

FISTS DOWN UNDER



Newsletter of the Australian / New Zealand chapter of the International Morse Preservation Society

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Recommended FISTS calling frequencies (MHz): 1.808 3.528 7.028 10.118 14.058 18.085 21.058 24.908 28.058

This month:

- Old(er) versus the new...
- FISTS logging software
- Low-to-high frequency helical antennas
- FISTS CW net report
- New member:
Ken Harpur ZL3AA
- Wyong field day

Members' news

Congratulations to **Ian ZL2AIM #9683** on recently achieving the FISTS Silver Century Award. To qualify for this certificate you need 250 points.

Gil ZL3GIL #14102 - I have a couple of summer projects lined up to keep me out of mischief during the annual vacation. One is a RockMite kitset transceiver for 17m and the other is the BodanSix which is a CW transceiver kit from Germany. The BodanSix covers a small segment of the 6m band which ought to be an interesting adventure. I've even managed to siphon off some funds (please don't tell my bank manager) to invest in a Czech Army telegraph key. It's going to be a right royal CW holiday break!

Gwynne ZL1AAR #9028 - I'm still not active on CW but it will happen!

My new address is at the Eastcliffe Retirement 'Resort' as they term it, but as in most places like this getting an aerial outside in the air poses a problem. I think it will be possible, but the second problem is drilling holes in 'their walls' to lead the co-ax inside.



Ian ZL2AIM with his Silver Award certificate.

During a visit to Sydney in December, **Joe VK2KJJ #9689** assisted **Steve VK2PS #9022** with repairs to his antenna farm. Steve has been off-air for several years due to health reasons, but we look forward to hearing him on the bands again soon!



Above: Joe VK2KJJ and Steve VK2PS checking antenna cables.



Right: Steve VK2PS at his radio desk.

After spending several months in England, **David G3SCD / VK3DBD #3756** has recently returned to his Australian radio shack in Yackandandah. David says his next project is to construct the Elecraft P3 Panadapter (visual display) to sit alongside his K3 radio.

Chris VK1CT / VK2CTN #9057 - After moving back to Canberra late last year, I was lucky to get my previous VK1 callsign: VK1CT. At the end of December I had lunch with Joe VK2KJJ and his XYL Lizzie, during their visit to Canberra. There was of course plenty of radio talk, but Lizzie is a fellow town planner, so we had much in common. The conversation continued the following day when Joe and Lizzie visited my QTH. Joe brought along his Heathkit HW8 QRP rig, which he used to participate in the FDU CW net the previous day.



Joe VK2KJJ and Chris VK1CT

Old(er) versus the new...

Ian ZL2AIM #9683



I have CW filters in all my rigs. It only takes about half an hour to insert them in the modern Icom, Yaesu and Kenwood rigs. But recently I acquired a Yaesu FT101ZD rig which didn't have a CW filter. I went on eBay and found one with a firm price.

The bad news was that he would only supply to continental USA. I remembered reading about getting a postal address in USA. I went onto the NZ post website and it was easy to set up (<http://www.nzpost.co.nz/tools/youshop>). Setting it up cost nothing and I now have a postal address in USA and one in UK. I suppose they make their money on charging something extra on the postage for redirecting the goods to your NZ address.

Now it was easy to order the CW filter and have it redirected to NZ. I started to prepare for putting it in. Not so easy! You have to remove two boards to just get at the board where you insert the filter. Both the AM board and the 'NB-Fix' unit have plenty of cables attached to them. Then you have to remove the IF board and turn it upside down to solder the new filter in. The photo below shows you the vacant space for the CW filter.



Inside the Yaesu FT101ZD.

It didn't take long for the filter to arrive. Unfortunately it was the wrong filter! Not the seller's fault, he did say it was for the FT101ZD but with the proviso that it was up to the buyer to check that it was the right filter. The seller was very understanding and as soon as he got the filter back, he refunded me in full. I now run the rig without a CW filter and use it on 80m and 40m for some nice ragchewing.



The Yaesu FT101ZD.

When I got the rig, it would not receive and it would not transmit. I am not a technical person but after disconnecting the mains, I started prodding various parts and also sprayed a contact cleaner on all the switches. At the same time I took off all the knobs and gave them a good clean with soap and warm water aided by an old toothbrush. The rig face came up looking very nice.

