



## SOFTWARE DEFINED RADIO ON THE CHEAP

OCTOBER 2014  
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GARY SKUSE, KA1NJL—RARA VICE PRESIDENT

At this month's RARA meeting Rich Nichols, KC2NJM, will tell us how he uses a \$20 USB dongle as a software defined radio. As usual, that meeting is scheduled for the first Friday of the month or October 3<sup>rd</sup> at 7pm.

In recent years the field of software defined radio (SDR) has exploded. I have an SDR-based transceiver at home that is made by FlexRadio Systems and it is pretty cool. Operating it takes some getting used to because there are no knobs to spin but otherwise it outperforms anything I have used in the past. To my delight, the manufacturer keeps upgrading the software, the brains and heart of the radio, with new features. The downside is that my transceiver cost me something like \$1800. It was a bit costly but the performance is nothing short of great for a radio at that price point.



In addition to FlexRadio Systems, there is no shortage of manufacturers who are marketing SDR-based systems. The ever popular and high performing Elecraft radios are indeed SDR-based despite their more traditional appearance and there are a number of receivers currently on the market with price tags starting in the hundreds of dollars and ascending into the fiscal troposphere from there. I am told that even the current line of handhelds from Harris are software defined. The great advantage

to any of these radios is that the software can be upgraded to improve performance, fix deficiencies and add new features at any time.

Having said all of that, there is an ongoing trend to adapt very inexpensive USB dongles for use as wide band receivers. Those dongles were intended to be television receivers but a little ham and software ingenuity has made them very capable receivers that are being used for a number of purposes. These devices cost about \$20 and software to use them as receivers is publicly available. There is even software to enable them to receive aircraft ADS-B transmissions, something that before now required expensive dedicated devices. If you doubt that, I can show you my dedicated ADS-B receiver that cost me about \$600. Whenever I travel with a laptop I bring a dongle with me so I can listen in on whatever VHF and UHF traffic is in the air at my destination.

Rich has far more experience using these little bargain receivers than me and he is going to share that experience with us at the next RARA meeting. I am confident that we will all learn something valuable from his presentation. Please join us at the next meeting on Friday October 3<sup>rd</sup> at 7:00pm and at the usual place, the Henrietta Fire Company #1, located at 3129 East Henrietta Road near Lehigh Station Road.

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# PREZ SEZ

FRANK SCHRAMM, WB2PYD—RARA PRESIDENT

As of this writing I've only been in office for 10 days, so I don't have very much to report yet. The new Board of Directors has met for the first time and the agenda was quite full; everyone left the table with many tasks at hand. The most definitive action came under new business when Jim Stefano, W2COP assumed the role of our new Public Service Coordinator. Thanks Jim! Jim is succeeding Joe Walker, KA8WJH; who has done a great job coordinating the many public service events RARA members volunteer for each year. Thank you Joe!

Remember that the RARA **Annual Banquet is Friday September 26<sup>th</sup>**!

The buffet includes all you can eat of: a carving station serving "Tuscan" roast sirloin of beef, and baked ham, chicken Mediterranean, mixed vegetables, rosemary potatoes, penne rigate, tossed green salad, fresh fruit salad, assorted seasonal salads, rolls and butter, coffee – tea – milk, and a dessert.

New this year we have a **guest speaker!** You won't want to miss Ed Gable, K2MP, talk about "*100 Years of Ham Radio, A Rambling Genealogy of the Past, and a Bold Step into the Future.*"

The cost is **only \$15.00\* per person** so be sure to bring your spouse, or significant other! If you like to live life on the edge... bring them BOTH! ([Click here to order your tickets today](#)) Tickets will NOT be sold at the door.

\*If your membership has lapsed, it will cost you \$20.00 – so renew your membership!

([Click here to renew your membership](#))

*RARA Membership Rewards Program* – If you volunteer for public service, or hold a non-elected office in the club you get Rewards Points. As long as you don't let your membership lapse, these points continue to accrue until you redeem them. What can you redeem them for? Well how about Banquet Tickets? [Login here](#) and see how many **FREE Banquet Tickets** you can get!

I'm looking forward to seeing everyone at the Banquet on Friday September 26<sup>th</sup>. Join us at the Burgundy Basin Inn, 1361 Marsh Road in Pittsford. The bar opens at 6pm!

