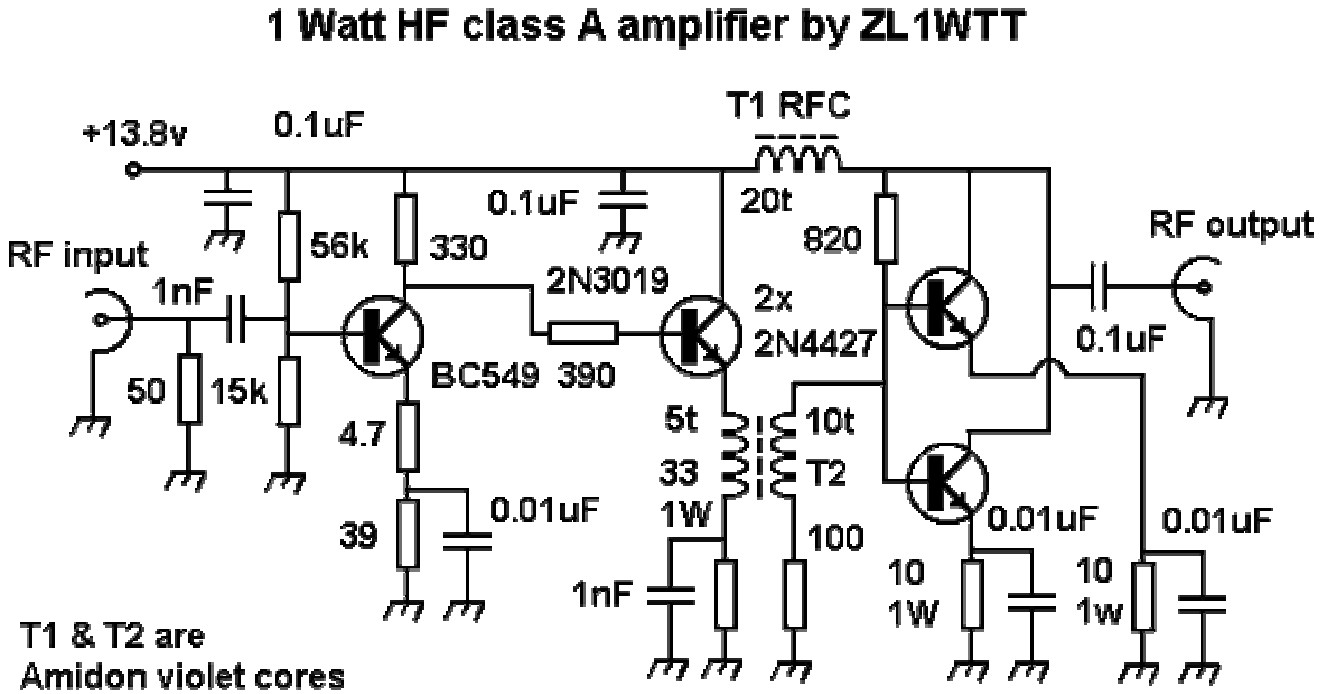
SPECTRUM July 2008 Vol. 45 No. 07

The Official Newsletter of the

Auckland VHF Group Inc.
Spectrum 2008



Circuit Analysis Software

Auckland VHF Group Inc.
Branch 66 NZART

PO Box 10138, Dominion Rd, Auckland 1446
Clubrooms: Hazel Ave, Mt Roskill
http://www.qsl.net/zl1bq

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Club Web Page		http://www.qsl.net/zl1bq			
ATV Interest Group		http://www.qsl.net/zl1qf/atvug/ATVusers.html			

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; $30 within the Auckland free dialling area, and $25 outside. 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.

Coming Events:

NOTE the change to the SECOND MONDAY of the month.

Meeting Notice:
Monday 14th July at 19:30, Clubrooms, Hazel Ave.
Speaker: Peter Loveridge
Topic: Circuit Analysis Software.

Contents

From the Chair – July 2008

Last Meeting.

David Colthorpe from Sony NZ Broadcast and Professional Group gave a very enlightening and different view point with his presentation called "The perfect storm of High Definition", with special reference to the New Zealand scene. His analytical approach was from the perceived reaction and experience the consumer may expect to experience with this new technology – a different aspect to the whole subject.

The subject was very appropriate with the introduction of Satellite and Terrestrial transmissions beginning in this country, and it proved to be a hot subject on the night judging by all the comments and discussion afterwards.

Working Bees:

SATURDAY JUNE 28

Sale and Stock sort out at the Clubrooms.

It was not the best weather for the day, never-the-less a good turn out right from the on-set established a pattern for the day. Many people took advantage to gain some good bargains, resulted in a good days trading.

The long awaited job of doing a stock take of the shelves, and sorting the junk out so we knew what we had and where it was, was too good an opportunity to miss so a few of us got stuck in and by 3.00 pm in the afternoon, 90% of the shelves had been done, the junk in the club rooms was sorted and in place, and the container had had a bit of clean up and sort out.

The job is not finished yet. After the next major sale opportunity (probably the Hamilton one) a skip will be brought in so that all the old and deteriorating stock, plus a quantity of metal work and old copper can be thrown away. There are some items within the container that have not attracted anybody's interest despite advertising them frequently, which leaves us the only option to dismantle them and throw them out for scrap.

So if anybody is interested in retrieving metal for scrap, come and see us and we will point you in the right direction.

ZL1BQ WEB SITE.

