

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:

- Good old FISTS!
- Straight key night 2014
- This and that...
- Looking over the fence at top band (160m)
- FDU nets - an update

FISTS Club aims:

Further the use of CW
Engender friendships among members
Encourage newcomers to use CW



Silent Keys

We regret to report that **Chris O'Brien VK3PEU #14139** and **Don Smith VK3ASD #14143** have become silent keys.

Chris joined FISTS Down Under in March 2012 and Don joined in May 2012.

Good old FISTS!

Thanks to the club, I have met several amateurs when on holiday abroad. For example, when in New Zealand in 2002 and 2003 FISTS members Nigel ZL2TX and Ralph ZL2AOH arranged meetings and visits to several members all over the country. When we went to Japan in 2009, Ralph set up meetings with Manabu JE1RZR and Mack JE1CLH. We have kept in touch with them ever since, mainly on 20m CW.



David G3KMG and Manabu JE1RZR

Then followed a tour – down to the bank of the Wear to see the Cathedral from the famous view point, then up into the hills via the moors for a varied view of our local countryside. Manabu wanted to sample typical English fare, so it was an evening meal at a local hostelry. That was followed by a good old natter – he speaks excellent English, and more amazingly, can understand our Geordie lingo!

After a lazy start, a wander round Durham city and the World Heritage Castle and Cathedral. This was followed by another 'English' meal – fish and chips at our favourite restaurant in the market square. Sadly, it was then back to the station so he could get back in time for his meeting.

Another wonderful experience, thanks to FISTS! Since Manabu got set up in Tashkent, we have been having regular skeds, mainly on 17m CW. His page on QRZ.com shows his enviable antenna location.

David G3KMG #124

In February, Manabu told me he was flying in to Edinburgh from Uzbekistan for a business meeting so could he pop down and see us. Uzbekistan? Manabu works for the Japanese government and has been posted there for a while. He arrived in Edinburgh on 2nd March and took the train to Durham. I was pleased to note that the train arrived as scheduled at exactly 1421 to match the fabled Japanese rail service punctuality.

NZART Straight key night 2014

Competing in the NZART Straight Key Night in November last year, the following were the section leaders who qualified for the FISTS Down Under SKN prizes. The prize for each leader is a certificate and a year's FISTS Down Under subscription.

Open QRP	Ian MacQuillan ZL2AIM 37.5 points (FISTS #9683)
HB/ Kitset QRP (equal first)	Max Saunders ZL2CVW 13.5 points (FISTS #14162) Alan Wilden ZL4FM at ZL4AA 13.5 points
Open QRO	Mike MacAlevy ZL4OL 23 points

Ian and Max have had their subscriptions extended, while the other two have been invited to join FISTS Down Under with their first year's subscription remitted.



This and that...

Ian ZL2AIM #9683



Reading the February 2015 FDU newsletter, Doc VK5BUG reminded me of rigs that I once owned. I had two Argonaut 505 rigs and both had the TenTec power supply and matching linear that boosted the power from 5 watts to 50 watts. Nothing fancy, but they were great rigs for CW.

He also mentioned the Elecraft K1 which is a rig I built in about 2004. I had the two band version and I note that Elecraft are no longer offering it in a four band unit. But the one that caught my eye was the Scout 555. I bought mine in about 2005 from a ZS6 station. It came with all the band inserts including 160m (which I never used). It would transmit at 5 watts and a twist of a screwdriver underneath the rig changed it to 50 watts output. I can kick myself now for selling both the K1 and the Scout 555 but I do know that there is a happy ZS5JON who now owns both those rigs.

We are so spoilt with the modern rigs...

Doc didn't mention the TenTec 13XX range of QRP transceivers. I have built four or five of them in either 40m or 20m versions. They cost about US\$85 when I built the first one and then were \$95 when I built the last one in about 2006. Another rig worth looking at for CW is the Oak Hills Research OHR 100A in the band of your choice. Mine is the 80m version and I have also got the kit for the digital dial DD-1.

