

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



During a contest

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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	Currently Vacant			vicepresident@aucklandvhf.org
Secretary	Alastair Anderson	ZL1NEO		secretary@aucklandvhf.org
Treasurer	George Raffles	ZL1TUX	021 735 361	treasurer@aucklandvhf.org
Committee	Darryl Grange	ZL1TCI	021 123 7733	darryl@aucklandvhf.org
	Jim Logan	ZL1DI	021 331 747	
	Brian Wilson	ZL1UXB	021 1639 532	
	Dave Dingley	ZL1TIA	021 782 159	
AREC Group Leader	Matthew King	ZL1YOT	022 649 3310	arec@aucklandvhf.org
Deputy Group Leader	Currently Vacant			
ZL1BQ Trustee	Vaughan Henderson	ZL1VH	021 844 804	zl1bqtrustee@aucklandvhf.org
Head Repeater Trustee	Vaughan Henderson	ZL1VH	021 844 804	headtrustee@aucklandvhf.org
Klondyke Manager	Vaughan Henderson	ZL1VH	021 844 804	zl1vh1@gmail.com
670 Manager	Vaughan Henderson	ZL1VH	021 844 804	zl1vh1@gmail.com
690 Manager	Dennis Seymour	ZL1UET	09 278 0381	dennis.seymour@broadtech.co.nz
850 Manager	Vaughan Henderson	ZL1VH	021 844 804	850@aucklandvhf.org
Spectrum Editor	Mark Howie	ZL1UMK	022 047 3240	spectrum@aucklandvhf.org
Trading Table	Currently Vacant			tradingtable@aucklandvhf.org
Account Reviewer	Basil Orr	ZL1TOW	021 867 367	
ZL1VHD Dstar gateway administrator:	Laurie	ZL1ICU	634 5130 0274 817463	perma@xtra.co.nz
ZL1VHD Dstar gateway registration URL :			http://zl1vhd.dstar.org.nz	
Webmaster	Terry Corin	ZL1BPA		webmaster@aucklandvhf.org

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 Monday of the last week of the preceding month. Articles to be submitted to the editor Mark ZL1UMK spectrum@aucklandvhf.org

Auckland VHF Group (Inc) Branch 66

**The next Auckland VHF Group General Meeting
will be held on**

Monday 9 September 2024

At the Clubrooms, 30 Hazel Avenue at 7:30 pm.

Social and Projects Night

Do you have a contribution for Spectrum?

Any and all contributions, would be welcome.

I don't promise to publish everything I receive, but would be glad to receive suggestions or contributions.

Mark Howie

ZL1UMK

Spectrum Editor

How does dBV / "S" Meter readings compare to Noise Power ?

The following email thread appeared on the UK Microwaves reflector, and I thought it might be of interest to Spectrum readers.

Nick Gregory G0HIK asked the question and added some explanation.

"I'll try to explain this, hopefully the learned folk here can make this clearer. I'm currently constructing an audio mV meter to measure sun noise using the audio output of my radio. I'm coming to the point of creating the ranges I want and looking at scaling/calibrating them.

Now "S" meters measure the P.D. on the aerial terminals I believe and when we measure the sun noise using the audio output, we are measuring a Voltage. But when we talk about Noise, we always say Noise Power not Noise Voltage.

I'm confused, we are inputting a power to the radio, but measuring a voltage out, they are different, i.e. 10 Log and 20 Log. I'd like to know what I am missing here."

From: [Andy G4JNT](#)

The S meter is usually calibrated for HF at 50 microvolts or a power of $10 \cdot \text{LOG}(50\mu\text{V}^2 / 50\Omega * 1000) = -73\text{dBm}$ into the antenna terminals. (5uV or -93dBm for VHF). That calibration is usually, or should be, a plain carrier. Power is proportional to voltage squared. So, when you measure your mV from the radio, to convert that to a power scale you need to square it. That is where the 20.LOG term comes from when you convert voltages (or current) to dB. When you square a value, you double its Logarithm.

