

**The Official Newsletter of the  
Auckland VHF Group Inc.  
Spectrum**



Space Teddy launch rising over the North Shore.  
Lake Pupuke is at the bottom left.

General Meeting — page 3  
The President's Report — page 4  
February General Meeting — page 4  
DX Weekend Contest — page 6



# Auckland VHF Group Inc.

## Branch 66 NZART

PO Box 10138, Dominion Rd, Auckland 1446

Clubrooms: 30 Hazel Ave, Mt Roskill

| Office  | Name  | Call sign | Work / Mobile | E-mail                          |
|---|---|-----------|---------------|---------------------------------|
| President   | Matthew King  | ZL1YOT    | 022 649 3310  | president@aucklandvhf.org       |
| Vice President  | Not filled  |           |               |                                 |
| Secretary (Acting)  | Vaughan Henderson   | ZL1VH     | 021 844 804   | secretary@aucklandvhf.org       |
| Treasurer   | George Raffles  | ZL1TUX    | 021 735 361   | treasurer@aucklandvhf.org       |
| Committee   | Brendon Reid  | ZL1XXX    | 021 970 785   | brendon@aa.net.nz               |
|   | Greg Storz  | ZL1GSG    | 09 849 2878   | greg.storz@orcon.net.nz         |
|   | Darryl Grange   | ZL1TCI    | 021 123 7733  | dgrange@ecohousing.co.nz        |
|   | Vaughan Henderson   | ZL1VH     | 021 844 804   | zl1vh1@gmail.com                |
| AREC Group Leader   | Dave Dingley  | ZL1TIA    | 09 828 9394   | mardayak@gmail.com              |
| Deputy Group Ldr.   | Not filled  |           |               |                                 |
| ZL1BQ Trustee   | Matthew King  | ZL1YOT    | 022 649 3310  | zl1bq@aucklandvhf.org           |
| Head Repeater Trustee   | Vaughan Henderson   | ZL1VH     | 021 844 804   | repeatertrustee@aucklandvhf.org |
| Klondyke Manager  | Vaughan Henderson   | ZL1VH     | 021 844 804   | 6625@aucklandvhf.org            |
| 670 Manager   | Vaughan Henderson   | ZL1VH     | 021 844 804   | 670@aucklandvhf.org             |
| 690 Manager   | Dennis Seymour  | ZL1UET    | 09 278 0381   | 690@aucklandvhf.org             |
| 850 Manager   | Vaughan Henderson   | ZL1VH     | 021 844 804   | 850@aucklandvhf.org             |
| Spectrum Editor   | Peter Loveridge   | ZL1UKG    | 09 427 6362   | spectrum@aucklandvhf.org        |
| Trading Table   | Vaughan Henderson   | ZL1VH     | 021 844 804   | tradingtable@aucklandvhf.org    |
| Account Reviewer  | Basil Orr   | ZL1TOW    | 021 867 367   |                                 |
| Webmaster   | Terry Corin   | ZL1BPA    | 027 697 4686  | webmaster@aucklandvhf.org       |
| Club Web Page:  | <a href="http://aucklandvhf.org">http://aucklandvhf.org</a> |           |               |                                 |
| ZL1VHD Dstar gateway administrator: Laurie ZL1ICU 634 5130 0274 817463 perma@xtra.co.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  
**[spectrum@aucklandvhf.org](mailto:spectrum@aucklandvhf.org)**

# **Auckland VHF Group (Inc) Branch 66**

## **General Meeting Notice**

**Monday 09<sup>th</sup> March 2020 7.30pm**

At the Hazel Avenue Club Rooms  
(Located on left at the end of Hazel Avenue)

### ***The Evening's Topic:***

Simon Watt-Wyness will discuss the Digital Communication Modes D-Star, DMR and All-Star available to the amateur. He will also have a look at the gateways which permit interoperability Between these modes.

**EVERYBODY WELCOME**

**We look forward to seeing you there**

### **Future Contest Dates for 2020**

|                   |                   |
|-------------------|-------------------|
| Low Band Contest  | 4/5 April 2020    |
| Microwave Contest | 3/4 October 2020  |
| Field Day Contest | 5/6 December 2020 |

73, Greg Storz ZL1GSG Contest Manager

### **Coming Events:**

- Te Puke Club sale at Paengaroa Community Hall, 28 March from 10 am. Hot breakfast from 7:30 am. WARO meeting at 10:30 am.

