FIVE AND NINE PLUS

THE OFFICIAL NEWSLETTER OF THE APPLEDORE AND DISTRICT AMATEUR RADIO CLUB

Club Callsigns: G2FKO and GX2FKO
Web Site : www.adarc.co.uk

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July, 2015

EDITORIAL

Welcome to another Club 5&9 Newsletter.
At this month's Meeting, Steve (G6SQX) will be talking about further **practical applications for the versatile Raspberry Pi 2.** Those members that were fortunate to attend one of Steve's earlier talks will know that a further treat lies in store for us this month.
I an delighted to report that due to sterling work by your Secretary - Alan (M6CCH) our **Open Meeting** to which friends and family are most welcome will be a talk - **"History of Bideford" by our well known local historian Peter Christie**. This is a Meeting not to be missed and one I am sure you will want to bring friends or family to for what promises to be a most entertaining and informative evening.
I know that many members have resisted the march of computers but fortunately or unfortunately many of us now have one. I have therefore included a couple of articles from members which have a computer bias which I am sure many will find most interesting.
Members may be interested to know that your Committee tried to organise a Special Event Station at **RAF Chivenor** to coincide with the search and rescue base closing on October 1, after 70 years of service. However, a letter has now been received stating that regrettably due to the number of such requests it is not possible to grant permission.

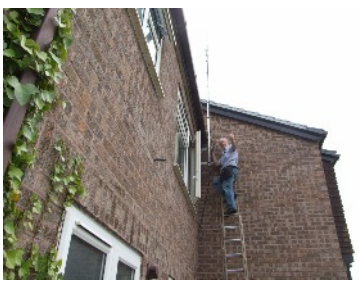
Terry (G4CHD)

CLUB MEETINGS

Meetings are held at the Appledore Football Social Club starting at 7.30pm for 8.00pm. Visitors always welcome. For further information, contact Alan (M6CCH) - details in the top panel.

July 20th	"Practical Applications for the new Raspberry Pi 2" by Steve (G6SQX)
August 17th	Back to Basics - "Coax Losses - Measurement & Effects" by Terry (G4CHD)
September 21st	"Bring & Buy"
October 19th	**Open Meeting** - "History of Bideford" by Peter Christie
November 16th	"MX0LDG Operations from Lundy" by John (G3JKL)
December 14th	"Club Christmas Party" (open meeting)
January 18th	"Radio Quiz" by John (G3JKL)
February 15th	"Whistles to Radios - Police Communications" by Alan (M6CCH)
March 21st	"Club AGM"
April 18th	"QSLing - Traditional to the latest methods of confirming a QSO" by John (G3JKL)

DAVE (G4XWQ) HELPS JIM (M3VJM) WITH HIS AERIAL

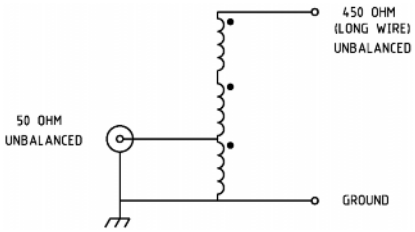


Dave (G4XWQ) changing Jim's (M3VJM) antenna cable and fitting a better pole to improve 70cms reception.

REPORT ON THE JUNE MEETING

"Baluns & Ununs" by Mike (G3PGA)

There was another fantastic attendance for Mike's talk which tackled the ins and outs of two of the most often misunderstood bits of radio gear - the Balun and the Unun. The talk was very well illustrated with a professional presentation and Mike had brought various examples to the Meeting for members to handle. This was a difficult subject which Mike explained with ease. However this was only possible due to the enormous amount of research done by Mike in preparing for this talk.



Everyone came away much the wiser, and a big thank you to Mike for giving yet another most interesting and thought provoking talk.

