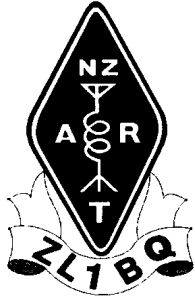


**The Official Newsletter of the  
Auckland VHF Group Inc.  
Spectrum**



**New Data Modes DVDs cover  
(Page 13)**



# Auckland VHF Group Inc.

## Branch 66 NZART

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

Office	Name	Call sign	Home	Work / Mobile	E-mail
President	John Dunn	ZL1JD	473 9514	021 731 907	<a href="mailto:john.dunn@clear.net.nz">john.dunn@clear.net.nz</a>
Vice President	Peter Loveridge	ZL1UKG	377 3398	481 0544	<a href="mailto:peterlov@ihug.co.nz">peterlov@ihug.co.nz</a>
Secretary	Marlene Mathews	ZL1MYL	634 5130		<a href="mailto:perma@xtra.co.nz">perma@xtra.co.nz</a>
Treasurer	Doug Cooke	ZL1TTE	846 6075	0274 978 121	<a href="mailto:d-jcooke@ihug.co.nz">d-jcooke@ihug.co.nz</a>
Committee	Vaughan Henderson	ZL1TGC	418 1071	021 844 804	<a href="mailto:vaughanh@vodafone.co.nz">vaughanh@vodafone.co.nz</a>
	Laurie Mathews	ZL1ICU	634 5130	0274 817 463	<a href="mailto:perma@xtra.co.nz">perma@xtra.co.nz</a>
	Grant Taylor	ZL1WTT		021 234 0270	<a href="mailto:z1wtt1@yahoo.com.au">z1wtt1@yahoo.com.au</a>
	David Probine	ZL1TND	630 8044		
<b>AREC</b>					
Section Leader	Laurie Mathews	ZL1ICU	634 5130	0274 817 463	<a href="mailto:perma@xtra.co.nz">perma@xtra.co.nz</a>
Deputy Section	Franc Dunatov	ZL1SLO	829 2003	021 396 381	<a href="mailto:franc@ihug.co.nz">franc@ihug.co.nz</a>
ZL1BQ Trustee	John Dunn	ZL1JD	473 9514	021 731 907	<a href="mailto:john.dunn@clear.net.nz">john.dunn@clear.net.nz</a>
Repeater Trustee	John Dunn	ZL1JD	473 9514	021 731 907	<a href="mailto:john.dunn@clear.net.nz">john.dunn@clear.net.nz</a>
Klondyke Managers	ZL1TGC, ZL1BK				
690 Manager	Dennis Seymour	ZL1UET	532 8666		
850/670 Manager	Vaughan Henderson	ZL1TGC	418 1071	021 844 804	<a href="mailto:vaughanh@vodafone.co.nz">vaughanh@vodafone.co.nz</a>
ATV/Beacons	Grant Taylor	ZL1WTT		021 234 0270	<a href="mailto:z1wtt1@yahoo.com.au">z1wtt1@yahoo.com.au</a>
Spectrum Editor	Stephen Hayman	ZL1TPH	09 4265056	0274 732663	<a href="mailto:z1tph@xtra.co.nz">z1tph@xtra.co.nz</a>
Trading Table	Franc Dunatov	ZL1SLO	829 2003	021 02572003	<a href="mailto:franc@ihug.co.nz">franc@ihug.co.nz</a>
Hon Auditor	Peter Loveridge	ZL1UKG	377 3398	481 0544	<a href="mailto:peterlov@ihug.co.nz">peterlov@ihug.co.nz</a>
Webmaster	Hannes Hanekom	ZL1LW	4417576	02102396653	<a href="mailto:z1bq.webmaster@gmail.com">z1bq.webmaster@gmail.com</a>
Club Web Page	<a href="http://www.gsl.net/zl1bq">http://www.gsl.net/zl1bq</a>				
ATV Interest Group	<a href="http://www.gsl.net/zl1qf/atvug/ATVusers.html">http://www.gsl.net/zl1qf/atvug/ATVusers.html</a>				
ZL1VHD Dstar gateway administrator;	Laurie Mathews	ZL1ICU	6345130	0274817463	<a href="mailto:perma@xtra.co.nz">perma@xtra.co.nz</a>
ZL1VHD Dstar gateway registration URL :	<a href="http://zl1vhd.ham-radio-op.net">http://zl1vhd.ham-radio-op.net</a>				

### 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.

Membership of the Auckland VHF Group is via subscription; \$25. It is expected that members of the Auckland VHF Group Inc. are also members of NZART, as we are branch number 66 of NZART.