## Auckland VHF Group Presidents Report March 2020

Dave Dingley has put his hand up for coaching electronics, but it looks like I'm one of only two students! If there are a few others who want to start a new project, or who need a hand with something they are stuck on, give one of us a yell.

Nothing radio has been done here at home for weeks. I have been struggling full time with the boat motor. The Buhk 20 HP is now sitting on its mounts but the bolts are cocked out at a bit of an angle so I may need to extract it and drill more holes. I have successfully welded up a coupling with flanges and bits of pipe. It has bolted on OK, so next is using a feeler gauge to align it a little more precisely.

Music wise, I have put together a motley crew of musicians for playing on St Patrick's Day, and now we need to practice a bit. Then I can go for a sail and sort out some radio stuff!

That's it for now from me. I look forward to seeing you at our meeting next week.

73

Matthew ZL1YOT



### Auckland VHF Group Inc.

#### Minutes for the General Meeting held on 10<sup>th</sup> February 2020 at the Clubrooms, 30 Hazel Avenue, Mt Roskill

Meeting started at 7.25pm

**Present:** 12 full members as per the attendance book.

**Visitor:** Tom Riley G0NSY, RSGB Regional Representative on holiday in New Zealand.

**Apologies:** Basil ZL1TOW, Greg ZL1GSG, Dave ZL1TIA

Moved apologies be accepted: ZL1VH, Seconded ZL1YOT. Carried

Matthew ZL1YOT invited our visitor Tom G0NSY to say a few words to the meeting. Tom introduced himself, described the work he was involved in and the geographic area he represented

(London and north London). Quite a large area and involved some travel visiting clubs in the area.

**Minutes of December General Meeting:** Moved that the minutes as published on pages 4 and 5 of February Spectrum be approved: Moved: ZL1JHW, Seconded ZL1AOX. Carried

**Matters Arising:** ZL1ICU repeated his concern about the Licence to Occupy for the Klondyke site. The clause with 6 months termination notice does not give the Group any real tenure.

#### **Correspondence:**

Break-In, AMSAT Journal and Cheque from Franklin Branch 10 – donation towards repeater licences.

**Reports:** There were no reports to the meeting

#### **General Business:**

ZL1VH advised the Group had received a donation of some 420 to 430 MHz stainless steel Yagi antennas. These were available to anyone who wanted to try one.

Meeting closed at 7.55pm

This was followed by the evening's guest speaker, Ian Ashley ZL1AOX on the subject of Space Teddy – the balloon launched telemetry package and his involvement in tracking the experiment.

ZL1VH E & O.E.