Terry (G4CHD)

LOCAL SKEDS

Zepp Net:	**Mon, Tues, Thurs : 145.450 MHz 4pm** **Wed via GB3DN - 4pm**
6m Net:	**Wednesday, 8pm, 51.480 MHz FM**
HF Net:	**Friday at 3pm 7.145 MHz ± qrm**
Slow Morse:	Run by **Dave (G3YGJ)** every **Tuesday and Thursday, 7pm clock time on 145.250 mode FM.**
70cm Net:	**Sunday, via GB3ND, 11am - noon local time.** **Available on Echolink node 221334**

LOCAL REPEATERS

70cm Handy Cross Repeater/Echolink (#221334) Gateway (GB3ND)
User: Listen 433.35MHz– Transmit 434.95MHz
Access 1750Hz Tone (Timeout 4.25 mins)/ 77Hz CTCSS
Repeater keeper is Jeff (G4SOF)

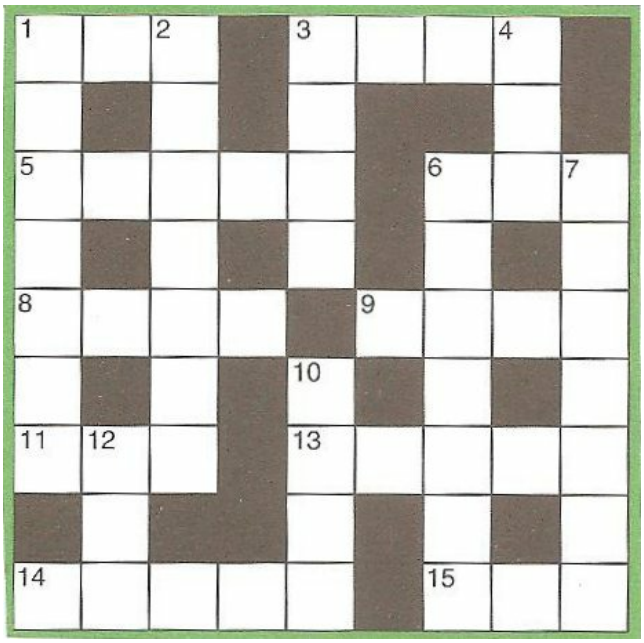
2m Stibb Cross Repeater (GB3DN)
http://www.g0rql.co.uk/gb3dn.htm
User: Listen 145.6375MHz - Transmit 145.0375 MHz.
Access 1750 Hz Tone or 77 Hz CTCSS Repeater keeper is Tony (G1BHM).
Yahoo users group for general chat and banter at :-
http://groups.yahoo.com/group/GB3DN/

CROSSWORD

This month's Crossword is by Stuart (M1FWD).
The answers will be published in next month's Newsletter. Good luck !

Clues Across
1) Large marine fish of the family *Gadidae* (3)
3) Nautically, to run before the wind (4)
5) Adhesive inflammable substance insoluble in water (5)
6) Female swans (3)
8) U.S. State, capital Salt Lake City (4)
9) Capital city of Uniform Romeo land (4)
11) Songbird of the family *Paridae* (3)
13) Granite paving blocks (5)
14) The speed at which music is or should be played (5)
15) Carrier of genetic information (1.1.1)

Clues Down
1) The path of a current (7)
2) Far away in space or time (7)
3) ? Wave, a curve representing periodic oscillations of constant amplitude (4)
4) A substance used to change the colour of hair, fabric, etc. (3)
6) ? Circuit, an electric circuit with thin strips of conductor on a flat insulating sheet (7)
7) Kilo Papa One island (7)
10) Capital city of Lima Alpha land (4)
12) Frozen water (3)



Last month's answers :-

Across 1) flare 5) therm 7) onion 8) subs 10) plug 12) legal 14) Paulo 15) Ceuta

Down 1) foolscap 2) ami 3) Etna 4) bevel 6) Mongolia 9) balun 11) bloc 13) gnu

Stuart (M1FWD)

SUDOKU PUZZLE

The aim is to enter a number into each cell so that **any column, or any row, or any block of cells contains all numbers from 1 to 9**.

