

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 overdue. 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 March 2017

Spectrum Utilisation Efficiency – 4G and Beyond by Ian Clark

In this issue: *Future & Most Recent Meetings, Chairman's Introduction, Across the Pond by 'Theorist', Technical Snippetts, , Miscellaneous, Noticeboard, Diary of External Events, News from other Clubs, Local Training Courses and Club Contact Information.*

Dear Reader

Future Club Meetings and Events

- 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
- 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.

03 March 2017 - Spectrum Utilisation Efficiency – 4G and Beyond by Ian Clark

Ian Ian will discuss current and future mobile radio networking technology and how the ever increasing need for data can be accommodated within the available bandwidth.

Ian Clark spent 26 years working for BT International and for most of that time he was responsible for the maintenance, installation and design of international transmission networks and systems operating over satellite and submarine optical fibre cables. Ian left BT in 1994 but during his final years at BT he was employed as a technical training designer and lecturer at the BT International training college. He now works as a freelance telecommunication technical trainer and is a specialist in radio, fibre optic transmission systems, data communications, and mobile technologies including GSM, GPRS, UMTS and LTE technologies.

30 April 2017 - Kempton Park Rally

Our Secretary Alan, with assistance from Jim and Damien, has been managing the collection and storage of equipment donated to the club including the monitors listed at the end of this newsletter. We plan to sell equipment this at the next Kempton Park event (see page 5 for details) and two tables are being booked. Help will be required at the event so please contact Alan if you can spare some time.

Recent Event News

3rd February 2017 - Annual General Meeting

At this meeting we worked our way through the previously published agenda summarised as follows:

- Apologies for absence from club members Giorgio Romanin, Graham Cousins and Alan O'Donovan
- The minutes for the 2016 AGM were read and approved
- Nick Stapley proposed some minor changes to the club constitution relating to 'Safeguarding Children and Vulnerable Adults' and Annex A of the constitution, 'Club Administration and Responsibilities of the Club Officials' relating to the Treasurer's responsibilities were discussed and approved.
- Officers reports were read and approved

- Elections: our Chairman Jim 2E0JFL and Treasurer Doris Bailey stood down and were replaced by Damien Nolan 2E0EUI and Ian Skeggs M6FZC respectively. Jim and Doris were thanked for their hard work for the club during their tenures. Damien and Ian's contact details are on the last page of this newsletter. Nick Stapley and Bob Burns were re-elected as ordinary committee members.
- Club programme: The forthcoming programme was discussed with some four months meetings yet to be arranged. The Chairman noted that the club projects had been very popular and members indicated that a further project should be instigated. Jim and Bob both offered open shack events when the weather was warmer.
- Newsletter: This is circulated to all members and a greater number of external readers including a number of local clubs. There are only three regular contributors to the newsletter and the Chairman asked members to consider writing an article with assistance from a committee member if required.
- Any Other Business: An active discussion ensued on the club room rent, additions to the club PC projector facilities, club trophies, the construction contest, the newsletter and future club projects. Three committee were asked to look for a new club construction project.
- There being no further agenda items the Chairman closed the formal meeting.

This was one of our better attended AGMs.

Our new Chairman Damien writes: *I look forward to taking up my new role as Chairman at the club and hope to help the the club move forward in the future.*

Chris G0FDZ from Cray Valley Radio Society (CVRS) has written to say *"Here is a photo of Jim 2E0JFL receiving the Sandell White-head trophy at a recent CVRS meeting.*

The trophy is awarded at each course to the candidate who in the instructors view has made the most progress and we decided that Jim had done so in the Intermediate course last November. The person presenting the trophy is our exam secretary Frank G0FDP"



Across the Pond by 'Theorist'

Wandering through the City recently I stumbled across the Guildhall Art Gallery, and as it is free I went in. Although really devoted to paintings it also houses the remains of Londinium's Roman amphitheatre, the discovery of which halted construction of the museum for 14 years, and to accommodate them necessitated a re-design of the museum. As it happened I caught the last

few days of a tiny exhibition being held about the first transatlantic telephone cables, a topic that was on my list of possible articles for the newsletter.