Now for noise: Assume a constant wideband noise input to your radio, much wider than the IF bandwidth. The mean noise POWER delivered to your speaker is proportional to the bandwidth of the IF. A 3kHz IF filter will deliver 10 times as much noise POWER than a 300Hz IF one does. Voltage output is the square root of power, and RMS voltage is the square root of mean power. A true RMS voltage reading of the receiver output will then show 3.162 times less voltage for that 300Hz filter over the 3kHz one.

Beware when measuring noise. True random noise will have very high spikes. There is an exact mathematical relationship between the PROBABILITY of a spike and the height of that spike compared to the RMS. A rough rule of thumb is that a spike of 3 times the RMS voltage (+10dB) will occur 1 in 100 times. Statistically that is called the three-sigma point, or three standard-deviations. This is usually sufficient to take as a limit for simple practical measurement accuracy, but it does mean that if you are measuring noise, you need a dynamic range in the linear stages before your detector of at least three times more than the maximum RMS input you're likely to get. 10 times is safer, so if you use op amps running from a 10V rail, that means no more than 1V RMS of noise anywhere in the system before the detector.

The uncertainty in noise, the jittering you see on a meter, is proportional to the square root of the bandwidth. So a noise meter running from a 3kHz bandwidth noise signal will jump around 10 times more than if you were to build yourself a custom noise receiver with 300kHz bandwidth. Or better still 1MHz bandwidth, a value used by many professional noise meters.

So, to conclude, calibrate your mV meter with the SQUARE of the measured value to get power. If doing it using an A/D + processor, use 20.LOG(N) to get dB. and use as wide a bandwidth as you can.

Nick Gregory G0HIK replied "Andy thank you for that, some interesting points there, that I'll take a note of.

I see the Big Guns on EME measure the noise at the I.F. (28 megs usually), you can obviously have a much wider B.W. there than at audio. I am using a OP-Amp precision rectifier circuit followed by an OP-Amp amplifier, with a single ended 12v supply, so I'll take note of the Dynamic range you mention.

"The S meter is usually calibrated for HF at 50 microvolts or a power of $10 \cdot \text{LOG}(50\mu\text{V}^2 / 50\Omega \cdot 1000) = -73\text{dBm}$ into the antenna terminals." I presume that is for "S 9" ?

Andy G4JNT replied:

Yes, S9 == -73dBm at HF, or -93dBm at VHF

Modern SDRs can give you the actual power level instead of amateurish S values

I tested the Elad FDM-DUO, it was within a dB over the HF to 50MHz range using a carrier.

Indicated input power using a noise source was more or less proportional to bandwidth of the IF filter selected and agreed near enough with my calibrated noise source (PN generator made with VAC CMOS clocked at 125MHz)

From Ranier DF6NA: The formulas are:

$$\text{dB}\mu\text{V} = 20 \log_{10}(U_{\text{eff}} / 0,000001\text{V})$$

$$\text{dBm} = 10 \log_{10}(P / 0,001\text{W})$$

$$P \text{ (in Watt)} = 0,001\text{W} \cdot 10^{\text{dBm} / 10}$$

$$\text{Noise Power (in Volt) an } 50 \text{ Ohm} = \text{sqrt}(50 \text{ Ohm} \cdot 0,001\text{W} \cdot 10^{\text{dBm} / 10})$$

Comparison of common units for S-meters from 144 MHz

S-Meter	uV (at 50Ω)	dBm	dBuV (at 50Ω)
S9+60dB	5.006	-33	74
S9+50dB	1.583	-43	64
S9+40dB	0.5006	-53	54
S9+30dB	0.1583	-63	44
S9+20dB	0.0501	-73	34
S9+10dB	0.01583	-83	24
S9	0.00501	-93	14
S8	0.00251	-99	8
S7	0.00126	-105	2
S6	0.00063	-111	-4
S5	0.00032	-117	-10
S4	0.00016	-123	-16
S3	0.00008	-129	-22
S2	0.00004	-135	-28
S1	0.00002	-141	-34

Auckland VHF Group Subscriptions are due by 30 June 2024 for the 2024-2025 year.