*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 the Monday 7 days before the following General Meeting. Articles may be submitted to the Editor.

## **From the Chair – August 2011.**

### ***Last Months Meeting.***

Tony Krzyzewski from Kaon Technologies has spoken to the Group on previous occasions, but this is the first time he has gone through Computer technology developments over the past 35 years, and how they have led to dramatic changes in the way that society operates. Tony cleverly outlined some of the major errors that have occurred in the development cycle and how we are now stuck with the results. As he pointed out, not all of these developments came about through a planned process, resulting in some quite unexpected pieces of technology now dominating the industry, and some very fundamental flaws in other pieces of technology that are having a major impact on the cost to industry, and to society for using it.

As usual, Tony had the audience's attention all the way through. Everyone enjoyed the presentation such that he was requested to repeat the talk to the Papakuru branch in the very near future. An ideal opportunity for those who missed this excellent presentation.

### ***Working Bee Sat 9<sup>th</sup> July.***

Two of us turned up at the club rooms, along with the Auckland City Council works department who had decided to trim all the trees along the side of the reserve on the same morning.

For an hour or so nobody could get in or out of the club rooms area while the workman worked their way along the access way. The noise and dust was also a nuisance requiring the club rooms to be vacuumed out. Meanwhile, quite a bit of material was sorted out in the container and made ready for the upcoming sales.

### ***Channel 39 ATV now Off the Air***

A phone call from the RSM on Friday 29<sup>th</sup> July was received advising us that the Group may be in breach of its Channel 39 licence, and because of additional service requirements for the Rugby World Cup, asked that channel 39 be cleared. We were asked to turn our transmitter off, which we did as requested. To continue could have resulted in the immediate issue of a \$1200 fine to the Group.

Channel 39 is in the middle of the band space allocated for Terrestrial Digital TV, which is why the amateur allocation would disappear when the Digital Switch Over occurs in November 2013. However it appears the roll out is occurring faster than originally anticipated.

Discussions are continuing with RSM as I write.



### ***SSB Net on 144.2 after News and Net Sundays.***

The SSB net after the News and Net on Sundays (approximately 8.35 pm) has proved to be very popular with nine stations coming on the first night! Signals from as far as Hamilton are frequently on, with signals being read by most stations around the district.

Most people are using vertical polarisation at this stage, which still gets signals out to those using the horizontal pattern. Power levels have varied from 5 watts to 50 or even more. Some signals were a bit rusty to start with but have improved over the past few weeks resulting in very readable signals.

Some of the call signs heard have been, ZL1LK, ZL1ME, ZL1PO, ZL1LW, ZL1FS, ZL1NE, ZL1AMO, ZL1TWR, ZL2CNC, ZL1BCJ, ZL1KB, ZL1AVO, ZL2UGS.

As the summer months approach again, good conditions could bring in signals from further down country, which could prove very interesting. A great warm up for the forthcoming contest season on VHF. We look forward to hearing more call signs on Sunday evenings to come.

### ***New Feeders Made Ready for Klondyke.***

New Heliac Feeders are sitting at the back of the club rooms in readiness to have one end terminated before transportation to Klondyke. These will replace the ones we lost last summer and provide a spare. The work to pull them up the tower is planned for when the weather allows access and suitable working conditions at the site again.

### ***Switching Hitch at Klondyke.***

Over recent weeks there has been a problem in the controller at Klondyke switching 6625 to 9875. This fault is also causing problems with bringing the Official Broadcast across to 6625 on the last Sunday of the month, and also affecting the Sunday News and Net.

With the Official Broadcast now coming up from down south, if it does not appear on 6625, then switch to the UHF national link or listen to 3900 KHz (Lower Side Band) where the broadcast can also be heard.

