

The Official Newsletter of the Auckland VHF Group Inc. Spectrum



2m omni-directional antenna at top of mast. Two sets of 4 x 7 element Yagi antennas form the National System links north and south. Below these is the 70cm omni-directional antenna for local access to the National System. Other Yagi antennas are part of the aviation band system. Photo ZL1VH

The Brynderwyn Repeater Site, close up
See page 9 for the report



Auckland VHF Group Inc.

Branch 66 NZART

PO Box 10138, Dominion Rd, Auckland 1446
Clubrooms: 30 Hazel Ave, Mt Roskill

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Klondyke Managers	ZL1VH / ZL1BK				
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Club Web Page				http://www.gsl.net/zl1bq	
ATV Interest Group				http://www.gsl.net/zl1qf/atvug/ATVusers.html	
ZL1VHD Dstar gateway administrator; Laurie ZL1ICU			634 5130	0274 817463	perma@xtra.co.nz
ZL1VHD Dstar gateway registration URL :				http://zl1vhd.dstar.org.nz	

Club News and Net:

The combined Auckland VHF Group and Auckland Regional Branch News and Net are held on 146.625 MHz and 439.875 MHz at 8.15 pm each Sunday or after the ZL6A National Broadcast on the last Sunday of the month.

Club meetings are held at the Clubrooms at Hazel Avenue, on the second Monday of each month at 7.30 pm. For other details, listen to the News and Net each Sunday evening.

SPECTRUM is the official journal of the Auckland VHF Group Inc. Opinions expressed are those of the authors and do not necessarily reflect club points of view.

The closing date for SPECTRUM articles is by the 1st of each month. Articles to be submitted to the editor Peter ZL1UKG peterlov@ihug.co.nz

Auckland VHF Group (Inc) Branch 66

General Meeting notice

14th August 2017 7.30pm, Hazel Avenue Club Rooms

(Located on left at the end of Hazel Avenue)

The Evenings Subject:

Meteor Scatter Communication

Meteor scatter or meteor burst radio communications relies on the fact that meteors continually enter the Earth's atmosphere. As they do so they burn up leaving a trail of ionisation behind them. These trails which typically occur at altitudes between about 85 and 120 km can be used to "reflect" radio signals.

Come along to our August meeting and learn more about this fascinating mode of communication from our guest speaker James Smith ZL2ET.

EVERYBODY WELCOME

Hamilton Amateur Radio Club

MARKET DAY

Saturday, August 26, 2017

Waikato Table Tennis Stadium, Edgecumbe Street

Vendors from 8:00am, Buyers from 10:00am

**All enquiries to: Market Day, Hamilton Amateur Radio Club,
PO Box 606, Hamilton**

E-mail: harcmday@nzart.org.nz

Web: http://www.zl1ux.org.nz/market_day.html

VHF Group General Meeting
Minutes : Monday 10th July 2017
Held At: Auckland VHF Group Clubrooms
30 Hazel Avenue, Mt Roskill.

Attendance: As per attendance book plus a couple

ZL1TIA, ZL1TUX, ZL1VH, ZL1TOF, ZL1TOW, ZL1AVZ, ZL1GSG, ZL1TCI,
ZL1YOT, ZL1TDG, ZL1AAR, ZL1KG, ZL1AYV, ZL1ICU, Brendon Reid, ZL1CCA,
ZL1DRB, ZL1UKG

Apologies: ZL1TAY, ZL1MYL, ZL1SK

Moved: ZL1TIA **Seconded:** ZL1TCI

Start of Meeting: 07:57 pm

Meeting Chaired By: Dave, ZL1TIA

Minute Taker: George , ZL1TUX

Minutes of Last Meeting: The General Meeting Minutes of 12th June 2017, as published in the July 2017 club newsletter (Spectrum) is taken as Circulated,

Moved: ZL1VH **Seconded:** ZL1GSG

Matters Arising: None.

Moved: **Seconded:**

Correspondence IN:

- 1) ASB Bank Term Deposit Renewal
- 2) Entrust Validating Account for Dividend
- 3) North Shore Newsletter
- 4) Auckland Council Lease Agreement for the Clubrooms
- 5) Contact Power, Price increase for power @ Klondyke.