If you haven't had a look at our Web Site recently, it would pay to make a visit to www.qsl.net/zl1bq. The site has had a re-vamp, and is now preparing to be reactive. Soon you will be able to see what the latest is on the trading table, and be able to order on line! Another means to make it easier to get stuff from the VHF Group Trading Table.

Being reactive also allows us to auction some items, and during August, a bunch of text books are going to be available to bid on. If you have a look at the site now, there is a preview of the sort of material that will be appearing. These are books that have come our way via deceased estates, donations etc, have a lot of information contained in them that is still very current today. So well worth a look at and bidding on during August.

By the way, the auction is on-going. There will be further things appearing in the auction as the month progresses.

Our thanks must go to Peter ZL1UPB for the work and effort he has put into the Web Site to turn it into something useful for everyone. Well done Peter.

CLUB ROOM MAINTENANCE

Help – Plumber Required!

Recently, the Auckland City Council employed a contractor to remove the large tree beside the clubrooms. Apparently the trunk was split and it was in danger of coming down! (Why they didn't do the one on the drive way at the same time remains a mystery!)

In the process, the contractors have managed to damage the guttering around that end of the building, so now we need to get those sections replaced. For some reason, the second toilet stopped working at the same time.

For some time, the hot water cylinder leaks when turned on, so that also needs some attention. The committee have decided that all this work should be cleaned up as soon as possible, so an outside Plumber is now required to do this work.
If you know of a good tradesman plumber who knows the ropes and been in the business since Adam wore trousers, then steer him in the direction of Franc ZL1SLO, who has been delegated (volunteered!) to look after this project.

REPEATERS 670 and 690

The 670 repeater at Ruaotuwhenua has developed a fault either in the coax to the antenna or the antenna itself. A visit to investigate will take place once the weather improves. Currently about 17W out of the filters into the coax to antenna and about 4.5W reflected. We also have the opportunity to relocate the repeater equipment into an ex-broadcasting rack which is a little larger than the existing rack. This work is planned for later in July. Leith ZL1TCJ and Vaughan ZL1TGC will do most of the work. Once the relocation and coax/aerial problem is sorted out, an investigation into the possible noisy TX will also be checked. This may be due to aerial/coax fault. If there are any other issues with 670 please let Vaughan ZL1TGC know as soon as, and they will have a look at same time.

The replacement 690 repeater is being built now, and we hope to have delivery of the unit soon. It was hoped to have the 690 repeater up and fully operational before work needed to be carried out on the 670 repeater. However, it looks as if the fault on 670 is going to beat us to it.

AREC WEEKLY SKEDS

The Thursday evening AREC Sked on 147.400 MHz at 19.30 Hours continues on evenings not affected by other meetings. It is proposed to shift these skeds up to 670 soon to make it easier for people to log in particularly during the cooler months. It has been interesting to see the coverage that has been obtained on the simplex frequency from around Auckland,

which has reminded many that it is not necessary to operate through repeaters all the time!

Subjects on these nets has varied over quite a range of topics, but in particular, the net has become important for the exchange of information particularly relating to the various exercises that come up from time to time. Long may they last.

This Month's Meeting:

Auckland VHF Group Program change for July

Originally there was to be a display and presentation about the latest in Sony HD equipment at our July 14th Meeting at the club rooms in Hazel Avenue. Unfortunately, the equipment will still be in Christchurch on that night as part of the New Sony Road show going around the country.

To overcome the clash of dates, we have been invited to the Sony Road show being held at the **SKYCITY Theatre, Foyer Level 3,** Corner Hobson and Wellesley Streets, Auckland, on **Wednesday 9th July 2008, commencing at 6.00 PM.** It is anticipated that the show will go until approximately 8.00 PM.

This road show event is aimed at the retailers but it does show and demonstrates the latest available equipment coming onto the market. Also on show could be a demonstration of the OLED (Organic LED) screen that is not yet into production but is possibly the next generation of Screens for Monitors and TVs.

Because catering is involved, please RSVP by registering on www.sonytechcentre.co.nz

To get to the Foyer, go to the "Theatre End" as signposted in the car park and take the Hobson St end lifts to Level 3, and you will arrive in the Theatre foyer. Please remember to register.

New Meeting Subject for July 14th at the Auckland VHF Group Club Rooms Hazel Avenue.

Peter Loveridge will give a presentation on how to use readily available **circuit analysis software** to measure and plan a circuit before it is even started construction! This is a modern tool that has become readily available to the serious professional and amateur alike, and is now used to optimize performance of circuits before they even reach manufacturing or the circuit board - a new form of experimentation – and a lot of fun!

Another meeting not to be missed!

AUGUST MEETING

A Special for this year, One and Only visit!

All Branches and Visitors are invited!

In August, we are planning a trip to the **University of Auckland** to visit their **Research Centre for Surface and Material Science (RCSMS)**. This is planned for **Monday August the 11th**.

The Research Centre is unique in materials science and engineering in NZ. It not only provides research facilities for 8 University Departments, but also operates commercially, consulting with over 40 companies each year to assist with their materials characterisation and research needs.

Among the techniques available at the centre are the Scanning Electron Microscopy, X-ray Photoelectron Spectroscopy, Ultraviolet Photoelectron Spectroscopy, and an Atomic Force Microscope.

What does Semiconductor material look like? What is the electronic structure of solids?

A lot of interest has been expressed about this visit, so we are now asking for an indication of numbers that would like to attend so that we can begin to organise space, etc. So if you think you would like to join us for this visit, please let one of the committee of the

Auckland VHF Group know, or drop an Email to John.Dunn@clear.net.nz or phone me on 473 9514.