Hopefully the repair to the controller at Klondyke will not take too long to be fixed.

### ***Watch for Small Children on Way to Club Rooms.***

It has been brought to our attention that a couple of young families have moved into Hazel Avenue, the blind end that provides access to our club rooms. These families have little ones that are at the running around stage and need a careful watch out for. They may think the street is safe – particularly when the evening light starts to come on at about the time people are heading towards the club rooms as summer draws closer. They may unexpectedly come rushing out in front of your vehicle. – Take care!

### ***THIS MONTHS MEETING:***

Paul ZL4AX has been travelling around the various branches with an excellent talk about Packet Radio. The VHF Group is the last “Port of call” for this interesting talk where Paul will discuss the past, the present and the future on this mode of transmission. He will also give the current situation and hopefully demonstrate what is available today.

Paul is an entertaining speaker and well worth another listen to if you have already heard this talk. To those who haven't, a presentation not to miss!

We look forward to seeing you all at the meeting – August 8<sup>th</sup>, 7.30 pm, Hazel Avenue Club Rooms.

Best 73's, de **ZL1JD**

# AUCKLAND VHF GROUP (INC) BRANCH 66

## **MEETING NOTICE**

**August 8th 7.30PM HAZEL AVENUE CLUB ROOMS**

(Located on left at the end of Hazel Avenue)

*The Evenings Subject:*

**“Packet Radio ”**

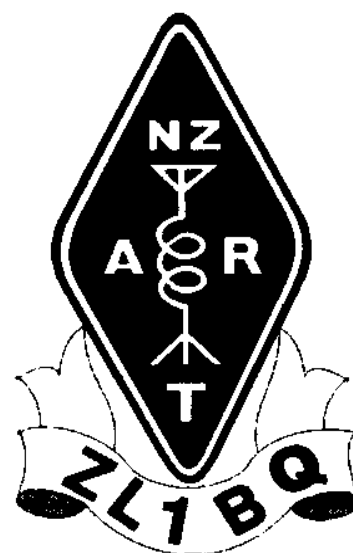
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Paul is an entertaining speaker and well worth another listen to if you have already heard this talk. To those who haven't, a presentation not to miss!

**EVERYBODY WELCOME**

**Dates to Remember over next few months.**

- August 7<sup>th</sup> (Sun)** 8.15pm News and Net 6625 and 9875
- August 8<sup>th</sup> (Mon)** 7.30 pm Hazel Ave Clubrooms, Packet - Past and Present, Paul ZL4AX
- August 13<sup>th</sup> (Sat)** Hamilton Equipment Sale
- August 14<sup>th</sup> (Sun)** 8.15pm News and Net 6625 and 9875
- August 21<sup>st</sup> (Sun)** 8.15pm News and Net 6625 and 9875
- August 29<sup>th</sup> (Mon)** Committee Meet, 7.30 pm Hazel Ave
- 



**Hamilton Amateur Radio Club**

# **MARKET DAY**

**Saturday August 13th, 2011**

Hamilton Table Tennis Club Rooms

Edgecumbe Street, Hamilton

Vendors from 8.00 am

Buyers from 10.00 am

Table space at \$20 per metre pre-paid

\$25 per metre on the day

All enquiries to: Market Day, Hamilton Amateur Radio Club,

P0 Box 606, Hamilton

E-mail: [harcmday@nzart.org.nz](mailto:harcmday@nzart.org.nz)

Web: [http://z1lux.tripod.com/market\\_day.html](http://z1lux.tripod.com/market_day.html)

Location: [http://z1lux.tripod.com/market\\_day.html](http://z1lux.tripod.com/market_day.html)



## NZART Headquarters Infoline SPECIAL Issue 28s

10<sup>th</sup> July 2011

NZART Website: [www.nzart.org.nz](http://www.nzart.org.nz)

### Jamie Pye ZL2NN, Silent Key Saturday 2<sup>nd</sup> June 2011

First licensed as ZL2TGP in 1966, became ZL2NN in 1970. Jamie had many achievements throughout his life in amateur radio, to name a few:

#### Locally:

- Member of the original design team for the first Mt Climie VHF Repeater
- Upper Hutt Branch Secretary in 1974
- Awarded the first "Branch 63 Merit Award" for the design, construction and commission of the Mt Climie 10 Metre Beacon
- Proposed and Constructed a 6 Metre Beacon
- Elected Branch President in 1980
- Throughout the 80's tutored many radio classes and held a 100% pass rate.
- Made Life member of Upper Hutt Branch

#### Nationally

- Elected to NZART Council 1983 – 1993
- Secretary to first Frequency Management Working Group (FMWG) forerunner of FMTAG
- Continued to produce many repeater and beacon maps and band plans for Call Book
- Responsible for several major revisions of the Basic Radio Training Manual
- In 2001 after a severe accident, becoming wheelchair bound he continued in administrative duties for NZART
- Awarded Life membership of NZART in 2005
- Appointed as Editor of HQ Info-line in 2006
- Appointed as Webmaster in 2008, a position he held until his passing
- Moderator of NZART Reflector
- Produced all certificates awarded to amateurs in New Zealand
- Maintained the Who's Who Directory of NZART Council & Officers

#### Internationally

- Appointed IARU Overseas Liaison Officer in 1981
- Member of the IARU Region 3 committee
- Attended many IARU conferences
- IARU Region 3 Beacon Coordinator
- Editor & contributor of many IARU papers
- Developed monitoring software for the IARU Beacon programme

To quote Terry Carrell ZL3QL another of the IARU committee...Jamie in his usual way and on so many occasions pulled the team together with his firm stance for the Association and his humoured approach to tasks.

Jamie not only greatly contributed to amateur radio, but passionately enjoyed his hobby. He and his XYL the late Gael ZL2SZ attended many NZART and VHF conferences. He was active with mobile operations both HF and VHF. Jamie was a keen enthusiast for the original Galbraith Frequency Counter, and modified it very early to use TV subcarrier for frequency locking accuracy.

On a number of occasions Jamie won the Frequency Measuring Contest and was involved with organising this event.

Jamie is survived by his son Jim ZL2PU, and daughters Elsa and Jan, who also held listener calls in their earlier years.

Jamie a great colleague, friend and amateur, you gave so much to this hobby and will be sadly missed. I thank you for your commitment and dedication and join with many others in celebrating the many wonderful memories you leave us.

73's & 88's Debby ZL2DL

# 2011 VHF-UHF-SHF Contest Calendar

*Remaining VHF Contests for 2011*

## Brass Monkey Contest

All bands 50 MHz and up. Saturday the 6th and Sunday the 7th of August.

## Microwave Contest

All bands 614 MHz and up. Saturday the 1st and Sunday the 2nd of October.

## Field Day Contest

All bands 50 MHz and up. Saturday the 3rd and Sunday the 4th of December.

For all contests, the operating periods are 1700 to 2300 on the Saturday, and 0700 to 1300 on the Sunday, NZ local time.

The complete Contest Rules are available at:

<http://www.vhf.org.nz/pubs/Contests/VHF-UHF-SHF-ContestRules>

\*\*\*\*\*

## Hibernation Contest (11-12 June 2011) - Results Announced

RESULTS OF THE HIBERNATION CONTEST 11th and 12th June 2011

### Band

Callsign	Locator	Points
----------	---------	--------

### 2 m

ZL1TPH	RF73ij	52 *
--------	--------	------

ZL1SWW	RF73kd	45
--------	--------	----

**70 cm**

ZL1SWW	RF73kd	102 *
ZL1TPH	RF73ij	50

**23 cm**

ZL1SWW	RF73kd	187 *
ZL1TPH	RF73ij	119

**9 cm**

ZL1SWW	RF73kd	141 *
ZL1TPH	RF73hm	112

**TOTAL SCORES**

ZL1SWW	RF73kd	475 *
ZL1TPH	RF73ij	221
ZL1TPH	RF73hm	112

**BEST DX**

2 m	ZL1TPH - ZL2IP	296 km
70 cm	ZL1TPH - ZL2IP	296 km
23 cm	ZL1TPH - ZL2IP	296 km
9 cm	ZL1SWW - ZL1TPH	47 km

