



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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Next Meeting: Wednesday, 7 to 9 p.m., August 19, 2009 at the American Red Cross, 2731 North First Street at Plumeria (between Trimble and Montague Expressway) in San José.
Speaker: To be determined (TBD) — Subject: To be determined (TBD)

Ham Radio Helps with Mountain Rescue — by Rich Lippucci, KI6RRQ — It was a quiet afternoon on July 11 and Rich Lippucci, KI6RRQ, of Vista, California, was monitoring the Catalina Amateur Radio Association (CARA) repeater on his base station. "I heard someone come over the repeater, calling, 'Is there anybody listening?' I responded and the caller said he was on his handheld transceiver hiking around the Mt Baldy area. He was about 2.5 miles off road and resting at the wilderness San Antonio Ski Hut <http://angeles.sierraclub.org/lodges/sanantonioskihut.html> >. A few hikers had arrived from farther in the backcountry — one of their friends had broken an ankle and was a mile or more up the trail and they needed help." Mt Baldy is the highest peak in the San Gabriel Mountains and the highest point in Los Angeles County.

Lippucci asked the caller for his call sign and name. "He told me he was Kirk Gustafson, KE6MTF," he told the ARRL. "I asked Kirk if he had a cell phone, but he told me there was no cell service where they were. I told him I would coordinate emergency services over my landline and asked for his exact location. He did an excellent job; he had a good idea of where he was and wasn't sure which county he was in, but he did have GPS coordinates."

Using his landline, Lippucci called 911 and was transferred three times until he was connected to Chelsea in the San Bernardino County Sheriff's dispatch center. "Chelsea coordinated the rescue with the San Bernardino Fire Department who sent a foot patrol to the area," he said. "The Sheriff's office dispatched a helicopter to meet someone at the ski hut to take them to where the hiker was down. It took a little less than an hour for emergency services to get above the location in a helicopter, but they were not able to land the helicopter due to the rocky terrain at the ski lift." Lippucci said that while the foot patrol and helicopter were on their way, the group of hikers had brought the injured woman down the trail to the ski hut, stabilized her leg and determined it was probably not broken. They still did not feel they could carry her out as the trail down from the wilderness ski lift was so steep." The ski hut can only be reached via a steep

three mile hike and 2200 feet elevation gain.

The dispatcher told Lippucci that the helicopter would perform a skid rescue where a crew member suspends a bed basket from the helicopter; the victim is secured and pulled back up to the helicopter. The dispatchers asked Lippucci to relay back to Gustafson, asking if the group needed anything, such as food or water. Gustafson relayed back that they didn't need anything. "After about 15 minutes from arriving on site, the helicopter and its crew got the victim airlifted out successfully without further complications," Lippucci said. Gustafson took a video of the rescue with his cell phone

<http://marlene.zimage.com/ke6mtf/hike/rescue/iPhone/IMG_0408.MOV>.

Gustafson and Lippucci -- both ARRL members -- have been in contact since that Saturday afternoon. "Since the incident, Kirk informed me that the injured lady was around 40 years old and that there were up to 15 hikers hanging around the ski hut, some of which were search and rescue volunteers on vacation," he told the ARRL. "They had some kind of radios with them, but their batteries were dead. Kirk said when he got out of his car to start his hike, he grabbed his handheld transceiver radio and GPS. His friends told him 'That's just extra weight -- you won't need that.' He told them, 'I go nowhere without my radio. If I need to call for help, the only way I would be able to let them know where I am is with GPS. I'm bringing them.' I don't think they will say that next time! Kirk said that one of them decided they need to look into getting a ticket and radio and that the search and rescue folks said they were going to look into getting ham radio licenses."

Lippucci said that ham radio saved the day: "A handheld radio, hitting a local wide-area repeater, was what was needed when cell and landline phones were not available. Many thanks to the CARA club for their awesome reach in Southern California on 2 meters. Thanks also to those on the air that were very gracious to respect the traffic and keep communications open during the rescue. This is such an excellent example of the benefits of ham radio. If people had to hike out of the wilderness, get to their cars and find a cell signal, they might have been pushing up against the loss of daylight hours. Any rescue would have been significantly more difficult in the dark."

Lippucci told the ARRL that 911 and the Sheriff's office in San Bernardino accepted the ham radio call without hesitation. "They used a ham radio operator to relay questions to Kirk through me, to gain all the information they wanted and needed to put assets on the emergency," he said. "It was as if I was calling about something in my own backyard, even though the problem was several counties away in the mountains, with people I didn't know. I am proud to have had the opportunity to use my license in service of an emergency situation. As a CERT member <<http://www.citizencorps.gov/cert/>>, this was the very reason I got my ham radio license in the first place!"

