ROCHESTER DX ASSOCIATION, INC.

rdxa.com

ROCHESTER DX ASSOCIATION, INC NEWSLETTER 1947–2007 • 60 YEARS OF DX IN WNY MARCH 2009

RDXA General Membership Meeting

Happy St. Patrick's Day!

March 17th

3rd Tuesday of the month

The Monroe County Emergency Operations Center (EOC)

Media room, right next to the EOC operations center.

1190 Scottsville Road

Exit 17 (Route 383 South) off 390

Media Room

Mark your calendar now!

Saturday May 30th

ARRL Atlantic Division Convention & 75th Annual Rochester Hamfest

Sponsored by: Rochester Amateur Radio Association

Barnard Carnival Grounds -
380 Maiden Lane, Greece -
www.rochesterham.org

Save the Date For .....

The RVHFG / RDXA combined Annual Awards Banquet

Where ... At Napagino's,

When ... April 25

The Podium

Paul Mackanos K2DB

Wow, A lot has happened in the last month, and here I am at the deadline for submitting to the newsletter.

It is now official; all of the necessary paperwork is signed, sealed & delivered. We are now officially the Rochester DX Association, Inc. We held the first official BOD meeting of the RDXA, Inc. on March 4th at the QTH of **W2BSN**. Lynn was nice enough to have a little celebration feast for the adoption of the official paperwork. After the paperwork was signed, Lynn brought out a bottle of Champagne (NY Vintage), Sparkling White grape juice, baguettes and Brie cheese. We had a toast to the newly adopted Constitution, bylaws and Incorporation papers, and it was official. I have a picture that **WO2P** was nice enough to take, showing all of the BOD members that were present; I am hopeful it will be in this newsletter. Speaking of BOD meeting, I was invited to the Rochester VHF Group BOD meeting last night, and they offered a fine wine along with the traditional soda and 807's. It happened to be a bottle of Kenwood Cabernet Sauvignon (see later in newsletter). Looks like the local clubs want to move up on the social scale hihi.

Well, the combined RDXA & RVHF Group banquet will be on April 25th at Napagino's. (More info to follow). A few of us RDXAers are working behind the scene with the groupers to help this years banquet be a great success. (Look out for the official marketing guy, **W1TY**, he will be letting us know all of the particulars about the banquet in the near future. In case you are not aware of the fact, this is the RVHF Group's 60th Anniversary of being a club and they want to celebrate the anniversary just like the RDXA did last year. They have things well in hand, and a big thanks to all RDXAer's who are helping them with their agenda. It's going to be a great banquet, so keep the date open.

Last week-end, I ventured up to the **K2NNY** QTH to find out that I have to do a replacement of my electrical power pole; it was cracked at the bottom, and needs to be totally replaced. Hopefully we can get that finished in the next month or so, as I am going thru withdrawal by not being able to operate remotely. I want to thank **W1TY** for the use of his borrowed generator, which allowed me to get on in the ARRL DX SSB contest. I ran low power on & off and had something like 27,000 points. I will be posting it on the club score board shortly.

It seems like the Thursday night 2 meter get together is going along fairly well for a new venture, in fact, members of the WNYDXA group in Buffalo are going to move their 160 meter net to their 2 meter system so that they can have more reliable communication with their out of town members too.

It looks like one member of our club - **AF2K** to be exact, has sent out a bureau pack thru the WNYDXA group, I hope more of us start using this service and save some bucks on QSLing. For now, have a great month, and see you at the meeting.

73 and above all else - HAVE FUN !

RDXA Membership News

Please renew your RDXA membership if you have not all ready done so.

If you have any question at all, please send me an email at k2rny@frontiernet.net.The current fees are:$20 - General Membership$5 - Family Membership $10 - Full Time Student

Also please send me an email (k2rny@frontiernet.net) with your current awards, if you are an ARRL member and a current email address so that we can keep the club's membership database and website up to date.

This month's bio is Lynn Bisha – W2BSN

I was exposed to ham radio in my family, at age 3, when my father was licensed as **W2BSN** in 1949. Early memories include listening to my mom practicing the code for her license 3 years later. She was licensed as **K2AHG**. The radio station was set in the kitchen, and Mom would enjoy her breakfast club every weekday morning on 3.885 mc AM.

The first receiver was a Howard 437-A and the transmitter was a home brewed rig with an 813 in the final. Later the station was upgraded to a Hallicrafters SX-42 receiver and the transmitter was an RMCA ET-8023 (pair of 813s) from a U.S. Navy Liberty ship. I have fond memories of field days in the 1950s and radio club meetings with a very nice group of people from the area around West Carthage, NY.

By the time I was in high school, 2 meters AM was all the rage and I wanted in on the action. I studied and passed the Novice test in theory and 5 wpm code and was licensed as **WN2CLT** in July of 1962. Now it was possible for me to use 2 meter phone. CW was never a particular interest.

There was a group on every night around 8 p.m. on 145.26 mc. Commercial 2 meter equipment was still pretty expensive. Dad home brewed a 2 meter converter for a surplus 3-6 mc "Command " receiver, and home brewed a transmitter using an 829B tube. This was good for about 30 watts. A home brewed 16 element collinear array on a 40 foot tower completed the station. Within the year I passed the Technician test and became **WB2CLT**.