**9 STATIONS ACTIVE:**

ZL1AKW ZL1AVZ ZL1BK ZL1IU ZL1SWW  
ZL1TPH ZL1TWR ZL1UET ZL2IP

**SPECTRUM**

**EQUIPMENT USED**

**2 metres**

TS-700A + 250 W SSPA + 10-element Yagi  
IC-706MkII + 400 W PA + 10-element Yagi at  
55 feet

**70 cm**

TR-9500 + 130 W PA + 11-element Yagi at 20  
feet  
FT-817 + 120 W Tono PA + 2x 7-element  
Yagi

**23 cm**

VK5EME variant 18 W + 56-element Yagi  
stack at 20 feet  
IC-202 + transverter + 150 W SSPA + 4x30-  
element array

**9 cm**

Converted DXR 5 W + 20-element patch an-  
tenna  
FT-817 + GPS-locked transverter + 18 W To-  
shiba PA + 6 dBi waveguide flange

**THE NEXT CONTEST**

The next contest is the Brass Monkey Contest,  
50 MHz and up, on Saturday the 6th and Sun-  
day the 7th of August 2011. The operating  
times are: Saturday 1700 to 2300 NZST and  
Sunday 0700 to 1300 NZST.

The contest after that is the Microwave Con-  
test, 921 MHz and up, on Saturday the 1<sup>st</sup> and  
Sunday the 2<sup>nd</sup> of October 2011. The operating  
times are: Saturday 1700 to 2300 NZST and  
Sunday 0700 to 1300 NZST.

All contest logs should be sent, to arrive within  
two weeks, to:

[zl2wa@clear.net.nz](mailto:zl2wa@clear.net.nz) with Contest Log in the  
subject line, or by post to:

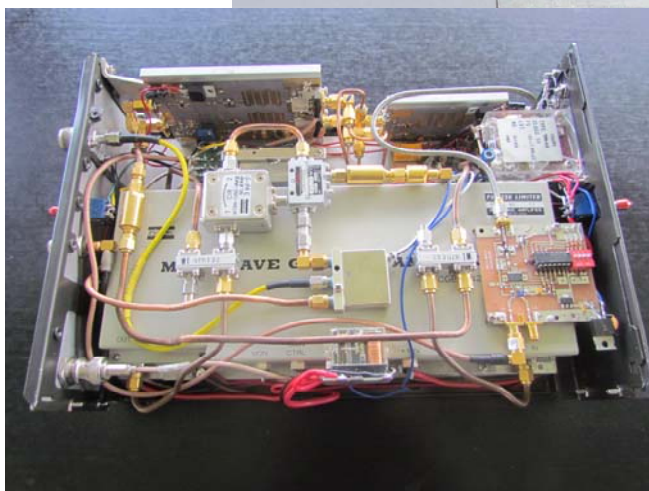
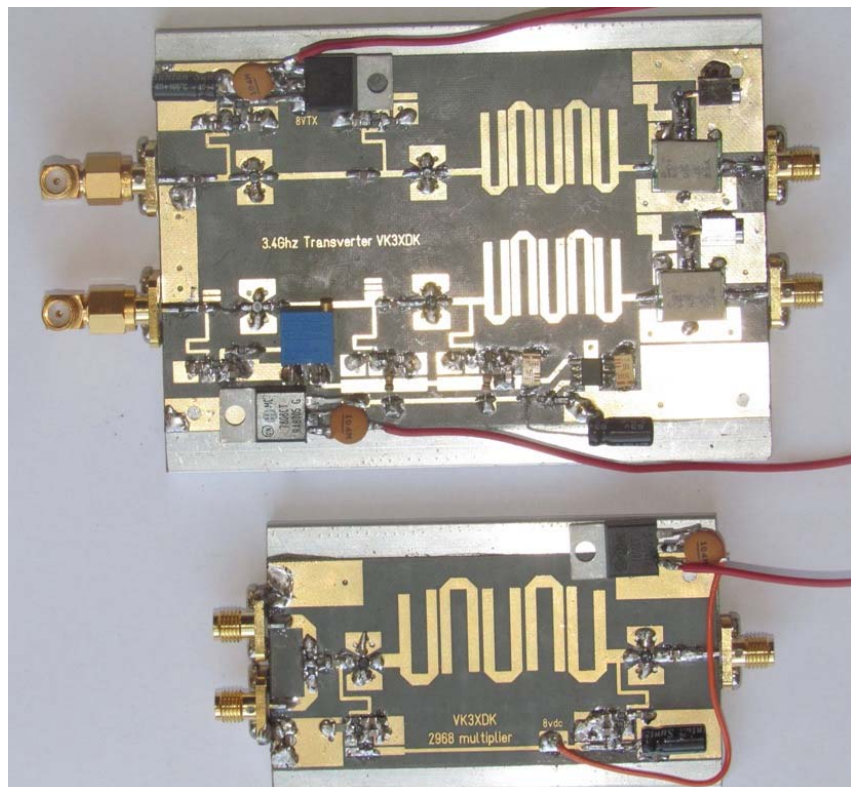
Contest Manager - NZART  
Wellington VHF Group  
P.O. Box 12-259  
Thorndon, Wellington