Subscriptions are now being accepted for the 2024-2025 year, 1 July 2024 to 30 June 2025.

This coincides with the financial year for the group, which ends 30 June 2024.

A Subscription notice will be sent out in June to club members who had not renewed their subscription at that time.

Note on Subscriptions:

- a. There is an increase in the Ordinary (Full) Members subscription for the 2024-2025 subscription year.
- b. All subscriptions terminate on 30 June.
- c. Your present subscription will run for two-months till 30 August, then your subscription drops to an in-active membership list. (As per the constitution)

Subscription Type	Subscription Price
Ordinary Members (Full)	\$70.00
Associate Members	\$55.00
Family Members	\$25.00

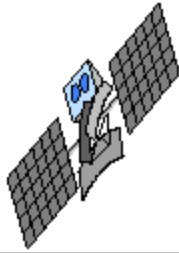
- For Family Members, one person needs to be an Ordinary Member, and then each additional person then becomes a family member.
- Subscription prices are determined at the AGM preceding the year being implemented (7 months ahead of the end of financial year)

73

George ZL1TUX

Treasurer,

Auckland VHF Group Inc.



AUCKLAND VHF GROUP INC.

P O Box 10138, Dominion Rd, Auckland 1446,
 30 Hazel Avenue, Mount Roskill, Auckland,
 Email: treasurer@aucklandvhf.org
 Web: <http://www.aucklandvhf.org>
 NEW ZEALAND



		Date Completed:	
Mr/Mrs/Miss/Ms	Forename	Surname	
	Address1	Phone: (home)	
	Address2	NZ Post Code	Phone: (work)
	Town/City	Phone (Mobile)	
	Email	Phone (Cell)	
Occupation:		Callsign:	
NZART Member	Yes / No	Branch assigned	
AREC Member	Yes / No	Branch assigned	
Family Member 1	(Name)	(Call)	(Email) (Mobile #)
Family Member 2	(Name)	(Call)	(Email) (Mobile #)
Family Member 3	(Name)	(Call)	(Email) (Mobile #)
New/Renewal/Change	Membership Category		To pay
	Ordinary (Full)		\$70.00 \$
	Associate		\$55.00 \$
	Family (per member after 1 full member registered at same address)		\$25.00 \$
Donations	Klondyke Refurbishment		\$
	Repeater Maintenance		\$
	Data/D-Star		\$
	Beacon/Repeater/Links Licences		\$
	General Club Donation / Other		\$
		Total	\$
If require Invoice / Receipt		Payment (Mark One →)	Cash <input type="checkbox"/> Internet deposit <input type="checkbox"/> Other: <input type="checkbox"/> Credit Card <input type="checkbox"/>
Internet	Account ASB 12-3011-0830580-00. Account Name: Auckland VHF Group Inc. Include your Name/Callsign for track. Note: this form needs to be sent to us to update our records. Email to: treasurer@aucklandvhf.org . (Especially if Contact information has changed)		
Credit Card	Membership Link: tinyurl.com/avhfg-membership-form		
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 the 4 th Monday of the month.		
Privacy	Unsubscribe from Email Notifications <input type="checkbox"/>		Do Not disclose contact Information <input type="checkbox"/>
	Unsubscribe from Google Groups <input type="checkbox"/>		

Club use only:	<input type="checkbox"/>	Approved:	<input type="checkbox"/>	Not Approved:	<input type="checkbox"/>
Sponsored by*			Sponsor's Callsign*		
*New members only.	Date:				

The information requested is for membership records required to be maintained under the Incorporated Societies Act and having due regard to the provisions of the Privacy Act