Nevada Hams Coördinate Roadside Medical Rescue — On the afternoon of July 16, ARRL Elko County (Nevada) Emergency Coördinator Greg Barker, K7CWL, was making his way home on Nevada Highway 278 when a van sped past him. About 60 miles later into his trip, he saw the van slow down and pull over to the side of the road. Barker, a physical therapist, pulled over and asked if he could assist. An elderly couple, their daughter and granddaughter were on the way to the hospital in Elko — another 60 miles — as the grandmother was experiencing what they believed was a series of mini-strokes.

The daughter told Barker that their van kept losing power and wouldn't run. Barker assessed the grandmother and tried to call 911 on his cell phone, but there was no coverage in that area. "I put out a call on my mobile radio, requesting immediate assistance, using the 146.850 repeater located about 55 miles away, part of a wide-area linked

repeater system maintained by the Elko Amateur Radio Club," he told the ARRL. "Kent LeBart, K6IN, club president and a radio technician for the Nevada State Highway Patrol, was monitoring the system and responded immediately, asking how he could be of assistance."

Using the crossband repeat mode on his mobile radio, Barker was able to stay with the family at the van. He also used his handheld transceiver to tell LeBart that the grandmother needed to get to the emergency room. "Kent contacted central dispatch and relayed the information I gave him and asked me questions from the dispatch about the patient's situation and condition," he said. "Based on that information, they sent a medivac helicopter from Elko and an ambulance from Carlin."

Barker said that Highway 278 has no mile markers: "I relayed information to dispatch about the location using the closest ranch name and mountain pass turn-off as landmarks. With this information, volunteer firefighters and first responders were on scene in about 20 minutes and the helicopter was on scene in about 30 minutes, followed by the ambulance at about 35 minutes."

Another local ham, Joe Sasgen, AD7OO, was able to offer useful information about approximate arrival times of the helicopter and ambulance. "Joe was monitoring central dispatch out of Elko," Barker said. "This information was reassuring to the family."

Flight paramedics assessed the grandmother and determined that a flight was justified based on her condition, Barker told the ARRL. "I was able to take her husband into the hospital in Elko to meet his wife. This is another testament to the value and utility of Amateur Radio, particularly on the lonely highways of rural Northern Nevada."

MFJ Acquires Cushcraft — On August 7, MFJ Enterprises <<http://www.mfjenterprises.com/>> announced they had purchased the Cushcraft Amateur Radio antennas product line from Missouri-based Laird Technologies <<http://www.lairdtech.com/>> effective July 31. According to MFJ, Cushcraft — makers of HF/VHF/UHF vertical, beam and Yagi antennas for the amateur radio community — will continue to be manufactured in Manchester, New Hampshire. "We are excited to have the Cushcraft Amateur Radio Antennas product line alongside our other five companies," said Martin F. Jue, President and founder of MFJ Enterprises, Inc. "This product line increases our ability to offer our customers a wide range of antenna options at different prices. Customers will be able to choose from Cushcraft Amateur Radio antennas, Hy-gain and MFJ antennas through one source." MFJ purchased Hy-gain in 2000 the company also owns Ameritron, Mirage and Vectronics. Jue said that the Cushcraft line will bring more than 50 new products to MFJ's Amateur Radio product line. "We will add more new products to this antenna line and will continue the Cushcraft Amateur Radio antennas name long into the future. Cushcraft Amateur Radio antenna product customers will appreciate the continued and expected top-quality manufacturing of this product in New Hampshire and the MFJ commitment to superb after-the-sale service and technical support in Mississippi," said Jue. The 120 page 2010 MFJ catalog will include the entire Cushcraft Amateur Radio antennas product line. MFJ has set up a special customer support line — 662-323-5803 — to handle Cushcraft antenna product technical support, parts requests and customer services.



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	Operating
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

X = Checked In # = Net Control

Call Sign	Name	6/30/09	7/7/09	7/14/09	7/21/09	7/28/09	8/4/09
AB6XS	Kevin	X				X	X
AD6YU	Loren	X	X	X #	X #		X
K1DOD	Jonathan				X		
K6EBN	Eben					X	
K6QFO	Mike						X
K6WAR	Bill					X	
K6WV	Jon	X					
KC6LEW	Roger						X
KD6VOR	Marv	X					
KF6EMB	Svend			X	X		X
KF6UTE	Casey					X	
KK6VF	Kevin	X #	X #	X		X #	X #
N6BIH	Senad					X	
N6EEE	Raymond				X		X
N6IPS	Roy	X			X		
NU6P	John			X			
W6FS	Arthur				X		
W6HOC	Howard	X		X	X		
W6TQG	Phil	X					
WA6CQA	Ralf		X				
WA6QYS	Lou					X	
WB6KHP	Dave	X	X	X		X	X



Cathay Amateur Radio Club (CARC), August 8, 2009 Meeting— The Cathay Amateur Radio Club (www.cathayradio.org) is a club that several WVARA members also belong to. The club holds a weekly net on Monday nights at 9 p.m. local time on a repeater located in the Oakland Hills, 146.67 (-) MHz, PL85.4. All hams are welcome to check into the net.