Correspondence OUT:

- 1) Email to Auckland Branch, re Repeater Donation

Correspondence In, Received and Out Endorsed.

Moved: ZL1TCI **Seconded:** ZL1UKG

Accounts:

Dave advised no responses over the last few days.

ASB to change addresses of accounts to Balmoral PO Box, 10138.

Looking to get statements via Email.

Changing of signatories with 2 signatories is not an issue, only the single signature accounts are an issue which may require signed Death Certificate.

ASB Logins, Multiple Logins (View only) required for various offices, (President, Secretary, Treasurer.

Transpower no longer using power at Klondyke.

Accounts IN:

Normal Power Accounts for Contact, Mercury and Meridian, for Clubrooms, Klondyke & Brenderwyns

Accounts OUT:

No Accounts out.

Accounts, Received and Payments done on receipts of invoices.

Moved:

Seconded:

General Business:

- 1) Auckland Council Lease, Seeking Permission (Authority) to sign and stamp using the Seal of the Club on the lease agreement,

Moved: ZL1DRB

Seconded: ZL1CCA

- 2) The club may require a Death Certificate for Doug, to transfer the accounts at the bank, to another officer. This requires the following request.

Seeking the Authority to apply for a Death Certificate for Doug Cooke, and have it certified for the Auckland VHF Group Bank Accounts that were controlled by Doug.

Moved: ZL1TCI

Seconded: ZL1VH

- 3) Vaughan discussed October Meeting re 45th Anniversary of the Clubrooms, (Saturday) 14th October. Require Photo's and other information of the clubrooms, dating back to the purchase and opening.
Check with Central Library, (Central Leader, Western Leader), NZ Herald during 1972.
Opening was Labour Weekend 1972.
- 4) Laurie Advised there was AREC Activity for the Welcome Home for Team NZ (Emirates) parade through Auckland. Various personal were used from different branches, One operator from Hamilton was also included.
- 5) Laurie advised that there are D-Star gateway setup issues with Generation 3 gateway firmware and these are causing issues.
The Klondyke Gateway is still running Generation 2 firmware.
The generation 3 firmware seems to be putting D-star users into a deletion list.

Business Meeting Close. 8:45 pm

Meeting guest speaker Matthew King ZL1YOT, gave a talk on the **NEC2 based antenna modeler and optimizer**.

Matthew's talk and demonstration of the software was enjoyed by all present.

Dave thanked Matthew King for his talk and demonstration.

Meeting closed at 21:43

Matthew King ZL1YOT on 4nec2

Examples of using the program to get it right at first build

Matthew's introduction to 4nec2 was by taking a short course in using it. This sounds much more productive than printing off the instructions to read and fiddle about with.



His areas of interest are VHF radio and Coast Guard. The Coast Guard uses a number of VHF Repeaters around the coast for weather reports, safety and message passing. The installations are located on high promontories close to the shore and patterns tend to be pancakes. It turned out that there were lots of dipole arrays in his examples. The same applies to amateur repeaters.

On starting 4nec2 there is a row across the top with commands which invoke the major functions. The Edit screens capture the physical dimensions of your antenna (Geometry) in x, y, z coordinates. In any given element of your antenna you can specify a number of segments. Calculations are done by segment. The more you ask for the longer it takes to calculate and the more accurate the result should be. Your design can be visual-