## **Space Teddy – High Altitude Balloon Launch 12/12/2019 – presented by Ian Ashley**

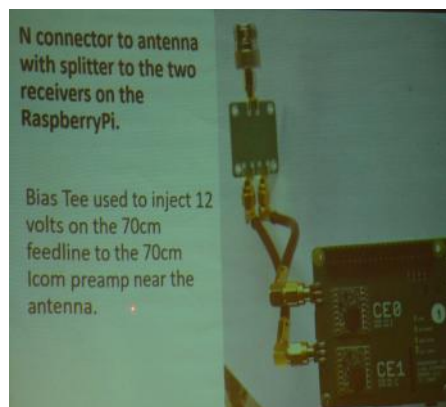
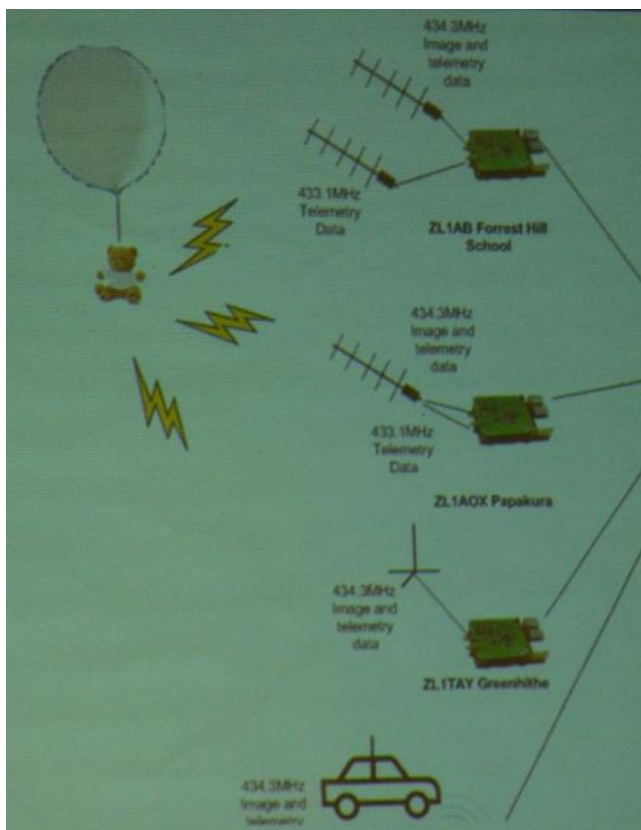
Space Teddy is the brainchild of Marius van Rijnsoever who has two children at Forest Hill School. There have been previous launches in 2016 (28.2 km) and 2017 (21.3 km) but this was the highest ascent. The children at this school become motivated by the technology involved and how easy it appears to be to study a scientific subject.

The help was considerable from their father and volunteer amateur radio enthusiasts. To receive a signal from Teddy the equipment used was

- RaspberryPi version 3
- LoRa Receivers from Uputronics on 433 MHz
- Software on an SD card for the receivers
- 70 cm antenna
- Link to the Internet to connect with Habhub servers in the UK

Julian ZL1ABX from North Shore Br 29 organised the ground stations and 4 stations were available on Launch Day.

Air Traffic Control at Whenuapai had to be notified so that pilots could be warned about Teddy's flight. Two 70 cm yagis feeding LoRa receiver modules provided by Graham ZL1GMB tracked the launch from the school sight. Two long 70 cm yagis feeding LoRa receiver modules operated by Ian ZL1AOX tracked from his home location on the Hunuas. Two mobile stations with short yagis and LoRa modules operated by Graham ZL1GMB and Andy ZL1COP tracked the Teddy as the wind direction moved the balloon, changing direction with altitude. A smart phone was used to provide an Internet connection to the Habhub web site.



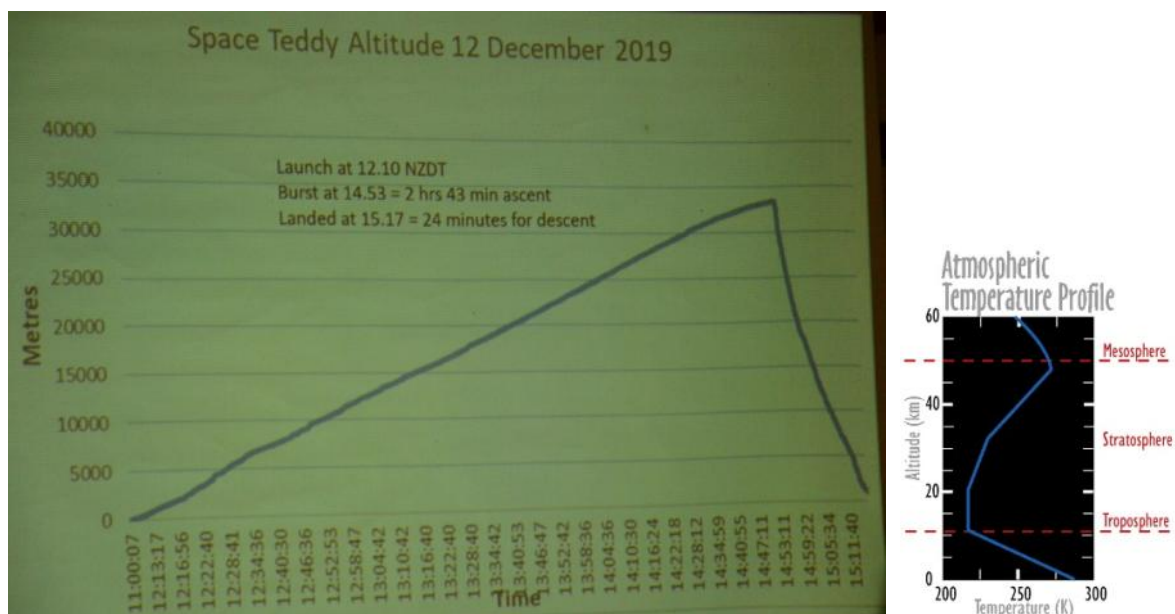
**Left**  
The communication links  
**Right**  
LoRa receiver details