The exhibition had a sample of the first sort of undersea cables used, which were made of copper wire coated in 'gutta percha', a natural thermoplastic material obtained from a species of Malaysian tree. Seven strands of coated wire were then twisted together to form the core of the cable, which was wrapped in jute, a tough natural vegetable fibre that can be spun, and is used to make 'hessian' bags and ropes. This was then sealed with further layers of gutta-percha.

This insulated core was then reinforced with steel wires wrapped in a tight helix around the cable. Unfortunately on the first attempt to make the transatlantic cable it was found that some sections had been wound one way, and other sections wound in the opposite way. It turned out that these sections were easily connected, but the newspapers had a field day harumphing about it. Nothing new there then.

The cables at the shore ends, where damage by anchors was more likely, were made much thicker and heavier than the deep-sea sections. A single mistake in manufacture would mean the failure of the whole cable, so it was electrically tested at each stage of the manufacturing process. The deep-sea cable section exhibited was about 1 inch thick, and had a mass of about 550 kg/km.

There were four attempts to lay a cable over a nine-year period. The first in 1857, the second in 1858, one in 1865, and one in 1866. The 1857 cable was a failure, and the 1858 cable lasted only weeks. Lasting connections were finally achieved with the 1866 cable, although the 1865 cable was repaired just after the 1866 cable was laid, and by the same ship (Brunel's Great Eastern) This gave two lasting connections.

The 1858 cable was laid by the Atlantic Telegraph Company between 1854 and 1858 and Queen Victoria sent the first transatlantic telegram across the Atlantic, to President Buchanan. Well, that was what the exhibition said, but leaving aside the test signals that were sent, it appears that the first message was one to nobody in particular, expressing 'good will to all men'. Unfortunately after Victoria's first official message the cable only lasted another three weeks.

The power to send signals was derived from 'Danielle Cells'. These consisted of a copper pot filled with copper sulphate, in which was immersed an earthenware container filled with sulphuric acid with a zinc electrode. The photos



show 8 such cells connected together in series to form a 'battery', with each cell generating about 1.1 Volts.

Each copper cylinder was about 18 inches tall and the terminal connectors can be seen in the close up of the top of the battery. There was no sign of any ceramic components in the display that I could see, but I think they should surround the inner copper cylinder. The display was unclear about this matter.

As signal power deteriorated with distance, the transmission

rate was extremely low as the received signal was only a few μW . This was partly due to the fact that it was not fully understood that the purer the copper, the less the resistance. Had very pure copper been used the problems would have



been much less. The 1858 cable probably failed because the chief electrician, Edward Whitehouse, attempted to increase the transmission rate by upping the voltage to 2,000 V, which reputedly damaged the cable insulation. He took the blame anyway.

Within a few years it was possible to send an incredible 8 words a minute across the Atlantic. As the telegraph developed, and to speed up transmission and cut down on expense, different organisations developed their own code books. Some of these were genuine cyphers, designed to be difficult to break, but almost all were a sort of shorthand whereby one word stood for several others, or a phrase. Signals were sent using Morse, with the received signal indicated either by movement of a needle on an instrument, an audible signal, or eventually by marking a paper tape – useful for automatically recording a message.

There had been earlier undersea cables, the 1850 cable between England and France for example, but the transatlantic cable seems to have had a great psychological effect. News from America could reach Europe within hours and vice-versa. The effect must have been similar to that of the first satellite broadcast via Telstar in 1962. The world got smaller.

Guildhall Art Gallery:

<https://www.cityoflondon.gov.uk/things-to-do/visit-the-city/attractions/guildhall-galleries/Pages/guildhall-art-gallery.aspx>

Marconi Memorial

Continuing with the historical theme, my wife's sister Margaret sent in the photograph on the right taken during a visit to the Isle of Wight.