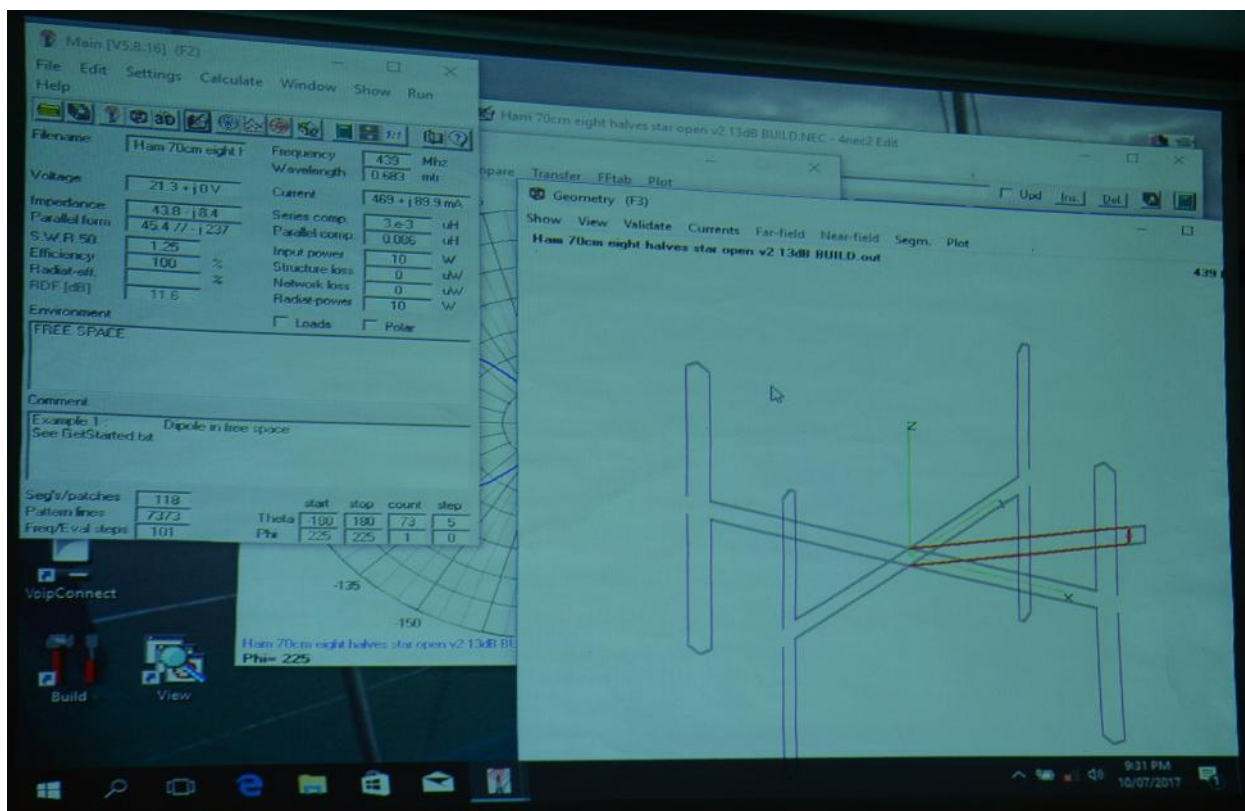
ised to check that it looks as you intended. With a frequency (range) of excitation and impedance you can see the radiation pattern and see SWR and other values that tell you how well it performs.

If you use variable names instead of fixed numbers to define the elements of your array you can tell 4nec2 to optimise the variables for best performance. When it comes to optimising you can also tell 4nec2 what is important and even have a mixture of priorities such as Gain, SWR, F/B, load resistance and reactance. Once you have an antenna with the right pattern it might not have an impedance that matches your radio. You have a choice of matching methods using lumped components or stubs (distributed components). The program is very flexible but you need a driver's licence to be safe from frustration.

In the past the reporter often used Yagi calculators and got acceptable results but they don't do matching for you and you are left scratching your head over things like Hair-pin matches for your new design. 4nec2 takes this sort of matching in its stride. It is worth the learning curve.

Matthew warned that it was addictive and could be time consuming. What happens if I change this length, diameter, separation from the next element..... He was clearly pleased with what it could do for him and may have converted the audience to give it a try.

Text and photos Peter Loveridge ZL1UKG 07/08/2017



Visualising the shape of the antenna details that you have entered

VHF Group News Round Up for August 2017

There are two important events coming up for amateurs.

The first is the Hamilton ARC Market Day on Saturday 26 August at the customary venue, the Table Tennis Association rooms. See the notice on page 3. The Auckland VHF Group will be represented with a table. Vaughan Henderson is coordinating assistants for the VHF Group table. Contact him if you are able to help.

The second is the Monday 11 September General Meeting of the Auckland VHF Group. This is our annual "Bring and Show" meeting. Advance notice is given that you will be the entertainment of the evening. Winter will have kept you indoors giving plenty of time to build projects to show the members. There will be a prize for the most interesting project.