		2		4	5		6	1
							8	7
9			8			4		
1			5	2				
	3						5	
				3	7			2
		3			6			8
6	7							
5	1		4	8		6		

Terry (G4CHD)

AMATEUR RADIO AND TWITTER

Many thanks to **Richard Hampson (2E0GPT)** - a new member of our Club - for the following fascinating article :-

It took me about 3 new accounts before I finally got Twitter. When I contacted the Appledore amateur radio club in December 2014 to arrange my foundation licence course I reactivated my most recent twitter account and started searching for Ham radio info to help me along with studying for the Licence. After sitting there finding none of any benefit that fits in the 140 character tweet, I found a few G, M0/M1, 2E0 and M3/M6 callsigns tweeting posts so I clicked the follow button on some of them. Almost immediately I'm reading tweets that are of interest to me, and gone on to make great acquaintances.
I've met home brewers, electronics geniuses, people who specialise in certain parts of Ham radio such as satellite operating, SOTA fanatics and writers for websites and magazines to name a few, plus many other friendly ops from all over the world, some of which I've contacted on HF. Plus there's all the other different interests catered for.
I'm now sat writing this article on a computer that was generously given to me from Damian G4LHT as I was stuck with a phone solely for internet, I've been helped with antennas from many hams to help me get on the air, I've built a pixie CW transceiver along with other hams and will be shortly making a data interface and a balun from a design by Patrick M0ZPK, who's helped me immensely with every part of ham radio that I don't understand (which is a lot!) including sorting out my common mode problems, learning not just how to make baluns/ununs from existing designs, but the theory behind them and why they work.
The beauty of twitter is that its easily accessible on the mobile phone so if I'm sat waiting for passengers at work, I can log in quickly and see what's going on, follow conversations of interest etc, my radio time is fairly limited so it's a good way to keep a toe in the water. Being in North Molton I'm fairly stuck out on a limb, my current VHF equipment means I'm out of range of the North Devon repeaters and I tend to go up on the moor with my HF gear in the car so attempting to get help on the radio isn't practical when /portable.
Here's a few active accounts I follow: @G4LHT @M0ZPK @AA7RX @g0lfp @W9GYR @M6GOF @bandconditions @NW7US @theRSGB @arrl @roadtowar1914(this account is tweeting daily newspaper clippings in an 'on this day in history' format 100 years ago during world war one) there are many others, if you follow one account it snowballs into others. Also some club calls use twitter to announce their special events...very handy if you're operating low power and need to get in there first!
For me, it's definitely the second best social network after Ham radio!

73 from Richard (2E0GPT) AKA @richheych on twitter

WINDOWS 10 LAUNCH IMMINENT

Many thanks to **Dave (2E0IXX)** for the following check on the prerequisites for installing Windows 10

As we near the launch day (29th July) for Window 10 I thought the club members would like to know if their computer will take the up grade.

First to run Windows 10 you will need a 1GHz (or faster) processor, 1GB of Ram for the 32bit version (2GB for the 64bit version), 16GB of free hard-drive space and DirectX 9 graphics card that supports 800x600 pixels, you also need a Microsoft account (you can sign up for free on https://login.live.com).
If you are in any doubt Microsoft has a free up grade assistant tool for Windows 7 and 8/8.1 (www.snipca.com/16653) for XP and Vista users it's (www.snipca.com/16654).
Windows 7 will need service pack 1 - unfortunately some versions of Windows 7 and 8.1 are excluded from the Windows 10 offer i.e. the Enterprise edition of either, or the RT version of 8.1, then you are out of luck.
Windows XP and Vista users will have to pay to up grade.

Dave (2E0IXX)

UPDATE FROM KEVIN (M6KBD) ON OUR CLUB SUNDAY 70cm NET (11am - noon)

Just to keep you up to date we gathered 3 new users recently and a possible new member. One was from Malta/Gozo and another from Godalming. Mainly through word of mouth and the hit rate of the site has reached 350 for the

past 2 months or so. Nothing compared to Microsoft I'll grant you but it's a start!
Attached below is an e-mail from one of our new users:-

Hi all, thanks for letting me join the net this morning. It was a good test for my recent DMR handheld (running in analogue mode) purchase and I had good signal all the way from Yelland to Instow whilst walking the dog on the Tarka Trail.