## CALENDAR OF EVENTS

**SEPTEMBER 26<sup>th</sup>** – RARA Annual Banquet  
6:00 PM Burgundy Basin Inn, 1361 Marsh Road, Pittsford

**SEPTEMBER 30<sup>th</sup>** – **RARA Memberships Expire**

**OCTOBER 3<sup>RD</sup>** - RARA General Meeting  
7:00 PM at Henrietta Fire Co. #1, 3129 East Henrietta Rd

**OCTOBER 9<sup>TH</sup>** - RARA Board of Directors  
5:30 PM RIT Engineering Hall, Room 2110

**OCTOBER 18<sup>TH</sup>** - RARA VE Testing  
10:00 AM RIT Gleason Hall, Room 3139

# ARRL Atlantic Division Director Election

## Tom Abernethy, W3TOM

My name is Tom Abernethy, W3TOM, and I am running for the position of Atlantic Division Director for the ARRL. Thank you for the opportunity to tell you a little about myself.

Over the years I have enjoyed meeting many hams in the Rochester area associated with RARA and attending the hamfest, many Atlantic Division Conventions and Field Days.

Licensed for 42 years, Amateur Radio has been a large part of my life. My experience in the Field Organization includes holding the positions of EC, SEC and SM in the Maryland-DC Section and Vice Director for the Atlantic Division for the past nine years. I've been a club officer, officer of the large contest club, Potomac Valley Radio Club, mentor, Volunteer Examiner and member of our local repeater coordinating committee.

As an active Amateur I have been active in most facets of the hobby such as contesting, chasing DX, emergency communications, digital radio operation, CW-QRP, EME, VHF/UHF Mountain Topping, antenna design and the study of propagation.

During my three terms as Vice Director I have gained a working knowledge of issues and built relationships with Board members through my participation as an appointed member of several ARRL committees: the Programs and Services Committee, a standing committee that deals with many of the issues that come before the Board; as the Board Liaison to the Contest Advisory Committee; as a member of the National Emergency Response Planning Committee, formed after Katrina; as the National Public Safety Telecommunications Council Board of Director Member representing the ARRL in national public safety matters.

I began working in law enforcement in our nation's capital and migrated to the Public Safety Communications technical arena. After retiring from there I became the Radio Services Manager for Prince William County, VA. My responsibilities encompassed the technical integrity of the County's critical Police/Fire Radio and Microwave Backbone Communications Systems.

As a member of the ARRL, the people you elect to represent you will have an impact not only on the direction of our association but Amateur Radio as a whole. Teamwork is the way that goals are achieved. Candidate for Vice Director Bob Famiglio, K3RF, Section Manager of Eastern PA, and I are running as a team. Bob brings his experience as a lawyer, engineer, Volunteer Counsel and elected Section Manager to the table. Bob has demonstrated his willingness to work above and beyond his Section Manager duties by attending meetings at the division level, sharing his knowledge and actively engaging with other division leadership members.

It is our mission to engage the membership in a dialogue on the current and future topics before the Board. We will accomplish this by division emails, webinars and attending as many club meetings, hamfests and conventions as possible. It is critical that the membership understand all sides to an issue and that we, as your elected representatives, understand your concerns and thoughts about those issues so that we can make an informed decision.

My experience in the Field Organization and as a three term Vice Director will allow me to hit the ground running. I ask for your vote for Bob and me for the privilege of representing ALL of you at the highest level of our national organization.

Please check out our campaign website at: < <http://www.hams4atlantic.org/> >. Thank you very much for this opportunity to introduce ourselves to you. When you receive your ballot we hope that you will vote for Tom Abernethy, W3TOM, for Director and Bob Famiglio, K3RF, for Vice Director, and afford us the honor of serving you.



## **Phil Theis, K3TUF**

The ARRL needs to actively seek out the needs and opinions of the amateur community by increasing the lines of communications, especially from the grassroots up. Bidirectional communication with you will be one of my top priorities. As your representative, I'll solicit your input and ideas, keep you advised of issues affecting amateur radio, and topics scheduled for Board of Directors action. I'll solicit your input and opinions *before* the vote, let you know how the item turned out, and the reasons for how I voted.

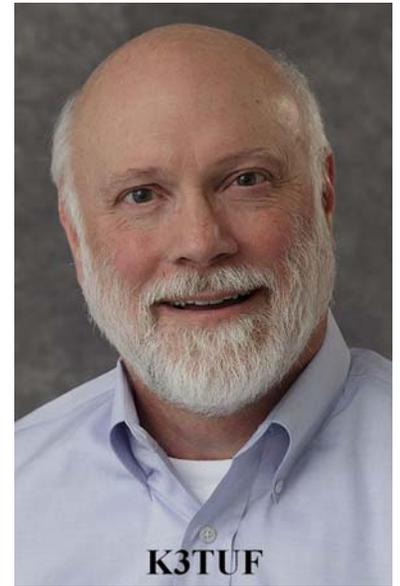
There are other areas where I believe the League could improve. Ironically, the common root of the problems I perceive is a failure to communicate. When an organization seeks to represent a group of people, it's that organization's responsibility to actively seek input from that group and act upon it. It is also that organization's responsibility to keep the group informed. The lines of communication must be kept open at all times and function in both directions.