Doug Cooke was Treasurer for the Auckland VHF Group. Resolving the takeover of his roles is still going on. The bank signatures have been changed to allow the club to function but other services he provided still require understanding of how he operated his computers. This is particularly affecting the distribution to committee members of email addressed to the club. The mail boxes are not being cleared and delivery failures are being received by the senders.

Until a permanent procedure is in place any email sent to the club may now be sent to vaughanh@vodafone.co.nz who will pass it to the people who used to get it from Doug.

The photo on the front cover of the July Spectrum was taken at the NZART Conference at Rotorua by Dave McLuggage ZL1DMA. He made all of his work available for use but wanted to be acknowledged as the photographer. This bit of information was missing from the Conference Report published in the July Spectrum.

David Wilkins ZL1MR/ZK1EXA has put out a warning about a protocol fault in the software controlling the Baofeng DM-5R which is advertised as “you can just use it together with other digital radios like MOTOROLA radios.”

The statement is true but like lots of marketing statements does not tell the full story.

These radios appear to be a repurposed dual band units that can decode/encode the DMR signal in time slot 1. They are apparently not capable of transmitting a fully compliant Time Slot 1 signal (by not transmitting in the time slot 2 space). As a result when it is used on the DMR network the transmission blocks both timeslots. In most DMR repeaters the primary is timeslot 1. To most other users the Baofeng operator seems to be OK. However when these radios are used anything on time slot 2 is blocked. There are other radios similarly advertised that have the same deviant behaviour. “you can just use it together with other digital radio like MOTOROLA radios.”

So what is the problem?

In New Zealand, as in most countries we operate most of our groups over timeslot 1. That is the Talk Groups ZL, WWE, and so on are all on time slot 1. No problem you say?

The UHF DMR network has been (funded) built primarily for AREC use. As a result the AREC ZK talk group is allocated for exclusive use of time slot 2. That means all other operators in New Zealand continue to use the system via time slot 1 for normal chat whilst AREC can operate in parallel in their reserved timeslot 2. The result is we can have a robust AREC UHF network across the country that fulfils an important emergency function whilst at the same time providing the amateur community with an additional UHF capability in parallel with the National System. This is all OK so long as timeslot 2 is not interfered with. If one of these Baofeng or other similar Time Slot 1 only radios starts transmitting the operator will effectively obliterate timeslot 2 on their local repeater and may even compromise the whole timeslot 2 AREC network in NZ. Action is required by all AREC personnel and everyone else to ensure that no noncompliant Time Slot 1 only radio is ever used on the NZ DMR system. We must ensure the integrity of the network otherwise what was the point in establishing it in the first place?

TYT and others are now producing dual band fully compliant dual-time slot DMR radios such as the TYT GD-77 (USD114) and the TYT MD-207 plus others. There is no excuse to buy a super cheap radio if for a few more dollars you can buy a perfectly good radio that is compliant with the open DMR standard. I am hoping that further clarity can be achieved by the official DMR gurus promulgating more succinct and accurate advice through the NZART online news and via Break In pages to ensure there are no excuses for noncompliant equipment to be used in NZ.

The last topic of the Auckland Unitary Plan implementation for Amateurs involved the definition of “Height” and where it was measured from and what should be measured. A “Consent Order” was signed by all interested parties in July 2017. Decision **ENV-2016-AKL-000243** of the Environment Court.

Anyone in Auckland who follows the news will have heard about the shortfall of new houses being built for the ever increasing number of people who want to live in our city. There has been some tinkering with the Resource Management Act by the Government to make it easier for developers to get consent for their projects. The most recent changes will come into effect on 01 October 2017. One of these may have a beneficial effect on Amateur Radio masts and antennas. Visit the web site at <http://www.mfe.govt.nz/publications/rma/resource-legislation-amendments-2017-fact-sheet-series> and click on Fact Sheet 8 "New consent exemption and fast-track processes". The advantage gained by amateurs is summarised under the heading "Councils must exempt 'boundary activities' from needing a resource consent if neighbour's approval is provided."

The advantage is that if you can get your neighbour (private boundary) to agree to a "height to boundary" rule which is broken by your antenna and the neighbour accepts it then the council must abide by it. Note that there are some restrictions in that it cannot be a public boundary like a road or reserve on your property boundary. Then you have to go through the normal procedures. I have heard that councils may be more forgiving for reserve boundaries than for road boundaries.