**Below left** – the expected path from altitude prediction and direction. **Below right** – the actual path.





From the telemetry data received the altitude versus time was graphed. The balloon burst at 33.431 km altitude. This was high enough for the temperature to be observed to rise. As the balloon entered the Stratosphere the Ozone layer is reached. The ozone gas is heated by the UV radiation penetrating that far into the atmosphere. The energy is radiated at lower frequencies. The density is so low that the heat is not conveyed quickly to the other gases present that do not absorb energy at the frequency of Ozone.



The photo sizes logged at Habhub start at 57 kB and reduced to 25 kB as Teddy rose higher along with Temperature and GPS position. Data was sent back at 433.1 MHz to ground receivers. The photos and data can be downloaded from the Habhub web site.

This account was created from notes and photos taken during the presentation by the editor.

Peter ZL1UKG

## Unrestricted Two Way Radios – Frequently Asked Questions

By Don Wallace, NZART ALO <alo@nart.org.nz>

We get a number of questions from members about the status of what RSM (Radio Spectrum Management) calls "Unrestricted Two Way Radios" – such as those made by Baofeng, Pofung, Wouxun etc. This article is aimed at answering the most common of these questions.

**What is the problem?** In 2018 RSM found that a number of people were illegally using these radios and which were causing interference to frequencies used by emergency services and commercial users such as the Police, Forestry and Railways.

**What was RSM's proposed solution?** In their August 2018 Business Update, RSM stated that their Compliance team were working on a Prohibition Notice to limit the import and illegal use of a range of low-end two-way radios. This would have meant that no one (including Amateurs) would be allowed to own or use these devices.

**Did NZART Support This Prohibition?** No - in fact the opposite was true. NZART recognises that these radios offer a cost-effective way for new amateurs to get on the air and worked with RSM to come up with a compromise solution that would allow Amateurs to continue to use these devices – provided they followed a set of rules.

**What Are These Rules?** The rules are set out in the Prohibition notice (see <https://gazette.govt.nz/notice/id/2018-go4836> or <https://tinyurl.com/y7hahuse> ) but can be summarised as follows: - The radios are only allowed to be owned and used by licensed amateurs - The radios may not be used outside the Amateur bands; and - If you want to buy or sell a radio, you have to fill out some paperwork.

**Are These Rules Over-Restrictive?** Not really – amateurs are fortunate in New Zealand as we have very few restrictions on what we can build and use. In some other countries in our region, radios have to be type approved and special permission is required if you want to build your own equipment.

**What About Non-Amateurs?** Non-Amateurs are not allowed to own or use these radios - only those who hold an amateur licence.

**What About Other Frequencies I Am Allowed To Use (e.g. Coastguard channels, or AREC frequencies outside the Amateur bands)?**

You are not allowed to use these radios on frequencies outside the Amateur allocations. All radios used outside the Amateur bands have to be type approved and these radios are not approved and most would not meet the technical specifications for type approval. Further, if RSM discovers that a radio has been programmed for frequencies outside the Amateur bands, even if owned by an Amateur, the radio could be seized and/or the user prosecuted.

**What about if I want to buy or sell one of these radios?** No matter how you intend to buy or sell your radio (e.g. on TradeMe, at a junk sale, privately etc.) you need to have a Licence to Supply.

**How hard is the paperwork?** Not hard at all – all you need to do is follow the instructions on the RSM website <<https://www.rsm.govt.nz/business-individuals/supplier-compliance/get-a-licence-to-supply-radio-equipment/> or <https://tinyurl.com/wbrx3x5> >.

