

## The Rochester VHF Group

# The VHF



# Journal

Volume 68, Issue 8

April 2015

The next regular meeting of the Rochester VHF Group will be Friday, April 10<sup>th</sup>, 2015 at 7:30 PM at **Spencerport Wesleyan Church 2653 Nichols St., Spencerport**

**Map and directions on last page**  
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Classified

**Topic:** Our Angry Sun

### RVHFG's Beacons

Band	MHz
6m	50.078
2m	144.298
1.25m	222.050
70cm	432.300
23cm	1296.257

W2UTH 6 meter Skimmer

<http://www.reversebeacon.net/dxsd1/dxsd1.php?f=0&c=W2UTH&t=de>

## The Chairman Speaks! Tom Jennings KV2X

**Groupers:** Spring is finally here but weather still on the cool side. Spring Sprints start Monday, the June VHF Contest, and Field Day are not that far away. Are you ready? Another reason to get rigs dusted off, antennas repaired and tuned up is the Worked All Rochester Award that Jared KF2MR introduced our March meeting. A write up of the awards description and rules is in the article below and will be discussed during the April meeting.

At the April meeting Marty Pepe will be giving a talk titled: 'Our Angry Sun' a brief history of the potential problems from large sunspots and RIT project being built to study same. As you may have guessed, the talk involves radio astronomy which has had made some exciting discoveries lately.

Continued....

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# The Chairman Speaks!

Continued... May is the month we hold elections for the RVHF Group's Officers and Board of Directors and if you would like to be a candidate or know someone who would willing to be one, please let me or one of the BOD know.

I look forward to seeing you at the meeting and bring a friend or two along .  
Tom Jennings KV2X

## Secretary Report

Freddie Sulyma, WB2GFZ

### Rochester VHF Group Meeting Minutes for 13 March 2015

The meeting was called to order at 1936L by Tom (KV2X). Tom welcomed everybody and all attendees identified themselves and gave a brief account of their recent activities. Tom (KV2X) asked for a motioned that last month's meeting minutes be accepted as written in March's journal. Frank (K2OS) motioned the acceptance and Dave (KA2OQZ) seconded. Tom (KV2X) asked for a motioned that the Treasurer's report be accepted as written in March's Journal. Ken (W2UAD) motioned the acceptance and Jarred (KF2MR) seconded. Freddie (WB2GFZ) highlighted the financials of the club.

#### Attending:

Dave (KA2OQZ), David (AB2YI), Bob (WA2QAU), Ken (W2UAD), Dean (WB2QCJ), Jarred (KF2MR), Frank (K2OS), Tom & "YL" Betty (KV2X), Ken (KD2CJR), Freddie (WB2GFZ) & Dave (K02HEV).

#### Old Business:

##### Potential Club Projects

- Radio Astronomy
- Low Noise Preamp.
- Contesting 101
- Cheap Yage construction for 432 or 903 MHz
- Moon Bounce Demonstration
- D-Star/Fusion (Digital Modes)

#### New Business:

Worked All Rochester award concept

#### Program:

The group enjoyed a riveting program by Jarred (KF2MR) regarding the "Worked All Rochester" concept and his presentation of digital modes typically used for HF being applied to VHF/UHF communications. These modes included PSK31, MFSK16 and

highlighted a plethora of other digital modes. Additional details regarding the “Worked All Rochester” will be presented to all shortly.

## **VHF Group Treasurer’s Report (3/31/2015)**

### CHECKING/CASH ACCOUNT

Previous Balance (PP = \$2.90, Cash = \$255.00Cash, \$2225.80 Checking):  
\$2463.70

Income: \$ 00.00

Expenses: Donation to AWA \$50 (CHK # 1053) \$ 50.00

Current Balance (PP = \$2.90, Cash = \$255.00Cash, \$1275.80 Checking):  
\$2433.70

Members paid up for 2014 – 2015 are as follows;

