



The next regular meeting of the Rochester VHF Group will be

Friday, March 14, 2008  
at 7:30pm

**NOTE: New Location for rest of season !**

**Spencerport Wesleyan Church**  
2653 Nichols St., Spencerport

Map and directions in back

**Topic:**

***VHF-And-Up Beacon Ideas***

## The Chairman Speaks! Andy Flowers, K0SM

Fellow Groupers,

We have lots coming up in the next couple months. First of all, many of you know we've had an offer to put up a beacon in the Gannett Hill area. This could potentially be a good project for the club going into the summer, so we'll be talking about beacons, what kinds of things we can do, would like to do, and what would best serve the area.

We have our annual awards banquet coming up in a little over a month. Our friends at the RDXA are finishing up the 60<sup>th</sup> anniversary and we'll be kicking off our 60<sup>th</sup> for the 2008-2009 season. The banquet will be held Friday, April 18. I will have tickets at the meeting—see details below.

We're also looking for some ideas we could do as a club at the Rochester hamfest in June. Last year K2TER brought his rover out for show and tell to the masses, and that was a big hit. We'd like to expand on this idea—perhaps by doing some microwave or EME demos (both of which this club has done in the recent past on portable power sources). Speak up if you have an idea!

See you at the meeting!  
Andy Flowers, K0SM

### Annual RVHFG/RDXA Awards Banquet

Friday, April 18 2008  
At Napagino's --NE Corner of Rt. 250 and 441  
6:00 PM Cash Bar  
7:00 PM Dinner  
Tickets \$25  
See Andy Flowers, K0SM (585-317-5375)

## **Secretary Report Judy Stonehill, N2KXS**

### **Rochester VHF Group Meeting Minutes for February 8, 2008**

The meeting, which was held at the Spencerport Wesleyan Church, was convened at 1935 local by the Chairman, K0SM.

Attendees introduced themselves with their names and calls.

Members in attendance included K0SM, K2TER, N2KXS, KV2X, WO2P, WB2QCJ, K6PSP, NQ2O, and N2OPW. Mark Hazel, K2MTH, attended as a guest.

Attendees talked about their experiences during the 2008 January VHF Sweepstakes. Most agreed that activity was lower than in the past.

Fred, WO2P, moved that the Secretary's report be accepted as printed in the RVHFG Journal. Paul, N2OPW, seconded the motion which was passed by the attendees.

#### **OLD BUSINESS**

Bill, K2TER, announced that he will need the money for the Sweepstakes award plaques by one month before the RVHFG/RDXA banquet. The estimated cost per plaque will be \$30.

#### **NEW BUSINESS**

Walter, NQ2O, told the group that we have an opportunity to set up a beacon system on a secure site over a long period. A great deal of tower space is being made available by an amateur radio operator. The Rochester VHF Group would need to make a commitment to purchase the necessary equipment and provide the labor to install the equipment. There is no timeframe required for a response. Attendees expressed a lot of interest and felt that an RVHFG beacon, perhaps 10 GHz, would be very useful. The group will look into the details.

Fred, WO2P, moved that the business meeting be adjourned. The motion was passed by the attendees.

The business meeting was adjourned at 2010.

#### **PROGRAM**

Andy, K0SM, gave a very interesting presentation, "RF Propagation and Digital Communication", pointing out similarities and differences among various modes using recordings of digital qso's.

## The Dirt-Cheap RF Lab

Andy Flowers, K0SM/2

My years in Rochester until very recently involved living the college bachelor life: Dirt cheap apartment, walking everywhere, and a meals that in which Hamburger Helper was a luxury. When it came to getting in microwave test equipment I found some corners that can be cut also. I don't mean to pass off all these little tricks as my own, since I pretty much learned all of this stuff from someone in the club much older and wiser than I.

- 1) Power meters: Here's something that you really need, and it's hard to cut corners here. Typically there are three parts to the system: (1) The meter, (2) the sensor and (3) the cable that connects (1) to (2). You can often find a HP-432 meter, cable, and thermistor head in the ballpark of \$75-\$100. I've noticed a trend that these things are getting more expensive as time goes on. While most folks would steer you away from older HP equipment (like the HP-431 or even <gasp!> the 430 series), they will work for most applications that don't need deadly accurate absolute readings (like peaking a filter). There are other power meters made by other manufacturers, such as General Microwave and Narda.
- 2) Frequency counters: A frequency counter that covers 10 GHz is nice, since that is also where frequency accuracy gets to be a problem. If the cheapest frequency counters are out of your range, you can cobble together a "prescaler" using a microwave signal source and a mixer. The idea is that you mix the unknown signal with a known frequency and read the difference on a cheap 1 or 2 GHz handheld counter.

For example, if you want to tune a 5.7 GHz filter and your counter only reads to 1 GHz, all you need is a mixer and brick oscillator somewhere in the 4.7 to 6.7 range—these are easy to find on the surplus market. If you add (or subtract when using high-side injection) your counter reading from your fixed frequency source you will know the true frequency of your oscillator. The image and LO will fall well outside the range of your counter and shouldn't interfere with your reading. I once tuned a 6-pole WR-90 filter using an X-band motion detector (with tuning screw!), 11 GHz Frequency West brick, surplus mixer that I ripped out of satellite upconverter, and a RadioShack 1.3 GHz counter. When I finally got around to putting it on a VNA I couldn't peak it any better!