The group recently held a meeting at the home of the club's newsletter editor, Ed, WB6IQN in Sunnyvale. Ed gave a presentation on "A DC-3 GHz Spectrum Analyzer Using Time Domain Sampling." Ed was part of an engineering development team at National Semiconductor that developed a spectrum analyzer built on a printed-circuit board that plugs into a USB 2.0 port. The board measures 8 inches by 8 inches, and can be used with a laptop computer.

Here is a collage of photos showing Ed's antenn as, station, and laptop computer-PCB demonstration set-up:



Fig. 1 — Antennas, Station, and Demonstration Set-up at WB6IQN

Ed also made several sales of his famous DBJ-2 portable roll-up J-pole antennas for 2 meters and 441 MHz. As always, he tested each antenna for correct functionality for each customer:



Fig. 2— WB6IQN Testing DBJ-2 Antenna

These hams attended the CARC August 8, 2009 meeting and WB6IQN's spectrum analyzer demonstration:

Call Sign	Name	Home Location (QTH)
AD6YU	Loren	San José
AF6AR	Shawn	Sunnyvale
AF6DS	Peter	Sunnyvale
K6JCA	Jeffrey	Los Altos
K6TXD	Gerald	Sunnyvale
K6PHL	Phil	Sunnyvale
K6XOX	Nimit	San José
K9ZPY	Dale	San Francisco
KA2COB	Donald	Sunnyvale
KC6POF	William	Daly City
KD6FJI	Lloyd	San José
KG6SCE	Walter	San Francisco
KI6AZB	Ronald	Cupertino
KI6FZB	Stuart	Brisbane
KI6UH	Gordon	Brisbane
KN6LV	Gary	San Leandro
NC6D	David	San Francisco
NK6U	Robert	San José
WB6IQN	Ed	Sunnyvale

A Bad-capacitor Story Ends Happily — by Samuel Kerem

[From: EDN, January 8, 2009]

I worked as a design engineer for an optical-telecom company that deployed 1000 pieces of equipment worldwide. Having so many modules in the field means a trickle of returns, and it was my job to investigate the failures. One investigation taught me a wonderful lesson. I received a module whose source of failure was easily identifiable: a charred tantalum capacitor. It failed short, making the whole multi-thousand-dollar module non-operational. This surface-mount capacitor — with a 7343 footprint and 20V rating — was sitting on a 12V-DC plane. This failure rate of one capacitor in about 10,000 pieces in this time span was well below the statistical prediction. I took a picture of the fallen capacitor and considered the case closed.

In a few weeks, a customer returned a similar module with a charred and shorted capacitor in the same location. Even including this case, the failure rate was still below statistical prediction. I knew there were five more identical capacitors on the board, sitting in parallel on the same 12V-DC plane. In addition to the module's failure rate, I now had a one-in-six chance with the capacitors. So, I took another picture. I wrote a report to calm upper management, but I had a feeling that I'd better study reliability calculation in general and reliability for tantalum capacitors in particular, and the faster, the better.

In another few weeks, I received another failed module. The same capacitor looked bad. I had by now done my studying and could intimidate other people by saying long and complicated sentences about reliability, but why was it always the same capacitor? Overvoltage? Spikes? No way. The same plane contained plenty of sensitive stuff that would fry well before the capacitor even felt it. Having nothing better, I clung to the theory of excessive ripple current.

The idea of a temperature rise due to ripple current causing the failure gained traction when all three photos of the fallen capacitors revealed a common condition: almost no solder on each negative terminal. The electrical connection was still good, but there was little solder. The capacitor's positive terminal was fine with a fair amount of curvature-profiled solder. I started to promote the idea that the lack of solder had caused impeded thermal contact, but it was only wishful thinking. I calculated the worst ripple current: 10% of the maximum rating. On an operational board, I got less than 5%.

I had already dismissed other ideas — from excessive humidity to airflow turbulence. Suddenly, the picture of the layout popped up in my mind. The layout sections for the five good capacitors were identical: Vias were close to both terminals going down to an internal layer. The bad capacitor had a via at the positive terminal, but, at the negative end, there was a heavy trace going inside the footprint, beneath the capacitor, and only then outside. That's when I knew how to fit together all the pieces of the puzzle.

On the positive terminal, the solder stayed where it was supposed to, clinching the terminal to the printed-circuit board (PCB). On the negative side, however, during assembly, the melted solder drifted under the capacitor and solidified, lifting the negative end and bending the capacitor just enough to create a microcrack — a capacitor's well-known nemesis. I never felt as much excitement writing a technical report as I did the next day.



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