Papakura Radio Club Inc.

**Do these rules affect Amateur Transceivers from Icom, Kenwood, Yaesu, etc?** These manufacturers amateur transceivers are designed to be used only on the Amateur bands and are not affected by the prohibition notice. However, if you use them on frequencies outside the Amateur bands, you could have your radio seized and/or be prosecuted by RSM. As amateurs we must comply with the rules of the Prohibition Notice or RSM have indicated that this exemption will be removed for amateurs, and opportunity to own and operate these transceivers will be lost.

**REMEMBER DOING THE RIGHT THING MEANS WE WILL CONTINUE TO HAVE A CHOICE**

This article was reprinted from the Papakura Radio Club newsletter





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

**INFORMATION**

The Auckland VHF Group has an AREC Group that works closely with Auckland Council Emergency Management. They provide advice, resources and manpower to assist in times of need.

The AREC section is headed by Group Leader David Dingley ZL1TIA.

From time to time the VHF Group has training sessions and exercises. Members also assist with sports events, parades and other community activities. For further information about AREC please see the NZART web site: <http://www.nzart.org.nz/arec/>

**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 Group Leader:

David Dingley ZL1TIA

828 9394 [mardayak@gmail.com](mailto:mardayak@gmail.com)

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**AREC News:**



## AUCKLAND VHF GROUP (INC)

SUPPORT THE EFFORTS OF THE VHF GROUP THROUGH YOUR  
SUBSCRIPTION

### SUBSCRIPTIONS FOR 2020

THE SUBS GO TOWARDS;

- Maintenance and on-going improvements to beacons, repeaters and linking systems for the national system, including the Klondyke repeater site.
- Providing on-time and free access to spectrum magazine as soon as it is available.
- Providing 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 **\$50.00**

ASSOCIATE MEMBERSHIP **\$44.00**

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

***SEE ATTACHED MEMBERSHIP RENEWAL FORM (next page)***

**REMEMBER TO KEEP US INFORMED OF YOUR EMAIL  
ADDRESS!**

**OTHERWISE WE CANNOT SEND YOU SPECTRUM!**



**Thought for the month:**

When I find it, I don't need it. When I need it, I can't find it.