ZL1JD

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The Contest Calendar

The next contest is the
Brass Monkey Contest, 50 MHz and above, on Saturday the 2nd and Sunday the 3rd of August 2008.
The operating times are: Saturday 1700 to 2300 NZT and Sunday 0700 to 1300 NZT.

The rules are available at:

<www.nzart.org.nz/nzart/update/contests/vhfcontestrules0606.html>

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

zl2wa@clear.net.nz

or:

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

* *

Building a first class web site for the Auckland VHF Group.

How hard could this be for someone who has done it before? My first attempt... Poor. Not a good start but I kind of expected this. Been there, done that as the saying goes. The main issue was content. I had none to speak of. So I set about writing up what I saw as the core business of the group. News, Activities, AREC, Exams, Projects, Spectrum and Repeaters. The transport method closely followed content. Drats! My weakness exposed. I am not an html web designer come graphics artist. I call myself a web enabler. Having spent 20 years selling and fixing PC's you pick up a few skills.

Follow the Linux path young Luke or as the geeks say "Use the source Luke". CPM, DR DOS, OS2 and the almighty M$ were not for me. Web servers, email and all that is Guru Internet is PHP, CGI, and SQL database engines. I knew what I would do if I had the resources. Throw an open source package at the problem but here I am faced with plain html hosted on qsl.net.

But wait... Technology has caught up with me. I now have reliable ADSL here in the country side. This opens up a whole lot of possibilities. So to cut long story short we now have a new web site with a very professional look and feel. The static web pages are still hosted on qsl.net. The look and feel has been changed to reflect the Trading Table which is hosted on my ADSL connection. As usual Hams making use of free or cheap resources. Be it blogs, Yahoo groups or qsl.net free hosting we have our fingers well and truly stuck in the pie.

Most of the web site is standard fair with a raft of information about the VHF group. To this I have added an interactive web site focused on the Trading Table. Although this facet of the group's activities is not for everyone there are many who do use it. From the odd PL259 plug to as many of the parts to build a project as possible, members are able to take advantage of stock held by the VHF group.

But wait there is more. I have added a trial auction facility. There are 24 books for auction over August. Anyone interested in bidding must create an account. As with many web sites the processes have been designed to be fool proof, intuitive and often have step by step instructions. Account management features such as changing user details and password recovery are familiar to most. Shopping carts, checkout processes and on line transactions are also familiar territory to many. The best advice I can give is to read the screen.

A quick run down of web site features follows.

Login uses your email address and the password entered when the account is created. Users are approved by the web master and cannot login until this is completed.
Applications to join generate an email to the applicant as does approval. Once approved, members have full access to the web sites features. Browse the catalogue, write a review, see what's new and search the catalogue.

Members can.

Edit their user profile and elect to receive the on line newsletter.
Request a new password. This is sent to your email address.
Add items to their shopping cart and then check them out.
View your order history and order information.
View or change your product notification list.

The auction facility needs a little bit of explaining. First of all it is very simple and does not have many of the features that many are used to with a site such as Trade Me. Only the highest bid by a member is listed. The winning bid must be verified by the web master. This process generates an email to the winner and also adds the item to the members shopping cart. It is up to members to monitor the auction and once notified of his/her winning bid login to the site and check out the item in their shopping cart.

Once an auction has been completed and delivered the item will be removed from the web site.

Shipping options.

Letter/Parcel/Courier
TBA Please advise the Trading Table Manager if you require Courier.

Pick up at the next club meeting
Please see the main web site for information on the next club meeting.

Members Only Delivery Service [Available to Auckland VHF Group Members in Auckland Only.]
Please pre-arrange delivery with your friendly committee member before selecting this option

Payment options.

Bank Transfer Payment
Cheque/Money Order
Cash on Delivery

The VHF group has set up a special bank account for bank transfers.
This is to allow on line verification of payments in order to streamline order processing. There is a set of rules associated with payment options. If a customer selects Letter/Parcel/Courier the payment option of Cash on Delivery is not available.

Clear as mud I hope. If you have any questions or problem please do not hesitate to email me.

Peter Bennett
ZL1UPB
Web master, Auckland VHF Group.

* *

Branch 03 Used Equipment sale

Greetings from Western Suburbs Radio Club.

This letter is an early notification of WSRC's Used Equipment sale on Saturday 11th October at Rosebank Road, Primary School, Rosebank Road.

Last year was a great success with two commercial retailers and two NZART Branches (29 and 02) bringing deceased estate collections to be sold.
So now is the time to start collecting all those treasures so your club can bring them to our Sale Day.
Hopefully again this year we will have some commercial companies attending.
As usual drinks and eats will be available.
Sellers 08.00 am Buyers 9.00 am.
$2 coin entry donation.

Mark it on your calendar or NZART Planner now.

New 24 GHz World Record

Thanks to Vaughan ZL1TGC

Posted by: "g4eat" g4eat@yahoo.co.uk
Date: Tue Jun 24, 2008 11:41 pm ((PDT))

Congrats to Marc F6DWG/P JN19 and Guy F2CT/P JN13 on a remarkable 637 km RS QSO late last night. This exceeds the previous tropo record of 544 km by some margin.

Robin G8APZ is collecting more information for Scatterpoint publication.

Dust off those 24G systems and make the most of the RS season!