After a few attempts at the internal prodding and spraying thing, it came to life on all the bands except 20m. I shall open it up again and see if I can resurrect that band. In the meantime it can put out its full power on the other bands. I have not got it going on SSB but that may be something to do with the microphone wiring. But I have it for CW and not for SSB! I use it with my Vibroplex paddle connected through my CMOS III memory keyer. I have had some nice DX contacts with it.

FISTS logging software

The latest version (3.1.2) of the free [FISTS Log Converter](#) program is now available.

A minority of logbook programs do not allow you to record a QSO's end time. However, QSO end time is needed for the FISTS Rag Chewers Awards and some EuCW Activities.



This new version of FISTS Log Converter allows you to store the QSO end time in your logbook's Comment / Notes / Remarks field by adding 'TIMEOFF' followed by a space then the time in UTC as 4 digits (hours and minutes) or 6

Graham G3ZOD #8385

digits (hours, minutes, and seconds). Do not include colons or any other characters - just 4 or 6 digits only.



For example, QSO end times of 09:29:00 UTC and 21:40:30 UTC can be represented using:

```
TIMEOFF 0929  
TIMEOFF 214030
```

There are also other improvements and bug fixes. The program is available from the [download web page](#).

Many thanks to Alex PA1FOX, David G4YVM, Peter G4LHI, and Richard GOILN for helping with the design and testing.

The helix is well accepted in amateur circles: the VHF / UHF 'rubber ducky' for example. At lower frequencies, the primary reason for using a helical aerial is to achieve low height and a specific frequency of operation. Helical aerials are narrow bandwidth, single frequency devices, and my experience has shown that an MF / HF helix needs to be ground mat (radial system) dependent, self-supporting and robust. Helix length: diameter appears best when in a 20:1 range.

Turns need to be wound typically at wire thickness spacing, although the photos which appear later in this article show one that I have wound from 5mm aluminium wire for portable experiments on MF and low HF frequencies. Even spacing distribution may be achieved through co-winding a cord of equal diameter along with the wire. Enamel copper wire is preferred and the helical inductor must be capable of dissipating its share of applied power, noting that when we move down into the MF range, this is much more significant that at 28MHz for example.

An unfortunate fact of 'helical life' is that at 1.8MHz, 475 or 136KHz, a helical vertical aerial will always have enough loss to dissipate a fair percentage of the applied RF power.

If spaced bare copper wire is used because of high power application, the turns ratio needs to be 0.71, deduced from:

$$\frac{\text{Wire diameter}}{\text{Winding pitch}}$$

Winding many turns is always a tedious process, unless a convenient coil winder is at hand. I have a large (for the suburbs) 11m tall MF vertical that includes a 1000-turn at 50mm diameter helix as the upper part of its radiator, and it took me about three months to wind it: my forearms were like Popeye's after every winding session!

When high power (whatever that is, but you will soon find out if you are running it!) is used, ionization will occur at the top of the aerial and precautions need to be taken to eliminate destructive corona discharge. Enter the world of 'capacity hats'. All of the better aerial reference material will refer to 'corona discharge' in detail, and the reader is invited to research that topic to gain a better understanding of the hazard.

Most of the transmitted power will be dissipated in the helix due to low efficiency. While a helix is an MF or HF Tesla inductor, its resonant frequency will be sensitive to the difficult-to-control diameter. Inductor Q will be high, so it may be necessary to prune helix height / length AFTER deliberately making it over-length.

For example, to change the frequency of a 1.8MHz aerial with a 3dB bandwidth of 7KHz by 3KHz, only two turns may need to be removed from a total winding of 1160 turns. If using 12AWG wire, work on 460 turns per metre, and if 14AWG wire is your selection, 580 turns per metre as a guide. When length is 100 times diameter, the helix may be over-length and not self-supporting when air-wound. Helix diameter is the winding former diameter, plus twice the wire diameter. Wind from bottom to top and use tape to hold at regular

distances when applying paint/ marine varnish of several coats. Cable ties are also useful at this stage.



Technical considerations

Base design frequency of 1810KHz

Wavelength of 165.75m (538' 6")

1/4 wavelength is 41.45m (134' 8")

Height (degrees) = Height / 984 x f (MHz) x 360 degrees = 19.865 or 20 degrees (rounded).