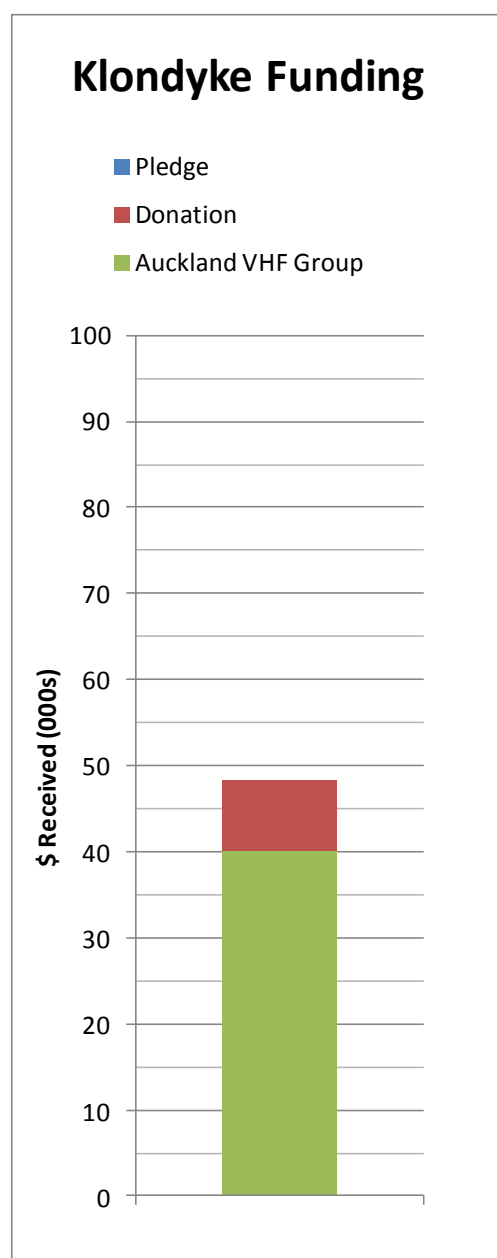
|                            |  |                           |                  |
|----------------------------|--|---------------------------|------------------|
| <b>NAME</b>                | <b>Mr/Mrs/Miss/Ms</b>  | <b>Christian or given</b> | <b>Surname</b>   |
|                            |  |                           |                  |
| <b>Address</b>             |  |                           |                  |
|                            |  | Phone: (home)             |                  |
|                            |  | Phone: (work)             |                  |
|                            |  | Phone (Cell)              |                  |
|                            |  | Email                     |                  |
| <b>Occupation:</b>         |  | <b>Callsign</b>           |                  |
| <b>NZART Member</b>        |  | <b>Branch assigned</b>    |                  |
| <b>AREC Member</b>         |  | <b>Branch assigned</b>    |                  |
| <b>Category</b>            |  |                           | <b>To pay</b>    |
| <b>Membership</b>          | Full   | \$50:00                   | \$               |
| <b>New/Renewal/Change</b>  | Associate  | \$44:00                   | \$               |
| <b>Receipt #</b>           | Family Add   | \$10:00                   | \$               |
| <b>Donations</b>           | Auckland/Klondyke  |                           | \$               |
|                            | Brynderwyn   |                           | \$               |
|                            | Data/D-Star  |                           | \$               |
|                            | IRLP   |                           | \$               |
|                            | Other  |                           |                  |
|                            | Beacon / Repeater / Links / Licence donations  |                           | \$               |
|                            |  |                           |                  |
|                            |  | <b>Total</b>              | \$               |
| <b>Payment</b>             |  |                           |                  |
| Circle one -->             | Cash   | Cheque                    | Internet deposit |
| Invoice/Statement required | Please Advise Treasurer  |                           |                  |
| <b>Internet</b>            | <p>To account <b>ASB 12-3011-0830580-00</b>. Account name is: Auckland VHF Group Inc. Include your <b>Name/Callsign</b> and Sub or <b>RepeatDon</b> etc in particulars field, for us to track. To sponsor a specific repeater, nominate the repeater and a backup repeater for the donation, in case the initial choice has been taken. The sponsorship is a minimum of \$50.00 which covers the licence for a year. <b>Note:</b> Please return the Form to the email or postal address given below to allow us to update our records.</p> <p><b>(Please Note the Account Number and email may have changed from last year)</b></p> <p><b>Email to: <a href="mailto:treasurer@aucklandvhfgroup.org.nz">treasurer@aucklandvhfgroup.org.nz</a></b></p> |                           |                  |
| <b>Post</b>                | The Treasurer, Auckland VHF Group Inc.,<br>PO Box 10138, Dominion Road, Auckland 1446.   |                           |                  |
| <b>In Person</b>           | Bring this form and payment to the next club meeting, 2 <sup>nd</sup> Monday of the month or to the Committee meeting last Monday of the month.  |                           |                  |

*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 2020*

*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 2020 or donate towards the Group's repeater Operations.*

**Target 100,000**

| Name                    | Donation | Pledge |                    |           |       |           |
|-------------------------|----------|--------|--------------------|-----------|-------|-----------|
| Donations 2018-2019     | 6550.00  |        | Tower              | 63,245.00 | Other | 27,268.25 |
|                         |          |        | GST                | 9,486.75  |       |           |
| Charles Graves          | 15.00    |        |                    |           |       |           |
| Ian Ashley ZL1AOX       | 500.00   |        | Total              | 72,731.75 | Total | 27,268.25 |
| Keith Dix ZL1BQE        | 50.00    |        |                    |           |       |           |
| Margaret Dingley ZL1AYV | 100.00   |        | Auckland VHF Group | 40,000.00 |       | 40.00     |
| David Dingley ZL1TIA    | 100.00   |        |                    |           |       |           |
| Jenny Dingley ZL1TDB    | 100.00   |        |                    |           |       |           |
| Russell King ZL1WITT    | 20.00    |        |                    |           |       |           |
| Basil Orr               | 500.00   |        |                    |           |       |           |
| Raffle — Meter          | 399.00   |        |                    |           |       |           |



|         |         |      |
|---------|---------|------|
| Total   | 8274.00 | -    |
| Percent | 8.274   | 0.00 |

## TRADING TABLE

Currently our Trading Table is only open on meeting nights.

