

MAY 2013

THE MONTHLY NEWSLETTER of the SANTA CRUZ COUNTY AMATEUR RADIO CLUB

# SHORT SKIP



## Thevenin's Theorem

What is it and why is it so useful?

This theorem provides a powerful means to understand the behavior of complex networks of sources and components having two terminals to which a load is connected. The theorem is valid only where the circuit elements are linear ie the voltage developed must be proportional to current. R,L and C components are generally considered to be linear devices whereas many semiconductor elements are not except over a limited range. The degree of linearity of a network can be determined by making voltage and current measurements at the load.

The Thevenin equivalent for any such complex networks is just a single source with a constant open circuit voltage in series with and impedance as measured at the network terminals with all sources shorted.

*Extra class question what if the source is a constant current generator,? clue see Norton's theorem*

In many instances we are interested in maximizing the power supplied by sources in a network to a load. For example this is the case when the power source is a battery supplying DC, a generator supplying AC, a radio transmitting RF to an antenna. The power source may also be an EM wave transferring its power to an antenna as a load which in turn transfers power to a receiver.

Maximum power transfer occurs when the impedance of a source equals that of the load and the simplest case is where both are purely resistive. So let's apply our knowledge of Ohms law to an exercise, (anyone know why Ohm has a law while OM Thev has only a theorem?). Consider a source with an open circuit voltage of 100 Volts and an internal impedance of 100 Ohms. We connect this to a load of 100 Ohms The power dissipated in

## DX DISCOVERIES

By Don K6GHA

Well, one of my New Year's Resolutions is about to be realized.

I wanted to find a way to share some information I am discovering about

Contesting and DXing and hope to do this over the next few issues of ShortSkip. This is for a wide audience, so don't expect super detailed articles, but rather highlights, tools, and references where you can find more information.

Positive feedback will keep me posting new and different information as I find it on DXing and Contesting (at least for a few issues).

In this edition, I want to share some of my sources, tool, and resources of information so you too can fill up your email in-tray with great stuff like I do daily. In future issues, I may do a deep dive on specific tools or resources to get you started.

### Web Sites:

In this episode, let's start with ARRL Propagation and DX activity announcements. The W1AW Bulletin is a good site for finding out about what's new on DX activity, Propagation, Satellites, and other general information produced from ARRL HQ. <http://www.arrl.org/w1aw-bulletins-archive>

I subscribe to this and have checked multiple boxes for email notification on DX activities, propagation as well as contest updates. Knowing what is out there, and if the sun will let you get to it, allows you to plan and capture those new or rare DX locations. Go look at the archive and see if it works for you!

If you are into contesting, don't forget the 12

the load is 25 Watts and note that 25 Watts is also consumed in the source network equivalent impedance. This is known as matching the source to the load. If you can confirm that 25Watts is correct recalculate power for mis-matched loads of 200 Ohms and 50 Ohms. You will obtain two new

month WA7BNM Contest Calendar. Everything you ever wanted to know about upcoming contest activity around the world, rules, and modes (well almost!). <http://www.hornucopia.com/contest-cal/index.html>

### DX Opportunities:

DX Coffee is a European newsletter site giving you a different perspective on DX Activity in the EU. <http://www.dxcffee.com/eng/>

- Contact SANTA CRUZ from Santa

Cruz!! Daniel DL5YWM in holiday-style will be active from Santa Cruz, Galapagos Islands, 4 to 11 May 2013, with the call HC8/DL5YWM. Activity from 40 to 6 meters in CW and SSB mode.

- Don't miss out on a 'light house activation' from Jersey Island, EU-013 off Normandy early in May:

The call sign MJ/OT1S will be used during the holiday style activation on Jersey Island EU-013 from 16 till 19 may 2013. Raf ON5RZ, Eddy ON6EF and Mick ON4RAW will be active from Friday morning the 17th onwards until Sunday the 19th.

### Print Resources:

And for the more hardcore DX/HF/Contest folks looking to improve your station, don't forget about the ARRL Antenna Book. It has a CD in the back that has not only Antenna design information, VOACAP data tables and propagation prediction software, and Terrain mapping programs to as well identify your 'black holes' or obstructions in your polar coordinate map of possible DX contacts.