Radiation resistance (Rr) is directly related to the height.

$$\begin{aligned} R_r &= 160 \times \pi^2 (H / 2 \text{ divided by wavelength})^2 \\ &= 160 \times 9.86 (15 / 538.5)^2 \\ &= 12.24 \text{ ohms} \end{aligned}$$

Aerial efficiency (from ARRL Handbook for short aerials – any edition)

$$\begin{aligned} A_n &= R_r / (R_r + R_t) \times 100 \\ &= 67\% \end{aligned}$$

Power radiated – Input 400W x 67% = 268 Watts (remainder lost due to low Rr)

Practical 1.8MHz examples:

KY3F (1990s) 2 x 3m sections of 100mm PVC as formers.

2 x 43m (140') AWG18 wire at one turn per 2.54cm (1") over each PVC section and joined at the centre.

Top/ capacity 'hat' of 12mm (1/2") mesh screen wire 30cm (11.8") diameter.

VK5BUG (2012) 6m (19' 6") at 290mm per turn length

fr = 1825KHz

L = 468 / fr = 468 / 1.825 = 78.92m (256' 6")

Typical initial measurements

The frequency was actually 1790KHz and with 400W applied showed a 50KHz bandwidth at 2:1 SWR. The radiator was then base tuned for a frequency of 1825KHz. A gate dip meter or aerial analyser may be used to determine the correct number of turns required on the helix, and fine tuning may be achieved by adding or trimming the capacity hat, and/ or installing a variometer in any base loading inductor that may have been included in someone's installation.

This article is by no means a 'how-to guide' but rather a sharing of experience (ongoing, I might add!). Good performance is to be had from using a long helix as a radiator, obviously being better with a low-loss former - I do not suggest that PVC pipe is in that category, but I happened to have it at hand and my hobby is not wallet-driven. Having the best ground mat that one can arrange is also a key to potential success.

The photos

I currently have a number of large helices with which to play, and this is just one of them. Photo 1. shows a modified Hy-Gain 18AVT base mounting section, the internal transformer having been removed and the base modified to accept balance feedline (dual-RG58 taped together). The large connector shown was only to keep paint and marine varnish out of the active connector during the painting process, and the large stainless steel bolt visible is for attaching a set of radials.



1. Modified Hy-Gain 18AVT base mounting section.

Photo 2. is the top of the helix showing the flattened section of aluminium wire used for capacity hat connection.



2. The top of the helix showing the flattened section of aluminium wire used for capacity hat connection.

I have elected to fabricate different aerial sections as above, including various sets of radials, simply so that I am able to swap into different configurations for testing and operation. Although time consuming and overly 'fiddly' to some no doubt, I find that I learn more and enjoy my aerial farm work as a consequence.

Photo 3. shows part of the actual helix, a 3.75m length of 50mm PVC pipe wound with 43 turns of 4mm aluminium wire spaced 50mm apart.



3. Part of the helix.

Summary

The larger the capacity hat, generally the better performance may be expected, since fewer turns will be required in the helix for a specific frequency. That then means lower AC resistance. However, site mechanical and physical stability requirements need to be considered so that an unwieldy top mass is not created. Should the large helix require guying, try heavy duty nylon fishing line or thin UV-stabilised polypropylene cords.

I have used various base insulators over the years: ceramic floor tile, ex-ETSA ceramic insulator, marine-varnished and routed Ironbark timber block, glass bottle and currently have the radiator mounted on a painted/ varnished timber mast with slices of PVC piping and silicone sealant as both spacing and adhesive for the helix to the mast, secured also by a number of heavy duty cable ties.

A solenoid wound HF helix aerial is tantamount to presenting the transmitter with an RF choke as its load, and therefore makes achieving efficacy and efficiency somewhat of an Everest-climb.

Experience has shown that providing a very substantial groundplane will give such a radiator the best chance of doing the job desired. At the time of writing, I am experimenting with a 2.5m x 2.5m piece of metal flyscreen at the base feedpoint of a 28MHz solenoid helical, while also having a minimum of four quarter insulated wire radials arranged in a St Andrew's flag cross pattern.

