA. Details from Ann, G8NVI on [rally@g3pia.net](mailto:rally@g3pia.net) or [www.g3pia.net/radio-electronics-rally](http://www.g3pia.net/radio-electronics-rally)

### **24 February 2019 - Rainham Radio Rally**

The Victory Academy, Magpie Hall Road, Chatham, Kent, ME4 5JB. Open 10am to 4pm, Entry £2.50, kids



free. Local and national Traders, BRATS Kitchen, BRATS Interactive Zone for Kids, BRATS Junk, Talk In Station on 145.550MHz using GB4RRR.

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#### **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>

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#### **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 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 increasingly difficult 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.

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#### **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](mailto:secretary@brats-qth.org) or <http://www.brats-qth.org/brats/>

17 Jan 19 Bring and Talk

31 Jan 19 The GB3VHF and GB3UHF Story

07 Feb 19 Quiz Night hosted by Nicky

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#### **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@bdars.co.uk](mailto:enquiries@bdars.co.uk). Web: [www.bdars.co.uk](http://www.bdars.co.uk)

15 Jan AGM and Programme

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#### **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@g0mwt.org](mailto:secretary@g0mwt.org) Web: [www.g0mwt.org.uk](http://www.g0mwt.org.uk)

08 Jan 19 My Interest in Offshore Radio by Jim Salmon 2E0RMI

05 Feb 19 Sub-Surface Comms – in tunnels etc by Peter Bridgeman G3SUY

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#### **Couldson Amateur Transmitting Society (CATS)**

8:15pm on 2nd Monday each month. Contact: Andy Briers G0KZT on 07729 866600 or [secretary@catsradio.org](mailto:secretary@catsradio.org). Web site: <http://www.catsradio.org/>

14 Jan 19 CATS Annual Dinner

11 Feb 19 Jam Handy

11 Mar 19 Apollo 13

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#### **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@carc.org.uk](mailto:secretary@carc.org.uk) or Web: <http://www.carc.org.uk/>  
23 Jan 19 Club AGM

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#### **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@cvrs.org](mailto:secretary@cvrs.org). Web [www.cvrs.org](http://www.cvrs.org)  
17 Jan 19 Annual Planning Meeting

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#### **Dorking & District Radio Society**

Meetings at 7.45pm. Contact: David Browning (M6DJB) at [djb.abraxas@btinternet.com](mailto:djb.abraxas@btinternet.com). Web site: <http://www.ddrs.org.uk>

22 Jan 19 The History of the Magnetron by Mike Underhill

26 Feb 19 Practical evening (slim-jim & J-pole antennas)

26 Mar 19 Logger 32

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#### **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@btinternet.com](mailto:jho_g4gsc@btinternet.com) or 01784 451898.

Web site: <http://www.qsl.net/g3ues/index.htm>

10 Jan 19 Tx Factor video evening

14 Mar 19 Annual Construction Contest

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#### **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@hotmail.co.uk](mailto:sionet3344@hotmail.co.uk)

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

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#### **Hereford Amateur Radio Society**

Meets on the first Friday of each month at Hill House, Newton, Nr Leominster, HR6 0PF. Contact: [enquiries@herefordradioclub.uk](mailto:enquiries@herefordradioclub.uk) or <http://herefordradioclub.uk/>

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#### **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 Jan 19 Bring, Show, Tell

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#### **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@msars.org.uk](mailto:M6ZRJ@msars.org.uk) or [www.msars.org.uk](http://www.msars.org.uk)

18 Jan 19 Radio Night and Table Top Sale

15 Feb 19 Talk by John G8JBJ on The Doublet Antenna

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

Contact Mark Callow 2E0RMT on 07842 336444 or [secretary@southessex-ars.co.uk](mailto:secretary@southessex-ars.co.uk) or <http://www.southessex-ars.co.uk/>

Meetings: 7pm 2nd Tuesday each month at The White House, Kiln Road, Benfleet, Essex, SS7 1BU.

08 Jan 19 Club Meeting: IMPORTANT pre-rally meeting, this is the life blood of the club and we should all be involved.

03 Feb 19 Canvey Radio & Electronics Rally.

12 Feb 19 Club Meeting: Post Rally debrief & discussion.

### 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/>

07 Jan 19 FT8 with Alan G0TLK

07 Feb 19 Millimetric Microwaves with Chris G0FDZ

04 Mar 19 Spring Surplus Equipment Sale

01 Apr 19 Annual General Meeting

### Sutton & Cheam Radio Society

8pm on 3rd Thursday every month. Contact Chris

Howard at info(at)scrs.org.uk Web: <http://scrs.org.uk/>.