I enlisted in the navy in 1965, after a year of college, and continued to pursue a career in radio. At first I wanted to be a Radioman; I had hoped to be sent to a Morse Code school to learn the code well enough to pass the general exam. After flunking the hearing test, that option was no longer open. I spent my time in an A6-A Intruder squadron, repairing doppler navigation radar, radar altimeters, and voice encryption equipment. This included two cruises in the "Tonkin Gulf Yacht Club" on the USS Enterprise in the period of 1965 – 1969.

My father passed away in 1969, when I was 23. He was the key to ham radio in the family, and my mother didn't use it very much after that. At this point, ham radio took a

back seat to life in general. However, I always maintained an interest through magazines and continued to repair anything electronic. After the Navy, I was hired by IBM here in Rochester and began a career in Field Engineering. Marriage, and a son and daughter, kept me very occupied.

Thirty - six years of repairing computers at several different companies also kept my skills up to date; and I faithfully renewed my license. I attended the Rochester Ham Fest each year because it was a continual source of parts and projects. I retained a few items from my father's estate for a long time, but I finally donated them to the Antique Wireless Association in 1982.

When the code testing requirements were eased to 5wpm in 2000, I upgraded to a General class license. In 2003 I filed under the vanity program to get my dad's call. I was amazed that it was still available. Finally, in 2004 I passed the Extra exam at the Rochester Ham Fest. Retirement came along in Feb. 2005. That was when I walked into the AWA annex and asked if they needed a volunteer.

Four years in the AWA have been like a second childhood. I get to play with radios I could only dream of as a youngster. I have had a wonderful learning experience in the many facets of collecting. It is also tremendously exciting to be intimately involved with a world class museum that is rapidly expanding its space. Two years ago I was asked to join the AWA board, and last August I was appointed Assistant Curator. It has also been rewarding to share operating events with the members of RDXA at the museum annex. As the museum grows and expands, we hope to build on the rapport with RDXA as well as other local clubs. Last year I joined the board of directors of RDXA and I'm enjoying the camaraderie and the exposure to the contesting environment.

My current stations consist of a Collins R-388 general coverage receiver paired with a Johnson Viking Valiant (1950s all tubes) for nostalgia AM (Listen for it on 3.837 Sundays @ 4p.m.), a Drake R-4C and T-4XC (1970s tubes and solid state hybrid) for nostalgia SSB (Sundays @ noon 7.237), and a Kenwood TS-440 for general use. I have several other radios and can operate from 1.8 – 440 mhz. Yes, I still have 2m AM, a Heathkit Twoer (Benton Harbor Lunchbox) that I used as a teenager and in college.

CW is one of my latest pursuits, and I am struggling to get past 12wpm. My biggest interests are rag chewing and restorations. I will admit I do much more listening than talking, but as my late father-in-law always said, " If you're talking, you're not learning."

Who will be next month's bio ?????

Let's line up Bio's for the rest of the year. I would love to hear how you got started in the hobby and what else do you do in your life (if there is anything besides amateur radio). Send your bio to Gayle **N2TWI**, the newsletter publisher and see it n print in upcoming months.

RDXA Constitution and Bylaws Vote

The new RDXA Constitution & Bylaws was approved at the February General Membership Meeting.

The vote was:
22 – Yes
1- No
Absentee Ballots:
9 – Yes

The officers and the Board of Directors want to thank all members for your support of RDXA.

It is now official; all of the necessary paperwork is signed, sealed & delivered.

We are now officially the Rochester DX Association, Inc.

Anything else besides K5D (or any DXpedition)? **Ken N2ZN**

The time during a MAJOR DXpedition is a great time to work DX. If you forget about the expedition and tune the bands, there is plenty of good stuff to work, and the rest of the world isn't spotting or paying attention to it-they are consumed with the DXpedition. I have always believed that while the whole world is screaming away at the expedition, the rest of the bands are ripe for the picking.

I'll always remember a few years ago, when the Peter I expedition was on and the whole world was calling them on all bands 24/7. I had just worked them on 30 meters, and wanted to see if I could do it on 40. Unfortunately, I could barely hear them on 40. I started tuning the band...things sounded like they were in really good shape otherwise.

About 4 khz down from **3Y0X** I found a very weak station calling CQ. He was probably about a 019 in reality, but since the band was quiet, he was very readable. It was **YI/WD8CRT** running QRP-5 W from a military base in Iraq. He came back to me on the first call and was probably the easiest QSO I've ever had with the Middle East...and there was nobody calling! Too distracted with the expedition! This has happened to me many other times, too.

Beam locator on the NJDXA website

Carey Magee, K2RNY

NJDXA has added a beam heading locator, so those of you with beams have at it. I created a chart based on my zip code. You can cut and paste directly into an Excel spreadsheet. I'll take a look at our DX Entity list to see if we have it all in line, etc. I am pretty sure the DX Entities are up to date on the list.

It is nice looking, so check it out at www.njdxa.org

JOIN A DIFFERENT KIND OF AMATEUR RADIO COMPETITION

Jarmo OH2BN

There is no doubt that our time-honored hobby is going through turbulent times with the intake of new hams decreasing in many countries. The overall Amateur Radio population has diminished dramatically.

As an independent body, the group at Radio Arcala, **OH8X** is poised to try some new methods to attract young people congregating in many non-traditional hangouts such as Virtual World on the internet. The Arcala radio station is the first-ever Amateur Radio station to be active in Virtual Reality. Millions of computer-minded youngsters gather there daily in an easy-going leisure mood.

The overall Radio Arcala strategy is spelled out on the **OH8X** Webpages but one of the key buttons - ON YOUNG PEOPLE'S TERMS - is still to be drafted.

