The Heterodyne

Bulletin of the West Valley Amateur Radio Association
An Affiliated Club of the American Radio Relay League

West Valley Amateur Radio Association, W6PIY— http://www.wvara.org
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August 2008

Next Meeting, Note Time: Wednesday, **7:00 p.m.**, August 20, 2008 at the American Red Cross, 2731 North First Street at Plumeria (between Trimble and Montague Expressway) in San José. Speaker: Tom Carney, K6EU — Subject: "VHF Contesting, with a Rover Vehicle Set-up/Demonstration"

About Our Speaker — Here is the autobiographical information that our speaker, Tom, K6EU wrote on www.qrz.com :

I was first licensed as WN4QVQ in 1963 while living in Lexington, KYand attending the University of Kentucky. At the time I was active at the university club station W4JP. After moving to Huntsville, Alabama in 1966, I upgraded to a General Class license and was a founding member of the Northern Alabama DX club.

This was followed by a stint as WA5SNY in San Antonio while a member of the United States Air Force. Continuing my migration west, I operated briefly from Salt Lake City, Utah as WA4QVQ/7.

I moved to the West Coast in 1973 and became WB6AZL, KA6CQQ and then KE6FI. After operating from about 1979 to 1983, I lost interest in the hobby and did not resume activity until 2001 after retiring. Currently, I am active in various forms of contesting including VHF contesting as a rover. I am a member of the Northern California Contest Club.

WVARA Field Day, 2008 — WVARA Breaks Field Day Record!

We had a very successful Field Day at Mora Hill with a total score of 11,650! This breaks all previous ARRL records for 8A-B, quite an accomplishment for the bottom of the sunspot cycle! Our 2007 and 2006 totals were 10,745 and 9,190, respectively. Seventy-two (72) contacts were made by the GOTA station with coaches AD6RE (Grant) and KG6SVJ (Jeannett).

The flex station proved to be a valuable addition to our Field Day line-up, adding 119 QSOs to our phone total and 23 QSOs to CW total. Thank you to the flex team! W6ESL (Tom) and AF6KD (Dave) also made big contributions to our phone score.

Our total Field Day 2008 points are summarized in the table on the next page.

Points Scored (Including Multipliers)		
Category	**2008**	**2007**
CW	5860	5710
Digital	1360	730
Phone	2340	2375
Bonus	2090	1930
Total	11,650	10,745

Back Porch Field Day, Sunday Morning, June 29, 2008 — Loren Singh, AD6YU.

Because of previous commitments, my Field Day operating was limited to the last 90 minutes of the event on Sunday morning. MY trusty MFJ QRP Cub (2 watts) picked up a few QSOs for me on 20M CW, including K7LED, W7DX, K6SA, and KE7NO. My ham shack is located in the back service porch of our mobile home, along with the laundry washer and dryer. I especially like to send out QSL cards for HF contest contacts, and I did so for the four QSOs that I made. The QSO manager for K7LED is Fred, W6TKV. Not only did he QSL, but he also sent me an interesting letter about K7LED, which is the club call sign for the Mike & Key Amateur Radio Club, an ARRL-affiliated club located in Renton, Washington.

Here is his letter to me:

July 11, 2008

Dear Loren:

A word on being K7LED's QSL Manager. It was my very first opportunity to be part of the M&K, not just a member. Not living in Washington, I often get to just a meeting, Field Day or club picnic each year. About 12 years ago in June, my XYL and I planned to be in Seattle to celebrate the arrival of a granddaughter. Since I wanted to participate in Field Day, I searched the prior year's ARRL Field Day records which led me to the Mike & Key ARC — a wonderful result!

Each year, the M&K Field Day site is at Fort Flagler State Park on the Olympic Peninsula— it overlooks the Juan de Fuca Strait right where the water bends around from an easterly direction to a southerly direction. With salt water for 4½ miles to the east and 10+ miles to the south, it is a wonderful QTH! The M&K operates Class 6A with 15, 20, 40, 80/10M plus GOTA and VHF phone stations located on a bluff overlooking the strait, and there are two CW stations in a tent down on the beach at the water's edge.

