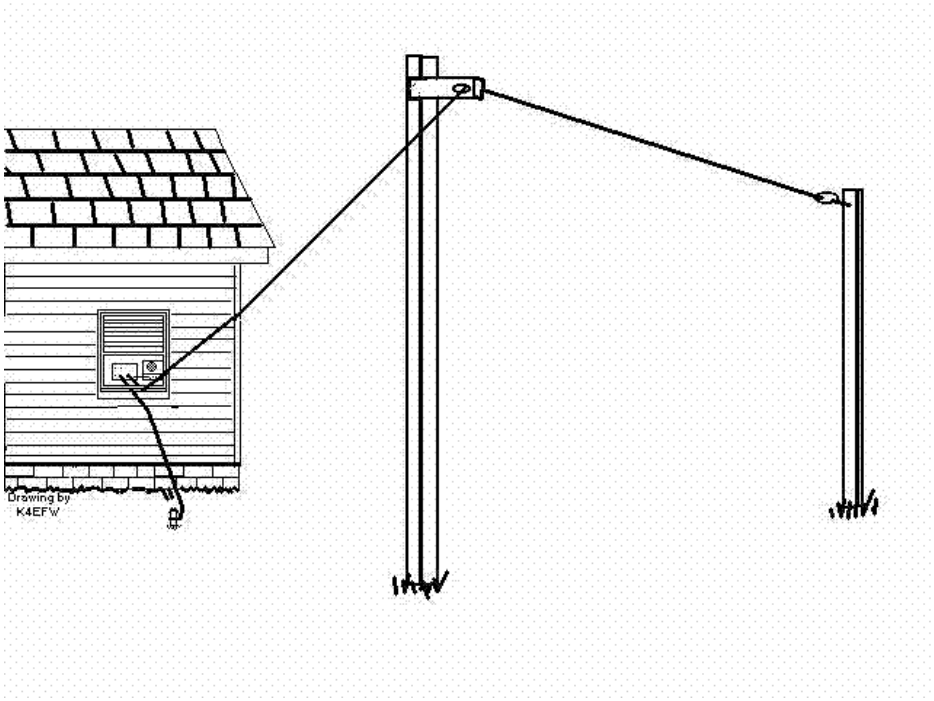
Ham Hum

September 2010

The official newsletter of
The Hamilton Amateur Radio Club (Inc.)
Branch 12 of NZART - ZL1UX
Active in Hamilton since 1923

Hamilton Amateur Radio Club Inc.
Serving the Hamilton Community for over 80 Years
ZL1UX



Next General Meeting

15th September 2010—19:30

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From the Editor

This years Hamilton Market Day went very well at its new location. The horrible weather was ignored, and a good time was had by all. The move back to the more traditional café food seemed to be appreciated. I know the lower prices was easier to deal with. Congratulations to the organising team on an excellent result.

Also, congratulations to ZL1JD John Dunn on winning the annual Market Day raffle. John has always been a keen supporter of our raffle, so well done.

Upcoming events include the Kairangi Hill Climb on 12th September for the Waikato Vintage and Veteran Car Club. A fun event to watch older cars sometimes going a bit faster than normal. Contact ZL1IC (Robin) for more info.

Also the normal collection of contests, nets, and other happenings.

Next Committee Meetings - 1st September & 6th October

SB PROP ARL ARLP034
ARLP034 Propagation de K7RA

As I was writing the bulletin overnight my desktop PC was hit by a drive-by virus that downloaded itself automatically when viewing sunspot images on an infected website. Unable to remove the malware by morning, the bulletin was rewritten on another PC, and some of the topics that were planned had to be skipped for now. The image was of a large sunspot in sunspot group 1084, from the New Solar Telescope at Big Bear Solar Observatory in California. The infected site was one of many news sites carrying the image.

Spaceweather.com provides a nice uninfected image file at http://snipurl.com/10trag.

This week saw three days (August 21-23) with no sunspots, and the average daily sunspot numbers for the week (August 19-25) declined over 28 points to 8, compared to the previous week. Average daily solar flux was down more than 8 points to 75.3. The last period of three days or more with zero sunspots ended on May 20, 2010, around 100 days ago.