See http://www.radioarcala.com

We now challenge members of our fraternity of all ages to draft the text for this button in a way that is both appealing and informative enough to encourage today's youth to take the step we once took.

CONTEST OUTLINE

Consider yourself as another 18-year old enthusiastic ham of today. Challenge yourself to talk to a bunch of young people ranging from 15-20 years of age in a large room with the occasion devoted only to you. Your mission is to tell them about the excitement of being an Amateur Radio operator today and why those in the audience should join our ranks. Draft your paper/talk to be no more than 250 words in length in English or Spanish.

Remember a few things:

1: These people have many other tempting options to occupy their youthful and modern mind and time.
2: They can take only a certain amount of history at once. Be balanced.

3: Consider that one of the current obstacles is the license exam; it is an entry barrier not found with many other hobbies. Address that issue, too.

4: Remember that electronics has become a highly complex science and that experimentation may not exist as an option the way it did before.

5: Find the most positive and truly unique features that Amateur Radio has. Highlight the positive and truly unique features of Amateur Radio.

6: And finally, take this not only as a fun game but consider that, indeed, the future of this hobby is in the hands of people like you.

Deadline: Please submit your paper by email no later than March 15, 2009 to:

oh8x@sral.fi (English)
or
yv5amh@iaru-r2.org (Spanish).

More than one text can participate and more than one submission can be selected, if seen practical.

The body to review the not-to-be-disclosed papers with their national focus group is composed of the following individuals:
Hans Blondeel Timmerman, **PB2T**, IARU Region 1, (Chairman);
Reinaldo Leandro, **YV5AMH**, IARU Region 2;
Dave Sumner, **K1ZZ** (ARRL);
Olaf Lundberg, **G0CKV** (for RSGB);
Tonno Vahl, **ES5TV**, (ERAU);
Hans Johansson, **SM0IMJ** (SSA)
Juha Hulkko, **OH8NC**
Martti Laine, **OH2BH** (Radio Arcala).

Prizes:

In addition to the award of first, second and third prizes in the form of three (3) Amateur Radio contest-like plaques, the winning text will be made available to a large group of people in Virtual Reality. You will be invited to be part of a Radio Arcala working group drawing up a next-generation recruitment campaign. Your work will be featured in national magazines by the above jury plus on the DX Summit and the Radio Arcala Website. You will be pleased with your achievement. Be aware that the review committee can for editorial reasons make style changes to the text before publication.

Reflector Clean Up

We are in the process of updating the membership list on the RDXA reflector.

Paul (**K2DB**) will be checking the membership roster of the club against the membership roster of the reflector. Any non-members of the club (RDXA) will be deleted from this reflector list. If you end up being deleted, you will not be receiving any more messages from the Reflector.

An email will be sent to all accounts that have been deleted.

The reflector is a benefit for paid members, we would appreciate the renewal of your RDXA annual dues and your account will be reinstated.

Thanks,

RDXA Board of Directors

Digital converter and TVI

Question: Before I begin, I will say that I am planning on moving my antenna further away from the house this spring.

Here's my story. I recently added a digital converter and an amplified antenna to the TV for the upcoming changeover. Well, now my operating time on the radio has been severely reduced because the kids can't watch because I blank out the reception when I key the rig (100W). This affects all channels on the TV. This doesn't happen when the TV is on analog, so I am pretty sure it is the digital converter box.

So, my thought is to add some Hi Pass filters at the converter first. I'd like to ask the group if you've got any ideas besides switching to cable TV for me before I begin this journey.

Thanks a bunch in advance,
Carey

Answers:

Way back BC (before cable) I had a problem with my TV. Had a roof mounted antenna, fed with 300 ohm line. Built a simple little single section HP filter and it did the trick, even with a KW. Good Luck !

Gene / **W2LU**

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If the TVI happens only when you are on digital it is very likely that a high pass filter will not work. It seems to me that you are messing up the inner works of the converter box itself. I would re-comment a few turns of the power cord around a ferrite to start with and maybe the same for the antenna lead to prevent common mode RF from reaching the box. If however it is caused by your signal to radiate directly into the typical unshielded plastic box, then you are out of luck unless you redesign it and install it in a metel enclosure.

John / **N2NEP**

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This sort of reminds me of back when I was in Buffalo, and tried to work 6 Meters with Channel 2 being the local station. TVI !!!!! (fix was to not get on 6 meters).
Good Luck, get cable or satellite TV (or have a lot of fun trying to fix it)

Paul / **K2DB**

****

I suspect this is going to be a big problem soon. These converters are super cheap and many are poorly designed. Yours is not the first case I have heard. A diner installed one and every time thy use the microwave it affects the TV signal. The filters may not fix it as I suspect the case is not shielded and the signal can get in right through the case of the converter. Let us know if filters do the trick.

Bill / **WB2JMX**

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When we moved to the Buffalo area in 1964 my Dad had to give up his big love of 6m because of channel 2. He STILL talks about it and about all the fun he had on 6m way back before then when we lived outside of Cleveland. You'd think all of this would be a non-issue today what with cable and satellite but John can tell you, there are a huge number of people who are using terrestrial signal reception for their television. In fact, this area has a large amount of people not on cable or satellite. John has the exact figures. Me, if I didn't love things like Anthony Bourdain's show on The Travel Channel and some of the news channels and a few other odd things, I'd probably be very happy with terrestrial reception, as long as neither of us is on the air of course. Good luck, Carey, and I'm sure you're not alone in this situation. From the looooong days John has put in at the station since the switch over, well actually prior to it but it's been worse since, I'd say there are going to be a lot of folks with all kinds of interference problems due to the way these boxes are made.