Of course, you might be wondering how you get those "connectorized" mixers without breaking the bank in the first place. The cheapest source I've found is the flea market—just look for someone with a box of old TVRO, MMDS, or some other microwave circuit boards. In particular you are looking for the mixers that may be soldered down to the board. If you are lucky you will actually be able to see the part number, but if not, you can usually guess the approximate frequency range by looking at the construction (S-band, X-band, etc), and which ports are which. When you get home, you can saw it out of the board and put some SMA connectors on it, often using the ground of the mixer case for support. (see photo)



**Figure 1: "Connectorized" SRA-11 ripped out of a Ku-band upconverter. The SMB connectors came on the board already installed, plus I got a pad on the LO for free! This is perfect for any L or S-band applications.**



**Figure 2: Two mixers ripped out of surplus boards. The one of the left has been retrofitted with connectors, the one on the right has not.**

3) **Signal Sources:** For 432 MHz and below I have used a handheld FM transceivers as signal generators, with attenuators as needed. The output tends to be fairly constant, and the frequency display on the radio is close enough for most work you'll have to do. I find it helpful if the radio can be tuned while keyed down, as this allows you to sweep the filter more easily.

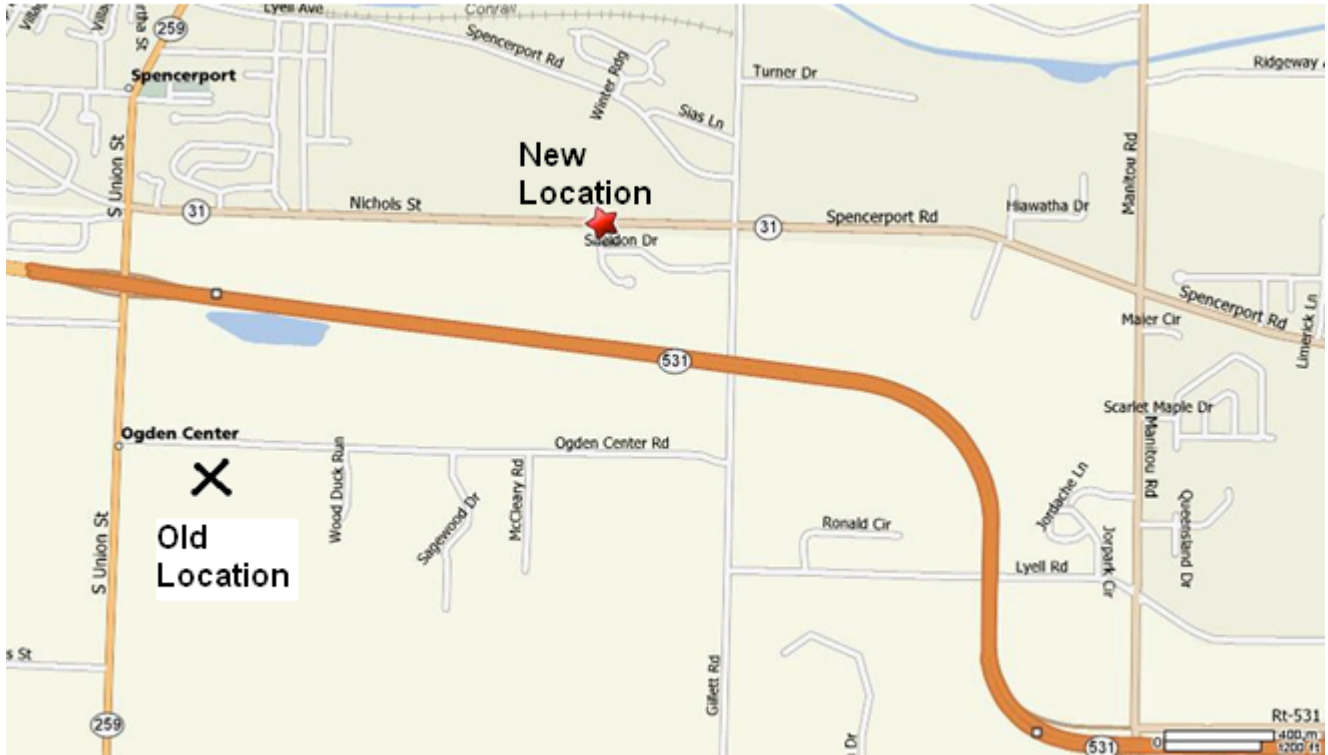
If you need a weak signal source for you microwave transverter system, you should try a 440 or 1296 MHz handheld first. I can hear my FT-470 on 10 GHz if its near the feed—just do some math and figure out where a harmonic falls near 10368.1.

Above 1 GHz you will probably want some sort of signal generator that can cover a much wider frequency range than our transverter systems. While a digitized 20 GHz signal generator is the ideal solution, most of us don't have one. My signal source is an old Polarad signal generator that tunes from 850 to 2430 MHz that I picked up for \$50, and its mechanical frequency display is not accurate enough for high-Q filters. It uses a power oscillator that is tuned by cranking a knob, which in turn moves a piston in an out of the oscillator cavity via an elaborate system of levers and pulleys. While the oscillator itself is stable enough for filter tuning, the frequency display is a bit out of calibration and is often around 10 MHz off toward the edges of its range. My unit has an external output in the back that can be used for an external frequency counter. Before I had the signal generator, I used some tunable "puck" oscillators for 2.3, 5.7, and a Gunn oscillator at 10 GHz. They aren't very stable, but 100 KHz of drift/min isn't usually too much of a problem when tuning filters at these frequencies. Since these oscillators don't have multiple outputs, you can use a power divider or directional coupler to pick off some of the RF for your counter.

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**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 (brightly lit)**

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

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