Big Rapids Area Amateur Radio Club

December 2010

PO Box 343 Paris MI 49338 Pres. Jim Woolen Web Page: www.braarc.net Editor: Phil – phildolly@power-net.net

PRESIDENT'S MESSAGE

We had a good turnout at the Festival of Lights parade! My sincere thanks go out to those who participated in decorating the "float" on a chilly Saturday morning! Our decorating crew consisted of Phil Marcotte; Jeff Sell; Mike McKay, Gary Atteberry; Tricia Walding-Smith; Patricia McKay; Gregory Woolen; Calvin McKay; and, me. The club also ended up purchasing a 3,000 watt generator to use on the float, and it will be used in all future club events where low to moderate emergency power is needed.

All who participated in the Festival of Lights parade Saturday night had a great time! We gave out over fifty pounds of candy to children. Our crew on the float consisted of: Tom & Sue Behler; Mike, Patricia and Calvin McKay; Tricia Walding-Smith, Gary Atteberry, Jeff & Lynne Sell, and, me. Thanks to Mike McKay for letting the club use his trailer for the float! And many thanks to Jeff Sell for using his truck to pull the trailer, and for being such a safe driver!

On a note of sadness: Tricia Walding-Smith (KD8KPU) is leaving Big Rapids this Wednesday, November 24th. She is joining her husband who is already been working for a couple of months in his new job. Tricia will be missed as she participated in many club events. Good luck Tricia on your job hunting.

I hope all of you have a great Thanksgiving with your family and friends. This is the time of year we count our blessings and remember how fortunate most of us are in America. It is also a time to enjoy good food and forget about counting calories or whatever during the holidays.

I hope to see you at the pot luck club meeting on Friday, December 3rd at the Big rapids Department of Public Safety. Remember this is a change from the normal club meeting on the prior day.

73s,

Jim

A Very Merry Christmas to All!!!

Minutes of the November, 2010 meeting were unavailable at the time of publication.

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Announcements:

Sat, November 27, 9:00am – 10:30am
Sharon's restaurant in Rogers Heights. Talk-in on the 146.740 Big Rapids 2-meter repeater for anyone needing directions.

Fri, December 3, 7pm – 9pm
Where 435 N. Michigan Ave, Big Rapids, Mi 49307 (map)
DATE CHANGE: Next BRAARC club meeting Thursday at 7 p.m. at the Big Rapids Department of Public Safety Building, 435 N. Michigan in Big Rapids. Presentation Topic: Holiday Potluck - bring a dish to pass. White Elephant sale, bring something that you know someone else absolutely needs!! Hi hi.

Thu, December 9, 7pm – 8pm
Emergency Committee meeting: Thursday, December 9 at 7 pm at Osceola County EOC.

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This Month's Brain Teaser

A hi-speed train leaves Detroit heading towards Chicago, traveling at 174 mph. Exactly five minutes later, another hi-speed train leaves Chicago heading towards Detroit, traveling at 215 mph. Chicago is 238 miles from Detroit. Which hi-speed-train will be farther from Chicago when they meet? (And yes, they are on separate tracks.)

Last Month's Brain Teaser

My 20-meter quarter wave long wire antenna has an SWR of 1.9 on 14.350 MHz and 2.0 on 14.300 MHz. How much should I cut off to lower the SWR on 14.300 MHz?

Answer: The SWR is higher at the lower frequency so the antenna is already too short. Don't cut it!

(My actual 20-meter antenna, a gift from Jon, N8ZH and David, KC8WGA, has an almost flat SWR across the 20-meter band.)

BREAKFAST
Saturday, November 27, 2010
9:00AM Sharon's Restaurant
Rogers Heights
Come fill your tummy with goodies – if Thanksgiving left room!!!

Float nearly ready for the big parade.