More next time on this and other DX fun.

—73, Good Contesting and DXing.

values of power each less than 25Watts and if you wish to go even further plot a graph showing power dissipated in the load vs value of the load to illustrate where it peaks

Most source and load impedances have reactive and resistive parts If both source and load are identical then we retain maximum

CLUB MEETING FRIDAY MAY 17, 7:30PM



By Art Lee WF6P

## CHATTER

One of the nice things about having ham radio friends on nets is establishing a history. During many years of working with maritime mobile nets, I accumulated a growing list of like-minded folks -- ham radio operators who are boaters. Sharing stories on the air would seem to be more enjoyable than tweeting (what's that all about?) or emailing someone. I do email a lot, but there is a certain allure in talking to someone on the air. Maybe someone you have recently met. Such is the case of Bill Hoek, N7WH. Always cheerful, he is the voice of Boise Idaho, coming on his watch as net control for the Baja California Maritime Net. Bill has a good signal and always a cheerful disposition and voice. Seems he can always pick me up for check-ins. Bill was absent recently, went back to work on the grave shift. I missed him but he gets on the air on weekends. When Hannah Lewbel Sappirus, KC6NXB, recently made a trip to Yap Island with her father for some underwater exploration, they passed through Guam. When I mentioned it on the air, Bill said that his sister lived and worked at a big hotel there. I tried to arrange a meeting and greeting of the travelers but was unable to arrange it in time. Then Walt, KM6MQ, came up and said he had been a USAF technician at Anderson AFB, Guam, for three years and had a baby born there. This was about the time my son was born in Honolulu. Later, Tim Foy, AA6GP, formerly of Ben Lomond, checked in to respond to all the questions about the fires near his home in Ventura county. This triggered information from all the members in Southern California who "smelled smoke" or watched flames sweeping adjacent hills. Having lived in San Diego, I recall that there were always summer fires burning on the surrounding hills. In my navy boot camp in 1946, recruits in training were turned into instant firefighters and taken by bus to the hills to help. Firefighting is an important part of training for seafaring life. It doesn't matter whether it is a burning bush or a shipboard fire, fire is fire. As instructors no doubt tell recruits

## Member Profile: Tom Stollar KW6S tells his story

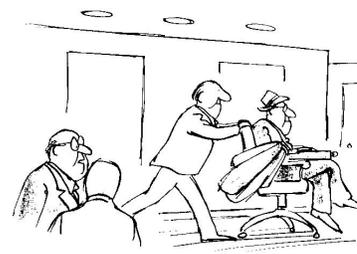


Like many I was fascinated at an early age by the radio with the glowing tubes and crystal sets. After graduating from my rural high school south of Fresno the technical interest grew, and I started night classes at Fresno City College to get my Radio Telephone License. A connection with a surplus dealer added a lot a variety. The ham license kept getting pushed back until Ancel, WB6IXE showed me his mostly homebrew 40M cw kilowatt (2x 3-1000). I met Herb, W6WL(sk), and took a license and cw class put on by the Fresno Amateur Radio Club. I finished the class with a technician license, WB6QHF. I went to the Fresno Hamfest that year and won the "newest tech" prize at the hamfest, a box of 6M crystals and soon made a contact on 6M AM with 1W from a CB set. I became fascinated by the 1296 articles in QST and CQ magazines and converted a Motorola T-44 to get FM going on 1296. With Joe, K6ZMW, an instructor at Fresno City College we worked some odd cross mode FM/CW/SSB contacts and made a few discoveries. I moved to Santa Cruz in January 1978 after buying Santa Cruz Electronics and put up a tower with 6M, 2M, 432 and 1296 antennas. My main activity became ATV and upgraded to Advanced. A few wires and a

today, "When on the ship, you don't call 9-1-1, you are 9-1-1." I was in an aircraft on fire once and as I think on it, it wasn't pretty. My grandson Eric is a fire fighter in Sacramento for the U.S. Department of Forestry. I suspect that he will be quite busy this year due to severe dryness of the California countryside. This reminds me, I should get my weed whacker out again and cut back wild grasses on my own hillside. I'd hate to lose the eucalyptus tree suspending one end of my 80-meter dipole.