AB2YI, Dave Muller	N2NEP, John Cunliffe
AF1T, Dale Clement	NA2X, Bob Rossi
AF2K, Irv Goodman	VA3CDD, Dean Denter
K2EHF, Jeffrey Luce	VE3CRU, Bill Burgess
K2ERG, Al Goss	VE3DS, Dana Shtun
K2GAB, Gloria Stevens	VE3NPB Murray Hill
K2IK, Walt Bordett	W1XR, Jim Welch
K2OEQ, Duncan Brown	W2CNS, Bob Nezelek
K2OS, Frank Pollino	W2GPS, Richard Hambly
K2STF, Stephen Fleming (Steve)	W2IT, Roy Wildermuth
K2TER, Bill Rogers	W2UAD, Ken Evans
K8ZES, Sid Emmons	W2XH, Ryan Tucker
KA2ENE, Harry Hoffman	WA2CHV, Jack Kelly
KA2LIM, Ken Kent	WA2QAU, Bob Roberts
KA2OQZ, David Carlson	WA5VJB, Kent Britain
KB8VAO, Stephen Gocala	WB2BYP, John Stevens
KD2HEV, Dave Malecki	WB2GFZ, Freddie Sulyma
KF2MR, Jarred Jackson, KF2MR	WB2KAO, Tim Magee
KV2X, Tom Jennings	WB2QCJ, Dean Keyser
N2IK, Walt Bordett	WO2P, Fred Miller

*Respectfully submitted,  
Freddie Sulyma, WB2GFZ, Treasurer*

# Radio Jove

- Martin J Pepe (MjpAstro@aol.com)

Most people think they have to have a 50 foot dish in the backyard to do any Radio Astronomy. *It just ain't so!!* Besides getting on your wife's short list for casting a large dark shadow over her petunias, with the way things are these days, you might even get a visit or two from 'Uncle Sam' ;-).

Everyone has seen colorful visual pictures from Hubble of deep space Galaxies. But many don't realize that deep sky objects have strong RF emissions, as well. Even some objects in our own Solar System give off radio waves in various frequency bands. The Sun and Jupiter are two of those objects in particular.

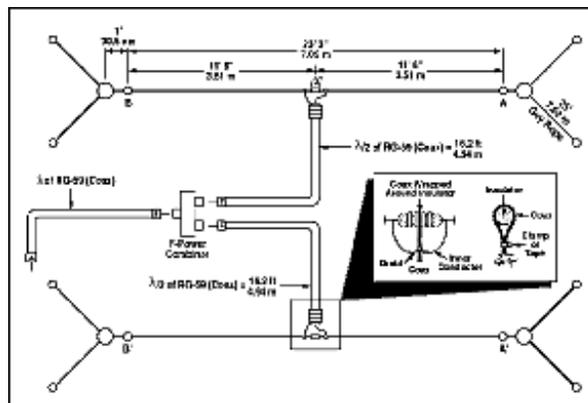
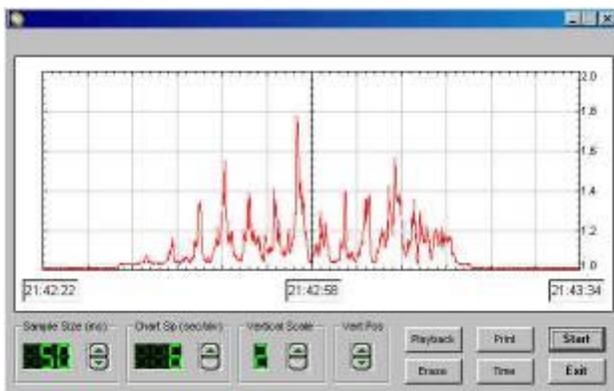
You may have seen or heard of articles about the ongoing Solar RT project which is a Solar RF Spectrograph to study sunspots, presently being built for the ASRAS astronomy club (site in Ionia, NY). It covers 50 - 890 MHz, This is a senior design project at RIT and it is progressing nicely.

Another stout RF emitter is the planet Jupiter (*see NASA Radio Jove, below*). The radio noise storms of interest can be heard from about 15 MHz up to a practical limit of about 38 MHz, the consensus seems to be that 18 MHz up to about 28 MHz is a good place to listen. Many 'hams' have inadvertently heard this, and assumed it was just background noise & hiss (*links, below*).

The very conditions that cause the ionosphere to get charged and yield a good DX bounce at times, are one's that 'shield' us from hearing these signals. When the DXing is good, the Jupiter signals are rather weak, since they can't penetrate the same strong ionospheric 'shell' that surrounds the Earth. Conversely, when the DXing is bad the Radio Jove signals can be good, they can actually complement regular Ham Radio operation.