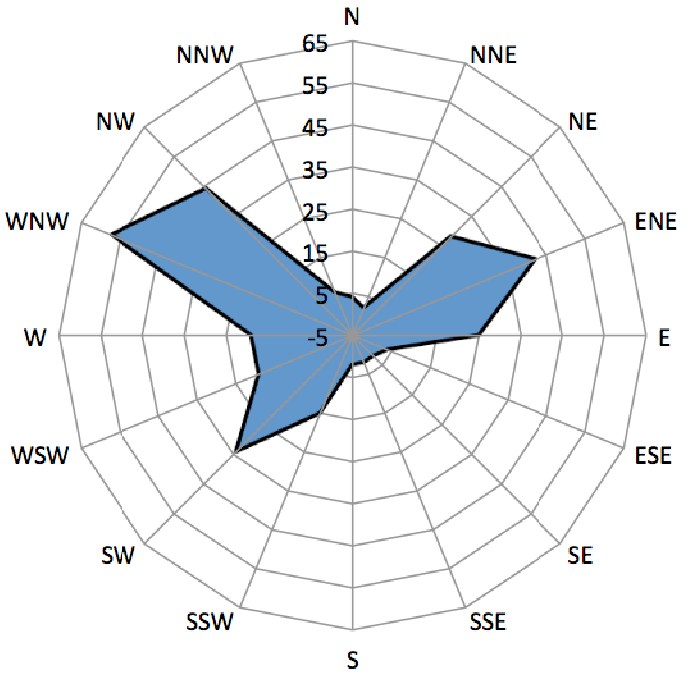
New Club generator being tested with lights connected.

The float crew that enjoyed the mornings work along with coffee and donuts. Note that it is a bit cool.

Weather Words

David KC8WGA

In this month's Weather Words article, I want to share with you my newest addition to my Microsoft Excel weather records spreadsheet. By recording daily wind direction readings, I have come up with a chart showing how many days of the year winds have come from different directions. This data is from January to October of this year.



Getting Ready For Winter

Pictured above is my snow measuring stick for this year. I managed to duct tape a very flexible and otherwise useless ruler to a sturdy piece of wood. It's amazing the things you can do with duct tape!

Zen and the Art of Radiotelegraphy

By Dan Romanchik, KB6NU

One thing that I find amusing about Morse Code is that the more people claim that it's dead, the more people there are that rise up to defend and promote it. Note that I said "defend and promote it," not actually use it, but that topic is for another column.

Having said that, let me direct you to a new tome on our ancient art, Zen and the Art of Radiotelegraphy by Carlo Consoli, IK0YGJ. This book is available as a free download in the original Italian (http://www.qsl.net/ik0ygj/enu/ZART_ita_v20100826.pdf) and in an English translation (http://www.qsl.net/ik0ygj/enu/ZART_r20101008m.pdf).

What makes this book different from others is that instead of concentrating on the mechanics of learning and using Morse Code, the author spends a good deal of time talking about the psychology of learning this skill. To succeed in learning Morse Code, Consoli advises that we need to change our approach to learning:

<<INDENT THE NEXT TWO PARAGRAPHS IF POSSIBLE. THEY ARE A QUOTE FROM THE BOOK.....Dan>>
"When learning CW, therefore, we must establish a new component in our self-image and, when doing so, we need to be relaxed. Always practice during the same time of day and in a place where you can experience positive feelings of comfort and pleasure. When we make a mistake we are always ready to blame ourselves. This is the way we learnt from our environment during childhood, often accepting any fault as our own error or weakness.

This potentially destructive mechanism can be used to build a positive self-image, rather than demolish it. A mistake must be considered a signal, pointing us in the right direction. If you fail, let your mistake pass away, with no blame or irritation. Learn CW in a relaxed mood, enjoy the pleasure of learning something new, repeat your exercises every day and be confident in the self-programming abilities of your self-image. Just a few minutes a day: you can take care of your 'more serious' stuff later on."

Consoli also has some interesting things to say about getting faster. He agrees with me that it's essential to abandon pencil and paper and start copying in one's head. We also agree that at this point, you need to start using a paddle instead of a straight key.

He has analyzed the situation a lot more than I have, though. When hams ask me how I learned to copy in my head, all I can do is to relate my own experience, which is that one day, I just went cold turkey. I put down the pencil and paper and never copied letter-by-letter ever again.

Unfortunately, that doesn't seem to work for a lot of operators. If that doesn't work for you, Consoli says that what you need to do is to program yourself to copy in your head. You do this, he says, by relaxing and visualizing. Visualize yourself as a high-speed operator, and one day, you will be one.

That seems to have worked for him. He is a member of the Very High Speed Club (VHSC), First Class Operator's Club (FOC), and has been clocked at copying over 70 wpm.

Will it work for you? I'm not sure, but if you haven't been successful with other methods to improve your code speed, then Consoli's methods are certainly worth a try.