New Members and Membership Renewal Form 2024_v10 2024-08-16.pdf

15 July 2024, Donations for Repeaters Licences							
2023-2024-2025 Repeater Licences							
	Operation	On Air	Location	Donor name	Call sign	Donation	Date
53.725	Repeater	✓	Klondyke Road	Gwynne Rowe	ZL1AAR	\$50.00	30 November 2025
144.253	Beacon	✓	Nihotupu (Testing Clubrooms)	Terry Corin	ZL1BPA	\$50.00	30 November 2024
145.625	Data Rptr	✗	Klondyke Road				30 November 2023
145.650	D-Star Rptr	✓	Klondyke Road	Terry Corin	ZL1BPA	\$50.00	30 November 2024
146.625	Repeater	✓	Klondyke Road	David Wilkins	ZL1MR	\$50.00	30 November 2025
146.700	Repeater	✓	Ruaotuwheua	Terry Corin	ZL1BPA	\$50.00	30 November 2024
146.900	Repeater	✓	Mt Puketutu Radio	David Wilkins	ZL1MR	\$50.00	30 November 2025
432.253	Beacon	✓	Nihotupu (Testing Clubrooms)	Terry Corin	ZL1BPA	\$50.00	30 November 2024
438.175	D-Star Repeater	✓	Klondyke Road	Terry Corin	ZL1BPA	\$50.00	30 November 2024
438.500	Repeater	✗	North Head				30 November 2023
439.850	Link TX to Kaimai	✓	Klondyke Road	Russell Richardson	ZL1RWR	\$50.00	30 November 2025
439.875	Ak Nat System Rptr	✓	Klondyke Road	Soren Low	ZL1SKL	\$50.00	30 November 2025
439.900	Link TX to Egmont	✓	Klondyke Road	Russell Richardson	ZL1RWR	\$50.00	30 November 2025
439.950	Link TX to Brenderwyn	✓	Klondyke Road	Terry Corin	ZL1BPA	\$50.00	30 November 2024
1291.900	Repeater	✓	217 Glenfield Rd	Ian Ashley	ZL1AOX	\$50.00	30 November 2025
439.700	DMR Repeater (Waitaker	✓	Quinns Rd				30 November 2023
			Number of Donors			\$650.00	
The Light Brown Repeater Licences are available for Sponsorship \$50.00 per licence							

2023-2024-2025,		General Club Donations		4 July 2024
Donor	Amount	Date Paid		
2024 - 2025				
2024 - 2025	\$0.00			
2023 - 2024				
New Zealand Electronics Institute	\$50.00	25-May-2024	Club Donation	
Estate of Roy Milam, ZL1WI	\$10,000.00	10-May-2024	General Donation	
Martyn Seay, ZL3CK	\$100.00	09-May-2024	General Donation	
Estate of Kenneth Boyce, ZL1TD	\$5,000.00	05-Dec-2023	General Donation	
New Zealand Vintage Radio Society	\$550.00	05-Dec-2023	Donation Club Usage	
New Zealand Electronics Institute	\$50.00	24-Sep-2023	Club Donation	
Brian Wilson, ZL1UXB	\$1.00	12-Sep-2023	General Donation	
2023 - 2024	\$15,751.00			
2022 - 2023				
Harry, ZL1BK	\$100.00	31-Oct-2022	General 50 Year Clubrooms	
New Zealand Vintage Radio Society	\$480.00	10-Aug-2022	Donation Club Usage	
2022 - 2023	\$580.00			
Total 2023 - 2024 - 2025	\$16,331.00			
Total 2023 - 2024	\$16,331.00			

Repeater Maintenance Donations		4 July 2024		
Donor	Amount	Date Paid		
Papakura Radio Club	\$500.00	06-Nov-2023	Repeater Operation Donation	
Murray McGehan	\$50.00	22-Oct-2023	Repeater Maintenance Donation	
YURI MYZUKA, ZL1GYM	\$20.00	13-Jun-2023	Repeater Maintenance Donation	
XIANGHUI LUO, ZL1XL	\$20.00	13-Jun-2023	Repeater Maintenance Donation	
Papakura Radio Club	\$500.00	02-Dec-2022	Repeater Operation Donation	
Manukau Radio Club	\$150.00	19-May-2022	Repeater Operation Donation	
Total	\$1,240.00			