I will try to login via Echolink on future Sundays from the Godalming based QTH and will certainly bring a radio each time I come down to Fremington.

73's Andy

FREE GEAR (OR GIVE DONATION TO RNLI)

Walter Cockerell (G0LKI) has some surplus gear to get rid of - free to anyone interested but for anyone who feels guilty about taking gifts - they could give a small donation to the RNLI.

1. One Marconi 1155 RX plus speaker and two power supplies - works on all bands bar one. The fault is an open circuit IF transformer T8 for which I have a spare but can't fit myself due to eyesight problems.

2. One Racal 1217 RX, ex GKA - at present operating from a power supply due to a short in its internal power supply.

3. One Yaesu FR101 RX with loud speaker

I have information and circuits for the three receivers.

4. One Watson Multiranger-9 antenna plus base

Also a few odds and sods.

Walter Cockerell (G0LKI) - walck@btinternet.com

Last month's technical puzzle: winner and prize, and yet more ruminations on time

My item last month had actually been originally entitled "*About time this got sorted out: a little technical puzzle*", with the implication that two of the three shopkeepers, er jewellers, in Barnstaple should perhaps do something about the timekeeping discrepancies between the atomic watches on display. After all, those displayed are typically ~£400 and are supposed to be accurate to 1s in 30My !

As usual with these technical puzzlers, I received an over-whelming set of submissions. If I wrote that I received 20 I'd be lying ..... Some included much copy and paste from Wikipedia and other web sources, I think reflecting the belief that I might not have read them before. BUT, no-one got the full, complete answer I was hoping for, er expected ! The nearest, however, was a succinct and close answer from new member Michael (ex 9Q5TS: *Out of Africa,* in fact).

By the way, the described saga continues in Barnstaple's finest watch retailers, er jewellers. I check around twice a week and stepped up my observations recently, as explained below. In short it's all to do with radio propagation. Surprise ! First, let's review how these watches work. As most will know, these watches are better described as 'radio controlled', but that certainly betrays some economy with the truth. There are only a couple of chip sets used in such watches now, and they invariably attempt to 'synchronise' (step correct) in the early hours, when RF propagation is normally best and RFI from various various generally lowest. This is commonly at ~2 a.m., and if unsuccessful the watch - or clock, for they are all termed RCCs, Radio Controlled Clocks - will attempt retries, usually two or three. So what happens when the step correction ('synch') fails ? Nothing, and indeed there is no obvious warning of this on the watch. However, on nearly all of these RCCs one can press one of the side buttons and after an impressive movement of (usually) the second hand, one can quickly use a strong eyeglass to peer at the near-microfiche level legend to which the pointer temporarily points - just before it smartly returns to normal. In this way it can inform the proud owner whether or not the last attempt to synch. was successful or not, and indeed if satisfactory at roughly what signal strength (denoted H, M or L normally). It is also possible to manually force an attempt to synchronise by a similar button sequence.

Next, consider what happens when satisfactory synchs. fail repeatedly. What sort of performance should one get then ? Of course now we have nothing but a quartz crystal controlled watch. The crystals included in this sort of watch are specified at typically +/- 0.5s/day over the temperature range. This may or may not be monotonic, even at a fixed temperature, due to battery, pressure, movement and so on. But generally we can expect a drift of order +/- 15s/month, all from a crystal costing ~10p. Most of the oscillators are nowadays TCXOs, which helps. So if the RCC is never corrected by radio for a couple of months and free-wheels, we get drifts from one to the other and to UTC of order a minute, and that's what we see in the display windows of the Green Lanes Hinds store, er jeweller. But what about the Samuels display watches, with less variation ? I've checked and since New Year, none of these and the other store have had their watches moved around. The answer is that RF propagation for the Samuel store - in Fore ('High') Street - is marginal, whereas for the Hinds store inside the shopping mall-ette it's terrible.