We are so spoilt with the modern rigs with memory keying, RIT, XIT, filters, AGC etc. With all those bells and whistles which the modern rigs have, I often wonder how the old timers managed with their sounders and keys.

Having been presented with a sounder some weeks ago, I decided to try sending some code with it and see (listen) what happens. The sounder is marked J.H. Bunnell & Co New York USA. Not knowing how to operate it, I went to Google and found plenty of information. I measured the resistance and it was 200Ω. I decided on putting 6 volts into it and keying it with a W.T. 8 Amp N° 2 key. The power supply would be a 6 volt lantern battery.

Everything went to plan and I heard the clack when I closed the contacts on the key. But here is where I scratched my head. How does one differentiate between a dit and a dah? I am still bewildered and hope that one of the Fists members can enlighten me. I have read about a click and a clack, but I only hear the clack!

To me it sounds exactly like what I hear on the internet at: <https://www.youtube.com/watch?v=Lki3jxNLVCI> But, I KNOW that he is sending CQ CQ. That part is easy, but when it came to his callsign, I was lost. (Even reading down the page I could see his callsign.) Maybe I need to get into a big learning curve, but I now can take my hat off to the operators who could read the code generated by a sounder. You could also look at: <https://www.youtube.com/watch?v=8EfXLvQmmno>

Well, thank goodness we now have modern CW rigs with all the bells and whistles!



OHR 100 (80m version) with DD1 digital dial.



Sounder: J.H. Bunnell & Co New York USA



The sounder and W.T. 8 Amp N° 2 key.

(Back in the late 1990's, I was a competitive lawn bowler and it was after a game on a Saturday afternoon that I happened to meet some members of the Morsecodians at the Wentworthville Bowling Club in Sydney. They were holding their AGM in the club's function room and their meeting was conducted almost entirely in Morse, using a sounder. It was around this time that I was studying for my radio licence, so it was an interesting coincidence. - Ed)

Although I have been active on-air with CW since 1964 including a three-decade stint on 20m QRP, I had never made a concerted effort to explore TopBand (160m, 1.8MHz). Perhaps it was rubbing shoulders with urban myths such as 'You can't do it successfully from a suburban block' and 'The aerials required are so big that you need an acreage to have any real chance of doing well on that band'.

Anyway, I was always busy with full-time study, work and other wireless world activities, so I never gave 160 a try: until recently. However, during the 1960s I spent about seven years working on 44KHz as a shore-ship Morse broadcast frequency for Australian submarines and small surface craft. I made many reception logbook entries while at sea around Australia, New Zealand, South Pacific, Papua New Guinea, Antarctica and South East Asia as part of profiling that frequency's accessibility and reliability footprint, and I think that my interest in the 'basement bands' was probably kindled back then, even if I was unaware at the time.

Now this is not a 'how to do it' article, nor is it a definitive work by an international authority on the subject of MF amateur radio, but simply a shared recount of the how I have gone about entering a most fascinating aspect of amateur radio after so many years. I really feel a bit like a child with a new whizz-bang toy, and that is not to be scoffed at when one is leaning on being 70 years old. It is easy to think that my best years are behind me, and when I now struggle to stand an 11m tall radiator up against a mast and bolt it in place, I often agree with that thought. Perception is reality.

It was during the first year of my retirement at the tender age of 68 that I freed myself from 30 years of fulltime academic study and began to formulate a 160m station plan. I had developed a life pattern of getting up at 3.30am and studying until 7am, heading off for a day's work then hitting the sack around 8.30pm – for three decades! Definitely no MF action for me! Long-time friend and very experienced TopBander, Andy VK5AAQ, was able to provide both the theoretical and practical experience motivation necessary, in addition to shedding much light regarding budget entry to that band. I was not interested in 'plug and play' with commercial items which is unfortunately so prevalent in the hobby today.

The sequence of events that I am about to unfold will appear bizarre to the latent project managers out there, but there were many, many events happening in my life during the last decade, so things happened as they found time and space. It was not a checklist-ticking exercise because that would be diminished fun for me and much like work.