Tech Corner

"The Roof's on Fire"

WA4FRJ

When I was a student an FM station in New Orleans transmitted background music on an FM sub-carrier (67 kHz) The system is called SCA (Sub-carrier Communications Authorization), but as a student I didn't care what it was called; I wanted to build a decoder to get the music free. I did exactly that and discovered that my reward was elevator music. Still I was proud of my SCA receiver. My boss mentioned the receiver to the owner of the FM station who was an important donor to the university.

About a week later the boss and the station owner wanted to meet with me. I figured that my Research Associate job was probably going to end with a chewing out for "stealing" the elevator music.

The meeting began with a compliment from the station owner, who liked what I had done. He wanted to meet with me because his FM station antenna, mounted on a hotel roof, was setting the roof on fire. The owners of the hotel weren't happy about the small fires and the station owner wanted me to find out why the recently installed antenna was responsible.

My knowledge of Maxwell's field equations didn't cover burning broadcast antennas, but I agreed to look at the problem. A few days later I found myself on the roof of the hotel looking up at a short tower topped with a multi-bay RCA antenna. This thing was being fed with 10,000 watts and I wondered how long I had to stand there before it cooked me.

A three-inch center feed pipe ran up past six bays, each of which had four connections to it. The non-feed ends of the bays were connected to ground cables that ran down the tower. The cables would burn in two, drop on the roof and start smoldering fires. Definitely bad Karma.

I am deathly afraid of heights but wanted to climb up to take a close look at the antenna bays. The owner agreed to shut the transmitter down early one Sunday morning. That way the fall could kill me but I wouldn't be roasted before I hit.

Scared or not, up I went with the wind whistling in my ears. About half way to the top there was a weld in the center feed pipe. "What's this weld?" I called down. The station engineer yelled back up that the center feed pipe was too long for the freight elevator so they cut it in half and welded it back together. I knew enough about RF to realize that it was fussy but the weld was done with a smooth bead and looked good. I came down, got an ohmmeter and went back up. Sure enough the continuity across the weld was perfect. What was I supposed to do to measure the RF level on both sides of weld?

Considering the power gain of the antenna the radiated power was 47,000 watts.
That was no place for me to make any RF measurements.

The station engineer told me that they only symptom they had other than red hot cables dropping on the roof was that the standing wave ratio (SWR) was about 1.8. SWR is a measurement of how well an antenna matches a transmitter. If it is one to one, no power is reflected back to the transmitter. Clearly this antenna was not matching the transmitter but how could I tell about the effect of the weld? That's when, as it were, a light came on.

In a night visit to the antenna the engineer had picked up a fluorescent light tube and carried it onto the roof. With all that RF around it, the tube lit. My bright idea was going to have someone, not me, climb to the top of the antenna and put on a gin pole and pulley. I got some funny looks when I explained my experiment.

What I proposed was to string a bunch of fluorescent light tubes end-to-end on a rope that we would hoist up using the pulley on the gin pole. Several nights later with the transmitter on and all the fluorescent tubes glowing, we hoisted them skyward. This part is really cool. The tubes nearest the roof were bright. As they passed the weld, they got dim. That beautiful weld was blocking the RF, unbalancing the antenna and causing high currents to burn the ground return cables in half.

As an interim fix I asked our Tulane Physics department shop to make a brass barrel to bridge the weld. With the bridge in place, we fired up the transmitter. The SWR dropped to almost one to one and the ground return cables ran cool.