73's John G4EAT

Re: New 24GHz World Record
Posted by: "Christophe Huygens"
christophe.huygens@cs.kuleuven.ac.be on1cfx
Date: Tue Jun 24, 2008 11:49 pm ((PDT))

Yes, well defined scatter point just in the middle.
I was able to hear F2CT/P at 805km (JN13-JO20) for 45 minutes on 3cm! (Easy SSB QSO 55s). Nil heard on 24.
Congrats and keep experimenting!
73 on4iy Xtof

Calculating Coax Cable Cutoff Frequencies

The concept of a cutoff frequency for rectangular waveguide is fairly well known but in a conversation at work recently, I was told by our systems engineer that coax cable also had a cut-off frequency. Not quite believing him (I could not recall having heard of it before); I decided some research on the internet might be appropriate. As a result of dispelling my ignorance on the subject – here's a short article:

Coaxial cable "cutoff" frequency is that frequency below which coax acts like coax and not like a combination of coax and waveguide. Coax will pass RF at frequencies higher than cutoff but does so in a random manner due to waveguide like effects which cause some frequencies to propagate at a different velocity to those utilizing the normal TEM mode.

From several internet searches, a common formula for calculating the cutoff frequency is given by:

$$F_{co} = \{ (\text{constant}) / [\text{sqrt}(e_r) * (ID + OD)] \}$$

Equation 1

Where: F_{co} = cutoff frequency
Constant = value determined by diameter measurement units (mm, inches) and frequency derived in Hz, MHz or GHz.
e_r = dielectric constant of insulation between centre conductor and coax shield
ID = Inside diameter of the outer conductor of the coax cable
OD = Outside diameter of the inner conductor of the coax cable.

Equation 1 is commonly cited as being accurate to about 5% of the actual cutoff frequency. A more accurate result can be obtained by using the following:

$$F_{co} = \{ [c*k_ca/(0.5*OD)] / [2\pi * SQRT(e_r)] \}$$ Hz

Equation 2

Where: F_{co} = cutoff frequency
c = speed of light in meters (300,000,000 meters/sec)
kca = a transcendental equation, expanded to the 6th order = $5.0337176E\text{-}06*(ID/OD)^6 - 2.253588E\text{-}04*(ID/OD)^5 + 4.11607E\text{-}03*(ID/OD)^4 - 3.978065E\text{-}02 * (ID/OD)^3 + 2.228958E\text{-}01 * (ID/OD)^2 - 7.562133E\text{-}01 * (ID/OD) + 1.564055$
e_r = dielectric constant of insulation between centre conductor and coax shield
OD = outside diameter of the inner conductor of the coax cable (in meters)

Dividing the answer by 1,000,000 gives the result in MHz, or by 1,000,000,000 for GHz.

The value for the dielectric constant (e_r) is often given by the coaxial cable manufacturer but if you can't find the correct value for your coax cable, it can be determined from the more commonly published value for velocity factor:

$e_r = 1 / (V_f)^2$
Equation 3

Using this value, you will be able to calculate the coax cable cutoff frequency with ease! (yeah, right!)

Fortunately, if you have access to the internet, there is an easier way. Go to the web site www.k5rmg.org/tech.html and scroll down to "JavaScript Calculators." Select number 6 which will do all the calculations for you. This web site, the Roadrunners Microwave Group Technical forum, also has a wealth of other interesting material. Enjoy reading!

Vaughan ZL1TGC

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Tait T355-02 Technical manual required.

Dear Peter ZL1UPB

I am I2HHJ in Italy and writing on behalf of a TX from TAIT, precisely T355-02, which is missing any documentation for servicing, and I am asking for your kind assistance on how to find that documentation.

I have been asking Google for TAIT T355-02 and was directed to web pages of Auckland VHF Group with a list of Club members where your address is given. (Indeed there is a RX T355-02 mentioned in one of the pages)

Our TX T355-02 has been running in a VHF repeater (including RX T355-02, Duplexer, Speaker Panel, Power Supply T296-11) for about 15 years and needs servicing because TX frequency is now several kHz below nominal frequency. (Aging of xtal might be the cause).

I have been trying to register at TAIT for access to technical documentation, however my request was rejected by "Richard Whiting, Partner Resource Coordinator". (sso.admin@tait.co.nz)

Do you know a way on how I can get access to the technical documentation of the shown devices?

Thanks for your help,
I remain with 73's from Italy
Hans I2HHJ (ex DL3QA)

Contact Hans at
hans.hasenjager@alice.it

* *

Kaguya lunar probe

Hello All,
For those who would like to try and experience a signal from a moon orbiter, the Kaguya lunar probe is transmitting a carrier around 2263.6 MHz. I use a medium size BBQ grill on a camera tripod, a noisy MMDS downconverter that has filtering against this frequency (it's tuned for 2300-2400 MHz) and a PCR-1000 as IF on 312.5 MHz (6 kHz filter on USB). It shouldn't work, but it does, and I get a 6-10 dB spike above the noise using DL4YHF's spectrum lab software.
It is audible.

The orbital period is around 2 hours and it can be behind the moon for up to 50 minutes. Doppler is about 45 kHz so it can be seen as different from the birdies from the MMDS.

73 de David VK5DG

* *

Editor's note:

The promised item on the Quicksilver receiver mentioned on the front cover of June Spectrum was fully covered in the May issue.
Progress on the graphical user interface continues with number 91 version released today.
Bandwidth can now be changed with a slider control from 25 kHz to 50 MHz.

A preselector/preamp/attenuator will be available soon, with the QS1T transmitter planned for delivery later this year.