Ruthie / **K2ZQ**

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My uncle (and Elmer) Kenneth Eicher (**W3MWB** SK) lived in southwestern PA in the late 50s. Tech class licensees at that time were very much into 6 meter AM operation, which was somewhat problematic in the secondary coverage area
for KDKA Ch. 2 in Pittsburgh. Twenty years ago a Xerox colleague of mine living in Webster enjoyed 6 meter operation, but ran afoul of neighbors across the street that were from Buffalo and wanted to watch hometown news from WGRZ Ch.2!

Roy / **WA2JLW**

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We had the same problem with a Channel 2 station in Utica, NY. Back when I was a Novice ham in Rome, NY, all the guys were abandoning their 6 meter equipment and moving to this new band called 2 meters!!!

Dave / **WJ2O**

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When deploying toroids be sure to use ones that the ferrite is rated for the frequency in question, you're operating frequency. Not using the correct core material is a big waste of time. Speaking from experience, installing the right toroid with the right material can be extremely effective. Always try to wrap the I/O conductor around/thru the core as each wrap will increase the effective impedance by the square of the number of turns. For testing purposes, do the power cord and assuming the RF I/O is CATV RG-6/U cable, get a nice big 3 inch or so core and wrap 10 turns of the input and output cables around the core. I had a neighbor's TV once that when I was running legal limit into an 8dB gain antenna that the TV audio SSB QRM was silenced by wrapping the input CATV cable around a big doughnut core of HF material. It's just simple overload coming in on the shield of the TV cable.

Rick / **W2RW**

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Propagation 11 years ago — AD5Q's notes from Cycle 22

March 1998 Forecast — Flux Range 88 - 142

The equinox approaches, and all DX bands will be in transition toward their summer conditions for the next few months. 20 has not yet opened for reliable nightpath work, but northern latitude paths are opening for greyline and daypath propagation. Polar paths are workable, though the windows are still narrow. In recent weeks, Europe has needed these polar openings to make certain rare Pacific contacts. Many Pacific countries rank high on European need lists, just as the Asian ones do in North America. Rare contacts across polar paths are much easier when expeditions make daily appearances on 20 while the polar windows are open. Over the next two months, conditions over the pole will improve dramatically on 20 Meters.

15 is another story. The flux is not high enough yet to open the really high latitude paths. The northeast and northwest paths are wide open, however, and have been the main source of activity in recent contests. Most of Europe is workable from here in Texas, but little is heard from Russia. In the western US, northern and eastern Europe are difficult because these paths are more polar. There are times at the peak of the sunspot cycle when polar paths are open for most of the day and night on 15. For now, we enjoy the novelty of a solar flux in the 90's and good running rates for Japan and Europe.

The spring season on 10 Meters is disappointing many. Openings to Europe and Japan have been brief and marginal. Even the east coast is reporting low numbers on this band in major contests. I do not have a scientific explanation why autumn conditions on 10 seem to surpass those in spring. (All my forecasts are more intuitive than scientific.) Anyhow, the solar flux will continue to rise and we will not see the benefits of this on 10 Meters until September. Openings to the east, west and south are good. From the US, we can access Africa, the Pacific and South America.

Since night paths are not yet open on 20, we continue to look to the low bands in the evening. 40 is in great shape because with fluxes in the 90's the high latitude night paths are open. Good signals from Europe begin in late afternoon and continue past midnight, and we can follow the sunrise peak from Russia across to Ireland. The Asian coverage at our own sunrise peak is awesome. These openings should be exploited as we await the return of nightpath openings on 20.

http://www.qth.com/ad5q/

Forecast of Solar and Geomagnetic Activity

04 - 30 March 2009

Solar activity is expected to be at very low levels. No proton events are expected at geosynchronous orbit. The greater than 2 MeV electron flux at geosynchronous orbit is expected to increase to high levels during 14 - 18 March. Normal flux levels are expected during the rest of the period.
Geomagnetic field activity is expected to be at predominantly quiet levels through 12 March. Activity is expected to increase to quiet to active levels during 13 - 14 March with a chance for minor to major storm periods at high latitudes due to a recurrent CH HSS. Activity is expected to decrease to mostly quiet levels during 15 - 30 March.

More at: http://www.sec.noaa.gov/radio/

S04R

An international team composed by **EA1CJ**, **EA1KY**, **EA2RY**, **EA3EXV**, **EA5RM**, **EA7AJR**, **F9IE**, **IN3ZNR**, **UT7CR** and **UY7CW** will be on the air from Western Sahara from April 12 to April 17 using **S04R** call sign.

Operation will be on all bands from 10 to 160 meters in SSB,CW and RTTY.

Qsl via **EA5RM**.

EA5BZ will be the pilot station and additional info is available on **S04R** Website at: www.dxfriends.com

Juanjo **EA1CJ**

Unique QSO

How cool is this.....!

If you follow the link below, and scroll down to the 20 meter CW MP3 file of **K5D** operations, the first QSO on the file is **K5D** calling **K2MP**.