As a postscript, the station brought a new center feed pipe up a construction elevator. With the new feed pipe installed the antenna kept on performing beautifully and the station kept transmitting classical music on the main channel and elevator music on the SCA sub-channel.
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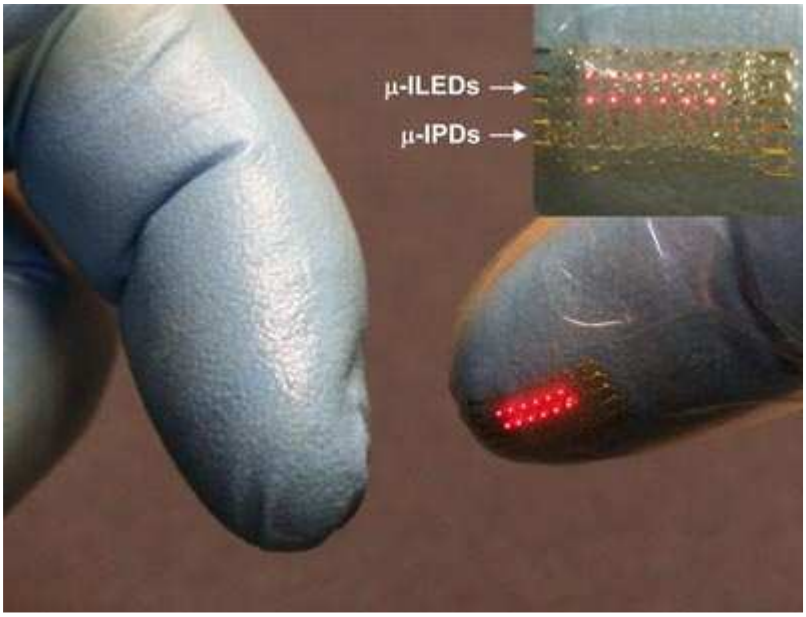
Flexible LEDs bring light to fingertips

Oct 19, 2010



Glowing gloves

Light-emitting diodes – or LEDs – have already found their way into traffic lights, TV screens and incredibly efficient light bulbs. And it may not be long before they are also deployed in medical technologies such as proximity-sensing gloves, surgical threads and intravenous flow rate monitors, thanks to the efforts of an international team headed by John Rogers from the University of Illinois, Urbana Champaign.

To target these applications, Rogers and colleagues have exploited a new printing technique for forming arrays of incredibly small red LEDs on flexible substrates.

Like conventional LED manufacture, device fabrication begins by depositing a stack of compound semiconductor layers onto a substrate. The lower and upper layers have an excess and a deficiency of electrons, respectively, and sandwiched between them is a layer just a few nanometres thick, known as a quantum well. When a voltage is applied across the entire structure, electrons and their positive counterparts, known as holes, are driven into the well where they combine to emit light.

LEDs are normally made by sawing wafers into thousands and thousands of square-shaped chips. To prevent them from becoming too fragile, their edges are at least 300 µm – far too long for forming flexible arrays on plastic sheets.

Small enough for flexibility

To produce LEDs with sides of just 50 µm, Rogers and his co-workers define the chip area with photolithography and etching. A printing technique then transfers arrays of these LEDs to alternative substrates, where they are given electrical contacts and wired in series.

"Printing is a key part of the process," says Rogers. "We have developed that technique to a very high level of sophistication, and we now have yields of over 99% and [placement] accuracies of about one micron."

While light-emitting organic materials could have substantially simplified the process of making LEDs on a flexible substrate, organics have other shortcomings "Their brightness can't compete with inorganic LEDs, and encapsulating them to prevent exposure to minute levels of moisture and oxygen is extremely difficult," explains Rogers.

Pencil pushing LEDs

Stretching, flexing, twisting and bending

To test the robustness of its LED arrays, the team deformed them and monitored changes in performance. "We can accommodate nearly any type of deformation mode – even to extreme values of stretching, flexing, twisting and bending – up to 100,000 cycles or more." Another strength of the printing process is that it can form LED arrays on a vast range of substrates, including plastic, rubber, aluminium foil, paper and even tree leaves.

To demonstrate potential uses for tiny LED arrays, the researchers attached them to a tube to provide a light source for a medical device that measures the concentration of glucose delivered intravenously.

Another application for these arrays is surgical stitching. It is not possible to print the devices onto a thread, but they can be attached by rolling this material over a glass carrier that is populated with red LEDs. Stitches incorporating these tiny light emitters have been inserted into an anaesthetized mouse. According to the team, adding LEDs to surgical thread delivers multiple benefits: accelerated healing; illumination of deep tissue; and the opportunity to monitor blood oxygenation.

Light at your fingertips

LED arrays can also be deployed in the fingertips of gloves to create proximity sensors for aiding robotic systems or surgical procedures. To do this, the researchers have integrated tiny LEDs with similar-sized photodetectors. This allows the distance to the nearby object to be determined through measurements of the intensity of backscattered light.

Rogers says that a start-up company, MC10, is targeting commercialization of some of the team's technology

"From the science and materials side, we are working to implement related ideas with blue and ultraviolet LEDs, to expand the functionality."

The researchers report this work in the latest edition of *Nature Materials*.

About the author

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