



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

CLUB'S OFFICERS

| | | | |
|----------------|---------------|-------|--|
| President | Terry Adams | G4CHD | |
| Chairman | John Lovell | G3JKL | |
| Vice Chairman | Steve Smith | G6SQX | |
| Secretary | Alan Fisher | M6CCH | 01237 422833 Email: fisheralan@gmail.com |
| Treasurer | Mike Wogden | G4KXQ | |
| Committee | Graham Bailey | G1ZTJ | |
| | Dave Cottle | G4XWQ | |
| | Ray Hunter | M0TLO | |
| | Keith Luxton | G0AYM | |
| QSL Manager | John Lovell | G3JKL | |
| Web Master | John Lovell | G3JKL | |
| Exam Secretary | John Lovell | G3JKL | |
| Editor | Terry Adams | G4CHD | |

November, 2017

EDITORIAL

It is with great sadness that I must report that Kevin (2E0KMG) passed away in October. Graham (G1ZTJ) and Mike (G3PGA) attended the funeral at the Barnstaple Crematorium on November 2nd. Although Kevin did not enjoy the best of health, he was an enthusiastic member of our Club and set up the very active Sunday morning Club Net. Our condolences go out to his family at this difficult time.



Graham (G1ZTJ) has offered to run the Sunday morning Net as a mark of respect to Kevin but Graham would appreciate any offers of help in running the Net.

This month's Meeting on **November 20th** is our **Club Bring & Buy** so an opportunity to either part with any unwanted gear or buy some new goodies.

Chris's (G0FJY) talk on the **Clansman Radio** has been postponed until the **April Meeting** next year.

Next month's meeting is of course our **Club Christmas Party** which I am informed will follow the same successful format as previous years with food, festive music, Quiz and Raffle included. Entry will be free but members are asked to bring along a suitable Raffle Prize. So I look forward to seeing many of you there for a most enjoyable evening.

Finally, I have included a **short article at the end** of the Newsletter written by yours truly and would be delighted to get any feedback even if just to prove that someone did read

it! So enjoy the Newsletter

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 the Secretary, Alan (M6CCH) - details in the top panel.

| | |
|------------|---|
| Nov 20th | Club Bring & Buy |
| Dec 11th | Club Christmas Party |
| Jan 15th | Memory Lane Evening - mini talks by members |
| Feb 19th | BITX40 - Homebrew Made Easy by Mike (G4KXQ) |
| March 19th | Club AGM |
| April 16th | Clansman Radio by Chris (G0FJY) |

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)

REPORT ON THE OCTOBER MEETING

Planned Talk by Chris (G0FJY) on the Clansman Radio

Unfortunately, this Meeting was cancelled due to a tropical storm forecast to hit the area that evening. Your Committee had to make a decision on the day before the planned meeting and felt that it was better to be safe than sorry. Fortunately Chris has offered to give his talk in April in the New Year.

Terry (G4CHD)

LOCAL SKEDS

Zepp Net: Mon, Tues, Thurs : 145.450 MHz
4pm
Wed via GB3DN - 4pm

2m Net: Mon/Tues/Wed : 145.450MHz
10.45 - 12.00 noon

6m Net: Wednesday, 8pm, 51.480 MHz FM

HF Net: Friday at 3pm 7.134 MHz ± qrm
If conditions poor - 145.450 MHz

70cm Net: Sunday, via GB3ND, 11am - noon
local time.
Available on Echolink node 221334

Top Band Net: Sunday 1.860 MHz
(LSB - 32W pep max) 9.30 - 10.15am
Contact Dave (G4XWQ) for details

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

Terry (G4CHD)

CROSSWORD

Many thanks to Stuart (M1FWD) for this month's Crossword.

The answers will be published in next month's Newsletter. Good luck !