ATV Repeater Donations / Fund,		30 June 2024,		
Donor	Amount	Date Paid		
Michael Sheffield, ZL1ABS	\$207.50	12-Jul-2021	ATV Repeater Donation	
Total	\$207.50			

Klondyke Refurbishment Donations		
2021-2022	As of 30 June 2022	
Jim Logan, ZL1DI	\$20.00	10/05/2022
Philip Sharp, ZL1PSH	\$15.00	14/03/2022
Margaret Dingley, ZL1AYV	\$205.00	11/10/2021
George Marr, ZL1TUJ	\$50.00	13/12/2021
Total 2022	\$290.00	
2020-2021	As of 30 September 2021	
Margaret Dingley, ZL1AYV	\$100.00	9/11/2020
David Dingley, ZL1TIA	\$100.00	9/11/2020
Jennie Dingley, ZL1TDB	\$100.00	9/11/2020
Yuri Muzyka, ZL1GYM,	\$50.00	23/11/2020
Martyn Seay, ZL3CK	\$500.00	1/12/2020
Martyn Seay, ZL3CK	\$100.00	14/06/2021
Yuri Muzyka, ZL1GYM,	\$50.00	13/09/2021
Total 2021	\$1,000.00	
2019-2020		
Charles Graves	\$15.00	7/10/2019
Ian Ashley, ZL1AOX	\$500.00	9/10/2019
Keith Dix, ZL1BQE	\$50.00	10/10/2019
Margaret Dingley, ZL1AYV	\$100.00	15/10/2019
David Dingley, ZL1TIA	\$100.00	15/10/2019
Jennie Dingley, ZL1TDB	\$100.00	15/10/2019
Russell King, ZL1WITT	\$20.00	13/11/2019
Basil Orr, ZL1TOW	\$500.00	9/12/2019
Raffle - Meter	\$289.00	10/12/2019
Martyn Seay, ZL3CK	\$100.00	9/03/2020
Brenton Faithfull, ZL1BBF	\$50.00	11/06/2020
Mark Howie, ZL1UMK	\$20.00	10/08/2020
George Marr, ZL1TUJ	\$50.00	10/08/2020
Total 2020	\$1,894.00	
2018-2019		
Western Suburbs Radio Club	\$200.00	11/11/2018
Michael Sheffield, ZL1ABS	\$500.00	11/11/2018
Ross Glover, Z1BGB	\$50.00	12/11/2018
Andrew Brill, ZL1COP	\$100.00	5/11/2018
Martin Seay, ZL3CK	\$50.00	8/11/2018
Aaron Pelly, ZL1FAT	\$10.00	8/11/2018
Cris Hodgetts, ZL1CLH	\$20.00	8/11/2018
David Crosier, ZL1THF	\$20.00	8/11/2018
Ann Walker, ZL1BFB	\$20.00	8/11/2018
Bruce Churcher, ZL1BLB	\$20.00	8/11/2018
Klondyke Raffle @ Western Suburbs Sale	\$180.00	8/11/2018
Dennis Thornton, ZL1TAY	\$50.00	12/11/2018
George Raffles, ZL1TUX	\$100.00	17/11/2018
Keith Dix, ZL1BQE	\$100.00	10/12/2018
Franklin Radio Club, ZL1SA	\$800.00	12/12/2018
Manukau Branch, ZL1QB	\$100.00	12/12/2018
Terry Corin, ZL1BPA	\$1,000.00	28/12/2018
Keily Petersen, ZL1KM	\$150.00	22/01/2019
North Shore Branch 29, ZL1AB	\$100.00	22/01/2019
Gilbert Ecroyd, ZL2EK	\$100.00	5/03/2019
Dave Blackett, ZL1AD	\$50.00	8/03/2019
Ian Sexton, ZL1PZ	\$500.00	13/03/2019
Auckland Branch, ZL1AA	\$100.00	13/03/2019
Ralph & Rosemary Boshier, ZL4AG & ZL1RO	\$40.00	13/03/2019
Nick Emery, ZL1BOP	\$50.00	16/04/2019
A. Kelvin McLean, ZL1AKM	\$20.00	16/04/2019
Soren Low, ZL1SKL	\$100.00	22/04/2019
North Shore Radio Club, ZL1AB, Branch 29	\$1,500.00	17/05/2019
Brendon Reid, ZL1XXX	\$20.00	10/06/2019
Auckland Branch, ZL1AA	\$500.00	8/07/2019
Gary Ball, ZL1FAB	\$20.00	1/08/2019
Total 2019	\$6,550.00	
Klondyke Total (11 November 2018 to 30 June 2024)	\$13,303.16	
Klondyke Total (1 June 2022 to 30 June 2024)	\$3,569.16	
Klondyke Total (11 November 2018 to 30 June 2022)	\$9,734.00	