Sunspot group 1100 disappeared on August 21 and returned August 25. In this case, the sunspot group didn't transit the non Earth facing side of the sun, but it just faded from view, returning just as it is about to rotate off of the sun's western limb. Sunspot group 1101 appeared on August 24, and on August 25 had grown to three times its initial size. Daily sunspot numbers for August 24-26 were 11, 23 and 23.

Remember that the sunspot number is not the same as the number of sunspots. The smallest non- zero sunspot number is 11, and gets 10 points for being a sunspot group, and one point for containing one sunspot. The sunspot number of 23 on August 25-26 represents two sunspot groups, at ten points each, one containing one sunspot (1 point) and the other containing two sunspots (2 points). On August 25 it appears that a new smaller sunspot may be emerging between the eastern horizon and sunspot group 1101.

A stiff solar wind from a coronal hole increased geomagnetic activity, and the planetary A index for August 21-26 was 3, 4, 7, 18, 20 and 11. The latest projec-

tion shows this decreasing, with the planetary A index on August 27-28 at 10 and 8, followed by a quiet reading of 5 until September 19. Solar flux for the same period is expected to be 75 for August 27 to September 3, then 85 on September 4-5. Several weeks from now is the fall equinox, which is a good time for HF propagation. The autumnal equinox will be at 0309 UTC on September 23, 2010.

David Moore of Morro Bay, California sent in another article about the weak sun and solar conveyor belt, this time from the National Science Foundation. Read it at http://snipurl.com/10trml.

Jeff Hartley, N8II of Shepherdstown, West Virginia sent this on August 23: "Lots of great over and near-the-pole propagation was a daily occurrence on 17 and 20 meters since Thursday the 19th here. The RDA Russian contest was a blast with many new Russian vanity calls in many areas of Asia worked here. It's interesting to note that around 0100 local (2100Z) in European Russia there was a nice opening from UA1 to UA6 into here on 20 meters, whereas only UA6 was workable in the 2-3 hours before that. I love the calls like RG8U, RG6G, R7AA, R9DX, etc. Around 0140Z I actually had a very nice run of Russian Asians from Zone 17-18 at around 80-100 per hour for about 25-30 minutes. UA0YAY in Zone 23 was loud on CW. Signals from the big guns were S9+. 17 meters has been open daily to SE Asia around 1300-1430Z. Over the past few days I have heard YB4IR, and worked VR2XMT, 9M6NRO, 9V1DE, UA0SV and some JAs, most with good signals. 15 was pretty punk until today when a few Europeans were finally heard around 1500Z".

If you would like to make a comment or have a tip for our readers, email the author at, k7ra@arrl.net.

For more information concerning radio propagation, see the ARRL Technical Information Service at http://arrl.org/propagation-of-rf-signals. For an explanation of the numbers used in this bulletin, see http://arrl.org/the-sun-the-earth-the-ionosphere. An archive of past propagation bulletins is at http://arrl.org/w1aw-bulletins-archive-propagation. Find more good information and tutorials on propagation at http://mysite.ncnetwork.net/k9la/index.html.

Monthly propagation charts between four USA regions and twelve overseas locations are at http://arrl.org/propagation.

Instructions for starting or ending email distribution of ARRL bulletins are at http://arrl.org/bulletins.

Sunspot numbers for August 19 through 25 were 11, 11, 0, 0, 0, 11, and 23 with a mean of 8. 10.7 cm flux was 77.9, 77.1, 75.5, 74.6, 74.9, 73.6 and 73.5 with a mean of 75.3. Estimated planetary A indices were 5, 4, 3, 4, 7, 18 and 20 with a mean of 8.7. Estimated mid-latitude A indices were 3, 1, 3, 0, 5, 13 and 15 with a mean of 5.7.

THE DOCTOR IS IN: SWR

Bil Paul, KD6JUI, of Dixon, California, wrote to the ARRL's Doctor, noting that he noticed when he was tuning for optimal background noise while in receive mode, it came close to -- but didn't match -- the dial positions for minimal SWR while transmitting. He asked which of the two antenna tuner dial settings would result in the most transmitted energy while in transmit mode. He also wants to know if minimal SWR always indicates the most transmitted energy going to the antenna system.