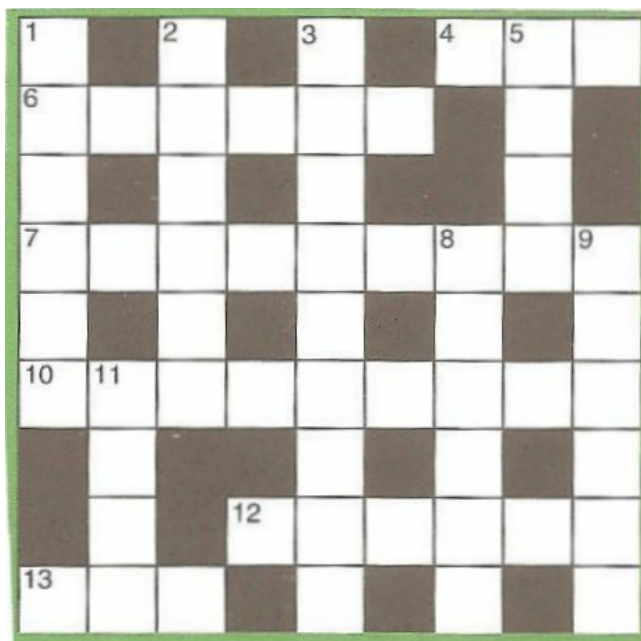


CLUES ACROSS

- The second largest city of Charlie November (CN) land (3)
- Wirelesses (6)
- The eighth largest town in Golf India (GI) land (9)
- Capital city of Papa Alpha (PA) land (9)
- A reflective surface (6)
- The chief monetary unit of Juliet Alpha (JA) land (3)

CLUES DOWN

- Saudi ? - Hotel Zulu (HZ) land (6)
- Grown-ups (6)
- French ? - Foxtrot Oscar (FO) islands (9)
- TV channel found on Sky 532 (4)
- East ? - TV soap opera (6)
- Small Nissan car produced between 1995 and 2006 (6)
- Officer on a merchant ship, subordinate to the master (4)



Last month's answers :-

ANSWERS ACROSS: 1) wheel 6) optic 7) focus
8) Swede 9) Nepal 12) exact
13) Leeds 14) skeds

ANSWERS DOWN: 1) wife 2) encrypted 3) loss
4) attenuate 5) acme 9) null
10) less 11) Otis

**Marconi NATO Navy
key - dream key??**



DATE FOR YOUR DIARY

19 NOVEMBER 2017

PLYMOUTH RADIO CLUB RADIO RALLY

Harewood House, Ridgeway, Plympton,
Plymouth PL7 2AS

There is car parking available and the venue has disabled facilities. Doors open from 10am to 2.30pm with disabled visitors gaining access from 9.50am. Admittance is £2.

There will be trade stands, special interest groups, a Bring & Buy and RSGB bookstand. A raffle will take place on the day. Catering is available on site. Information available from David Beck, 2E0DTC on 0777 766 4822 or by email to d.beck123@outlook.com.

EXAM SUCCESSES

Many thanks to Mike (G4KXQ) for the following update :-

The following club candidates passed their Foundation Exam recently -

David Munn
David Gibbeson
Darren Tofield

together with David Hendy (M6IUI) who upgraded to an Intermediate Licence.

Congratulations to all of you and look forward to working you under your new call signs.

All four will be continuing their studies towards the next level in the New Year.

Many thanks to Beryl (G1SVP) for assisting the other volunteers in invigilating the examinations. Without their invaluable help, the Club would be unable to offer the opportunity for taking these examinations locally.



ANTENNA COMMON MODE CURRENT - CAUSE AND CURE by Terry (G4CHD)

I was prompted to write this short article after suffering some tvi after erecting a W3EDP OCFD antenna some time ago. I also remembered the Club having similar problems with an OCFD used for a Special Event in Victoria Park when the Laptop intended for logging kept freezing.

I don't profess to fully understand the intricacies of Balun design and so would welcome any comments.

The article is on the following 2 pages.

DETAILS OF A NEW LOCAL RADIO ESTABLISHMENT

Many thanks to Helen (G0EOA) and Fred (G0EOB) for bringing details of Shortwave (UK) to my attention. Being local, it is often an advantage to be able to discuss your needs in person.



Shortwave UK is located close to Tiverton in Devon, in the comfort of our very own 4.5 acre caravan park and serves the hobby communication needs of near and far. We are authorised agents for Icom, Kenwood, Yaesu and many others. We also have a full workshop approved by Ofcom with an experienced team for service and repair of all modern communications equipment. We are also an authorised Icom repairer.