Maintenance work has already begun at the clubrooms with replacement of the doors that have been attacked by borer. This and other work will be done prior to the celebration in October of 45 years occupying the clubrooms at our Hazel Avenue location and the granting of a new 10 + 10 year Licence to Occupy giving stability for the future.

These notes have been assembled by your editor Peter Loveridge ZL1UKG

The Brynderwyn Repeater Site

The Auckland VHF Group is fortunate to have access to a prime site well north of Auckland, on top of the Brynderwyn range. Planning for this site, to become an extension to the National System commenced in 1988. Fundraising, path planning and obtaining the repeater equipment and aerials took approximately two years. The Group received a building permit from the Whangarei District Council in May 1991 after submitting details of the antenna mast and building plan.

Very much a co-operative effort between the Whangarei Amateur Radio Club, Branch 28 and the VHF Group, construction of the concrete block building and foundations for the tower commenced soon after receipt of the building permit. As with the Klondyke site, teams of volunteers from Auckland and Whangarei completed the site work and the site became operational in late 1991.

Radio path profiles undertaken by FMTAG (now ELG) showed that the path from Klondyke to Brynderwyn was obstructed, and would be subject to fading and signal drop-outs. FMTAG strongly recommended a two-hop extension from Klondyke. This option was investigated with the possibility of establishing an intermediate UHF repeater linking site out towards Hellensville or out towards Leigh. Although not very scientific, the deciding factor on staying with a single-hop link from Klondyke to Brynderwyn was a visit to the proposed site in October 1990 by the then President, Ron Philips ZL1TBO, Colin McKenzie ZL1ARC and Vaughan Henderson ZL1VH. The photo below shows Ron ZL1TBO standing on top of a fence post holding a

70cm dipole and Colin ZL1ACM taking signal strength readings on his 70cm hand-held. The results of these tests convinced the Group that the location on top of the Brynderwyns was useable and that signal strengths received from the UHF repeater at Klondyke were sufficient to justify going ahead with the site.



Colin
McKenzie
Assessing the
Brynderwyn
site

The tower at the site is a Create Model KT22S, 22m high self-supporting radio mast manufactured by the Creative Design Company Ltd in Japan. Two of these masts were brought in for use at the 1990 Commonwealth Games in Auckland where they formed the entrance-way into the athletes village. After the Games, items like this were sold off and the Group was able to obtain one at a good price!

The site has 70cm link equipment to enable the National System to extend north, local 70cm access via a “reverse” repeater, and the 146.500 MHz 2m repeater. The repeater equipment is all Tait Electronics 300 series with a 6-cavity 2m filter made by Wacom and purchased via the Wellington VHF Group. The required 70cm cavity filters were made by Deltec.

The antennas at the site for linking are 4 x 7 element Yagis pointing south to Klondyke and north to Whangarei. An omnidirectional antenna with 10dB gain (Decibel Products Model DB450) is mounted lower on the tower on the north face and provides local 70cm access to the system. On 2m, a 5dB gain omnidirectional Decibel Model DB516 is mounted at the top of the tower, giving excellent coverage from Warkworth/Wellsford through to Whangarei.

The site also hosts the Auckland Rescue Helicopter Trust’s aviation band repeater and links for use by the rescue helicopter’s when transiting from Whangarei through to Auckland.

During the first half of 2017, members of the Whangarei Amateur Radio Club made several trips to the site to give the repeater equipment building a tidy-up make some repairs to the mortar joints around the base and a new coat of paint. The Auckland VHF Group is indebted to the Whangarei club for its continuing work on our behalf keeping this site in good working condition. The following photos show the site in July 2017 with the new paint job completed.

Report and photos by Vaughan Henderson ZL1VH



Overall view of the Brynderwyn site, some 500m to the West of SH1 as it passes over the top of the Brynderwyn Range.

Access to the site is via a forestry road and the land surrounding the repeater has been logged and re-planted with pine trees.

70cm and 2m transmitters and receivers inside the equipment building. Third module in from the left is the site microprocessor controller.

The site has mains power and for back-up a bank of six 2V lead acid batteries keep the site fully operational during occasional power outages.