A 'cookie jar' amplifier

Having been gifted a couple of ex-broadcast 833A 'cookie jar' triodes, sockets and connectors by another friend, Donald VK3IT, I commissioned Andy to build me a custom 400W tri-band amplifier using one of the 833As for 160, 80 and 40m. I scrounged most of the parts and Andy supplied the rest. It was built in an ex-CRO vented

cabinet and denied Andy some of the room he would have preferred when working with such physically large components: for example a 200 x 200 x 200mm 1000pf variable capacitor!



My workshop suffers from AC supply voltage drop and for several years we were unable to source a really stiff HT supply, battling with various transformer iterations that resulted in either inadequate or manifestly excessive HT voltages. Trying to dispose of a spare 600V off the secondary is not an easy thing to do, and although a bucking transformer was able to tame that excess, neither of us saw that as being good practice so kept looking out for something more tractable. It also meant a much larger power supply enclosure than was preferred. Eventually it was Andy who inherited a 27MHz diathermy machine out of which we extracted a magnificent transformer that is right on the money for the 3100V required.

The separate power supply box rolls away under a desk or bench and was built from 11mm plywood, moves on castors, is metered and

has all of the ventilation openings screened to prevent 'local wildlife' from setting up residence. It was a grand day for me when Andy connected the completed beast in line and flashed it up: 400W on each of the three bands with in-spec harmonic suppression. Output waveform was very nice and although Andy hates triodes in RF amplifiers (but likes them for audio operation), I am

delighted to be one of a very few people (apparently) to have a properly working 833A amateur band linear amplifier. Efficiency figures are not the be-all end-all thing for me, but a big glowing 'cookie jar' triode has heart, soul and presence, just like a steam engine. Try and get that from a much more efficient power FET! It is all an age and comfort zone thing...

The most notable statement I need to make is that we originally opted for the 1981 ARRL HB circuit project for this 833A unit, only to discover that what had been printed there could NEVER have worked with an 833A due to drive requirements, and Andy needed to recalculate and redesign the circuit so that it did. Naughty, naughty ARRL! Not the first time we have discovered such 'black holes' in what they print annually. Anyway, the 833A amplifier is a 'goer', Andy refuses to claim it and I love it!

Venerable 813s on TopBand

At the same time that the HT transformer search was going on, I acquired a non-operational 2 x 813 grounded-grid HF linear amplifier with separate power supply from another RF-comrade, Rob VK5RG who built it back in about 1975. During a subsequent process of down-sizing I tried to resell it a few times but the market for these had evaporated and I decided to discuss with Andy the idea of modifying it to a fixed-C loaded, monoband, TopBand linear amplifier, retaining the grounded-grid configuration.

I confess to retaining a 1950's amateur radio vision in which the *ne plus ultra* station consisted of one exciter and a range of monoband amplifiers to cover bands of interest. In those days the

... a big glowing 'cookie jar' triode has heart, soul and presence ...

items were usually rack mounted with a large power supply at the bottom of the rack, whereas I like to have them desk-topped. Space for that approach is not an issue in my RF Central.

For that project and armed with Andy's advice, I gutted the bandswitch and coils, wound a dedicated 27T 90mm diameter inductor for 160m, new VHF parasitic suppression inductor, front panel-mounted the larger coil, bogged the now unused front panel holes and resprayed the entire unit and power supply box, while adding a dedicated bonding strap between the power supply and RF deck in addition to their independent earth straps to the station single point earth; peace of mind with the 2250V HT present. The completed unit is about to be tuned for on-air operation and gives me a second nostalgic valve amplifier option for TopBand.