Klondyke Refurbishment Donations			
2024-2025		As of 15 July 2024	
Rob Stokes, ZL1RJS	\$30.00		3/07/2024
Total 2025	\$30.00		
2023-2024		As of 30 June 2024	
Murray McGehan ZL1OD	\$190.00		14/05/2024
Keith Dix, ZL1BQE	\$30.00		7/05/2024
Russell Richardson, ZL1RWR	\$100.00		7/05/2024
Yuri Muzyka, ZL1GYM,	\$140.00		8/04/2024
Cary Rawson, ZL1CLR,	\$50.00		20/12/2023
Rob Stokes, ZL1RJS,	\$40.00		6/11/2023
Total 2024	\$550.00		
2022-2023		As of 30 June 2023	
Donation,	\$10.00	\$250.00	13/06/2023
Ian Ashley, ZL1AOX	\$40.00		12/06/2023
Russell Richardson, ZL1RWR	\$100.00		10/06/2023
Martyn Seay, ZL3CK	\$100.00		10/06/2023
George Raffles, ZL1TUX	\$199.16	\$199.16	12/05/2023
MiniSA (Donated by ZL1TIA) / RF Signal Source (Donated by ZL1VH) for Klondyke Refurbishment	\$270.00	\$270.00	19/12/2022
Estate Ian Sexton ZL1PZ	\$950.00	\$2,300.00	27/07/2022
Estate Tony Babish ZL1ATE	\$500.00		27/07/2022
John Sexton ZL1AQS	\$750.00		27/07/2022
George Marr, ZL1TUJ	\$100.00		19/07/2022
Total 2023	\$3,019.16		
Klondyke Total (11 November 2018 to 30 June 2025)	\$13,333.16		
Klondyke Total (11 November 2018 to 30 June 2024)	\$13,303.16		
Klondyke Total (1 June 2022 to 30 June 2024)	\$3,569.16		
Klondyke Total (11 November 2018 to 30 June 2022)	\$9,734.00		



**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 Matthew King ZL1YOT.

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:

Matthew King ZL1YOT

022-6493310

mattking@gmail.com

The Deputy Leader position is currently vacant

TRADING TABLE

Currently our Trading Table is only open on meeting nights.

NEW – Printed Circuit Board. Thanks to a generous donation from N.Z.'s last circuit board production company (now closed down), we have a large quantity of single sided fibreglass printed circuit board material in sizes ranging from 1200 x 600 down to smaller pieces. There's some double sided board as well. Come along to our monthly meeting if you want some – prices can be negotiated!

NEW – RG58C/U 50 Ohm Coaxial Cable. Thanks to a bulk purchase we are able to offer this good quality coax at a competitive price. The cable has tinned centre conductor and screen braid making it resistant to long term corrosion. The price is \$2.00 per metre with a discount for purchases of 20m or more. See Vaughan ZL1VH on meeting nights to get this quality coax cable.

The Trading Table is now on line. Navigate your way to our new look web site at <https://aucklandvhf.org/> and click on TRADING TABLE (the most right hand tab).

Wait a few seconds and the on-line version of the Trading Table will pop up. From here you can browse the various sections, dig deeper to look at what's available and even place your order online.

If you prefer to just look at the Trading Table List, just hover your mouse pointer over the TRADING TABLE and a pull down list will appear. From this you can access the full trading Table list and download it in .PDF form.

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