How's THAT for a QSL !

http://www.dokufunk.org/amateur_radio/dxcc_entities/index.php?CID=4728&lang=EN

Upcoming Hamfests:

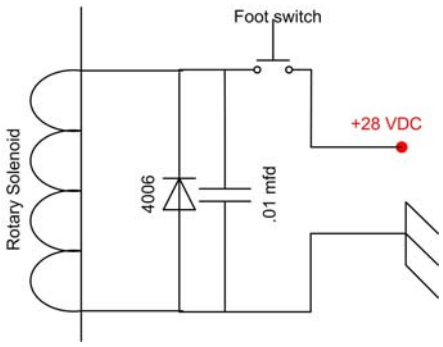
Saturday April 18th – Drumlins 23rd annual Hamfest in nearby Newark!

The F1 Key Extender W1TY

And now... THE F1 KEY EXTENDER !!!

Ever tire of being hunched over the keyboard when contesting? Wouldn't it be nice to lean back during a long string of CQ's? Admittedly with some time on my hands I considered this problem and a junk box scrounge became this device. Every part used has been with me for 30 years, waiting to be used! Now I can both plug in a footswitch or a hand held switch and send CQ from the keyboard without actually touching it or clicking the mouse! This device keeps me more involved and alert than using the Auto CQ mode contesting programs offer. I use this for RTTY contesting but it would work equally well calling CQ with CW or a SSB WAV file.

My solution uses a rotary solenoid with a 45° rotation powered with an old telephone answering machine power supply at 28vdc. The arm rotates down and presses the F1 key. It is adjustable for length with a 6-32 screw inside the rubber foot. Also installed is a second arm (yellow) which can be pushed manually. On the rear of the keyboard are sockets for the power and footswitch. I am pleasantly surprised how useful this project turned out to be! Bet there is a fun and useful project hiding in your junk box of goodies.



The Nano Radio –

copied from Scientific American, March 09

Nanotechnology has demonstrated more hyperbole than substance for many years—and the "nano" label has been applied to items ranging from motor oil to lipstick.

One of the first true nanoscale machines is a radio that can play songs such as Eric Clapton's "Layla" and the theme from Star Wars.

A single nanotube in this device performs the function of multiple components in larger radios. The nanoapparatus may ultimately find uses in drug delivery devices, prosthetics or explosives detectors.

Nanotechnology is arguably one of the most overhyped "next big things" in the recent history of applied science. According to its most radical advocates, nanotechnology is a molecular manufacturing system that will allow us to fabricate objects of practically any arbitrary complexity by mechanically joining molecule to molecule, one after another, until the final, atomically correct product emerges before our eyes.

The reality has been somewhat different: today the word "nano" has been diluted to the point that it applies to essentially anything small, even down to the "nanoparticles" in commodities as diverse as motor oil, sunscreen, lipstick and ski wax. Who, then, would have expected that one of the first truly functional nanoscale devices—one that would have a measurable effect on the larger, macroscale world—would prove to be ... a radio? But the nanotube radio, invented in 2007 by physicist Alex Zettl and his colleagues at the University of California, Berkeley, performs a set of amazing feats: a single carbon nanotube tunes in a broadcast signal, amplifies it, converts it to an audio signal and then sends it to an external speaker in a form that the human ear can readily recognize. If you have any doubts about this assertion, just visit www.sciam.com/nanoradio and listen to the song "Layla."

The nanotube radio, its fabricators say, could be the basis for a range of revolutionary applications: hearing aids, cell phones and iPods small enough to fit completely within the ear canal. The nanoradio "would easily fit inside a living cell," Zettl says. "One can envision interfaces to brain or muscle functions or radio-controlled devices moving through the bloodstream."

The Call of the Nanotube - Zettl, who directs 30 investigators engaged in creating molecular-scale devices, decided to make nanotubes a focus of his work because they are remarkable structures. The question of who first discovered them is controversial, but Japanese physicist Sumio Iijima is generally credited with having put them on the scientific map, when in 1991 he announced finding "needlelike tubes" of carbon on the tip of a graphite electrode that emitted an arc, a luminous discharge of electricity.

Those nanotubes had some surprising properties. They came in a large variety of sizes and shapes: they were single-walled, double-walled and multiwalled. Some were straight, some were bent and some even looped back on themselves in toroidal configurations. Common to them all was their exceptional tensile strength, the resistance to being pulled apart along their length without breaking. The reason for this unusual property, Zettl says, is that "the force that holds the carbon atoms together in the carbon nanotube is the strongest bond in nature." Nanotubes are also excellent conductors of electricity, far better than copper, silver or even superconductors. "It's because the electrons don't hit anything," he explains. "The tube is such a perfect structure."

Zettl got the idea for a nanoradio when he decided he wanted to create tiny sensing devices that could communicate with one another and broadcast their observations wirelessly. "They were to do monitoring of environmental conditions," he says. They would be distributed in the field near some factory or refinery and would radio their results back to some collecting point. Anyone could then go to Google "and click on the air quality of a city and see it in real time." During the course of some experiments aimed at producing a nanotube mass sensor, one of Zettl's graduate students, Kenneth Jensen, found that if one end of a carbon nanotube was planted on a surface, creating a cantilever, the beam would vibrate when a molecule landed on its free end. Molecules of different masses would make the beam vibrate at different frequencies. When Zettl noticed that some of these frequencies included those in the commercial radio band, the idea of using the cantilevered nanotube to make a radio became virtually irresistible.

A bare-bones radio, Zettl knew, has four essential parts: an antenna that picks up the electromagnetic signal; a tuner that selects the desired frequency from among all those being broadcast; an amplifier that increases the strength of the signal; and a demodulator that separates the informational signal from the carrier wave on which it is transmitted. The informational component is then sent to an external speaker, which turns that part of the signal into audible tones.