I want to restore grassroots control of the organization by keeping you informed of what is going on in Newington so that you can keep Newington informed of your ideas and opinions. I want the voices of *all* of the members of the Atlantic Division to be heard; I want to fix the missing communications link and serve as a Director that represents you and your interests.

I also have thoughts on representing the interests of amateurs at large within the Atlantic Division. If we are to persuade these amateurs to ultimately become members we cannot treat them (as anything) much less than we would treat our members. They must be communicated with as potential members and not pushed off to the side as second class citizens.

One of my first actions will be to create a Council of Club Presidents as an advisory group (ACCP; Advisory Council of Club Presidents). The Atlantic Division is far too expansive for the Director and Vice Director to attend every meeting at every club, so the Council will provide a conduit for amateurs' voices and concerns to be heard from every corner of the Division. I want the affiliated club presidents to feel like they are a part of the team and have direct access to League matters. This will also give their members (comprising ARRL and non ARRL members) a clear path to ARRL policy issues.

I will appoint Assistant Directors from around the entire Division. I'll lead a team made up of the Vice Director and the Assistant Directors that will work to keep you informed, solicit your input, and assist me in ensuring that all of the vast Division is represented. I'll work closely with the Section Managers to see that their needs and concerns are addressed. I will work closely with the Vice Director to ensure that we provide the best representation possible.



# Peak The Grid

Forest Shick, WA2MZG

Over the last few months and especially at the September RARA meeting, the RAG has received many favorable comments. I would like to take a minute to acknowledge all the people involved in RAG production.

First and most important are the authors and contributors of RAG articles. Without their efforts, the RAG would be very dull.

Second, the information supplied by area clubs, gives the RAG a broad appeal.

Of course, there is the team of people that help prepare the RAG for distribution. Irv Goodman, Marisa Ashour, Pam Kasperkoski and Frank Schramm cover proofreading to web publishing.

I would not want to forget Kevin Carey who was the previous editor of the RAG and also provided the coaching Marisa and I needed to get started on our adventures with the RAG.

Finally, the new look of the RAG is the result of Marisa's artistic abilities.

I would like to thank all the people that help create the RAG each month and also ALL the people who have acknowledged this team's efforts with their compliments for a job well done – Thank You All.

## New Articles

If you have a project that you are proud of, please share it with your fellow RARA members. It can be something you built as a kit or designed and built yourself. It might be firmware or an antenna. Maybe it is a database of information you have been gathering. Do you have a new technique for making front panels or circuit boards or boxes for your projects – share the information.

Debugging and repairing equipment is always a worthy topic. Installing your first dipole and how you brought the coax into your house is a good lesson for the new hams.

Please consider writing an article describing your experiences. If you need help, ask a friend.

Rochester and the surrounding area has many talented people—consider sharing that knowledge.

## Update: Thrill Before the Chill

The weather forecast for Saturday morning was nothing short of gloom and doom. A major rain storm centered over Lake Michigan was slowly moving our way. That and a brisk morning temperature in the low fifties kept many Hams at home. By 7am the early birds began to arrive and were awaiting flea market parking directions. The sellers started to form a steady stream entering the grounds with anticipation of all the money they would be leaving with. The buyers arrived with their own eagerness to get going and find that bargain radio or rare tube that has eluded them for years! Soon the flea market area was abuzz with activity.

The promise of a sunny day never materialized, but a steady flow of hot coffee from the kitchen kept everyone supplied with that needed jolt and a portable hand warmer. Those who skipped breakfast were greeted with two large sheets of breakfast pizzas. Those of you unfamiliar with these delicacies need to check them out. Think pizza dough covered with eggs and bacon, ham or sausage. There were a lot of happy faces walking around with these culinary delights!

Our Hams working the breakfast tables were Jim DiTucci, N2IXD and his son Joe, KD2COD an officer in the Shriners and Bill Hopkins, AA2YV. Jim also arranged for and picked up all the breakfast food, for which there are many happy tummies out there in Ham land. Thanks Jim and Joe for all you did behind the scenes and on the day to make this event happen.