Here's what the Doctor had to say:

In answer to the first question, by setting the antenna tuner to an SWR of 1:1, you have transformed the impedance at the bottom of your antenna feed line to 50 ohms, just what your transceiver is designed to deliver its rated power into. If your receiver input impedance were exactly 50 ohms, then that setting would likely also be the position that would yield maximum receiver noise. As it happens, there is no such guarantee that the input impedance of the receiver will be exactly 50 ohms. Although it should be pretty close, a slight change may yield a stronger signal into the receiver.

Regarding the second question, the transceiver is rated to provide its design output power into 50 ohms, usually within a specified SWR range. As was pointed out by Eric Nichols, KL7AJ, in a QST article last year ["Keeping Current with Antenna Performance," Feb 2009, pages 34-36], an SWR of 1:1 does not generally result in the maximum power output. By building a transmission line current meter, such as

described by Eric, or later by Paul Danzer, N1II ["A Simple Transformer to Measure Your Antenna Current," Sep 2009, page 35], you can actually tune the antenna tuner to get the highest output. This corresponds to the maximum current into the antenna, which may occur at some setting different from either of the above.

Be careful, though: If you exceed the maximum rated SWR, the resulting voltages or currents in the final amplifier or output filter of the transceiver will exceed design specs and damage may result. The likely small increase in transmitted power is likely neither worth the trouble nor the risk, in my opinion.

Thanks Doctor! Do you have a question or a problem? Send your questions via e-mail <doctor@arrl.org>

NZ MED CREATES 70 CM REPEATER INTERFERENCE

The New Zealand Ministry of Economic Development has relaxed the conditions of use of unlicensed Short Range Devices in a key ham band. Amateur Radio Newsline's Jim Meachen, ZL2BHF, is in Auckland with the latest:

The new conditions or rules were put in place without any consultation with our national society the NZART. They permit the use of walkie-talkies, wireless headphones, wireless audio senders and other such consumer gear in the input band of most of nations 70 centimetre amateur repeaters.

The previous rules had permitted the same 433.05 to 434.79 MHz frequency range but with an output power limited to 25 milliwatts and restricted the use to Telemetry and Tele-control modes that had far shorter transmissions. The new devices now given access to 433.05 to 434.79 MHz typically have very annoying, long duration transmissions causing significant interference to licensed amateur radio operations.

It should be noted that all of the New Zealand National System repeaters use input frequencies above 434.79 MHz and are not affected by the change. Those owned and operated by individual Kiwi hams operating with input channels below 434.79 MHz are the ones suffering from access by these consumer electronic devices.

From down-under in Auckland, New Zealand, I'm Jim Meachen, ZL2BHF, reporting for the Amateur Radio Newsline.

As if this were not enough, there is also a new allocation in New Zealand from 3.640 to 4.040 MHz for Auditory Aids. These hold the potential to interfere with amateur signals in the amateur 75 and 80 meter bands.

The Theory Behind the Venerable Stub Antenna

A stub is a length of transmission line that is connected at one end only. The other end is either left open or is shorted. The “connected” end looks like a capacitor or an inductor depending on the length of the line and whether the far end is open or shorted. Stubs that are exactly a quarter-wave, or multiples of a quarter-wave long are purely resistive at the “connected” end.

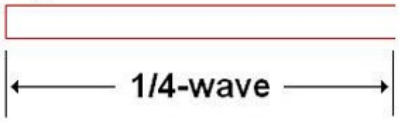
A quarter-wave stub looks like an infinite resistance (open circuit) if the far end is shorted or like a dead short if the far end is open. It’s like a playground teetertotter where, if one end is on the ground the other end is up in the air. The *ARRL Handbook* tells you this but it doesn’t tell you why. Kurt will tell you why.

Imagine an RF wave going down the stub. When it hits the shorted or open end it is reflected back to the input end. We can’t see or measure this but, as the wave travels, it produces a voltage across the line and current through the line. This we can measure.