Ian ZL1AOX

AUCKLAND VHF GROUP (INC) BRANCH 66

MEETING NOTICE

July 14th 7.30 PM HAZEL AVENUE CLUB ROOMS

(Located behind the Scout Den at the end of Hazel Avenue)

Note the change to the previously advertised program:

Circuit Analysis Software

Peter Loveridge will give a presentation on how to use readily available **circuit analysis software** to measure and plan a circuit before it is even started construction! This is a modern tool that has become readily available to the serious professional and amateur alike, and is now used to optimize performance of circuits before they even reach manufacturing or the circuit board - a new form of experimentation – and a lot of fun!

EVERYBODY WELCOME

The Auckland VHF Group has also invited the NZ Electronics Institute to join us at this meeting.

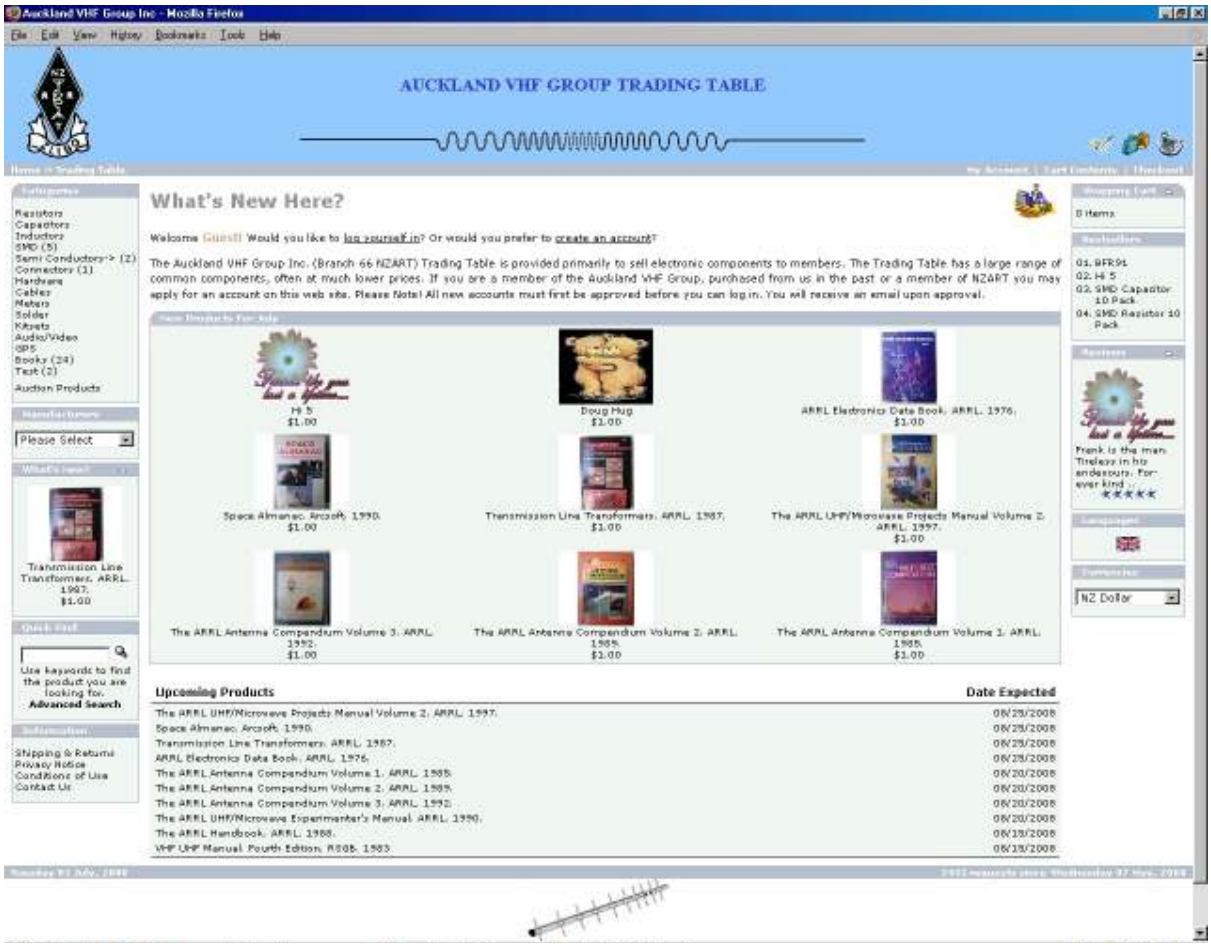
Franklin Junk Sale
The annual sale at Franklin Amateur Radio Club will be held at the clubrooms, Stadium Drive on Tuesday 15 July 2008.

Doors open 7.00 pm
Conducted sale begins 7.30 pm

Vendors, please parcel your offerings in lots marked with your callsign, and an attached message to the sales conductor if you wish to put a reserve on the price.

Buyer's terms; cash or a cheque by arrangement with the cashier.

Come and enjoy an evening of fun and banter.
At the conclusion there will be time for a rag chew over the complimentary supper.



View of new Web Page

AREC Net:
Every Thursday evening at 19:30 on 670 repeater or 147.400 MHz Simplex.

Whangarei Junk Sale
Saturday 26th July at 1030
Club Rooms, Museum & Heritage Park
St Hwy 14, Whangarei

The article on the Intelligent Battery Charger (Next page) is reprinted from the Papakura Radio Club newsletter. Thanks to the Editor Cliff ZL1RP.