**Resistors:** We are no longer going to stock the standard 1/4W carbon film resistors on the Trading Table. Any members wanting to stock up on resistors before they are otherwise disposed of – come along to the next meeting and help yourselves.

The shelf space currently taken up by resistors will be used to display other Trading Table stock items. Watch this space for details.

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.

Back in Stock — SO239 UHF Adaptor:

Just what you need to make up a mobile antenna. SO239 socket and mounting nut. The tube on the side is a screw-in fit for RG58 coax cable. Just strip the outer sheath off and allow about 6 to 7mm of centre conductor, screw the RG58 into the side of the adaptor and solder the center conductor to the centre pin of the fitting.



### Coax Adaptors:

Thanks to a recent donation we have a range of assorted coaxial adaptors available at only \$3.00 each, but be in quick!





## Capacitors, Transmit:

Capacitors, Metal Clad Mica (Unelco, Semco)

\$2.20 each

Values (in pF):

Or 10 up for \$2.00 each

3.9, 4.7, 6.8, 10, 12, 15, 20, 22, 24, 27, 30, 33, 34, 47, 51, 62, 82,

100, 120, 130, 150, 220, 240, 300, 360, 680pF

Most are rated 350V working  $\pm 5\%$  tolerance.

Similar to illustration, tab does not have hole:



## Resistors Surface Mount:

Packed in bags of 10 for \$0.50 bag

Most are 1206 size: 2.7 ohm, 4.7 ohm, 22 ohm, 49 ohm, 56 ohm, 68 ohm, 82 ohm, 100 ohm, 180 ohm, 270 ohm, 330 ohm, 390 ohm, 470 ohm, 510 ohm, 680ohm, 820 ohm, 1K ohm, 2k2 ohm, 3k3 ohm, 5k6ohm, 10K ohm, 68K ohm, 100K ohm.

## Quartz Crystals:

3.579545 MHz HC18/U wire ended holder

4.194304 MHz HC18/U wire ended holder

[F.4.1]

\$1.00 each

4.1952 MHz HC18/U wire ended holder

[F.4.2]

\$1.00 each

4.33618 MHz HC18/U wire ended holder

\$1.00 each

6.000 MHz HC49/S SMD package 20pF load capacitance

[F.4.3]

\$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

13.875 MHz HC18/U wire ended holder

[F.4.5]

\$1.00 each

14.31818 MHz HC18/U wire ended holder. Rakon J30G-4H spec

[F.4.6]

\$2.00 each

14.7456 MHz HC49/S SMD package

[F.4.7]

\$1.00 each

17.472 MHz HC18/U wire ended holder

\$1.00 each

18.432 MHz HC18/U wire ended holder

[F.4.8]

\$1.00 each

20.0000 MHz HC49S SMD package P/No.7D20000183BSAF25Q3

[F.4.9]

\$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

## Miscellaneous:

Battery clip for 9V (PP9) type battery

[F.2.5]

10 for \$1.00

RJ-12 sockets, 6-way PCB mount

[E.6.10]

20c each

TO-3 Mica Washer and insulating bushes

[S.9.9]

50c bag of 20

LED Holder panel mount type

[S.7.10]

50c bag of 10

Test point sockets pcb or chassis mount

[F.2.4]

10c each

Brass rivets, ideal for through-hole connections

[F.2.6]

50c/100

Cable retainer clips black plastic fits 25mm square boom

[F.2.7]

50c each

Plastic standoff mounts for PCB mounting

[F.4.8]

10c each

Handle, Grey Plastic, for equipment enclosures

[F.2.1]

\$1.00 each

Crystal socket PCB mount for HC25/U crystals

[F.2.10]

10c each

Crystal socket chassis mount for HC6/U crystals

[F.2.9]

10c each

Rubber switch boot (waterproof) 15/32"

[F.2.7]