Let’s look at a shorted quarter-wave line (Figure 1). The current from the open end travels down the line and when it hits the shorted end it is reflected and travels back to the input. It has traveled 90-degrees down the line and 90-degrees back. So the forward and reverse currents are exactly out of phase and cancel each other. There is no current at the input. The voltage also is reflected when it hits the short but there can be no voltage at a short circuit so the reflected wave has to change phase by 180-degrees. Then the incoming voltage and the reflected volt-

age cancel each other – there is no voltage at the short. The wave also traveled back and forth so its total shift is 360-degrees. It is in phase with the input voltage so they add.

Fig. 1



Understanding the Stub Antenna

Fig. 2

Fig. 3

Fig. 4

Using Ohm's law (R = E/I) we have the voltage divided by zero which, as you remember from grade school arithmetic gives R = infinite ohms (an open circuit).

This brings us to William Lattin, W4IRW's, 1950 stub antenna patent. The version he described in December 1960 *QST* can be seen in Figure 2.

In the drawing we see half of the stubs and their shorted ends. The main antenna wire forms the other half of the stubs. The center section is a half-wave dipole on 10 meters. There is a shorted stub on each end that looks like an open circuit so the dipole doesn't know there is anything else to the antenna. An extra length of wire has been added to the shorted ends of the stub.

On some lower frequency the stub is shorter than a quarter-wave and looks like an inductor. Now with the 10 meter dipole, the stub inductor and the added wires together resonate on a lower frequency, say 40 meters. Now we have a two band di-

pole with no traps. Nice!

Unfortunately there is a problem: The lengths of the 10 meter dipole and the two stubs add up to a half-wave on 20 meters. Add in the reactance of the stubs and the resulting antenna resonates below 20 meters. So you can't make a 10/20-meter antenna. But there is a way around it. Look at Figure 3.

The ends of the 10 meter dipole are bent down like in a Moxon beam. The dipole still resonates on 10-meters but the lower frequency doesn't see the hanging-down parts. It just sees a shorter antenna. Now we can make one where the lower frequency is just half the upper, a 10/20 antenna, for example.

You don't have to stop with just two bands. Figure 4 shows Lattin's four bander.

It resonates on 29 MHz, 14.3 MHz, 7.2 MHz, and 3.9 MHz. To get construction details and dimensions you can Google patent number 2,535,286.

So what does Krusty Olde Kurt think of these antennas? On the plus side they should work just as well as trap multibanders. The stubs are simpler than traps and should be lower loss. The stubs will change little with temperature. Their major drawback is the inability to resonate at much less than half their upper frequency. This probably is why you don't see the principle in use in commercial antennas. So why does Kurt bring the principle to your attention? It's a little known method but you should have it in your arsenal of ways to build antennas. You never know when it might come in handy.

Kurt's Big Goof

A couple of months ago Kurt received a letter from Harald Cirs, YL3BZ, in Latvia that explained that it is always best to tune your antenna right at the antenna. Kurt made up an example that showed that it is almost as good to tune it from the shack. His example was a 40 meter dipole with 80 feet of coax going to the shack on 40 meters with nearly 1:1 SWR – very little loss. On 20 meters with the antenna at 75 ohms, also very little loss.

Several astute readers pointed out that on the second harmonic at 20 meters the antenna impedance would be much higher than 75 ohms. They were right! Probably 2,000 ohms at resonance. This would give an SWR of 40:1 with a loss on the 9913 coax of 4.4-dB – 100 watts in and you get 36 watts out.

With a tuner right at the feed point your loss would be only 0.35 dB. – 100 watts in and 92 watts out. Of course if you had to put your tuner on the ground 30 feet below your loss would be 2.3-dB – 100 watts in, 59 watts out. Still better than going direct.

So YL3BZ is right, but Krusty Olde Kurt will still keep his tuner in out of the rain and, if he's worried about the loss would use ladder line instead of coax to feed the antenna. The loss there is only 0.2-dB – 100 watts in, 95-watts out. Better than a

tuner at the antenna fed with coax. Kurt wasn't far off after all. But his thanks to the readers for spotting his error.

Kurt welcomes questions of general interest from readers and will answer them in his Kolumn. Write to him at: WorldRadioOnline@gmail.com.

-Kurt N. Sterba

I guess a direct lightening strike like that one is going to do some damage no matter what you do to protect equipment.