Our set-up begins at 1800Z on Friday exactly 24 hours before the start of Field Day on Saturday morning. Set-up includes a variety of towers, monoband beams, wire antennas, generator trailer and tents. Although I operate several of the stations each time I attend Field Day, my favorite is the 40M SSB station which features 2 inverted V beams, 6-elements to the east and 4-elements to the south — there are some very big pine trees and a fellow with a fishing pole is outstanding in casting lines over them. These 40M antennas are nothing like my 40M dipole here in California.

Operators include several guys and gals who are great contesters, plus many others who are not. Everyone signs up for operating time, so it is a great way to include everyone who wants to operate. In 2007, I invited KCØUYG (my grandson, Dan) to join me for Field Day. He flew out from Minnesota and we both had a great time. He is 6 feet and 215 pounds, so he looks a lot older than his 13 years. When it came to operating, he went one way and I went another (on Saturday night, he got to bed at 4:00 a.m., whereas I went to bed earlier to get up at 5:00 a.m.

and relieve the 40M SSB operator). This year, Dan joined me at one of our local clubs in "Class 2F" with Field Day in a firehouse. Boy, what a difference!

I look forward to seeing your call sign in future M&K logs.

73,
Fred, W6TKV

P.S.: 2 watts! You must like to work harder. I did achieve DXCC with 4 watts SSB— ended up with 140 countries in my log.

Adventure Radio Society, Flight of the Bumblebees Contest, July 2008— by Jim Peterson, K6EI

The Flight of the Bumblebees QRP contest in late July was a blast as usual. I hiked 10 minutes behind the in-laws cabin and strung a dipole up about 20 feet in a pine tree on a hilltop overlooking Loon Lake, Washington. The only difficulty was that intermittent power line noise (corrosion on a pole-top power line transformer connector?) made copying some of the weaker Bumblebee signals a real challenge. I ended up in tenth place out of 74 entries — quite respectable.

For those of you who have not heard of it, the Flight of the Bumblebees contest is even more fun than Field Day! To learn more about the contest, see:

http://arsqrp.pbwiki.com/Flight+of+the+Bumblebees

To see the 2008 contest results:
http://arsqrp.pbwiki.com/2008+Bee+Results

Jim Oberhofer, KN6PE, Wins April *QST* Cover Plaque Award —

The winner of the *QST* Cover Plaque Award for April 2008 is Jim Oberhofer, KN6PE, for his article "Outpost: Packet Radio for Emergency Messaging." The winner of the *QST* Cover Plaque award — given to the author or authors of the best article in each issue — is determined by a vote of ARRL members on the *QST* Cover Plaque poll web page http://www.arrl.org/members-only/qstvote.html . Congratulations, Jim!

Kansas Ham, Son, Electrocuted While Erecting Antennas— from Larry Staples, WØAIB and Others

While putting up backyard antennas on the afternoon of Sunday, July 13, Edward Thomas, KCØTIG of Kansas City, Kansas, and his son Jacob were electrocuted. Edward, 65, was pronounced dead at the scene. Jacob, 27, was rushed to the hospital but died later that day. Initial reports suggest that the antenna they were installing came in contact with 7620-volt power lines. Neighbors reported a "loud popping sound" and the electricity went out on the block.

Jacob's 7-year old daughter witnessed the tragedy and ran to the neighbor's yard, calling for help. Byron Kirkwood and another neighbor attempted to perform CPR on the men; the neighbor also called 911. Robert Mullendore, a spokesman for the Kansas City Board of Public Utilities (KCBPU), was quoted by Kansas City television station KSBH as saying it is rare to survive a shock as strong as the two men received: "There are people who will survive — they're lucky by the grace of God, it's high energy, it's dangerous, that's why it's up in the air — you just have to

be careful. Even those who survive have pretty wicked wounds and they are lifelong wounds." In the power business for more than 30 years, the spokesman said these accidents are "really rare," saying that he only sees something like this "every two or three years. If you're doing any kind of work like this, you just really, really need to be aware of your surroundings."