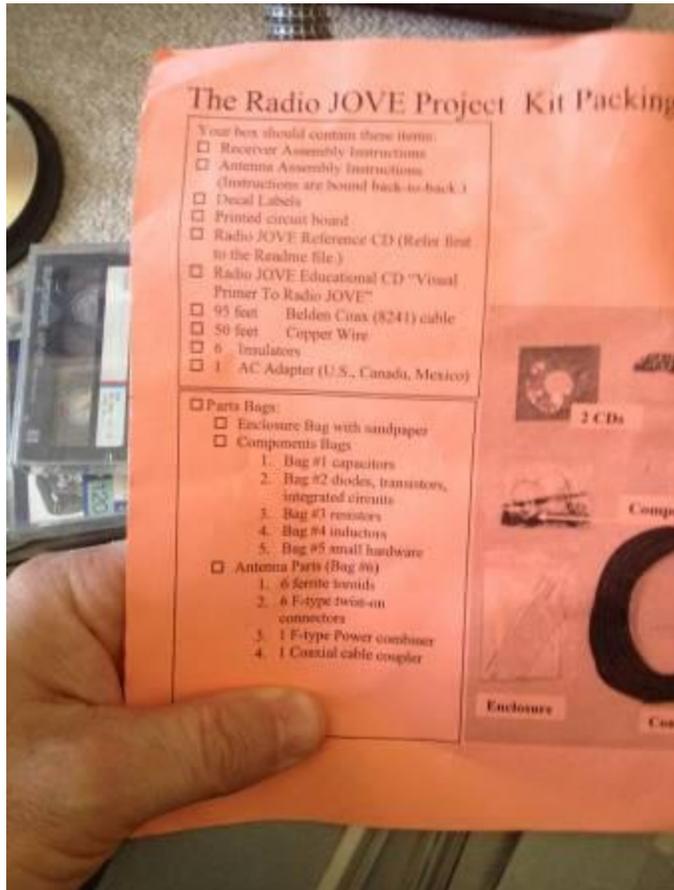
The RF generator of these signals is an interaction of some of Jupiter's Moons (*typically IO*), and the planet's strong magnetic fields. These signals can be directional, and don't always point at the Earth.

A simple direct conversion receiver and external antenna (*right & lower*) for the above band(s) can be used to monitor these signals (*lower left*), and the audio output can even be sent to a laptop to form a strip chart recording. So try DXing something that's literally out of this world.



For further reading check out some of the following links;

- Radio Jupiter Central - <http://www.radiosky.com/rjcentral.html>
- NASA Radio Jove - <http://radiojove.gsfc.nasa.gov/library/newsletters/toc.htm>
- SARA Radio Jupiter - <http://www.radio-astronomy.org/pdf/qex/radio-jove-proof.pdf>
- Interested? email Martin Pepe @ [mjpastro@gmail.com](mailto:mjpastro@gmail.com).



**The Radio JOVE Project Kit**

## 2015 VHF Spring Sprints

The Central States VHF Society Spring Sprint Organizing Committee has announced sponsorship and dates for the 2015 run of the VHF and up Spring Sprints. The schedule, sent out by Kent O'Dell, KA2KQM & Mike Metroka, WB8BZK, is as follows:

- 144 MHz: Monday, 4/13/15 from 7 – 11 PM local
- 222 MHz: Tuesday, 4/21/15 from 7 – 11 PM local
- 432 MHz: Wednesday, 4/29/15 from 7 – 11 PM local
- Microwave, 902 MHz and up: Saturday, 5/2/15 from 8 AM – 1 PM local
- 50 MHz: Saturday, 5/9/15 from 2300Z until 0300Z Sunday, 5/10/15

More information and rules will be posted

at: <https://sites.google.com/site/springvhfupsprints/home>

# WORKED ALL ROCHESTER

A VHF/UHF Award Sponsored by the Rochester VHF Group

Prepared by Jarred Jackson KF2MR

## Description

This award will be granted to any amateur radio operator who makes 100 contacts with other amateurs living within 50 miles of Rochester, NY. Anyone may participate, regardless of location. An operator may be counted for credit once per band (6m, 2m, 1.25m, and 70cm) and once per mode (Voice, CW, and Non-Voice Digital) for a possible total of 12 contacts per person. The preferred exchange is the call sign and 6 digit grid square. Alternatively, a valid exchange from VHF Contests, Field Day or the NY QSO Party may also be used in lieu of the 6 digit grid square.