trap vertical for HF followed. A few years past with regular contacts with my Dad, N6JAE, in Fresno on 2M SSB/FM, and 160M. I added the HF slopers, and learned to build traps. About 2006 my wife Barbara encouraged me to take the Extra test, became AE6XQ and started attending SCCARC and CAKE meetings. I wasn't having much luck on HF until I bought a TS-2000X and obtained my current call. Don K6GHA and I were both new operating HF and at contests and having some one to discuss things with when you are learning something new really helps. Contests are fun and challenging, however the real value to me is the testing of my technical abilities. My early interest in 6M and 1296 still survive and grow. My interest in building has expanded to include understanding what I build. With my consulting career over the past 30 years, I accumulated some good test equipment and surplus parts, and look forward to putting them to good use in retirement. I'm always looking for other builders and VHF/UHF contacts to operate, build, and discuss.

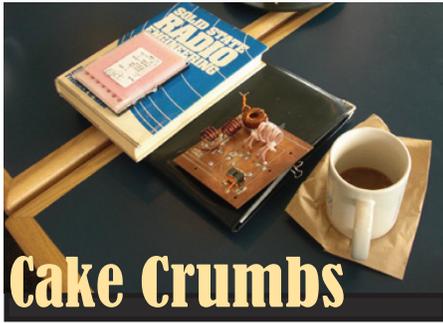
**Tom has been very modest, he hosts the uwave link and internet connection to K6BJ, is an expert builder and experimenter, always willing to help others. His greatest asset however is his wife Barbara. He just loves those flea markets.**



Tom needs a little help getting to the flea market these days

I missed the last club meeting again. My son and family came down on Friday night. As we say in the Amateur Radio community, "Family first." They were escaping the early Sacramento heat to enjoy a respite in our lovely city. I was going to take them sailing on Monterey Bay but was afraid they'd freeze to death.

Good news. After leaving my Gold Beach gift hat in Felton for a week, I returned and retrieved it. The logo, Port Orford K7POH Amateur Radio Club, is prominently displayed so guess it had limited appeal for non-ham wearers.



## Cake Crumbs

The Abbey patio is just delightful on a day like it was- how fortunate we are!

Daniel KE6PQV and Michael AG6MK are regulars and both have a lot of know-how to share so let's challenge them more with questions. The DX convention in Visalia provided much of the conversation. Tom KW6S came away with lots of new project ideas while Don K6GHA, Bob K6XX and others were clearly impressed with Clublog as a way of efficiently managing DXCC activities. No doubt we will be learning more. As usual we switched back and forth discussing the technology of the past present and future. Now for those who think buying a green banana is a long range plan, February 2016 might seem as remote as the long path to Europe on 10 meters. However this group began a discussion on what the Club might do to celebrate our 100th anniversary and what a show we could put on! So expect much more on this subject. If you have not already done so take time to study the history on our Web site. Tom brought the finished trap for his 40/80 meter sloper and his VNA measurement that afternoon showed how well it tuned the antenna. He is taking no bets on its operation at full legal limit. Frenk K6BDK has made his first PSK31 contact on 6 meters and seems determined to get another DXCC. Nice going Frank! Bob always has penetrating questions, often laced with humour. He asked about pronunciation of the word "antipodes" and if there could be such a thing as an "antipode" I checked Websters dictionary (I had to ceremoniously dump my Oxford in the harbour when I became a citizen) Sure enough Webster simply says an antipode is a direct opposite (assumes there is such and not very enlightening in my point of view). As you can tell our CAKE meetings are not just hard core technology, why not join the fun.

73 Ron W6WO

## Tiny Satellites

NASA launches three tiny smartphone satellites operating at 437.425 MHz <http://www.kurzweilai.net/nasa-successfully-launches-three-tiny-smartphone-satellites>

NASA launched 3 miniature satellites Sunday. Amateur radio operators can participate in the "PhoneSats" mission by monitoring transmissions and retrieving image data from the three satellites. ("Since the picture packets need to be stitched to restore the complete Earth picture, we will need as many packets as possible," says NASA.)