Keith Dix, ZL1BQE has produced a design for an intelligent battery charger for small SLA (Sealed Lead Acid) batteries. It was designed to use a surplus laptop power supply able to supply 19 volts at up to 4 to 5 amps as the source, and the charger regulates the voltage/current so that the SLA is properly charged and can be left connected without possibility of overcharge.
A small group are building prototypes of the charger and next month we hope to have more details with circuit and PCB layout etc. Ian ZL1AOX, Editor.

Intelligent Battery Charger Progress

PCB Manufacture

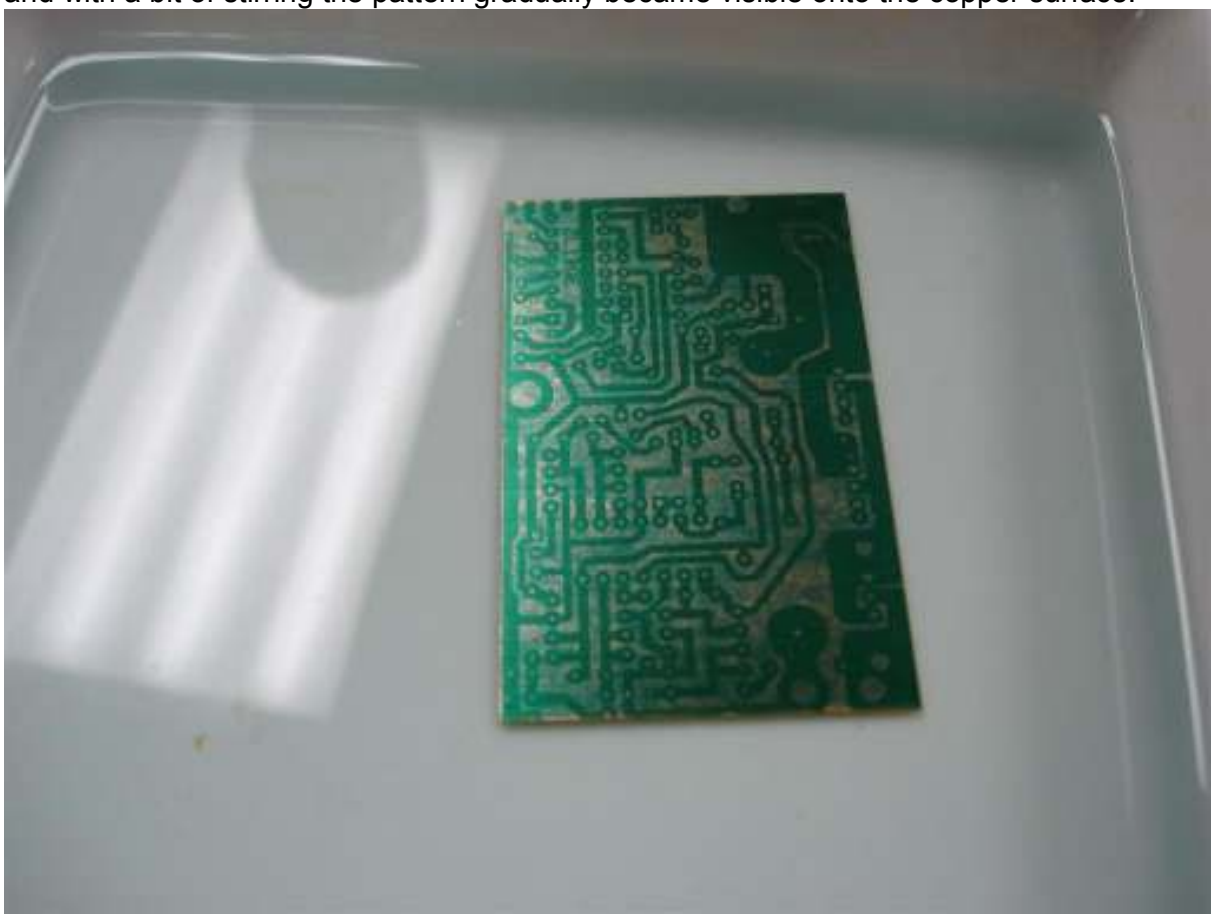
At the last meeting Ian ZL1VFO brought along the pattern for the PCB.

Ian ZL1VFO with all the equipment required to develop and print/etch a PCB

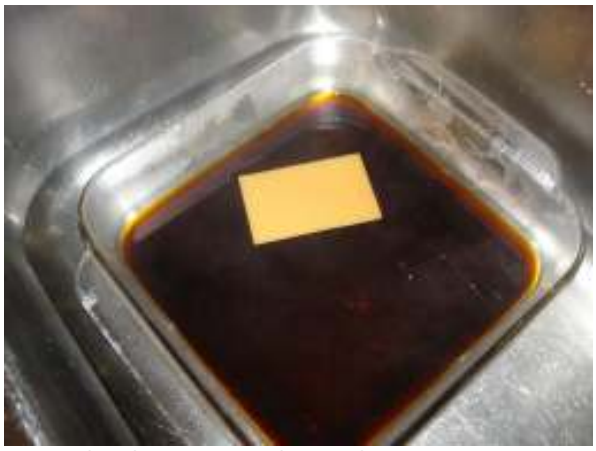
The layout had been designed by Ian using a program on his computer and then printed onto a sheet of paper. The pattern was laid onto the Ultra Violet Light box, the backing removed from the pre-sensitized Printed Circuit board, and the board carefully placed on top of the pattern, sensitive side down. The cover was placed over the light box and the lights turned on for a period of time to expose the pattern onto the copper board. At this stage the pattern was not visible.