## Additional Rules and Details

- Contacts must be made from May 1 – Oct. 31<sup>st</sup>, 2015
- Logs must be received by November 29, 2015 via email to [awards@rvhfg.org](mailto:awards@rvhfg.org), but may be submitted at any time throughout the award period. Any plain text, .doc, .pdf or .xls file is acceptable.
- Operators that count for credit must have a permanent residence within 50 miles of Rochester NY (Corner of Main St. and Clinton Ave.). These operators must also be located within the 50 mile radius (fixed, mobile, or portable) at the time the contact is made.
- Modulated CW over FM is not considered CW mode for the purpose of this award.
- Use of repeaters or other electronic retransmission methods are not permitted for contact credit.
- Contacts made for VHF contests, Field Day, or the NY QSO Party may be applied for award credit as long as the required exchange for the event is made. Multiple exchange formats may be submitted.
- All individuals living at the same address may use the same station, as long as each individual is separately licensed and use their own callsign during the exchange. When this provision is used, contacts between these amateurs is not permitted for award credit.
- Up to two licensed amateurs not living at the same address may use the same station or equipment, but must use their own callsign during the exchange. When this provision is used, contacts between these amateurs is not permitted for award credit.

## Endorsements

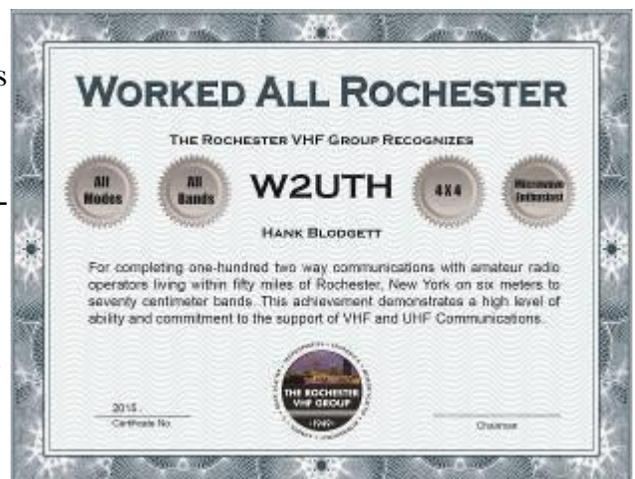
The following endorsements are optional and are not necessary to earn the Worked All Rochester award:

Microwave Enthusiast – Certificate holders will receive a special “Microwave Enthusiast” endorsement for completing an additional 10 contacts on authorized amateur radio frequencies above 902 MHz.

Worked All Modes - Certificate holders will receive a special “Worked All Modes” endorsement for making at least one contact on each of the following modes: FM Voice, SSB Voice, CW, and Non-Voice Digital.

Worked All Bands - Certificate holders will receive a special “Worked All Bands” endorsement for making at least one contact on each of the following bands: 6m, 2m, 1.25m, 70cm.

4 X 4 - Certificate holders will receive a special “4 X 4” endorsement by working each of the four modes on all four bands (16 band/mode combinations). Note that since FM and SSB are both voice modes, it is not possible to complete all 16 combinations with the same operator.



The first 10 amateurs who qualify for three of the above endorsements will receive their certificate framed for presentation. After the first ten frames have been awarded, applicants who have three endorsement may purchase a frame for \$15.

See [www.rvhfg.org](http://www.rvhfg.org)

## Antennas on a Chip?

A team of researchers from the University of Cambridge have unraveled one of the mysteries of electromagnetism, which could enable the design of antennas small enough to be integrated into an electronic chip. These ultra-small antennas would be a massive leap forward for wireless communications.

In new results published in the journal *Physical Review Letters*, the researchers have proposed that electromagnetic waves are generated not only from the acceleration of electrons, but also from a phenomenon known as symmetry breaking. In addition to the implications for wireless communications, the discovery could help identify the points where theories of classical electromagnetism and quantum mechanics overlap.

The phenomenon of radiation due to electron acceleration, first identified more than a century ago, has no counterpart in quantum mechanics, where electrons are assumed to jump from higher to lower energy states. These new observations of radiation resulting from broken symmetry of the electric field may provide some link between the two fields.

The purpose of any antenna, whether in a communications tower or a mobile phone, is to launch energy into free space in the form of electromagnetic or radio waves, and to collect energy from free space to feed into the device. One of the biggest problems in modern electronics, however, is that antennas are still quite big and incompatible with electronic circuits – which are ultra-small and getting smaller all the time.

“Antennas, or aerials, are one of the limiting factors when trying to make smaller and smaller systems, since below a certain size, the losses become too great,” said Professor Gehan Amaratunga of Cambridge’s Department of Engineering, who led the research. “An aerial’s size is determined by the wavelength associated with the transmission frequency of the application, and in most cases it’s a matter of finding a compromise between aerial size and the characteristics required for that application.”