We are located at Zeacombe House Caravan Park, Blackerton Cross, East Anstey, Tiverton, Devon, about 2 miles off the North Devon Link Road (A361) - turn North at the junction for Moortown Cross Picnic area, signposted Knowstone and The Masons Arms - or just punch into your Sat Nav EX16 9JU or give us a call on **01202 490099**.

The shop is managed by owner Duncan (M0KMP) along with Kelly who maintains the office and records to a high standard. We would be very happy to meet you in our pleasant environment where you can try out the gear before buying. Just let us know in advance what it is you are interested in and we will endeavor to have it available for you to try.

Looking forward to meeting you

That's it for this month - hope you enjoy the Newsletter

73s de Terry (G4CHD)

ANTENNA COMMON MODE CURRENT - CAUSE AND CURE

by Terry (G4CHD)

When feeding a simple dipole with coax, the first question that arises is whether to use a balun or not.

The pros and cons of whether to or not will now be examined.

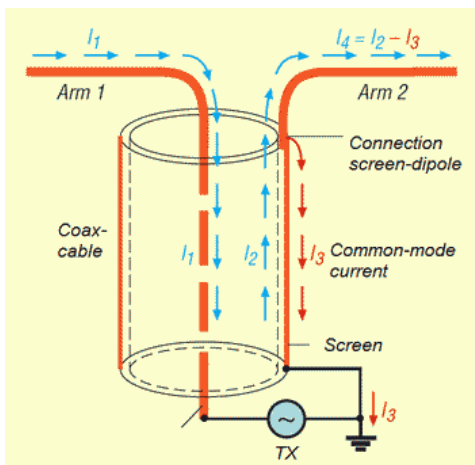
A BALUN - TO HAVE OR NOT TO HAVE - THAT IS THE QUESTION

One obvious advantage of NOT using a balun is that a simple cheap antenna dipole centre can be used - eg the Watson WDC-50 shown opposite which costs approx £7 from Radioworld.



But are there any disadvantages when NOT using a balun? To answer this it is necessary to examine the currents in both the dipole and coax as shown in the following diagram by DK7ZB:-

RF current from the TX travels within the coax (due to the skin effect at HF current travels in the outer layer of the central conductor and in the inner layer of the outer screen assuming it is sufficiently thick) shown as I_1 and I_2 in the diagram.



According to basic theory I_1 and I_2 are equal and opposite and represent Differential Currents. However, with no balun, when I_2 arrives at the far end of the coax and emerges at the connection to one arm of the dipole, the current splits with some flowing into the arm of the dipole and the remainder flowing down the outer surface of the coax shield. It is this current on the coax outer that constitutes Common Mode Current. The current split is determined by the relative impedances of the two options. If the electrical distance along the coax outer back to ground is a multiple of half wavelengths, then the low earthy impedance will be reflected at the screen dipole connection causing most of I_2 to flow as Common Mode Current on the coax outer at the expense of current flow

into the dipole. This will result in a not only a distorted radiation pattern from the dipole but more importantly, there will be radiation from the coax which could cause rfi to you and possibly your neighbour as well as rf feedback within the shack effecting your radiated signal and computer operation.

Alternatively if the electrical length of coax back to the earth connection was an odd number of quarter wavelengths, then a high impedance would be reflected back to the screen dipole connection resulting in little Common Mode Current and hence little discernable rfi etc. Perhaps this is why some amateurs who opt not to use a balun claim doing so is problem free.

The reason usually given for fitting a balun is to interconnect an unbalanced system such as coax feeder which has one terminal earthy, to a balanced system such as a dipole antenna where neither terminal should be earthy ie both terminals should be allowed to float relative to earth. However, perhaps a better reason would be to choose a balun which would eliminate Common Mode Current on the coax outer. A further reason might be to choose eg a 4:1 balun to match an antenna's higher impedance to the 50 ohms characteristic impedance of the coax.