The carbon nanotube that was to be the core of the device proved to be a combination of such extremely favorable chemical, geometric and electrical properties that when it was placed between a set of electrodes, the miniature element alone accomplished all four functions simultaneously. No other parts were needed.

Zettl and Jensen began by working out an overall design in which a multiwalled carbon nanotube would be built on the tip of an electrode, an arrangement in which the nanotube would resemble a flagpole on a mountaintop. They decided on a multiwalled tube because it was a bit bigger than other kinds and was also easier to mount on the electrode surface, although they later constructed a version with a single-walled one as well. The tube, which would be about 500 nanometers long and 10 nanometers in diameter (roughly the size and shape of some viruses), would be placed on the electrode using nanomanipulation methods or directly grown on the electrode by a technique called chemical vapor deposition, in which layers of carbon precipitate out of an ionized gas.

Some distance away from the tip, rounded off in the shape of a hemispherical buckyball, would be a counterelectrode. A small direct-current (DC) voltage would be applied across the electrodes, creating a flow of electrons from the nanotube tip to the counterelectrode. The idea was that electromagnetic waves from an incoming radio transmission would impinge on the nanotube, causing it to physically vibrate in tune with the variations of the electromagnetic signal. Vibrating in sync with the incoming radio waves, the nanotube would be acting as an antenna but one that operates differently from that of a conventional radio.

In a normal radio, the antenna picks up incoming signals electronically, meaning that the incoming waves induce an electric current within the antenna, which remains stationary. In the nanoradio, in contrast, the nanotube is so slender and slight a charged object that the incoming electromagnetic waves are sufficient to push it back and forth mechanically.

"The nanoworld is weird—different things dominate," Zettl describes. "Gravity plays no role whatsoever, and inertial effects are basically nonexistent because things are just so small that residual electrical fields can play a dominant role."

The nanotube's vibrations, in turn, would set up a change in the current flowing from the nanotube tip to the counterelectrode: technically a field-emission current. Field emission is a quantum-mechanical phenomenon in which a small applied voltage produces a large flow of electrons from the surface of an object—a needle tip, say. Because of the way field emission works, the nanotube was expected to function not only as an antenna but also as an amplifier.

The small-scale electromagnetic wave hitting the nanotube would cause a big spray of electrons to be released from its vibrating free end. That electron spray would amplify the incoming signal.

Next came demodulation, the process of separating a radio station's carrier-wave frequency from the informational message—voice or music—that is coded on top of it. In an amplitude-modulation (AM) radio broadcast, for example, this separation is achieved by a rectification and filtering circuit that responds to the amplitude and ignores (filters out) the frequency of the carrier-wave signal. These functions, too, Zettl's team reasoned, could be accomplished in the nanotube radio: when a nanotube mechanically vibrates in tune with a carrier wave's frequency, it also responds to the coded informational wave. Fortunately, rectification is an inherent attribute of quantum-mechanical field emission, meaning that the current coming off the nanotube varies only with the coded or modulated informational wave, whereas the carrier wave drops out of the picture. It would be demodulation for free—no separate circuitry required.

In short, an incoming electromagnetic signal would cause the nanotube, now acting as an antenna, to vibrate. Its vibrating end would amplify the signal, and its field-emission property of built-in rectification would separate (or demodulate) the carrier wave from the informational wave. The counterelectrode would then detect the changes in the field-emission current and send a song or news broadcast to an audio loudspeaker, which would convert the signal into sound waves.

Doing the Experiment - That, anyway, was the theory. In January 2007 Zettl, Jensen and two other Berkeley researchers, Jeff Weldon and Henry Garcia, performed the actual experiment. They mounted a multiwalled carbon nanotube on a silicon electrode and placed a counterelectrode about a micron away, connecting the two by wire. They also attached a DC battery to the apparatus to set up a small field-emission current between the nanotube tip and the counterelectrode. To actually see what would happen during the course of a radio transmission from a nearby antenna, they placed their device inside a high-resolution transmission electron microscope (TEM). Then they started broadcasting.

According to the well-worn tale, the first message sent by telephone was the request, "Mr. Watson, come here. I want to see you," spoken by Alexander Graham Bell in 1876. The first wireless transmission, sent by Guglielmo Marconi in 1894, was a radio wave that made a bell ring 30 feet away. And in January 2007 the first successful operation of Zettl's carbon nanotube radio was the radio's reception of the music for "Layla," by Eric Clapton (while playing with Derek and the Dominos).

"It was fantastic," Zettl recalls of the experience. "I mean, it was spectacular. We could watch the nanotube [in the TEM], and the fact that you could see this molecular structure vibrating and hear it at the same time is kind of cool. I never thought I could *see* a radio operate!"

You can see the results for yourself, because the experimenters documented the entire process—audio and video—and converted the recording to a QuickTime movie that they posted on the Zettl Group's Web page, where anyone can download and play it for free. Later, they did the same with "Good Vibrations," by the Beach Boys; the "Main Title" theme from *Star Wars*, by John Williams; and the largo from *Xerxes*, the opera by George Frideric Handel. "This is the first song ever transmitted using radio," Zettl explains.

Hearing (and, yes, even watching) these tunes play is a surreal experience to witness. As the process starts up, a long, thin stationary nanotube appears against a featureless, grainy backdrop. The tube extends horizontally from a rocky-looking, irregular surface, next to a shorter nanotube that will remain untouched throughout by all the electromagnetic commotion taking place around it. (The shorter nanotube is insensitive to the broadcast because the frequency at which it resonates, which depends on its length, does not coincide with the frequency of the incoming transmission.)