The experiment will continue with addition of more radials, making observations and taking measurements to perhaps provide a clear picture of what is, and is not, happening during transmission and reception.

I share my comings and goings in case they are of interest or use to someone else, which is one criterion on which I rate amateur radio: its function and value as a collaborative fraternity. Best wishes for all that you do.



FISTS CW net report

Chris VK1CT #9057

Since it began in September last year, several members have participated in the Club's weekly CW net on Tuesday evenings. A few non-members have also called in and perhaps they will join us in the near future.

The band conditions on 40m have recently been excellent and this has allowed experiments with QRP. The net follows a round-table QSO style, where each station passes to the next station and eventually back to net control. This method has worked very well and saves time by not having to pass back to net control after each over.

Sending speeds are generally around 18 words per minute. But don't let that put you off! We're happy to slow down to a speed you're comfortable with.



"CQ FISTS NET
DE VK2FDU K"

Details of the Tuesday CW Net:

Time: 0900 UTC (8pm AEDT) and closing at around 1000 UTC (9pm AEDT).

Frequency: 7.028 MHz +/- QRM

Net control: VK2FDU (operated by Chris VK1CT)

To check into the net, you just need to send your callsign during a pause and the net controller will take care of the rest. Everyone is welcome to participate. We look forward to hearing you on the net!

The table below shows the log details of each net held so far.

Don't forget we also have two other nets: the slow speed net run by Garry VK2YA #14151 on Wednesday evenings and a voice net (SSB) on Thursday evenings run by George VK2DLF #9052. See the back page for more information on these nets.



Date	Time (UTC)		Freq.	Callsigns	Net Controller
	Start	End			
02-Sep-14	1000	1110	3.528	VK3FGE - VK2KJJ - VK2ASB	VK2CTN
09-Sep-14	1000	1058	3.528	VK2KJJ - VK2ASB	VK2CTN
16-Sep-14	1000	1100	3.528	VK2KJJ - VK2ASB - VK4MDX - VK2EBN	VK2CTN
23-Sep-14	1000	1100	7.028	ZL2AOH - VK2KJJ - VK2ASB - VK4ARC - VK2EBN - VK2GAZ - VK7AD	VK2CTN
30-Sep-14	1000	1005	7.028	VK2KJJ - VK2ASB - VK2EBN	VK2CTN
07-Oct-14	0900	1000	7.028	VK2ASB - ZL2AOH - VK2EBN - VK1AI - VK2KJJ - VK3FGE	VK2CTN
14-Oct-14	0900	1000	7.028	VK2EBN - VK2ASB - ZL2AOH	VK2CTN
21-Oct-14	0900	0958	7.028	VK2EBN - VK2ASB	VK2CTN
28-Oct-14	0900	1000	7.028	VK2EBN - VK2KJJ - VK2ASB	VK2CTN
04-Nov-14	0900	1016	7.028	VK2EBN - VK2KJJ - VK2ASB	VK2CTN
11-Nov-14	0900	0955	7.028	VK2EBN - ZL2AOH - VK2ASB	VK2CTN
18-Nov-14	0900	1010	7.028	VK2RQ - VK2ASB - VK2EBN	VK2CTN
25-Nov-14	0900	1000	7.028	VK2GAZ - VK2RQ - VK2ASB - VK7AD	VK2KJJ
02-Dec-14	0900	1000	7.028	VK2EBN - VK3EO - VK7AD - VK2ASB - VK2GAZ	VK2KJJ
09-Dec-14	0900	1033	7.028	ZL2AOH - VK2ASB - VK4JAZ - VK3FGE - VK2RQ	VK1CT
16-Dec-14	0900	1005	7.028	VK2EBN - VK2ASB	VK1CT
23-Dec-14	0900	0930	7.028	VK2EBN - VK2ASB	-
30-Dec-14	0900	0950	7.029	VK2ASB - VK2KJJ	VK1CT
06-Jan-15	0900	1002	7.0295	VK2ASB - VK2EBN	VK1CT
13-Jan-15	0900	1015	7.028	VK2KJJ - VK2ASB - VK2EBN	VK1CT
20-Jan-15	0900	1022	7.028	VK2KJJ - VK2ASB - VK4JAZ - VK2FGBR	VK1CT
27-Jan-15	0900	1010	7.028	VK2KJJ - VK2ASB	VK1CT

Table 1. Log sheet of FISTS Down Under weekly Tuesday CW net.