Aerials

Aerial-wise, a 46m length overall alloy tubing and single top wire Inverted-L over about 40 radials and fed with balanced line had been in place for almost a decade and worked well as a multi-bander. As part of the plan I decided to drop it to the deck for revamping: multiple 41m wires in the capacity hat, an enlarged alloy tubing vertical radiator of 11.3m x 50mm, increase in radials from 40 to 60, and lots of bonding inclusions to the ground mat system – domestic copper piping, rainwater tanks, metal fence rails and sheeting etc. Visitors with amalgam fillings ran the risk of inclusion also! One 800 litre tank is dedicated to the aerial base and has been fitted with a four-dripper irrigation line to maintain the base zone moisture level. My motivation for this renewed configuration came from Stew Perry W1BB SK in Bridges, 1997, p. 11-9.

Most of my band activity has initially been using a 52m flat top + 26m feeder doublet at 11.4m. That particular aerial began life as a 40m band Extended Double Zepp fed as a doublet with 450-ohm dogbone ladder line. The Inverted-L is used for transmitting and receiving as is the low doublet, and the pair are also used as separate transmit/receive aerials respectively. Amateur friend Hans VK5YX recently passed on to me a 160m dipole made from sturdy 7-strand bare copper wire with robust ceramic insulators which is a real bonus acquisition, and I will find a justified purpose for it soon, perhaps in portable operation, or if/ when we relocate, as another TopBand receiving aerial option.

Aerial coupler

The next piece of equipment home-brewed was a heavy duty monoband link coupler using a chunky four-gang broadcast capacitor, wide-spaced 350pf variable capacitor and hand-wound beefy inductor with a three-turn link. It works a treat on 160m.

TopBand transceiver and receiver

After many transceiver trials I acquired a Drake TR-7 and matching power supply that has become my MF station exciter. I also have a Swedish ITT SRT CR304A professional digital receiver for split frequency work.

Getting going on TopBand

So after about 15 years of mulling things over and planning, Andy and I fired up and tested the MF station on 10 February 2015,

appropriately the 51st anniversary of my joining the Royal Australian Navy as a Radio Operator. Since the test, I have made regular early morning and/ or late evening forays on 1818KHz and spent many hours listening on air to note which countries appear and when, during the last summer season. My intention is to continue doing this to develop a 'station footprint' for TopBand and I will have to repeat the performance so both main MF aerial data are at hand.

Researching what I was getting into

Having the equipment capability for 160m operation was one thing, and I then busied myself with researching as much as I could about theories and experiences on TopBand by many others, including Andy VK5AAQ, Donald VK3IT, and Stew W1BB SK. I also explored the writings of Terman, Cebik, Jacobson and Hiller, and Nichols to name a few key authors: I have listed them in the Bibliography.

Accepting that the three key elements of successful TopBand operation are location, location and location, I also investigated contributing factors of radiation angle, improving signal-to-noise ratio, ground conductivity and switchable transmit/ receive aerial options. However, it is the actual propagation of 160m radio waves that holds the greatest fascination for me already.

Some unique aspects of TopBand propagation

Operating on 160m is not simply a magnified or more difficult version of 80m activity as some may think. It is a whole new world, parallel to the 6m 'Magic Band' and for all the microwave builders and operators, providing one of the last bastions of what I call *proper amateur radio*.

A lot of technical material has been written about TopBand and MF propagation in general, and it is not my intention to either compete with or replicate it here, although I would like to share some recent interesting experiences and what my research has provided by way of a guide, if not an explanation. This information may be of use to others contemplating dedicated TopBand operation.

Ionospheric particle collisions

The ionosphere has been reported as absorbing energy from radio waves passing through it as a result of collisions between the vibrating electrons and resident gas molecules. This action causes the ionosphere to act with respect to the radio wave as a medium having a certain conductivity [which] will have a value proportional to the average number of collisions between electrons and gas molecules per second, and will be greater the higher the average velocity possessed by the vibrating electrons (Terman 1943, p. 714).

The number of attenuating collisions is independent of the frequency or amplitude of the radio wave and the collision rate per second is determined by the height within the ionosphere at which such collisions are occurring.