Measurements

I've used the integral rough signal strength measurement facility (forced synch.) of my Citizen RC watch, as described above, to check the signal strength for DCF77 (Mainflingen, Germany, 77.5 kHz) at the three retailers, at least just outside the display windows. I also done this during daylight hours and also late at night – but not as late as 2 a.m. in the case of Green Lanes, as the whole complex is secured overnight. I had hoped also to use a commercial receiver, but the most suitable - my AOR8600 MkII plus 12V bright yellow battery - would have attracted even more attention and would not go down quite far enough in

frequency. It seemed possible to use my Rigol spectrum analyser which has lower frequency coverage + 12V 'jump starter' with integral mains output …..... But I chickened out, for already the security personnel and police were both taking an interest as I regularly made my RC watch measurements at the three locations and over several weeks, complete with notebook, eyeglass and large torch.☺ Each synch. attempt takes at least a minute or two, as the data stream (as PWM) is of very low bit rate. It's also noteworthy that none of the display watches seem to use the MSF (Anthorn, UK, 60 kHz) service, and for us in the UK this does not help. This is a matter of economies of scale. Citizen and most other RC watches do not use all of the LF time systems worldwide (one each in USA, Europe and China, one in UK and two in Japan), but sell regional versions. I think Casio dominate the global coverage category, a boon for the true international traveller – as long as he forces a re-synch. regularly as he crosses time-zones !

I won't detail it all, but I verified that the first Hinds store on Fore Street enjoys an RF - favourable location, even at most daylight hours, whereas the Samuels one is marginal and the larger Hinds store in Green Lanes is disastrous all the time. Not that anyone seems to care ! For those interested in the numbers, about 100µV/m is the receive level normally expected as far out as 2,000km from Frankfurt (single hop, D-layer), which does cover the whole UK including off-shore islands. But it is buildings and RFI that cause the difficulty, especially steel-framed types (although, rather as for the IEEE 802.11 (wi-fi) standard some 10^5 times higher in frequency, domestic cob and thatch construction was equally not taken into consideration in system design !).

In conclusion one can 'free-wheel' with such RCCs for a couple of days, especially if temperature excursions are modest, such that local time is displayed to within about a half-second, which for most folk is satisfactory - and indeed discernible by eye. To maximise performance it's best to place the watch overnight flat near a window orientated appropriately – usually with the 9 o'clock marking roughly pointing to the time system station. The actual antenna is a tiny ferrite-cored coil. But how accurate is the synch. anyway; is it negligible as we have so far assumed ? Well, it turns out that for the UK it takes ~5-10ms for the radio transmission itself, and up to ~10ms for the watch to decode and synchronise, so overall such a RCC can step correct in this way to within ~20ms of UTC, with an indeterminate drift in any direction of up to about 0.5s thereafter. Good enough for most of our personal needs – so long as satisfactory RC synch's occur often enough.

Related snippets

Last year there was a vanity Kickstarter project to produce a small quantity of watches using the Chip-Scale Atomic Clock (CSAC) that I described in a previous 5&9 article. So this was to be the first caesium based true atomic watch. That is, it is not synchronised in any way to any other reference. The claim is thereby to provide accuracy of 1s in 1ky. The first half dozen were pledged at $6,000 each, and this was the carbon-fibre cased prototype:

It uses a Li-ion battery for 36hrs running, but interestingly has a miniature COM port that not only allows charging but also permits output of a PPS signal or even allows disciplining ('training') of its internal CSAC from an external higher performance atomic clock. So in my case, for example, I could discipline the *Cesium 133*, as the watch is called, by connection to my SRS PRS10 Rb frequency standard which itself is disciplined via a GPS timing (not geolocation) receiver.

Also last year Apple introduced its *Apple Watch* which its CEO modestly proclaimed to be “the most advanced timepiece ever created”.