Also, big thanks go to Forest Shick, WA2MZG, James Oliver, KF2B, Len Crellin, KC2PCD and Ross Mazzola, KC2LOC

for doing the bulk of collecting the entrance fees from our guests. Despite the rain showers which rolled in just before 9am, more than 80 Hams braved the poor weather. This year's event raised \$400 which goes directly into the Shriner's Hospitals for Children fund. RARA did not make any money from this event. A BIG "thank you" to all of you who attended this year and made this event happen.

We have already reserved the same location for the next Thrill Fest, so save the date of Saturday September 12, 2015 and please plan to attend! Of course it can't be done without volunteers. The six of us were stretched a bit thin. Consider helping out next year, even for a couple hours and earn some member reward points!

## Public Service. What Exactly is it? Is it for Me?

James Stefano, Jr., W2COP

At the last Board of Directors meeting I was asked to serve as the new Public Service Coordinator for RARA, and it is my pleasure and honor to do so. It only took 37 years to get here having worked my first event, the Hike for Hope in 1977, so it's been a very long hike ... hoping for this position but I finally made it :). All kidding aside, I look forward to an exciting year ahead and would like to turn over a new leaf regarding how we do Public Service.

Amateur Radio has a traditional roll of providing Emergency related comms when we're called upon, particularly as ARES / RACES trained operators. What does that mean? Quite frankly, it means that a Ham who hasn't dusted off his/her microphone since the last ice storm would probably not be prepared for any event ... and we seem to have many locally or regionally annually these days. So as radio operators how do we keep our level of response where it needs to be? Rag chewing on the local repeater or HF Net is not going to cut it. Sorry, but that's like sitting around the fireplace talking about old times; it's not going to prepare you to be a trained firefighter. So, how prepared do we really have to be?

Our lives are busy; many Hams don't have time to go through all types of training in order to be prepared to assist with a very serious event or work the radios and computers at the County EOC. Especially NEW HAMS who wouldn't know where to start. Fortunately you can choose your level of preparedness. The Homeland Security Management Institute at the County Office of Emergency Preparedness facility has been offering emergency preparedness courses for the past several years. NWS Skywarn offers training to us every three years. There is a monthly ARES meeting at the Red Cross facility and a weekly ARES Net to test your radios and digital modes. So how do you get your feet wet and brush up on your skills?

Fortunately, RARA provides about a dozen Public Service events throughout the year that can sharpen those skills. If you're also a member of ARES we also throw in a few zingers like the Northern Border Anti-Terrorist Exercise for the past three years or an Active Shooter scenario at a local college campus this past summer. There can never be too many helicopters, SWAT, armored vehicles or ships with machine guns. The point is, the opportunities are there to sharpen your deployment and operator skills, while being able to serve your community at a level comfortable to you.

Here is the reality of the situation; unfortunately, it's usually the same Hams working these different venues. Quite frankly many are getting tired as evidenced by the higher demand for our services throughout the year and the lower number of operators that can now fulfill all of these events. We have actually had to turn down requests for our assistance countless times this past year because we're now spread so thin. With a membership of our size there is absolutely no excuse for this, particularly since we are in higher demand! On top of that, we're turning out new licensees and upgrades by the dozens almost monthly. As your new Public Service Coordinator I want to work particularly with those of you who have not had an opportunity to venture into this area.

Each of these events has a different flavor, as well as the locations of deployment and what you might be doing. SignUps are on a first come first served basis as well as preferred deployment if you have any. If you are new, our goal is to put you with a mentor (Elmer) so you can learn the ropes. The most important part above all else, this is a hobby and we are volunteers. We're here to have fun, socialize and enjoy ourselves, while being responsible and learning some valuable skills in the process. If you would like to bring your talents to the table on how we operate these events and improve operations, we welcome your input. There are usually a few perks provided by the organizers for the volunteers at many of these events. Did I mention food? Shirts?

Please review some very fast approaching events and sign up if you can. I look forward to hearing from you. Are you prepared?

- Barktoberfest Lollipop Farm - Fairport, NY Saturday September 27
- Fairport Lift Bridge Regatta Erie Canal – Fairport, NY Sunday September 28
- Jamboree on the Air BSA Camp Babcock-Hovey Ovid, NY Saturday October 18
- Pumpkin Patrol Overpasses of the New York State Thruway Thursday & Friday October 30 & 31

See details at [http://www.rochesterham.org/public\\_service.htm](http://www.rochesterham.org/public_service.htm)

## JOTA

### SCOUTING JAMBOREE ON THE AIR

We could us help at Babcock Hovey Scout Camp located half way down the east shore of Seneca Lake on October 18, 2014. The event is world wide and a good way to introduce a young boy to the hobby of Ham Radio. There will be a free patch. In the past we linked to a repeater in England. It's all bands and all modes.