Upcoming Happenings & Events

Date	*Happenings & Events*
5th September	**NZART HQ Info-Line**
6th September	HF Net, 3.575 MHz, 19:30
6th September	**NZART Doug Gorman Freq Measuring Contest**
7th September	VHF Net, 146.525 MHz, 20:00
10th September	**Closing date for Break-In**
11th September	**NZART Nostalgia Night**
12th September	**Kairangi Hillclimb (AREC)**
13th September	HF Net, 3.575 MHz, 19:30
14th September	VHF Net, 146.525 MHz, 20:00
15th September	**General Meeting**
19th September	**NZART HQ Info-Line**
20th September	HF Net, 3.575 MHz, 19:30
21st September	VHF Net, 146.525 MHz, 20:00
26th September	**NZART Official Broadcast**
27th September	HF Net, 3.575 MHz, 19:30
28th September	VHF Net, 146.525 MHz, 20:00

2-3 October—Oceania All Bands SSB

2-3 October—NZART Microwave Contest

3rd October—NZART HQ Info-Line

9th October—Western Suburbs Equipment Sale

9-10 October—Oceania All Bands CW

16-17 October—JOTA/JOTI

17th October—NZART HQ Info-Line

20th October—General Meeting

31st October—NZART Official Broadcast

6th November—NZART Straight Key Night

7th November—NZART HQ Info-Line

13th November—NZART Boat Anchor Sprint

13th November—GlobalSET

21st November—NZART HQ Info-Line

27-28 November—Bridge to Bridge (AREC)

28th November—NZART Official Broadcast

4-5 December—NZART VHF/UHF/SHF Field Day Contest

4-5 December—KDMG Twin Sprint

12th March 2011—Colville Connection (AREC)

22-25 April 2011—VHF Convention (Wellington)

4-5 June 2011—NZART Conference (Upper Hutt)

For more information on any of the above please contact myself or any committee member.

AREC Event Operators Page

WRC Rally NZ/ Possum Bourne Rally	2011	Organiser : ZL1DK
Please contact the Section Leader with your team information and he will pass it on to Auckland.		

Rollo's Marine Bridge to Bridge Water-Ski Race	27-28 November 2010	Organiser : ZL1UPJ

Position		Saturday Operator	Sunday Operator
Base			
Start Boat			
Rescue Boat			
X-Band			
A.	Ngaruawahia/Taupiri		
	Start/Finish at Point		
B.	Ngaruawahia Ramp		
C.	Ngaruawahia W/S		
D.	Horotiu		
E.	Pukete Ramp		
F.	Days Park		
G.	Fairfield Bridge		
H.	Malcolm St		
I.	Narows		
J.	Field Days		
K.	Between Pipe and F/Days		
L.	High Level Bridge		

Kairangi Hill Climb	Sunday 12th September 2010	Organiser : ZL1IC

Position	Operator
1.	
2.	
3.	
4.	
5.	

School Cycling	July 2011	Organiser : ZL1IC

Position	Operator	Position	Operator
1.		5.	
2.		6.	
3.		7.	
4.		8.	

Colville Connection	12th March 2011	Organiser :

Position	Primary Operator	Secondary Operator	Other Operator
Base			
Stony Bay			
Fletcher Bay			
Hill 1			
Hill 2			
Fantail Bay			
Stand By			

For Details about and to help with these events, contact the person indicated as the organiser for the event. See Page 1 for their contact information.

Club Information

Contacts :-

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General Meeting:	1930 Third Wednesday of each month (except Jan) 88 Seddon Road, Hamilton
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eMail:	branch.12@nzart.org.nz
HF Net:	3.575MHz LSB 1930 Mondays
VHF Net:	146.525MHz simplex 2000 Tuesdays
2m Repeater:	145.325MHz -600kHz split
STSP Repeaters:	146.675MHz -600kHz split 438.725MHz -5 MHz split
ATV Repeater:	615.250 Ch39 (off air)

Cover Photo: A nice and simple picture of an end-feed antenna (including RF ground). (thanks to K4EFW)

Sender	Hamilton Amateur Radio Club (Inc) PO Box 606 Hamilton 3240