Chuck Kraly, KØXM used to work for KCBPU; he built and maintained the substation that fed the circuit going to the Thomas home: "This is nothing to take chances with. In my almost 30 years as a ham — and 27 years in the power utility field— I have seen way too many 'accidents.' Stop and look. If it is close or seems that way — don't. Find another place. High voltage lines are not forgiving. Your life depends on it. Please follow the warnings. Anywhere close is too close."

Club Net: Tuesday, 8:30 p.m. on our club repeaters:

WVARA Repeaters (W6PIY)			
Band	**MHz**	**PL**	**Status**
6 Meters	52.580-	151.4 Hz	Down*
2 Meters	147.39+	151.4 Hz	Operating
1.25 Meters	223.96-	156.7 Hz	Operating
0.70 Meter	441.35+	88.5 Hz	Operating
0.23 Meter	1286.2-	100 Hz	Operating
Note: *6M repeater is out of service. AD6CL is working to restore operation.			

WVARA Tuesday Night Net Check-ins:

Call Sign	Name	July 8, 2008	July 15, 2008	July 22, 2008	July 29, 2008	August 5, 2008
AA6W	Don			X		
AB6XS	Kevin	X	X			
AD6YU	Loren			X	X #	X
AE6LL	Doug					X
K6EBN	Eben	X	X	X	X	
K6QFO	Mike		X			
KE6RRU	Dan		X			
KF6EMB	Svend				X	X
KF6NBO	Matt		X			
KI6LQE	Bruce		X			
KI6RLA	Ken		X			
KK6VF	Kevin	X #	X #	X #	X	X #
N6BIH	Senad	X				
N6FFC	Bill		X			
N6IPS	Roy			X		X
W6HOC	Howard		X		X	
W6TQG	Phil				X	
W6ZZZ	Marc	X				
WB6KHP	Dave	X	X	X		

Notes:
— Net control operator
X — Checked into net

Low-Loss Waveguides for Terahertz Frequencies — NASA Jet Propulsion Laboratory, Pasadena, California (*NASA Tech Briefs*, July, 2008).

Hollow-core, periodic bandgap (HC-PBG) flexible waveguides have been proposed as a means of low-loss transmission of electromagnetic signals in the frequency range from about 300 GHz to 30 THz. This frequency range has been called the "terahertz gap" because it has been little utilized. Heretofore, there has been no way of low-loss guiding of terahertz beams other than by use of fixed-path optical beam guides with lenses and mirrors or multimode waveguides that cannot maintain mode purity around bends or modest discontinuities.

The terahertz HC-PBG waveguide concept utilizes a periodic bandgap structure surrounding a hollow single-mode core to transfer energy with low loss even around bends. The waveguide was developed to enable in-vivo applications for THz imaging and sensing at wavelengths from 10 microns to 1 mm, using flexible endoscopes and fiberscopes. Other potential applications include distribution of terahertz power and coupling of signals in general terahertz instrumentation. PBG structures have been developed for a wide range of traveling-wave applications in the microwave and optical regions of the electromagnetic spectrum.

The terahertz HC-PBG waveguide concept involves the same basic physical principles used to optimize infrared PBG structures, but at significantly increased length scales (corresponding to the greater terahertz wavelengths), and with somewhat different geometric arrangements and different materials appropriate to the intended applications. A representative proposed terahertz HC-PBG flexible waveguide would comprise a hollow overmoded air or vacuum waveguide core surrounded by a flexible PBG honeycomb structure made of low-loss polyethylene, Teflon, quartz, or high-resistivity silicon tubing. The honeycomb structure would be designed to exhibit bandpass/band-stop behavior for electromagnetic fields of the guided wave penetrating into that structure, resulting in the confinement of the wave within the core for frequencies within one or more desired propagation band(s). Because the core would be hollow and the periodic structure would be of a honeycomb nature, most of the electromagnetic power would propagate in air; therefore, propagation losses would be much lower than that of prior dielectric or metal waveguides.

A major advantage of the proposed structure is flexibility for bending or twisting the waveguide without appreciably distorting the internal electromagnetic fields. In designing this or a similar structure of the same type, the width of the hollow core could be chosen to accommodate insertion of a pyramidal or conical wavegu9ide horn for exciting the propagating field or coupling the field out to a detector or load.