Terman (1943) also noted that because the electron density drops off very rapidly below 80km above the earth's surface, the maximum conductivity occurs in the ionosphere at heights in the order of 60 to 80km for all ordinary frequencies. This is at the lower edge of the ionosphere (p. 714) and corresponds with the D layer which is closest to the earth at about 60-90km. A succinct, not-too-technical

description of its structure and ionisation process may be found in Wikipedia (/ionosphere#D_layer).

The D layer lies below the E layer and 'probably has an influence on daytime 160m band [and broadcast band] signals at considerable distances. Very little is known about D layer action beyond the fact that it is actively present as a reflective medium only part of the time and has traditionally been seen as less important than the E and F layers in returning radio waves to earth' (Terman, 1943, p. 720). The diurnal and seasonal characteristics and the variations with latitude and longitude of the various ionospheric layers in terms of virtual heights and critical frequencies have been well-documented by many authors and the reader is invited to undertake personal research of those aspects that may be of particular interest.

Auroral Oval synopsis

Having spent a lot of time at sea 40 years ago when using 500KHz CW communication in the Arctic and Antarctic circles, I am intrigued by the propagation theory promoted by Oler and Cohen (1998), as not everything about MF operation happened back then as it seemed or was anticipated. I find that little has changed in that regard, now that I am exploring TopBand. They promoted that TopBand signals may navigate through the auroral zone without being heavily absorbed or attenuated, solely by skirting underneath it and into the Polar ionosphere (which is inherently more stable) and back into the middle latitude ionosphere without ever having to come into direct contact with the auroral ionosphere. This is able to produce trans-Pacific and trans-Atlantic openings which are known to be of short duration, maybe a few minutes. The local midnight time zone is the most heavily ionized, volatile and unpredictable. Worth noting is that 160m DXCC #1, Stew W1BB SK was never able to make a two-way 160m contact with a JA, perhaps due to this auroral ionosphere characteristic (Oler and Cohen, 1998)

Of course, their investigative work was undertaken in the northern hemisphere, but I am comfortable in extrapolating that notion to VK operators experiencing similar effects on TopBand signals emanating from South America and South Africa via the South Pole for example.

160m signal fading

Sky waves from a distant transmitter at MF always exhibit fading (QSB) and it is usually relatively slow, commonly taking some minutes to go from a maximum to minimum signal strength, although in some instances it may be more rapid. 'This fading is the result of interference between waves that have traveled slightly different paths in the ionosphere' (Terman, 1943, p. 744). When researching radiation angle enhancement for TopBand, I discovered that 3.5 degrees from horizontal is assumed to be the minimum practical angle at which radio waves can depart a transmitter aerial (Terman, 1943, p. 749) although that specification was actually cited in connection with skip distance, a phenomenon not usually applied to 160 or 630m operation, being more relevant to E and F1 layer propagation with which we are more familiar in HF work.

Terman (1943) suggested that 'practically all the absorption that a wave suffers as a result of the ionosphere occurs where the wave enters and leaves the ionosphere' and also interestingly, at the lower

frequencies the earth's magnetic field reduces the conductivity to values less than can be validly calculated using conventional formulae (p. 715). 160m propagation is not an exact science but may be considered scientifically in order to glean more evidentiary information for amateur operators to interpret and experiment with. At least that is how I see it.

What am I hearing/ working?

Given that mid-summer is not considered to be the optimal hunting ground for TopBand DX, and that it is very early days into my station footprinting, I am able to confirm that during February 2015, Norway, Finland, Channel Islands, Czech Republic, Poland, Germany, France, Italy and the United Kingdom, while VK3, 6 and 7 have all been RST 229 or better late at night/ early morning local time. Barefoot TR-7 at 100W and the low doublet was the station used.

Epilogue

My grateful thanks are extended to Andy VK5AAQ for all his time, effort, construction and advice to help me get this far, and to Donald VK3IT for his ongoing signal reporting and TopBand observation sharing. It is my hope that my article may encourage others to try 160m with their favourite mode(s) and station configuration.