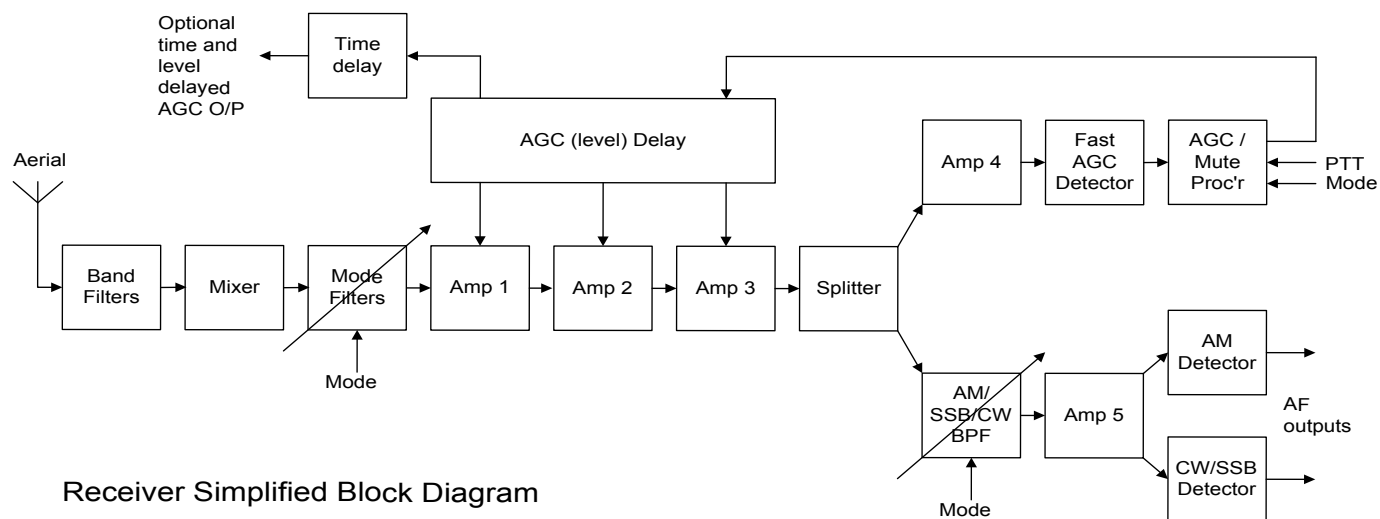
SCRS run a practical group most Monday evenings at the Bandstead Scout Hut.

17 Jan 19 Practical Fault Finding

21 Mar 19 Talk by RSGB Regional Representative Keith Bird, G4JED

09 May 19 Annual General Meeting and construction competition

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



Receiver Simplified Block Diagram

Crystal Palace Radio & Electronics Club is a member of the South East Tutors training group.

### Local Training Courses

Licence Level	Dates	Location	Club Provider	Format	Further details
Foundation	02 - 09 Feb 2019	Eltham, SE9 2SD	Cray Valley RS	2 days (Sat)	<a href="http://www.cvr.org">www.cvr.org</a>
Intermediate	17 Feb - 17 Mar 2019	Bromley BR2 7NH	Bromley & District ARS	3 days (Sun)	<a href="http://www.bdars.org">www.bdars.org</a>

**Please note that a new syllabus will apply for all exams from July 2019.**

Foundation	Autumn 2019 - to be confirmed	Bromley BR2 7NH	Bromley & District ARS	2 days (Sun)	<a href="http://www.bdars.org">www.bdars.org</a>
Full	07 Oct 19 - 30 Nov 19	Eltham, SE9 2SD	Cray Valley RS	TBA	<a href="http://www.cvr.org">www.cvr.org</a>
	= course commenced				

### CPREC Committee Information

<b>Officers:</b>		
<b>Chairman:</b>	<b>Secretary:</b>	<b>Treasurer:</b>
Damien Nolan 2E0EUI	Alan O'Donovan G8NKM	Ian Skeggs M6FZC
E: <a href="mailto:cprec.g2lw@gmail.com">cprec.g2lw@gmail.com</a>	E: <a href="mailto:cprec.g2lw@gmail.com">cprec.g2lw@gmail.com</a>	E: <a href="mailto:cprec.g2lw@gmail.com">cprec.g2lw@gmail.com</a>
<b>Committee Members:</b>		
Bob Burns G30OU	Newsletter Editor	T: 01737 552170 E: <a href="mailto:g3oou@aol.com">g3oou@aol.com</a>
Nick Stapley	Web Manager	