Another challenge with aerials is that certain physical variables associated with radiation of energy are not well understood. For example, there is still no well-defined mathematical model related to the operation of a practical aerial. Most of what we know about electromagnetic radiation comes from theories first proposed by James Clerk Maxwell in the 19th century, which state that electromagnetic radiation is generated by accelerating electrons.

However, this theory becomes problematic when dealing with radio wave emission from a dielectric solid, a material which normally acts as an insulator, meaning that electrons are not free to move around. Despite this, dielectric resonators are already used as antennas in mobile phones, for example.

“In dielectric aerials, the medium has high permittivity, meaning that the velocity of the radio wave decreases as it enters the medium,” said Dr Dhiraj Sinha, the paper’s lead author. “What hasn’t been known is how the dielectric medium results in emission of electromagnetic waves. This mystery has puzzled scientists and engineers for more than 60 years.”

Working with researchers from the National Physical Laboratory and Cambridge-based dielectric antenna company Antenova Ltd, the Cambridge team used thin films of piezoelectric materials, a type of insulator which is deformed or vibrated when voltage is applied. They found that at a certain frequency, these materials become not only efficient resonators, but efficient radiators as well, meaning that they can be used as aerials.

The researchers determined that the reason for this phenomenon is due to symmetry breaking of the electric field associated with the electron acceleration. In physics, symmetry is an indication of a constant feature of a

particular aspect in a given system. When electronic charges are not in motion, there is symmetry of the electric field.

Symmetry breaking can also apply in cases such as a pair of parallel wires in which electrons can be accelerated by applying an oscillating electric field. “In aerials, the symmetry of the electric field is broken ‘explicitly’ which leads to a pattern of electric field lines radiating out from a transmitter, such as a two wire system in which the parallel geometry is ‘broken’,” said Sinha.

The researchers found that by subjecting the piezoelectric thin films to an asymmetric excitation, the symmetry of the system is similarly broken, resulting in a corresponding symmetry breaking of the electric field, and the generation of electromagnetic radiation.

The electromagnetic radiation emitted from dielectric materials is due to accelerating electrons on the metallic electrodes attached to them, as Maxwell predicted, coupled with explicit symmetry breaking of the electric field.

“If you want to use these materials to transmit energy, you have to break the symmetry as well as have accelerating electrons – this is the missing piece of the puzzle of electromagnetic theory,” said Amaratunga. “I’m not suggesting we’ve come up with some grand unified theory, but these results will aid understanding of how electromagnetism and quantum mechanics cross over and join up. It opens up a whole set of possibilities to explore.”

Piezoelectric materials can be made in thin film forms using materials such as lithium niobate, gallium nitride and gallium arsenide. Gallium arsenide-based amplifiers and filters are already available on the market and this new discovery opens up new ways of integrating antennas on a chip along with other components.

“It’s actually a very simple thing, when you boil it down,” said Sinha. “We’ve achieved a real application breakthrough, having gained an understanding of how these devices work.”

The research has been supported in part by the Nokia Research Centre, the Cambridge Commonwealth Trust and the Wingate Foundation. Additional support was provided through the East of England Development Agency, Cambridge University Entrepreneurs, and investment from Cambridge Angels.

*Reference: Dhiraj Sinha & Gehan Amaratunga, Electromagnetic Radiation Under Explicit symmetry Breaking, Physical Review Letters, 114, 147701 (2015)*

*Complete text of this article can be found at <http://www.cam.ac.uk/research/news/new-understanding-of-electromagnetism-could-enable-antennas-on-a-chip>*

## Classified Listings

### For Sale Flex 1500 \$500

Very clean (Non-Smoker), low usage & with Power Supply. I plan purchasing a replacement radio. Freddie WB2GFZ, HM 585-787-1108, Cell 585-413-8553

### For Sale: Coax Relay

Never used brand new. The part number is 402A-285332. It is the high power version with SC connectors and no/nc messenger contacts. Power handling: @2m=4kw, @10Ghz=500W Isolation:

@2m= 85dB. @10Ghz=60dB

More data to be found @ [http://www.dowkey.com/\\_upload/DowKeyCatalog.pdf](http://www.dowkey.com/_upload/DowKeyCatalog.pdf)

This is the ideal preamp relays and will prevent your sensitive gas fets from blowing because of poor isolation. Asking \$150 for it and it will end up on Flea-bay if nobody wants it.