As ever with Apple, lots of classy marketing, a contrived hint of mystery about the exact technological features, and great packaging have obscured exactly what's inside. It claims “accuracy within 50 milliseconds of the global time standard, the same precision found in GPS satellites”. As ever there is confusion between accuracy and precision here. First of all, its use requires one first to possess an iPhone; as an AAPL shareholder I like this ! There is a suggestion that the quartz in the Watch is a tad better than, say, that in the iPhone as a start. And that all it does is use an enlarged set of Apple-owned NTP stratum 2 time servers worldwide to more frequently synchronise (step correct) its time. Certainly use of the established NITZ (Network Identity and Time Zone) system widely used in all our cellular mobile devices is not the answer; it is poor, and can be up to a half minute in error. No-one seems to know exactly what is featured, but my suspicion is that it does indeed judiciously use quite frequent calls via the iPhone 'mothership' to the nearest Apple stratum 2 NTP server/s and perhaps an occasional call to the iPhone's GPS time determination. Again this is just step correction that is reasonably frequent – say every couple of hours. I doubt

that there is a proper system clock disciplining involved, although this is possible (using ported NTPD as it's basically Linux, see my earlier articles). This could just about give 50ms accuracy much of the time, as long as the iPhone maintains adequate cellular or wi-fi connectivity.

The leap second was added right at the end of June, as explained in an earlier article. This, the 27th since 1972, seemed to proceed without serious hitch around the world. Most all network administrators seemed to have corrected any problems that did arise within an hour or two. One aspect that surprises me is that the majority of the work done on NTP and extensions continues to be done by volunteers.

Back to the last month's puzzler. I'll be setting up Michael's FPV virtual flight on my new quadcopter, and contacting the runners-up with the offer of a similar flight of reduced duration (2.50.000 mins).

Next puzzle

We all know what “electrically short” means, don't we ? Well, here's your chance to win a useful £5 Amazon voucher. Just send me a 1 or 2 page explanation of this, including a useful rule of thumb on transmission line approximation accuracy. Artistic merit as well as technical content will be taken into account …...

Dave (M0JAP)

TALE OF THE DRIP THAT GOT INTO MY SHACK

by John (G0UNB)

It all began about three weeks ago when thunderstorms were predicted for this area and I thought it prudent to disengage my aerial lead from the tuning unit.

A week later, having had a rush of blood to the head, I decided to go on air. I picked up the feeder to fit it back to the tuning unit when, to my horror, I noticed a drip of water coming from the lead end! At this point I should say that the feeder was R67 coax and was about 50 to 60 ft long! No way would I be able to dry that out this side of the next millennium!

I took my troubles to the coffee morning gathering in Bear Street (highly recommended) - after all a trouble shared is a trouble halved and in any case I thought this state of affairs was somewhat unique. I should have known better.

I got the sympathy bit right, but something else came as well. Something that perhaps others may not all be aware of - Mike G4NCU (who can usually come up with an answer and didn't fail on this occasion) said "Ah yes, I have actually seen sufficient water inside a TV set which had crept down the aerial feeder and eventually shorted out the set, though not common it is by no means unknown". He also cautioned against insulating the aerial connection with tape and suggested instead that the semi- vulcanised tape, which stretches and self-seals was the thing to use.
In my case the water had worked it's way between the black outside and white inside insulations and down the copper braid. It must have taken quite a long time because the feeder does not have a gradual slope downwards, in fact goes upward upon occasion.

I've never had any evident problems with the SWR, though the tuner could have hidden any that may have been there. Anyway, having run a new lead and cleaned up the connections (which had been a whitish green) I get the impression that my HF set sounds a little better - although it might just be my imagination!

Moral. Take an occasional look at any outside connections you may have to your aerials HF, FM or TV and it may save you some grief (and cash).

John (G0UNB)

Interestingly this is a reprint of an article from the December 2002 5&9 which just goes to show that some things never change !!

So that’s it for this month - I hope everyone enjoys the read

Best 73s de Terry (G4CHD)