FISTS Down Under nets

CW

Tuesdays on 7.028MHz

0900 - 1000 UTC

Net controller: Chris VK1CT

CW (slow speed)

Wednesdays on 7.028MHz

0900 - 1000 UTC

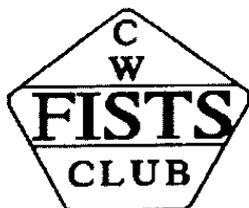
Net controller: Garry VK2YA

SSB

Thursdays on 7.058MHz or
3.538MHz depending on band
conditions.

0900 - 1000 UTC

Net controller: George VK2DLF



Donations

Thank you to the following members who included a donation when renewing their membership:

Noel VK2CAO #14127

Steven VK2PS #9022

Dick VK3AGQ #14155

Bevan VK4BCM #9053

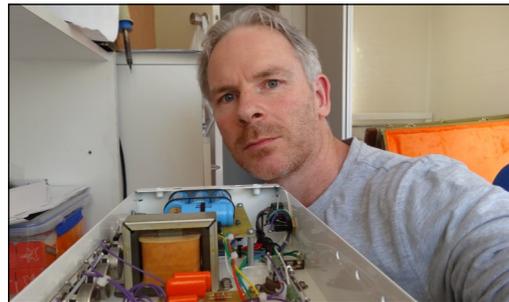
John ZL1BHQ #9625

Ian ZL2IH #9027

New member

This month we welcome **Ken Harpur ZL3AA #14183** from Christchurch.

Ken writes: Born in 1968, I first developed an interest in radio when I was nine years old and my Dad bought me a Crystal set for Christmas. I watched as he and my older brother assembled it for me and I was amazed when I started tuning around and picking up local stations. I was hooked!



Ken Harpur ZL3AA

Fast forward to the age of 15 when in 1983 I bought a Short Wave receiver kit from Dick Smith for NZ\$10 and was again amazed to be tuning in stations that weren't so local! A couple of years later when I started earning my own money, I bought an FRG-7700 and started seriously getting into radio.

Of course, sometimes life gets in the way and time enjoying the hobby was quite limited for a while. In 2002 I became a Ham and had my first contact on CW was with Don WB6NMN on a TS-520. I had a lot of fun on that old radio, but the clunking of the relay was hard to handle sometimes. No high power for me...that radio taught me that as long as the other station was between 1 and 2 S-points above the noise, I could have a reliable contact, barefoot and with a dipole.

Over recent years I haven't been active on the bands, apart from occasional SWLing. I am temporarily living in Brisbane and am QRT during this time. I will be moving back to Christchurch late in 2015 where I will be active on-air (CW only) once again. In the meantime, I am re-learning and brushing up on my Morse by using the Koch Trainer for Mac.

I have only used a straight key, an old one from the 'post office' days. The only rig I have for now is a Softrock RX / TX which I use to listen to mainly 40m CW to keep my ear in.

So there you have it...I'm very excited to be a new FISTS member and looking forward to meeting you all on the air!

WYONG FIELD DAY

22nd FEB 2015

Flea market opens from 6:30am

Traders & exhibitions 9am

Lectures from 10am

Bus from Wyong Station

<http://www.fieldday.org.au>

This annual field day is one of the largest gatherings of radio amateurs in Australia. It will be held on **Sunday 22 February 2015** at Wyong Racecourse, on the NSW Central Coast. Although there will not be any official FISTS Club presence, the event provides a good opportunity to arrange a meeting with any FDU members that may be in attendance. If you plan to be there, please let us know at fists-down-under@ihug.co.nz and we'll put you in touch with any other members who may also be going.

Membership renewals

The following memberships are due for renewal to the end of February 2015. Some are well overdue.

3756 - 9028 - 9048 - 9067 - 9097 - 9658 - 9677 - 14111 - 14118 - 14119 - 14145 - 14145 - 14150 - 14154 - 14156 - 14157 - 14169 - 14171

If you are listed in error, wish to receive a replacement reminder notice or would like to discuss your membership, please email us at: fists-down-under@ihug.co.nz

Ralph ZL2AOH #1073



Until next month, 73