The Whangarei Amateur Radio Club turns 70

A fine combination of market day, dinner, speeches and quiz

The Auckland VHF Group was represented at the Market by Vaughan Henderson and Peter Loveridge with a selection of goodies from the clubrooms. The buyers show a lot of interest at having items not seen in their area so some stock up at our table. Trading days like this help support the clubrooms and repeaters that the VHF Group maintains. The reward for the traders is the evening's entertainment which has been prepared for the 50 diners that can be fitted into the clubrooms. There were a number who had driven up from Auckland for the market and the dinner. After dinner there were dignitaries such as Jim Meacham ZL2BHF who was NZART president at the time of the opening of the current clubrooms and other significant characters well known to the community. This was followed by desert and a quiz. A loud vote of thanks was given to the cooks who provided our dinner. Some Aucklanders had to drive home after dinner. Teams were formed for the quiz and friendly banter flowed around the room as answers were marked. It was an enjoyable day for those who took part.



Photo by Allan Wooller ZL1AUW

Text by Peter Loveridge ZL1UKG



Amateur Radio Emergency Communication.
Volunteers in radio communications.
Using our resources to help the community.

INFORMATION

The Auckland VHF Group has an active AREC section that works closely with Auckland City Civil Defence. They provide advice, resources and manpower to assist in times of need. The Auckland VHF Group clubrooms provide a backup system to complement the existing systems maintained by Auckland City Council Civil Defence.

The AREC section is headed by Section Leader Laurie Mathews ZL1ICU.

From time to time the VHF Group has training sessions and exercises. Members also assist with sports events, parades and Rally NZ.

For further information about AREC please see the NZART web site.

JOIN BRANCH 66 AREC

All members of the Auckland VHF Group are encouraged to join the AREC section. Your contribution, large or small is appreciated by all involved.

For further information about joining branch 66 AREC contact the Section Leader or his Deputy.

AREC:

Section Leader; Laurie Mathews ZL1ICU 634 5130 0274 817 463 perma@xtra.co.nz

Deputy Section; George Raffles ZL1TUX 626 6944 021 735 361 zl1tux@xtra.co.nz



AUCKLAND VHF GROUP (INC)

**SUPPORT THE EFFORTS OF THE VHF GROUP THROUGH YOUR
SUBSCRIPTION**

SUBSCRIPTIONS FOR 2017

THE SUBS GO TOWARDS;

- Maintenance and on-going improvements to beacons, repeaters and linking systems for the national system, including the Klondyke repeater site.
- Provides on-time and free access to spectrum magazine as soon as it is available.
- Provides facilities for good speakers and lecturers at our general meetings.
- Discounted access to our trading table goodies.
- Access to test equipment and technical help when needed.

FULL MEMBERSHIP **\$45.00**

ASSOCIATE MEMBERSHIP **\$40.00**

FAMILY MEMBERSHIP ADDITIONAL **\$10:00**



SEE ATTACHED MEMBERSHIP RENEWAL FORM (next page)

REMEMBER TO KEEP US INFORMED OF YOUR INTERNET ADDRESS!

OTHERWISE WE CANNOT SEND YOU SPECTRUM!

NAME	Mr/Mrs/Miss/Ms	Christian or given name	Surname
	Mr		
Address			
		Phone: (home)	
		Phone: (work)	
		Phone (Cell)	
		Email	
Occupation:		Callsign	
NZART Member		Branch assigned	
AREC Member		Branch assigned	
Category			To pay
Membership	Full	\$45:00	\$
New/Renewal/Change	Associate	\$40:00	\$
Receipt #	Family Add	\$10:00	\$
Donations	Auckland ATV		\$
	Auckland/Klondyke		\$
	Brynderwyn		\$
	Data/D-Star		\$
	IRLP		\$
	Beacon/Repeater/Links/ATV Licences		\$
	Other		\$
		Total	\$
Payment			
Circle one -->	Cash	Cheque	Internet deposit
Invoice/Statement re-quired	Please Advise Treasurer		
Internet	To account ASB 12-3020-0473626-00. Account name is: Auckland VHF Group Inc. Include your Name/Callsign for us to track. Note: this form needs to be returned to update records. FAX to 028 25544801 or Email		
Post	The Treasurer, Auckland VHF Group Inc., PO Box 10138, Dominion Road, Auckland 1446.		
In Person	Bring this form and payment to the next club meeting, 2 nd Monday of the month or to the Committee meeting last Monday of the month.		