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The International Morse Preservation Society



FISTS Down Under nets

CW (approx. 18 wpm)

Tuesdays on 3.528MHz

1000 - 1100 UTC

Net controller: Chris VK1CT

CW (approx. 10 wpm)

Wednesdays on 3.528MHz or 7.028MHz depending on band conditions.

1000 - 1100 UTC

Net controller: Garry VK2YA

Have you recently made a breakthrough with your CW speed, met a fellow club member, called into a FISTS net, or built an electronic keyer?



Tell your fellow members about it. More items for the newsletter are needed.

Items can be sent by email or post to Chris VK1CT or Ralph ZL2AOH (see details in masthead).

Donations

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

Pat VK3OZ #9070

Roy ZL1WI #9678

Peter VK3FPL #14144

Tony ZL3HAM #9015

Justin VK7TW #9077

FDU Nets - an update

Chris VK1CT #9057

I'm happy to report that the club's Tuesday night net continues with a dedicated following of several members showing up each week. As net controller, I often use the club's callsign VK2FDU which is worth 5 points to FISTS members!



Gary VK2YA #14151 is controller of the weekly Wednesday night slow speed net. He reports that one or two operators call in each week. However, to ensure its viability, more operators are encouraged to take advantage of this net and join in.

Many thanks to George VK2DLF #9052 for taking the initiative to start the Thursday night SSB net and act as net controller. Unfortunately the SSB net has not attracted enough participants to keep it running.

The nets provide a great opportunity to meet other members on-air and to build up your FISTS award points at the same time. If you haven't called into a net before, please give it a try and you will be warmly welcomed.



Now that winter is here, it's time for us to switch from 40m to 80m. For net details, please see the panel to the left of this page. Below is a log sheet of the Tuesday night nets since the start of this year.

Date	Time (UTC)		Freq.	Callsigns	Net Controller
	Start	End			
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
03-Feb-15	0900	1010	7.028	VK2ASB - ZL2AOH - VK2EBN - VK2KJJ	VK1CT
10-Feb-15	0900	1005	7.028	VK32ASB - VK2EBN - VK3DBD	VK1CT
17-Feb-15	0900	1014	7.028	VK2ASB - VK2KJJ - VK3FGE - VK3DBD	VK1CT
24-Feb-15	0900	0915	7.028	Condx very bad. No net.	VK1CT
03-Mar-15	0900	1020	7.028	VK2ASB - VK2KJJ - VK2EBN - VK3DBD	VK1CT
10-Mar-15	0900	1012	7.028	VK2ASB - ZL2AOH - VK2EBN	VK1CT
17-Mar-15	0900	1025	7.028	VK2ASB - VK2KJJ - VK2EBN - VK3DBD	VK1CT
24-Mar-15	0900	1019	7.028	VK2KJJ - VK2EBN - VK3HJ	VK1CT
31-Mar-15	0900	1018	7.028	VK2ASB - VK3DBD - VK3CGB - VK2KJJ - VK2FGBR	VK1CT
07-Apr-15	1000	1114	7.025	VK2ASB - VK3DBD	VK1CT
14-Apr-15	1000	1040	7.028	VK2EBN - VK2ASB - VK2FGBR	VK1CT
21-Apr-15	1000	1045	7.028	VK2KJJ	VK1CT
27-Apr-15	1000	1100	7.0255	VK2EBN - VK2KJJ - VK2ASB	VK1CT
05-May-15	1000	1045	3.528	VK2KJJ - VK2ASB	VK1CT
12-May-15	1000	1015	7.028	No stations heard. Poor condx.	VK1CT
19-May-15	1000	1035	7.028	ZL2AOH - VK2KJJ - VK2ASB	VK1CT
26-May-15	1000	1030	7.026	VK5CJC - Poor condx and many contest stations	VK2ASB

Membership renewals

Ralph ZL2AOH #1073

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

9023 - 9052 - 9075 - 9078 - 9097 - 9644 - 9673 - 9674 - 9679 - 9690 - 9695 - 14107 - 14118 - 14121 - 14140 - 14141 - 14142 - 14169 - 14175



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

Until next month, 73