PhoneSat satellites are transmitting at 437.425 MHz. All three satellites transmit using AFSK (1200 bps) modulation and AX.25 packet coding, and have vertical linear polarization (packet details at [http://www.phonesat.org/packet\\_description.php](http://www.phonesat.org/packet_description.php)).

I would like to do a follow-up article on how hams are monitoring these transmissions and helping assemble data; I welcome all inputs, especially with shack pics and screen shots. Also, what ideas do you have for using these satellites?

Sensors ([http://www.phonesat.org/packet\\_description.php](http://www.phonesat.org/packet_description.php)):

- Time: unix time time in milli seconds.
- Reboot: number of reboots of the phone.
- Counter: number of packets sent since the beginning of the mission.
- Packet type: for this packet will be sensors from the phone (1).
- Phase: phase in which the satellite is (we have 3 phases).
- Compass: magnetic field value for X, Y, Z axes from the phone sensor in nanoTesla.
- Gyro: spin rate for X, Y, Z axes from the phone sensor in deg/sec.
- Accel: accelerometer value of X, Y, Z axes from the phone sensor in m/sec<sup>2</sup>.

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[amara@kurzweilai.net](mailto:amara@kurzweilai.net)  
[www.kurzweilai.net/nasa-successfully-launches-three-tiny-smartphone-satellites](http://www.kurzweilai.net/nasa-successfully-launches-three-tiny-smartphone-satellites)



Don became rather inflated after his RTTY contest success

## Thevenin's Theorem continued

power transfer although less power is transferred than for a matched resistive case . What we often do is to add reactance of the opposite phase to make the end-end reactance zero resulting in the best possible case of power transfer. We use so-called antenna tuners to do this and tend to think impedance matching is only important for efficient TX power transfer.

It is also informative to consider the reception of signals. An EM wave is energy propagated through space and the job of a receive antenna is to capture as much as possible, The EM wave can be treated as a Thevenin source of some strength in Volts/ meter with an impedance of free space which is 277 Ohms resistive so ideally our antenna should have large aperture and equal impedance for maximum signal capture. Now even if an antenna impedance is 277 Ohms and purely resistive only part of the receive power is put to good use as there are several forms of loss involved . We then have to connect the antenna to a receiver which is another power transfer interface. All together we have a rather haphazard situation without even considering the mismatch situations seen in some popular multiband wire antennas. It is a curious fact that power captured by a mismatched antenna that isn't matched is actually re radiated .

—Ron W6WO

## Repeater Committee Input Wanted

Have you ever thought you would be interested in helping with the Club repeaters? We would like to have your input and show you around. Technical work (radio and computer), general maintenance work, future improvements, your Club (repeaters) could use a bit of various kinds of help. There are good opportunities for ham learning and fun as we go too. Start sharing some of your interests by email, meet at the repeater site, and take it from there.

If you would like to begin helping, please subscribe to the Google Groups "fun\_k6bj" group at:

[http://groups.google.com/group/fun\\_k6bj](http://groups.google.com/group/fun_k6bj) and share input there. Meetings, training and work can be scheduled, and one meeting will be at K6BJ repeater site in Santa Cruz on (Third) Saturday morning, May 18 at 10am.

Thanks!

73, Cap KE6AFE

**SCCARC Board - 2013**

President	Robert Ritchey	KJ6FFP	
Vice President	Ron Skelton	W6WO	
Secretary	David Copp	WS2I	708-2206
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	Suellene Petersen	K6CPA	
	Oliver Pitterling	KI6LLD	
	Becky Steinbruner	KI6TKB	
(Immediate Past Pres.)	Bruce Hawkens	AC6DN	
K6BJ Trustee	Allen Fugelseth	WB6RWU	475-8846