50c each

## **Radio Frequency Transistors**

|          |   |               |
|----------|---|---------------|
| ATF55143 | Low noise E-PHEMT 0.6dB noise figure. Low noise amp for frequencies between 450MHz and 6GHz. SMD package SOT343 (4 lead). [S.case]  | \$1.00 each   |
| MGF1302  | Low noise GaAs FET $N_f = 1.4\text{dB @ } 4\text{GHz}$ , $4\text{dB @ } 12\text{GHz}$ . [S.case]  | \$5.00 each   |
| BF199    | NS 25V 25mA, 500mW $f_t = 550\text{MHz}$ TO92[S.4.14]   | \$1.00 for 10 |
| BF494    | NS 20V 30mA Low noise mix-osc/IF amp TO-92 [S.4.15]   | \$1.50 for 10 |
| BFR91    | NS RF Amp. 5GHz 1.9dBn @ 500MHz [S.case]  | \$2.00 each   |
| MFE121   | Dual gate N-MOSFET 20V 5mA VHF Amp BF352 equiv. [S.case]  | \$0.50        |
| MPS5179  | NS TO92 12V 50mA 200mW $f_t$ 2000MHz $N_f$ 5.0dB [S.5.13]<br>RF Transistor. Use in UHF/VHF amplifiers with collector currents in the 100 $\mu\text{A}$ to 30 mA range, and in low frequency drift, high output UHF oscillators. | \$0.50 each   |
| BFG67    | NS 8GHz 50mA rf amp/preamp SOT143B package [S.case]   | \$1.50 each   |
| MPS5172  | NS 25V 100mA $f_t$ 120MHz [S.7.5]   | \$0.10 each   |
| MPS6507  | NS, VHF Mixer, 20V, 100mA, $f_t$ 700MHz [S.5.8]   | \$0.20 each   |
| C1-12    | NS RF Pwr 400 – 500 MHz 1W 12.5V [S.Case]   | \$1.00 each   |
| C3-12    | NS RF Pwr 400 – 500 MHz 4W 12.5V [S.Case]   | \$2.00 each   |
| MRF237   | NS RF Pwr. VHF 4.0W 12V TO39 [S.5.13]   | \$3.00 each   |
| MRF449   | NS RF Pwr. 2-30MHz 30W 12.5V stud mount [S.Case]  | \$10.00 each  |
| MRF559   | NS RF Pwr. 806-960MHz 0.5W 12.5V [S.5.13]   | \$0.50 each   |
| MRF628   | NS RF Pwr 400 – 500 MHz 1W 12.5V [S.Case]   | \$2.00 each   |
| MRF904   | NS RF Small signal amp. $f_t$ 4GHz 15V TO206 [S.5.13]   | \$3.00 each   |
| SD1144   | NS RF Pwr 400–550 MHz 2W 12.5V stud mount [S.Case]  | \$3.00 each   |
| 2N5945   | NS RF Pwr 400–700 MHz 2W 12.5V stud mount. [S.Case]   | \$3.00 each   |
| 2N5946   | NS RF Pwr 400–550 MHz 10W 12.5V stud mount [S.Case]   | \$4.00 each   |
| 2SC908   | NS TO39 RF Amp 1W @ 500MHz 13.6V [S.5.13]<br>Designed as driver and RF power amplifier.<br>0.5 to 0.8W output at UHF land mobile band.<br>Gain 15dB ( $V_{ce}=6.0\text{V}$ , $I_c=5\text{mA}$ , $f_t=2000\text{MHz}$ )          | \$1.00 each   |
| 3SK45    | Packaged as ECG221, dual-gate N-channel MOSFET for vhf amp and mixer applications. [S.6.16]   | \$0.75 each   |
| 3SK192GR | Dual-Gate MOSFET 15V 30mA(max) [S.7.13]   | \$1.00 each   |
| 2SC5488  | NS 30V 70mA low noise rf pre-amp [S.6.4]  | \$0.10 each   |

### **Recent additions:**

|          |  |               |
|----------|--|---------------|
| BST70A   | N-Chan DMOS 80V 0.5A TO92 switch       | \$0.20 each   |
| PMBT3904 | NPN 40V 200mA switching transistor SMD | \$0.50 for 10 |
| PMBT3906 | PNP 40V 200mA switching transistor SMD | \$0.50 for 10 |