Soon you hear a lot of static, but then the needle simply disappears in a vibrational blur as the song in question is dimly but recognizably heard above the background noise. It may sound like a broadcast from Neptune, but in fact it is the audible report of a countable number of carbon atoms moving in synchrony with the music.

Shortly after their initial success the experimenters removed the device from the TEM, made minor changes to the radio's configuration, and then were able to both broadcast and receive signals across the length of the laboratory, a distance of a few meters. They were also able to tune in different frequencies in real time, in effect "changing the station" as the radio played.

A nanotube radio can be tuned in two separate ways. One is by changing its length. While you can change the tone of a guitar string by bending it down against different frets, you can change the resonance frequency of a nanotube by shortening it—for example, by boiling atoms off the tip.

That, change, however, is irreversible. But just as there is a second method of varying a guitar string's pitch (namely, by varying its tension), so, too, with the nanotube. Varying the strength of the applied electric field will make the nanoradio respond to different frequencies of the radio band.

Their device did, in fact, perform all four of a radio's functions simultaneously: it was an antenna, amplifier, demodulator and tuner—all in one. That such a small and simple structure combined all these functions continues to amaze Zettl. How does he explain their almost magical convergence in a single elongated molecule of carbon?

"In electronics, often you have a trade-off: if you optimize this, then you lose something else. Here everything seems to just work for you, which is a little unusual. You don't see that often in science. It's one of those rare opportunities to see Murphy's Law not rearing its ugly head. Here everything that can go right is going right," he says.

Zettl and his colleagues withheld news of the nanoradio for several months, until it could be published in *Nano Letters*, a journal of the American Chemical Society. The apparatus had its formal debut online in October 2007 and then in the November print edition. In that same print issue, two independent researchers, Chris Rutherglen and Peter Burke, both at the University of California, Irvine, announced the use of a carbon nanotube to demodulate an AM signal. They called their piece "Carbon Nanotube Radio," but their radio was not an all-in-one device like Zettl's. In Rutherglen and Burke's setup, the antenna and amplification functions were provided by conventional, life-size desktop units. Burke, for his part, concedes that Zettl's all-in-one radio is "very elegant."

Lilliputian Drug Delivery Systems - Because it turns nanotechnology from a collection of theories, hopes and speculations into a practical, working appliance, the nanotube radio is potentially a transformative piece of equipment. Zettl, for one, is not bashful about foreseeing a bunch of killer apps made possible by the nanoradio: a whole new generation of communications devices, brain

and muscle implants, and so on. Whereas some of these more futuristic applications will require a nontrivial amount of additional insight and engineering to make them into operational realities, others are more near term—in the form of radio-controlled drug delivery systems, for example.

One of the downsides of chemotherapy for shrinking invisible cancers that have spread or for treating inoperable ones is that the chemical agents used to kill cancer cells travel through the bloodstream to all parts of the body and often kill healthy cells as well as the malignant ones. A solution advanced by some physicians who have been in contact with Zettl would be to first inject packages that are molecularly targeted to cancer cells and that contain a chemo agent as well as a nanoradio; after allowing the packages time to find the tumors, radio-control signals would trigger release of the drug into the tumor cells for their destruction.

A second use would be to repair individual cells by injecting drugs into them. Zettl's group has moved in this direction by working on a fine-scale approach to nanoinjection in which the researchers punctured cell walls and membranes and put nanotube structures inside, where they released specific chemicals.

"The cells withstand that very nicely," Zettl says. "This nanoinjection technique works much better than the old technique where people used to try to use micropipettes that puncture cells and inject fluid. Those are way too crude and disruptive for most living cells." Zettl also foresees an application of his original nanotube mass sensor. Some types of explosives contain signature molecules of a known mass, and so a minuscule instrument that detects those molecules rapidly and reliably could replace the refrigerator-size explosives-sensing mass spectrometers now in use at some airport security checkpoints. No one is commercializing any of these devices as yet. Zettl, however, has patented his nanoradio, the nano mass sensor and other inventions that have come out of his Center of Integrated Nanomechanical Systems and has begun licensing the technology for others to develop.

Perhaps not surprisingly, some of Zettl's more recent achievements in the nanoworld seem to have plumbed the very limits of the Lilliputian. In July 2008 he announced in Nature that he and his group had coaxed an electron microscope to image individual atoms of hydrogen, nature's smallest atom. In the downward direction, there is nowhere left to go.

ABOUT THE AUTHOR(S)

Ed Regis has written seven science books, including the recent *What Is Life?: Investigating the Nature of Life in the Age of Synthetic Biology*, which is about the attempt to build an artificial living cell. He and his wife live in the mountains in Maryland near Camp David.

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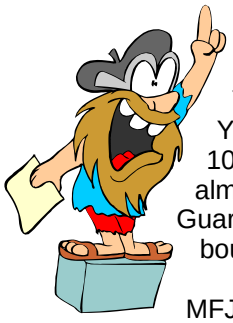
http://www.sciam.com/article.cfm?id=the-worlds-smallest-radio



FOR SALE

Yaesu MD-100A8X desk mic for Yaesu transceivers. Primarily for FT-1000MP, FT-2000, etc but will work with almost any Yaesu. Surplus to my needs. Guaranteed VERY little use. 3 years old-bought new. $70

MFJ 974-HB Balanced line antenna tuner-300W SSB, 150W CW (?). 160-6 meter version. Bought new at Rochester Hamfest this year, used maybe 5-10 times. $150.