Left photo shows PCB layout ready for sensitized PCB. Right – do not do this at home!

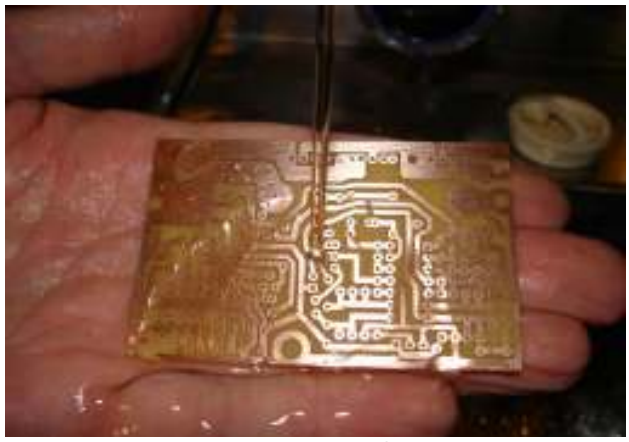
The board was then removed from the lights and placed into a weak Caustic Soda solution and with a bit of stirring the pattern gradually became visible onto the copper surface.



When the pattern had formed sufficiently the board was removed from the solution and washed then dried to prevent over reaction.



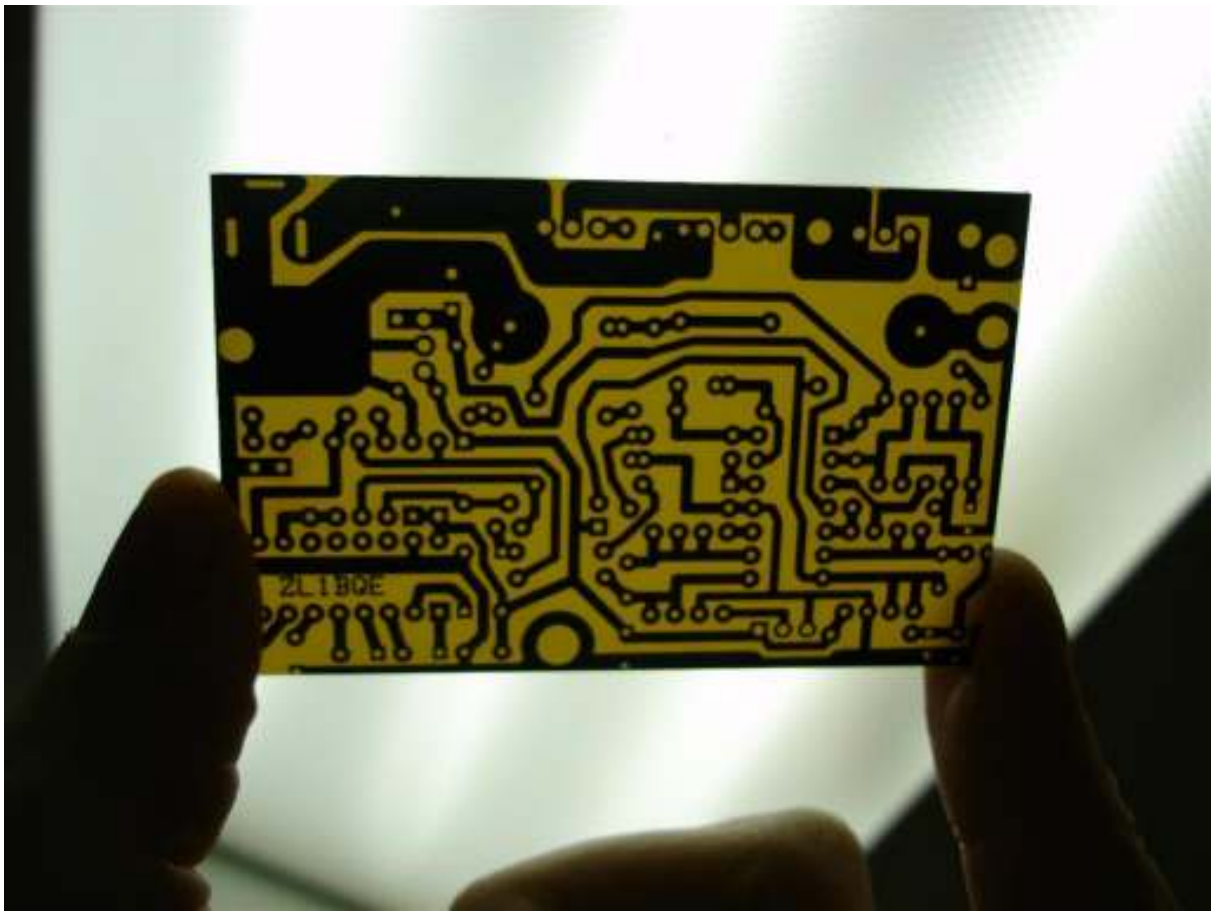
PCB floating on ferric Chloride solution



Washing etched PCB with water

The board was then placed into a solution of Ferric Chloride etchant and the copper not covered by the developed pattern was slowly etched away. When the unwanted copper had been removed, the board was washed in fresh water and the sensitized layer covering the PCB tracks was removed with a light scrub using steel wool. After another drying the board was ready for drilling and the placement of the components but that's another story.