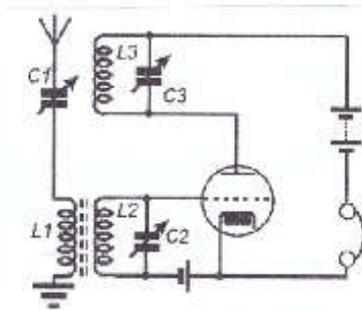
This commemorates wireless communications work carried out by Marconi and his UK associates between 1897 and 1900.

The station was erected at the Royal Needles Hotel, Alum Bay with a 165ft high wooden mast to support the aerial.



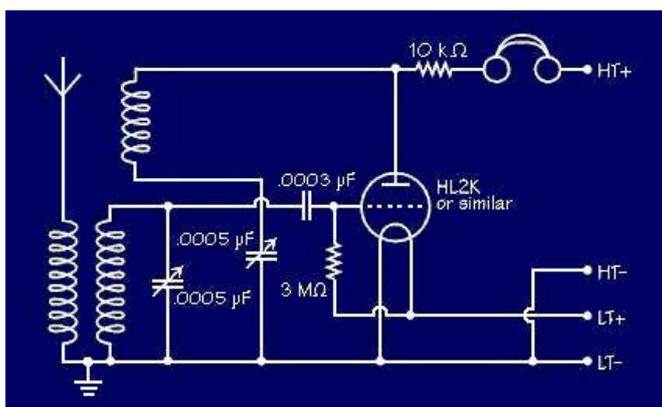
Technical Snippets

One Valve Radio - Listening to a discussion at the Club's AGM on encouraging new members to have a go at building their own equipment, reminded me of an article I had read about radio communication in the WW2. In 1940 the retreat of the UK Expeditionary Force made the War Lords realise that the Germans were using an advanced method of communication between strike forces. In a belated attempt to catch up with the technology, they set up a team of listeners, to record enemy radio communications.



At that time there was no equipment available for listening over long instances in the UK, though the Japanese and Germans were making long distance transmissions. Typical to limited thinking the team was comprised of radio operators from the navy and army, none with much knowledge of radio design. Instead of asking advice of the amateur radio enthusiasts in the the UK, they seized their equipment which went into storage until the end of the war.

The Marconi Company had been researching radio reception and had produced a one valve radio, which was used initially by V stations (the secret listening units). The circuit shows the technology. The valve



would have been a 2v, using a wet battery to heat the valve, and a dry battery giving an HT Voltage of 90V to provide an HT voltage.

The following circuit uses an HL2K triode with a 2v heater as a classic 'reaction detector'. I was intrigued by this, having never seen one, so a look into the internet provided a design of one advertised in a Boy's magazine in 1948.

In 1958 an advanced model using a pentode DAF91*. I doubt if this valve is available now, but there are many small glass valves still in the Radio suppliers stores, if you thought of trying your hand at building one.

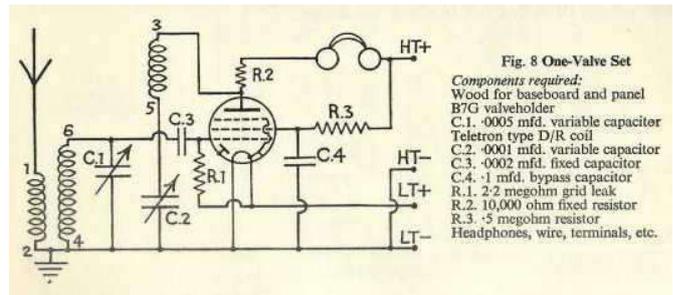


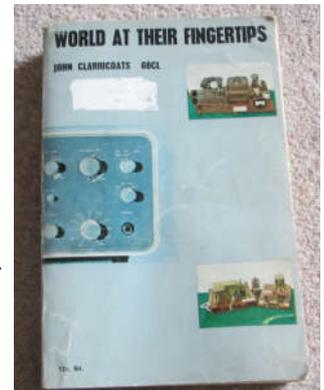
Fig. 8 One-Valve Set
Components required:
Wood for baseboard and panel
B7G valveholder
C.1. .0005 mfd. variable capacitor
Teletron type D/R coil
C.2. .001 mfd. variable capacitor
C.3. .0002 mfd. fixed capacitor
C.4. .1 mfd. bypass capacitor
R.1. 2.2 megohm grid leak
R.2. 10,000 ohm fixed resistor
R.3. .5 megohm resistor
Headphones, wire, terminals, etc.