## VK3XDK 3.4 GHz transverter kit project!

This microwave transverter for the 9 cm band (3.4 GHz) was recently constructed using the designed and produced transverter boards from Graham VK3XDK. This transverter also includes his PLL board for oscillator injection, that is referenced to an internal 10 MHz OCXO or optional external GPS reference. <http://vk9na.com/Transverters.html>

Two FUJITSU 3.9 GHz Gas-As FET power amplifiers were acquired surplus and modified with added inbuilt minus volt inverters for + 12 volts only connections externally and then flaked for the best down on 3.4 GHz. They are combined with 3 dB SMA couplers for 0 and 90 degrees for an output power of around 10 Watts. Both PA's are mounted back to back.

Steve, ZL1TPH





## Advertisement

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**The Auckland VHF Group Inc Branch 66 NZART gratefully acknowledges the sponsorship of Branch 66 Beacons, Repeaters and Fixed Links licence fees and the Group's repeater operations by the following radio amateurs and NZART Branches:**

53.725 Repeater - Tim Moore VK4TIM / ZL1TN

144.253 Beacon - Steve Hayman ZL1TPH

144.575 Digipeater - Franklin Branch ZL1SA

145.625 Repeater - Jim Meachen ZL2BHF

146.625 Repeater - Frank Dunatov ZL1SLO

146.700 Repeater - Western Suburbs ARC

146.900 Repeater - Franklin Branch ZL1SA

432.235 Beacon - Steve Hayman ZL1TPH

438.450 Repeater - Laurie Mathews ZL1ICU

438.500 Repeater - Franklin Branch ZL1SA

439.850 NatLink - Franklin Branch ZL1SA

439.875 NatSys Repeater - John Dunn ZL1JD

439.900 NatSys Link -

439.950 NatSys Link - Vaughan Henderson ZL1TGC

615.250 ATV Repeater - AKVHFG ATV Group

1296.253 Beacon - Steve Hayman ZL1TPH

Papakura Radio Club Branch 65 NZART Donation of \$300.

If you would like to support the Auckland VHF Group by sponsoring the licence fee for one of the available Beacons, Repeaters or Fixed Links or donate towards the Group's repeater operations please contact Jim ZL2BHF by email - [zl2bhf@clear.net.nz](mailto:zl2bhf@clear.net.nz)

# TRADING TABLE

## AREC recommended "T" type connectors:

Set of male and female quick connect terminals and housings similar to illustration. Terminals are tin plated, not brass as shown.

Only \$2.00 per set

Back in stock: **PL259 UHF Connectors and Reducing Adaptors.**



UHF-MALE (PL259) connector is nickel plated, with a tapered brass tip, brown phenolic insulation and heavy duty knurling. Suits RG8, RG213 50 ohm coaxial cables. These connectors perform satisfactory up to 200MHz, and are usable with caution up to 500MHz. The voltage rating is 500 volts RMS.

**Our price: \$2.50 each or 10 for \$20.00**

Nicely machined reducer which screws into the back of the PL-259 connectors.

Nickel-plated on brass construction, will fit RG58/U 50 ohm coaxial cable.