If interested, e-mail to n2zn@rochester.rr.com or call 63-764-8340

CONGRATULATIONS

Max Kelley KC2SPY

Passed his Extra Class exam

on his first attempt

****

Citizen of the Year

Christopher Raymond Shalvoy

Let's all congratulate Chris, **K2CS** on this fine accomplishment. It is a pleasure to have such a fine person associated with our club. Congratulations Chris!

How's this for a new Kenwood? K2DB

Renew your ARRL membership through RDXA
K2RNY

Checking with Norm Fusaro at ARRL below is the proper procedure for the club on handling ARRL membership through RDXA. As you know, RDXA will receive $2 for every ARRL membership renewal and $15 for each new membership OR lapsed membership (of two years or more).

Here's how it works.

- Go to our website and download the ARRL Renewal form. Here is a direct link to the form --> http://www.rdxa.com/NewsLetters/clubapp.pdf

- Fill it out and make a check out to RDXA for the fee, not ARRL. Remember to check whether this is a new membership or a membership renewal. Don't make the check out to ARRL. See, RDXA will pay the renewals to ARRL, so it is important your renewal check goes to the club.

- Get me the completed form and your check made out to RDXA, or give it all to Irv. Irv and I will hook up.

- I will send in the renewal forms and club rebate form and a check for the total amount to the ARRL.

Bottom line is you, personally, don't get a break on ARRL membership fees. You do help out your club by having $$$ of your ARRL renewal stay with RDXA.

Thanks to Scott (**K2ZS**) for uploading the application and to Dave (**N2CK**) for getting me off my butt on this HIHI.

RVHFG Information K2TER

The RVHFG April meeting will be a RVHFG Nostalgia Night!

In celebration out the club's 60th Anniversary, the April 10th RVHFG group meeting will be a "Nostalgia" night. Please join us and present and past members of the club for a night to remember the club's history, we will have a number of speakers, if you would like to contribute contact a board member.

The club meeting is held: Spencerport Wesleyan Church – 2653 Nichols Street (Hwy 31)

Check the website for more information: http://www.RVHFG.org.

Also I would like to remind you of the RVHFG / RDXA 2009 Banquet - RVHFG 60th Anniversary

Location: NapaGino's - 2200 Penfield Rd

N.E. corner of Route 250 and 441
(PennFair Plaza)

Date: April 25, 2009

Time: 6-7 Social Hour

7-8 Dinner

8-10 Awards

Need your opinions and input…. W1TY

RDXA is considering sponsorship of the **NY QSO Party**, which has not been activated for many years.

Any contest sponsorship is a big responsibility and requires a number of people working together. There are many duties to be performed... advertising, log checking, contest rules and certificates, just to name a few.

We are in a preliminary stage in this project. If there is not enough support we will just let it go. If there is interest of members committed to investing their time and efforts, we will take the next steps.

There will be a brief discussion about this at the meeting on Tuesday. Think about it!

Contest Awards N2ZN

With the Awards Banquet fast approaching, it is time to compile the contest awards for this year. At the November meeting, I introduced some new awards that will be given out for participation in various contests throughout the contest year. There is a document in the members-only section of RDXA.com showing the contests for which awards will be given, and the requirements for those awards.

Since these awards are based on QSO count and not overall score, it would be helpful if everyone's score were posted on the 3830 reflector so I can get your totals. However, I suspect that there are many scores that were never posted to 3830 therefore I don't have access to the breakdowns. It looks like there are some fine scores on the RDXA.com contest grid, and I would like to recognize everyone who made the effort this year to get active.

So, if you qualify for any contest award listed in the Contest Awards document, and have not posted to the score grid or 3830, please send your scores to me so I can start getting the awards together.

Toasting the newly adopted Constitution, Bylaws and Incorporation papers

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It is with deepest sympathy that we report the passing of Leo Meadow, **KT4BA** of Boca Raton, Florida, from cardiac arrest on February 21st 2009 at age 90.

We are sure many of you remember him as owner/operator of MovieTown Film Center on Hudson Ave. corner Clifford for many years, and subsequently in Eastway Plaza.

R.I.P. Leo

Rochester DX Association

W2RDX rdxa.com

This Bulletin is the official organ of the Rochester DX Association and is published monthly, September through June. Email your articles, tidbits, ham ads, etc. to Gayle, N2TWI at the addresses below by the second Tuesday of the month for inclusion in that month's issue.

Al those with an interest in amateur radio and DXing and contesting are cordially invited to any meeting and to join RDXA. Meetings are held at 19:30 local time on the 3rd Tuesday of each month, September through June.

President----------Paul Macanos – K2DB/k2db@k2db.org
Vice President--------Ken Boasi-N2ZN/ n2zn@rochester.rr.com
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Packet Cluster Sys Op ---------- Bob Hunter, NG2P
Webmaster ---------- Scott Hoag, K2ZS
Contest Chairman ----------Ken Boasi , N2ZN
Membership Chairman ----------Carey Magee, K2RNY
Newsletter Editor--- Gayle Shalvoy, N2TWI/ges@rocsoft.com
NG2P Packet Cluster ----------144.910 MHz
----------Telnet: ng2p.ham-radio-op.net / Port 7300

Membership Dues can be sent to:
Regular membership - $20.00
Family Membership - $5.00
Full Time Student - $10.00

Carey Magee
69 Fairview Crescent
Rochester, NY 14617

Any other correspondence to:
Irv Goodman