The Auckland VHF Group Inc Branch 66 NZART

gratefully acknowledges the sponsorship of Branch 66 Beacons, Repeaters and Fixed Links license fees and the Group's repeater operations by the following radio amateurs and NZART Branches for 2017

<u>Repeater frequency</u> and name	Repeater location	Sponsorship advised for 2017	Amount paid
53.725 Repeater	Klondyke Road		
144.253 Beacon	Nihotupu	ZL1IU	50.00
145.625 Data Rptr	Klondyke Road	NON-operational	
145.650 Dstar repeater	Klondyke Road	ZL1ICU	50.00
146.625 Repeater	Klondyke Road	ZL1ICU	50.00
146.700 Repeater	Ruaotuwheua		
146.900 Repeater	Mt Puketutu Radio		
432.253 Beacon	Nihotupu	Under repair	
438.175 Dstar repeater	Klondyke Road	ZL1ICU	50.00
438.500 Repeater	North Head		
439.850 Link Tx to Kaimai	Klondyke Road		
439.875 Ak Nat Sys Rptr	Klondyke Road		
439.900 Link Tx to Egmont	Klondyke Road		
439.950 Link Tx to Brynderwyn	Klondyke Road		
1291.9 Repeater	217 Glenfield Rd	ZL1ABS	50.00
		Total Sponsorship	\$250.00
NZART Inc: Branch/Personal donations			
Franklin Radio Club. Br: 10		\$200.00	
Papakura Radio Club. Br: 65		\$500.00	
Auckland Radio Club. Br: 02		\$100.00	
		\$	
		\$	
	Donations	\$800.00	
Current as at 03/08/2017			

The Auckland VHF Group, Branch 66, would like to thank all those who came forward to sponsor the licence fee for our Beacons, Repeaters or Fixed Links for the year 2017 or donate towards the Group's repeater Operations.

TRADING TABLE

Currently our Trading Table is only open on meeting nights. Opening on Saturdays may resume later in the year so keep an eye out for announcements in Spectrum.

NEW – NEW - NEW

We have heaps of parts from dismantled commercial analog TV gear – transmitters, filters, circulators, patch panels, power supplies, cabinets. Too much to list individually, so come along to the clubrooms and have a look



And there's

more....



Band Pass 39-57 MHz
 -10dB @ 38-60 MHz
 -40dB @ 33-70 MHz



Motorola Oncore VP GPS Receivers

The VP Oncore is Motorola's original credit card-sized 8-channel GPS receiver. It measures just 2" x 3 1/4" x 1/2", has very low power requirements, and is well suited for embedded applications. The VP Oncore has the capability of acting as a DGPS reference station for greater position accuracy.

The units on offer have been in storage for some time, and the tinplate screen covers show some signs of corrosion – see photo. Most of the units have a sticker attached saying "Prog NMEA" and are likely to output data in NMEA V2.0 serial format.

Interface is via a 10-pin board header – see reference below for pinout details. Power supply is 5.0v +/-0.25V. Module requires an external active GPS antenna (5V power supplied by receiver module). GPS connector is a snap-on type OSX. Output data includes a 1PPS (one pulse per second) output and TTL level Tx and Rx data lines.

More details can be found at : <ftp://ftp.tapr.org/gps/motorola/oncore.eng.notes.pdf>



\$20.00 each – limited quantity.



N-Type connectors for LMR-400

Crimp-on only. \$5.00 each

Other coaxial connectors available from the Trading Table:

Please note we have sold out of TNC connectors – these are no longer available.

BNC plugs 50 ohm for RG58 coax (solder/clamp type)	\$2.50 each
BNC plugs 50 ohm for RG58 coax (crimp on type)	\$2.50 each
BNC sockets 75 ohm – single hole mounting	\$1.50 each
N Type male solder on suit RG213 coax	\$4.00 each
N Type male right angle, suit RG213 coax	\$4.00 each
N Type male crimp on suit RG213 coax **	\$3.00 each
N Type socket crimp on suit RG213 coax **	\$3.00 each
N Type male right angle, solder on suit RG213 coax	\$4.00 each
N Type male silver plated solder/clamp on suit RG58 coax	\$3.00 each
N Type male crimp on suit RG58 coax **	\$2.50 each
N-Type adaptor Male to Male	\$3.00 each
Adaptor TNC Male to UHF Female	\$3.00 each

** Crimping service available for these at club meetings.

Need Crystals for your next project?