**Our price: 50c each.**

## DATA MODES & UTILITIES CD

Over 270 programmes, utilities, tutorials on just about every aspect of Ham Radio you could want. Many useful utilities, logging programmes, amateur satellites, digital modes, test equipment. Software Defined Radio, PCB design programmes, this CD has got it all!

Latest version is V 10.9.

**Still only \$10.00**



## CONNECTORS

New stock just arrived of type N connectors for use with RG58 coaxial cable. These are solder clamp type, just the thing if you don't have the right crimp tool!



**Only \$5.00 each – be in quick, we only have limited stock.**

### Other coaxial connectors available from the Trading Table:

TNC plugs 50ohm for RG58 coax (crimp and clamp/solder type available)	\$2.50 each
BNC plugs 50 ohm for RG58 coax (solder/clamp on 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
BNC jack cable end crimp type 50ohm for RG58 coax Radiall R141237161	\$1.50 each
PL259 coaxial plugs. Genuine Amphenol 83-ISA brand. Brown phenolic insulation. Suit RG8/RG213 50 ohm coaxial cable.	\$3.50 each
PL259 right angle adaptors Male-Female (limited quantity)	\$3.00 each
SO239 chassis mount socket (4-hole flange)	\$2.00 each
N Type male solder on suit RG213 coax	\$4.00 each
N Type male quick-fit (solderless press fit into centre pin) for RG213	\$8.00 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 silver plated solder/clamp on suit RG58 coax	\$3.00 each
N Type male crimp on suit RG58 coax (only a few left) **	\$2.50 each

\*\* Crimping service available for these at club meetings.



**Back in stock:**

**ATF55143 Low noise E-PHEMT 0.6 dB noise figure.**

Low noise amp for frequencies between 450MHz and 6GHz.

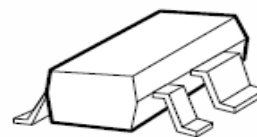
SMD package SOT343

(4 lead). Data sheet available.

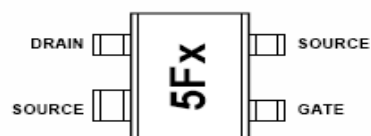
Available from the Trading Table for

Only \$1.50 each.

**Surface Mount Package  
SOT-343**



**Pin Connections and  
Package Marking**



**Note:**  
Top View. Package marking provides orientation and identification

"5F" = Device Code  
"x" = Date code character identifies month of manufacture.

Don't forget our range of specialty

fixed and variable capacitors:



**Variable Capacitors:**

0.2-4.5pF GHW4R5000. Glass piston trimmer

(Sprague-Goodman) [scase] \$4.00 each

1 - 14 pF Murata MVM0145 [scase]  
\$2.50 each



1.7-11pF	T6-5 125V DCW. Johnson T-type, Q=2000@1MHz [scase]	\$3.00 each
1.4-9.2pF	189-503 air variable [scase]	\$2.00 each
1.8 – 10pF	Philips high temp. film dielectric [B.5.9]	\$1.00 each
1 - 52pF	TP52CA glass piston trimmer (Voltronics) [scase]	\$3.00 each
2 - 20pF	150V Philips film dielectric green [A.6.1]	\$1.00 each
3 – 65pF	250V Philips film dielectric yellow 10mm [A.6.2]	\$1.00 each
3 -16pF	Ceramic pcb mount. Packed in bags of 10 [A.6.3]	\$1.00 bag
4 - 40pF	100V Philips film dielectric high. Temp. (2222 809 08002) [scase]	\$1.00 each
5 -15pF	100V film dielectric [A.6.4]. Packed in bags of 10.	\$0.50 bag
5 - 20pF	100V Murata TZ02R200. Packed in bags of 5. [A.6.5]	\$1.00 bag
7 – 40pF	Mica compression type. GMA30200	\$1.00 each
5 - 100pF	Mica compression type [A.6.7]	\$1.00 each
16 - 100pF	Mica compression type GMA70300 [scase]	\$1.00 each
25 – 150pF	Mica compression type 424	\$1.00 each
2-gang	Miniature broadcast type [A.6.8,9]	\$0.50 each

See our website: <http://www.qsl.net/z11bq/>