**MONTEREY BAY REPEATER ACTIVITY**

Santa Cruz County	K6BJ 146.790- PL 94.8 Santa Cruz (linked to KI6EH) KI6EH 147.945- PL 94.8 Watsonville (linked to K6BJ) K6BJ 440.925+ PL 123.0 Santa Cruz (not linked) K6BJ D-Star 441.675 +5MHz (D Star link: <a href="http://tinyurl.com/dstar-sc">tinyurl.com/dstar-sc</a> ) • SCCARC Net Monday 7:30 PM 146.79- /147.945- /147.180+ linked • SCCARC 10 Meter Net Monday 7:00 PM 28.308 MHz USB
ARES Net	SC County Wide ARES Tuesday 7:30 PM on 147.180+ PL 94.8 and 443.600+ PL 110.9 linked
San Lorenzo Valley	WR6AOK 147.120+ PL 94.8 Ben Lomond • SLV Net Thursday 7:30 PM
Loma Prieta	AB6VS 440.550+ / AE6KE 146.835- PL 94.8 (linked for net) • LP ARES / LPARC Net Tuesday 7:15 PM
Monterey	K6LY 146.97- PL 94.8 / 444.700+ PL123 (linked for net) Monterey • Monterey Co. ARES Net Wednesday 7:30 PM K6LY 146.970- (PL 94.8) • NPSARC Net Wednesday at 8 PM on K6LY/R
LPRC	WR6ABD 146.640- PL 162.2 / 442.900+ PL 162.2 (winsystem.org) • LPRC Net Tuesday 8:00 PM 146.640-(PL 162.2) • Amateur Radio Newslines broadcast Tuesday

• Santa Clara Valley Section Traffic NET Tuesday 9:00PM 146.640- (PL 162.2)

FOR MORE INFO SEE: <http://www.k6bj.org/freq.html>

**SCCARC Calendar of Events**

ARES Meeting (prior to club meeting)	Friday May 17
SCCARC Meeting	Friday May 17
Cake Meetings	Sat May 11, 25
Board Meeting	Thur May 23
Short Skip articles due	Mon Jun 10
SCCARC Meeting	Friday Jun 21
Field Day	Jun 29-30

**MONTHLY MEETINGS.**

The SCCARC Meets at 7:30 PM, on the THIRD FRIDAY of the each month (except December). Meetings are at Dominican Hospital, Education Center, 1555 Soquel Drive, Santa Cruz

**Net Control Schedule:**

5/13	Chris KG6DOZ
5/20	Tom K6TG
5/27	Phil KE6UWH
6/3	Lou NJ6H
6/10	Becky KI6TKB
6/17	Chris KG6DOZ

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Writer: Ron Skelton, W6WO

**ARES Volunteers**

Here's a reminder and request for volunteers for upcoming public service events in our county.

**May 19th,**

**Strawberry Fields Forever**

(a cycling event): we typically need about 14 operators to cover net control, start/finish, rest stops, SAG and motorcycle SAG. Course opens @ 7 am and closes @ 5 pm. Excellent, distinctive food is available at each of the rest and lunch stops. Additional swag usually includes a tee-shirt.

If you are available to work either or both of these events, please email me and let me know which event you're interested in, and I will send you more detailed information so you can select the times/positions that you would like to work.

—73, Jerry Inman, AE6I

Emergency Coordinator - SC ARES

**July 13,**

**Fireworks 25/50 Endurance Ride**

Just a reminder that the Fireworks 25/50 Endurance Ride will be held in Santa Cruz on Saturday, July 13 this year. The route will be the same as the 2011 ride - beautiful views of Monterey Bay, a thorough tour of Wilder Ranch State Park, and, for the 50 milers, some trails on private property, opened only for the endurance ride.

We have a couple of new features:

This year, for the first time, we'll be keeping track of completion times for LD participants - the time will be recorded when the horse reaches criteria, not when they cross the finish line - and the top 10 LD finishers will be eligible to show for BC.

And we've added a fun ride. If you have friends or spouses who aren't interested in doing the distance, but would like to experience the redwoods of Henry Cowell on horseback, this is a great opportunity. The fun ride will be led by one of our most experienced members and start from Ride Camp. And dinner is included with the fun ride fee.

Also, if you're a ride manager or are mentoring a first time endurance rider, we're offering an entry discount. And we're "honoring" NATRC memberships, so if you have friends who are NATRC members, but not AERC members, let them know that they will not have to pay the non-members fee to ride,

All the ride details can be found at <http://www2.cruzio.com/~candg/FWDdetails.pdf>, where you can also download the entry form.

If you have any questions, drop me a note and I'll see if I can get them answered.

See you on the trail,

Donna Stidoph, Ride Secretary