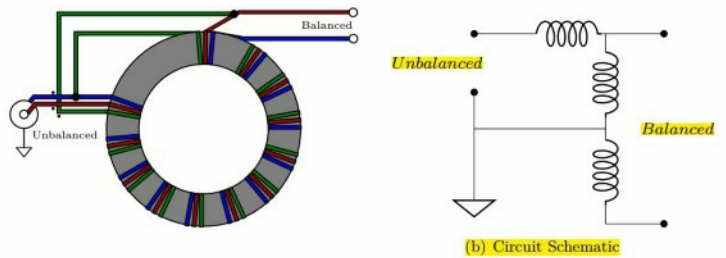
So if the decision is made to USE a balun, then one must decide whether to use a **Voltage Balun** or a **Current Balun**

So what is the difference between a Voltage and Current Balun?

Voltage Balun:

A voltage balun forces equal and opposite voltage potentials at its output terminals. An example is the 1:1 **Ruthroff Balun**, the design of which was published by C. L. Ruthroff in 1959, and described as a 1:1 broadband transmission balun.

This balun design uses bifilar windings around a toroid to create a balanced output. A third winding is added in order to complete the magnetizing current. With an equal number of turns as the bifilar windings, the third winding forms a voltage divider with the bifilar pair.



This puts each of the balanced terminals at half the voltage of the unbalanced terminal, where or

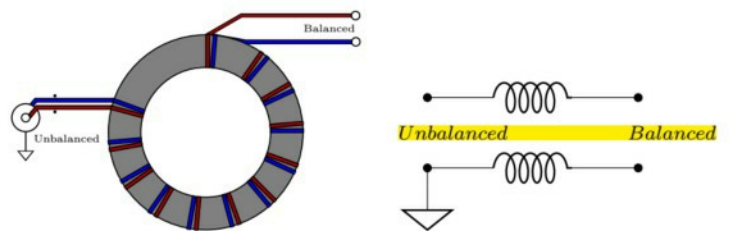
voltage. Voltage baluns therefore always try to force the output terminals to equal voltages, which means currents can be far from even! A voltage balun almost certainly guarantees some feedline radiation (or reception), because there are very few “perfectly balanced” antennas.

Current Balun:

A **current balun forces equal and opposite currents** (180° out of phase) to flow through its output terminals. Current baluns therefore allow the output voltage with respect to “ground” or outside world, to float to any value required to provide equal currents to each feedline conductor. In essence, current baluns are a universal device that can be used to drive either balanced or unbalanced lines equally well.

A current balun protects against RF currents flowing on the outer shield of a coaxial cable or transmission line. If an antenna is fed at a low-impedance point or current maximum, as is most often the case, current baluns are more effective than voltage baluns in forcing the right currents on the antenna and hence maintaining the desired radiation pattern. This is especially important when nearby metallic objects are interfering by coupling to the antenna.

An example is the **Guanella balun** which is similar to the Ruthroff balun with the exception that it does not contain the third winding. The construction of the Guanella balun is comparatively simple as shown opposite.



In 1944, G. Guanella showed that only transmission line currents were allowed to flow without respect to where the ground was placed on the load. Given that the topology has enough choking reactance, the output is isolated from the input. Like the Ruthroff balun, the voltage of the unbalanced line is split inversely among the two balanced terminals.

CONCLUSIONS

It would appear that if your antenna is well balanced eg a centre fed dipole with no nearby objects such as trees etc to unbalance the antenna, and the feeder comes away from the antenna symmetrically eg at right angles, then a **Voltage Balun** could be used with little common mode current being produced.

However, as a general rule, the use of a **Current Balun** is preferred in order to minimise feeder radiation caused by current imbalance in the antenna. This is particularly important with any OCF (Off Centre Fed) antenna where the individual antenna arm currents are substantially different and therefore the use of a voltage balun can lead to significant feeder radiation depending upon the electrical length of the feeder. However, minimising Common Mode Currents is only part of the story as the unequal dipole currents in an OCF dipole will induce differing currents on the coax outer which are therefore not be self cancelling. The magnitude of such currents will be maximised when the feeder electrical length is a multiple of half wavelengths. It would therefore be prudent when using an OCFD to also fit in line feeder choke(s) - perhaps one where the feeder enters the premises/shack and maybe another nearer the antenna to reduce feedline radiation and possible rfi to neighbours. An example is shown which costs approx £40.



It is hoped that there are no great glaring inaccuracies in this article but should the reader find any, I would be most grateful if they contact me.