Victor G1PKS

* This range of 1.4V filament valves are still available at a typical cost of £3 - £5 each but the circuits will work with almost any small receiving valve - Ed.

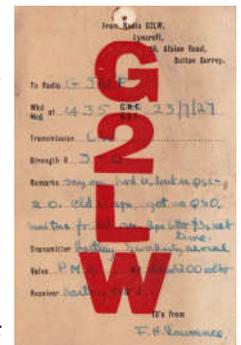
Miscellaneous

a) For my recent birthday my sons bought me a copy of "World At Their Fingertips" by John Clarricoats G6CL.



This book is a great source of information on people and equipment from the very early days of amateur radio. It reviews the progress in wireless communication developments in the late 1800s, the formation of the London Wireless Club in 1913 which subsequently became the Radio Society of Great Britain, a number of 'firsts' in amateur radio and continues on to the early 1960s.

b) Our club callsign G2LW was left to us in the Will of Fred Lawrence, a founder member of this club. In 1956 we started out as the Crystal Palace & District Radio Club and our original callsign G3VCP dates from the late 1970s.



While searching the Internet a week or two back for G2LW I found a reference to a QSL card, pictured on the right, that Fred had sent to G5UF in 1927 and now resides in a collection called the 'K8CX Ham Gallery' in the United States.

More QSL examples from:

<http://hamgallery.com/qs1/country/England/g2lw.htm>

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

- 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, both plus P&P.

73



G3OOU

Diary of External Events

26 Feb 2017 - (BRATS) RAINHAM RADIO RALLY

[There has been an unavoidable change to the venue](#) for the Rainham Rally for this year, which will now be held at: The Victory Academy, Magpie Hall Road, Chatham, Kent, ME4 5JB. This new venue however is larger with on site parking for 250 cars, and is located a couple of miles from the M2, Junction 3, and is easy to find.

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@darco.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 G3OOU. 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

21 Mar The Arduino Microcontroller G4WGZ

18 Apr Frequency Counter Construction

16 May Fix-it Evening

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 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/>

13 Mar Roll Your Own PSB's by Matthew Nassau M0NJX

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/>

22 Mar GB7MH Upgrades - Paul G7KBR

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

02 Mar Construction Contest

16 Mar Signal Generator and Spectrum Analyser demos by Bob G3OOU

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 G3OOU

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>

09 Mar Club Construction Contest

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 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/>

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

10 Mar Green Antennas - Dennis M0YDC
07 Apr Surplus Equipment Sale

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 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](mailto:secretary(at)g3src.org.uk). Web: <http://g3src.org.uk/>

06 Mar Spring Surplus Equipment Sale

Sutton & Cheam RS

8pm on 3rd Thursday every month. Contact John Puttock G0BWW 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.

20 Apr Home Construction & Finishing - Bob G3OOU

18 May Annual General Meeting and Constructional Contest

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	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.cvr.org
	= course commenced				

CPREC Committee Contact Information**Officers:**

Chairman: Damien Nolan 2E0EUI 7 Fonthill Court Honor Oak Road London SE23 3SJ 07900 242541 Gorby928(at)gmail.com	Secretary: Alan O'Donovan G8NKM 2 Mackenzie Road Beckenham Kent BR3 4RU 020 8778 9660 Alan.odonovan(at)btinternet.com	Treasurer: Ian Skeggs M6FZC Ground Floor Flat, 24 Kendall Road Beckenham Kent BR3 4PZ 020 8650 9049 ian.skeggs(at)btinternet.com
Committee Members: Bob Burns G3OOU Nick Stapley	Newsletter Editor	01737 552170 or G3OOU(at)AOL.COM