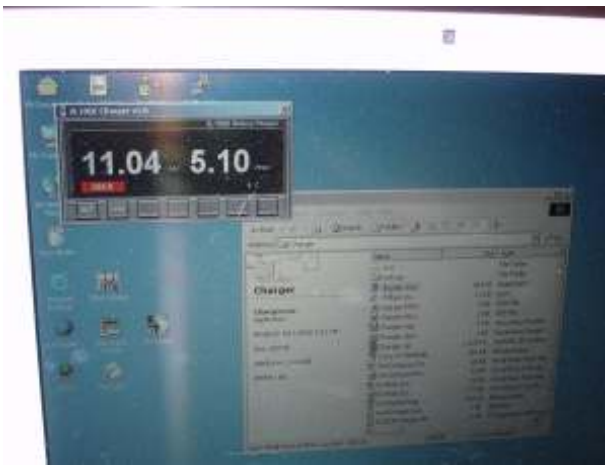
The timing of each procedure had been worked out by Ian using good old trial and error, and with a good dash of experience.



Checking the finished PCB for any blemishes.

The software designed by Andrew Quinn ZL1WJQ was also up and running. This will be covered in the next newsletter.

Andrew ZL1WJQ



Charger software running

Trading Table Specials – July 2008

MGF1302	Low noise GaAs FET Nf = 1.4dB @ 4GHz, 4dB @ 12Hz. [S.case]		$15.00 each
BFR91	NS RF Amp. 5GHz 1.9dBnf @ 500MHz [S.case]		$2.00 each
MPS5179	NS TO92 12V 50mA 200mW fT 2000MHz Nf 5.0dB [S.5.7] RF Transistor. Use in UHF/VHF amplifiers with collector currents in the 100 μA to 30 mA range, and in low frequency drift, high output UHF oscillators.		$0.50 each
MRF237	NS RF Pwr. VHF 4.0W 12V TO39	[S.5.8]	$3.00 each
3SK73GR	Dual-Gate FET N-channel 30V 7mA	[S.6.7]	$1.50 each

SMD RESISTORS – 10 per pack. Most are 1206 Format. 10 per packet.

Values in stock: 22, 33, 49, 100, 270, 330, 390, 510, 1k, 2k2, 68k 100k Ohms. 50c per packet

SMD CAPACITORS – 10 per pack. Most are 1206 Format 10 per packet.

NPO 50V working: 2.2pF, 6.8pF, 47pF, 68pF, 82pF, 270pF, 470pF

63V working: 10pF, 100pF, 1nF, 10nF, 100nF 50c per packet

10uF 25V electrolytic

Kitsets:

VHF/UHF Preamplifier Kit.

Parts, pcb and instructions to build a preamp for 2m, 70cm, $18.00 each

Now includes instructions for using a SMD package transistor, e.g. the BFG67 in place of the BFR91A supplied with the kit.

Available NOW: T connectors as recommended for AREC equipment. $2.00 per kit

Moving Coil Meters - 500μA movement with back lighting via separate terminals. Two scales 0 – 30 and 0 – 100, plus a battery "replace/good" indication. Scale can be removed/reversed for different uses. A very versatile meter. $3.00 each

Integrated Circuits

ZSM560 under voltage monitor IC's. 4.6 volt threshold for 5 volt systems. Spec sheet available on request. Packet of 5 $2.00 per packet

HEF4060B SMD IC's. and HEF4060BT 14-stage ripple-carry binary counter/divider and oscillator. Spec sheets available on request. $1.00 each

74HC74D SMD IC's Dual D-type flip-flop with set and reset; positive- edge trigger. Spec sheets available on request. $1.00 each

LM393D IC's (SO8 package) and LM393DT Low Power Dual Voltage Comparators. Wide single supply voltage range or dual supplies: +2V to +36V or +/- 1V to +/- 18V. Spec sheets available on request. $0.50 each

74LS38N IC's Quad 2-Input NAND Buffer with Open-Collector Outputs. Still in original RS packets. $1.00 each

GPS Receivers – 12 channel GPS receivers in plastic dome mounting with DB9 Connector. RS232 output on pins 2, 3 and 5 and power +ve 6-12V on pin 6. NMEA output sentences. $120.00 each

GPS Patch Antenna – with Macom SO8 preamp 26dB @ 1.575 GHz, 1.15 dB NF. It still has 20dB gain @ 1.3GHz but the noise figure is rising a bit. Fitted with 3m of RG174 cable and MCX connector. No housing/case for patch antenna. $10.00 each

GPS Patch Antenna – as above but in plastic case. Fitted with about 3m RG58 coax cable and SMA connector. $20.00 each

Mail Order accepted. Please forward your mail orders to Auckland VHF Group, PO Box 10138, Dominion Road, Auckland. Or Email to john.dunn@clear.net.nz.

Please Note: For mail orders please add $5.00 for packing and postage.

NEW INTO STOCK – LIMITED NUMBERS – A/V Distribution Amplifiers.

Talia professional Audio/Video Distribution amplifiers in a single 1U rack unit. 75 ohm looping video input with 10 separate outputs, all on BNC connectors. Stereo balanced or unbalanced audio input (RTS Jack's) with 10 stereo outputs on RCA connectors. This will be the last of these.

Limited numbers available. $40.00 each.

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New Stock: "T" Connectors:

"T" CONNECTORS BACK IN STOCK

Packaged into kits of 1 male holder, 1 female holder,
2 Male spade connectors, 2 female spade connectors.

Ideal for interchanging Equipment between power supplies etc.
As used by many for their AREC Equipment.

ONLY $2.00 per Kit.