3.579545 MHz HC18/U wire ended holder	
4.194304 MHz HC18/U wire ended holder	\$1.00 each
4.1952 MHz HC18/U wire ended holder	\$1.00 each
4.33618 MHz HC18/U wire ended holder	\$1.00 each
6.000 MHz HC49/S SMD package 20pF load capacitance	\$1.00 each
8.000 MHz HC18/U wire ended holder	\$1.00 each
8.192 MHz HC18/U wire ended holder	\$1.00 each
8.867238 MHz HC18/U wire ended holder	\$1.00 each
10.000 MHz HC18/U wire ended holder (KDS Brand)	\$1.00 each
13.875 MHz HC18/U wire ended holder	\$1.00 each
14.31818 MHz HC18/U wire ended holder. Rakon J30G-4H spec	\$2.00 each
14.7456 MHz HC49/S SMD package	\$1.00 each
17.472 MHz HC18/U wire ended holder	\$1.00 each
18.432 MHz HC18/U wire ended holder	\$1.00 each
20.0000 MHz HC49S SMD package P/No.7D20000183BSAF25Q3	\$1.00 each
24.567 MHz HC18/U wire ended holder	\$1.00 each
45.600 MHz HC18/U wire ended holder	\$0.50 each

Radio Frequency Transistors

ATF55143	Low noise E-PHEMT 0.6dB noise figure.	\$1.00 each
	Low noise amp for frequencies between 450MHz and 6GHz. SMD package SOT343 (4 lead).	
MGF1302	Low noise GaAs FET Nf = 1.4dB @ 4GHz, 4dB @ 12GHz.	\$5.00 each
BFR91	NS RF Amp. 5GHz 1.9dBnf @ 500MHz	\$2.00 each
BFY90	NS 30V 50mA 2.5dBnf @ 200MHz TO72 VHF/UHF	\$1.50 each
MFE121	Dual gate N-MOSFET 20V 5mA VHF Amp BF352 equiv.	\$0.50 each
MPS5179	NS TO92 12V 50mA 200mW ft 2000MHz Nf 5.0dB	\$0.50 each
	RF Transistor. Use in UHF/VHF amplifiers with collector currents in the 100 μ A to 30 mA range, and in low frequency drift, high output UHF oscillators.	
BFG67	NS 8GHz 50mA rf amp/preamp SOT143B package	\$1.50 each
MPS5172	NS 25V 100mA Ft 120MHz	\$0.10 each
MPS6507	NS, VHF Mixer, 20V, 100mA, Ft 700MHz [data]	\$0.20 each
MRF237	NS RF Pwr. VHF 4.0W 12V TO39	\$3.00 each
MRF559	NS RF Pwr. 806-960MHz 0.5W 12.5V	\$0.50 each
MRF904	NS RF Small signal amp. Ft 4GHz 15V TO206	\$3.00 each
2SC908	NS TO39 RF Amp 1W @ 500MHz 13.6V [data]	\$1.00 each
	Designed as driver and RF power amplifier.	
	0.5 to 0.8W output at UHF land mobile band.	
	Gain 15dB (Vce=6.0V, Ic=5mA, ft=2000MHz)	
3SK45	Packaged as ECG221, dual-gate N-channel MOSFET	\$0.75 each
	for vhf amp and mixer applications.	
3SK73GR	Dual-Gate MOSFET N-channel 30V 7mA	\$1.50 each
3SK74L	Dual-Gate MOSFET N-Channel 20V 25mA(max)	\$1.00 each
3SK192GR	Dual-Gate MOSFET 15V 30mA(max)	\$1.00 each
2SC5488	NS 30V 70mA low noise rf pre-amp	\$0.10 each
BF199	NS 25V 25mA, 500mW ft = 550MHz TO92	\$1.00 for 10
BF494	NS 20V 30mA Low noise mix-osc/ IF amp TO-92	\$1.50 for 10
40673	Dual-gate N-Mosfet – See MFE121	\$0.50 each