This work was done by Peter Siegel, Cavour Yeh, Fred Shimabukuro, and Scott Fraser of the California Institute of Technology for the NASA Jet Propulsion Laboratory.

Protect Yourself from the Dangers of Knockoff Battery Packs — by Robin Sarah Tichy (*Electronic Design*, July 10, 2008).

In recent years, the news of individual battery incidents such as cell-phone and laptop fires has been eclipsed by factory fires and large recalls of lithium-ion (Li-ion) cells. Several large, well-known Li-ion cell suppliers have been affected. The most notable event was the recall of Sony batteries in 2005. Panasonic and, more recently, LG Chemical have had fires affecting their Li-ion manufacturing volume as well.

While these factors present challenges for the Li-ion supply chain, the field failures of individual batteries result in the potential for serious injuries, and the continuing growth of handheld devices has spawned a healthy selection of aftermarket battery pack suppliers. Counterfeit batteries have become increasingly common and popular with consumers. Globally, more than 5 million

counterfeit cell-phone batteries have been confiscated and destroyed by law enforcement officials.

In the News

The unregulated supply represents a huge safety issue. In November 2007, *The Korean Times* reported on the death of an excavation worker. The cause of death was suspected to be a cell-phone battery explosion. The cell phone was found in the worker's shirt pocket with the battery melted, and the worker's chest was burned.

This incident was remarkably similar to an event in China reported by *The Register* in July 2007 where a welder died when his ribs were broken after an apparent cell-phone explosion. According to the article, "a Beijing spokesman for Motorola said it was 'highly unlikely' that the company's product was to blame and 'questioned whether the man was using a fake Motorola cell phone or battery.'" Seemingly random battery fires are often attributed to aftermarket or "fake" batteries.

Battery packs are no longer a simple configuration of cells. They are carefully engineered products with many safety features. The main components of a battery pack include the cells, which are the primary energy source; the printed-circuit board, which provides the intelligence of the system with features such as the fuel gauge and protection circuitry, the plastic enclosure, external contacts, and insulation.

Standards from several sources outline in great detail the safety features that battery packs need. The most significant are the IEEE 1625 and 1725 standards for laptop and cell-phone batteries, respectively. Imitation battery packs often lack one or more of these safety features. Typical violations include:

- The use of substandard or unqualified cells
- Mismatched components on circuit boards that may not provide adequate performance
- Lack of a current/voltage or thermal protection circuit
- Lack of accommodation for normal cell swelling over time
- Nonexistent or obstructed gas vents
- Bad welds or solder joints

Combating Counterfeiters

It is important to protect yourself as a consumer against the dangers of knockoff battery packs. As an electronic design engineer, it also is your responsibility to protect your company from aftermarket packs. Fortunately, many options are available to design-in protection against aftermarket batteries.

The most obvious is the form of the packaging and connectors, but this approach can be circumvented by simple measurements. And once a counterfeit or clone is available, the original manufacturer would have to change the form factor, which is not a trivial task.

Labeling such as stickers, certification markings, and holograms are another possibility. Good, cheap scanners and color copiers make these methods easy to reproduce, though. Web-based registration is another idea, but it creates an inconvenience for the user.

A challenge/response between the battery and the device is a more secure approach. It requires a secret shared between the host and the battery, random input, and an algorithm for generating an output that is difficult to predict. Selection of the correct authentication technique is about understanding the tradeoffs to be made.

The design community must not neglect the danger of counterfeit batteries. Imitation or aftermarket batteries have resulted in public-relations issues for portable equipment manufacturers because these counterfeits usually lack the quality of the original battery. Single-cell lithium battery packs for cell phones have received most of the media scrutiny.

However, multiple-cell lithium packs are more complex and have many more points of failure. Also, safety is more a concern in industrial, military, and medical equipment where reliability and safety intertwine.

The quantifiable impact of imitation battery packs on the original equipment manufacturer include increased safety risks for customers, greater product returns due to non-performing batteries, reduced customer satisfaction, and reduced revenue for batteries supplied by the original manufacturer. The intangible qualitative impact is the negative effect on the device manufacturer's brand-name equity.

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