John, N2EP, 474-6936 is my cell

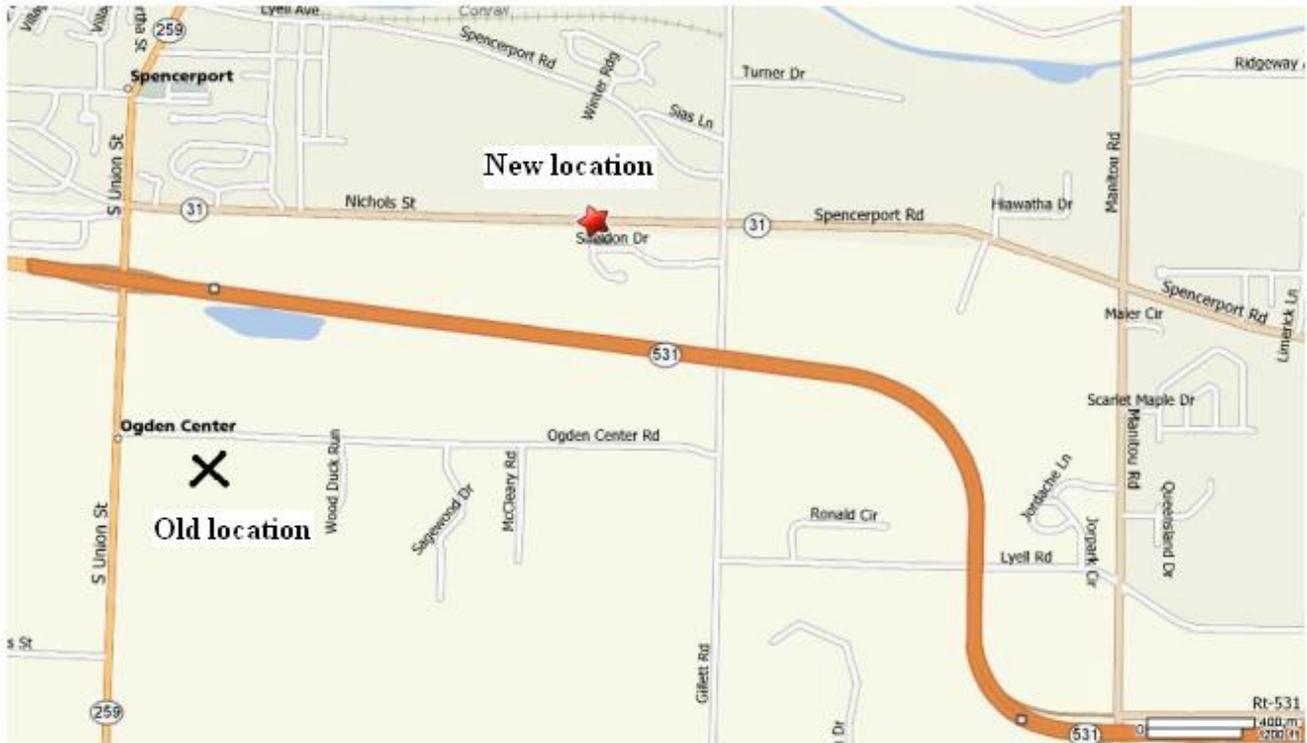
### For Sale: 1Kw Larcen amp

Hi all, I have 1 low/low 1Kw Larcen amp for sale. It can be used as is for about 1.2kw SSB and 1KW FM out. Or can be converted to 2m (easy conversion documentation on the internet @ <http://www.mmra.org/larcen/>) for 1Kw+out. The conversion info for the low/low is exactly the same as for the low/high as the only difference according to the schematic are a couple of capacitors that can be changed. I am asking \$250. For you folks that run Harris amps, I have a couple of low/high final modules. In light of the very limited availability of the power transistors, it may be good for you to have a spare...lol...contact me if you are interested and make me an offer I can't refuse.

585-474-6101 at home, 585-321-4427 at work.

John, N2EP

# Meeting Location and Directions



**Spencerport Wesleyan Church on 2653 Nichols St. (actually Hwy. 31).**

**Directions from Rochester:**

**531W exit RT. to 259N**

**259N turn Rt. on 31E (first Rt. at traffic light)**

**Look for Spencerport Schools Bus Garage on left**

**Take first Rt. on Sheldon at A-framed church, park in rear lot.**

**Enter gray metal door under fire escape.**