CONTACT K2SRF

[K2SRF@ROCHESTER.RR.COM](mailto:K2SRF@ROCHESTER.RR.COM)

585-233-7706

STEPHEN FELL

## VE Team Input

Ken Hall, W2KRH

As the deadline for the RAG is before the September test session there is no report. Next month the September test will be reviewed.

Changes for this VE year are the new Element 2 (Technician) Question Pool and resulting new tests. Also the FCC has liberalized the credit for prior licenses which have expired for more than 2 years. If you have possessed a General, Advanced or Extra and would like to check your potential credit please contact Ken Hall [ken@w2krh.com](mailto:ken@w2krh.com)

# Build It!

Forest Shick, WA2MZG

After discussions with various club members over the past few months I sense there is an undercurrent of people looking for a “build it” project. We all have different skill levels and experiences. Finding the comfort level for a wide range of skill sets is an important part of any build it project. Let’s start with a beginner level project – something everyone can do and be successful with.

Lets get started with a homebrew Code Practice Oscillator (CPO) and straight key. The project will be all thru hole construction for ease of assembly. There will also be a little mechanical work involved. For those of you not familiar with the term thru hole, this term basically means that the components have leads that allow the component to be mounted to a circuit board by passing the leads thru the holes in the board. Then the leads are soldered together on the bottom side of the board. This will be a 2 part article with the Straight Key discussed in the November issue of the RAG.

After deciding to build a CPO, the first thing I did was grab the 2014 ARRL Handbook – the perfect place to find a code practice oscillator and straight key project. You would think that wouldn’t you! Well – I thought it would and boy I was disappointed! The closest project to a CPO was a keyer with code practice oscillator capability. It required a microcontroller which you had to purchase already programmed and lots of components. This was unacceptable for a simple build it project.

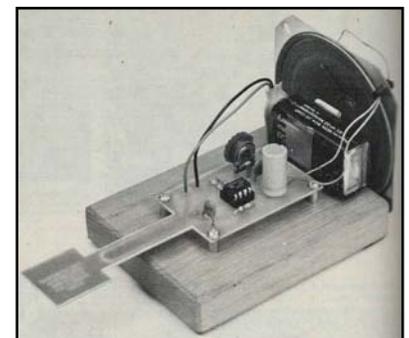
At the Batavia Hamfest this summer I purchased 3 old ARRL Handbooks, 1972, 1975 and 1982. Each Handbook had a different CPO. The 1972 Handbook had details for building your own straight key. Why reinvent the wheel? I picked the CPO from the 1985 Handbook and the straight key from the 1972 Handbook.



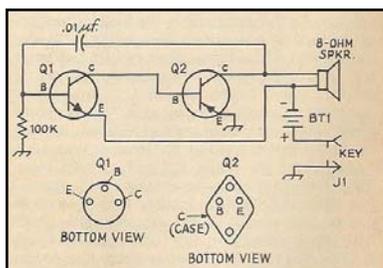
CPO and Straight Key  
1972 ARRL Handbook



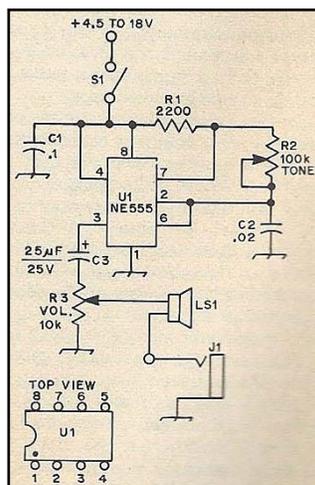
CPO  
1975 ARRL Handbook



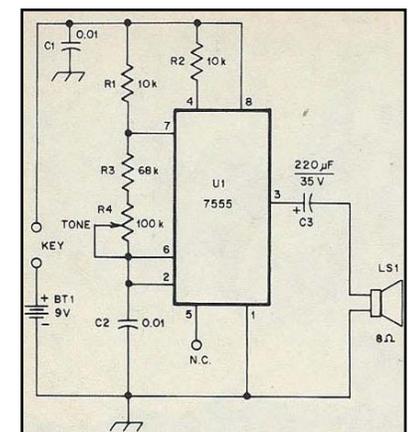
CPO  
1985 ARRL Handbook



1972 ARRL Handbook



1975 ARRL Handbook



1985 ARRL Handbook

## Code Practice Oscillator

The CPO is a simple project with few components. The circuit I have selected is based on the 555 timer IC. The 555 was introduced in 1971. It is a rugged, reliable and versatile timing device. It is such a practical device it is still made today. How often can you say that about anything?

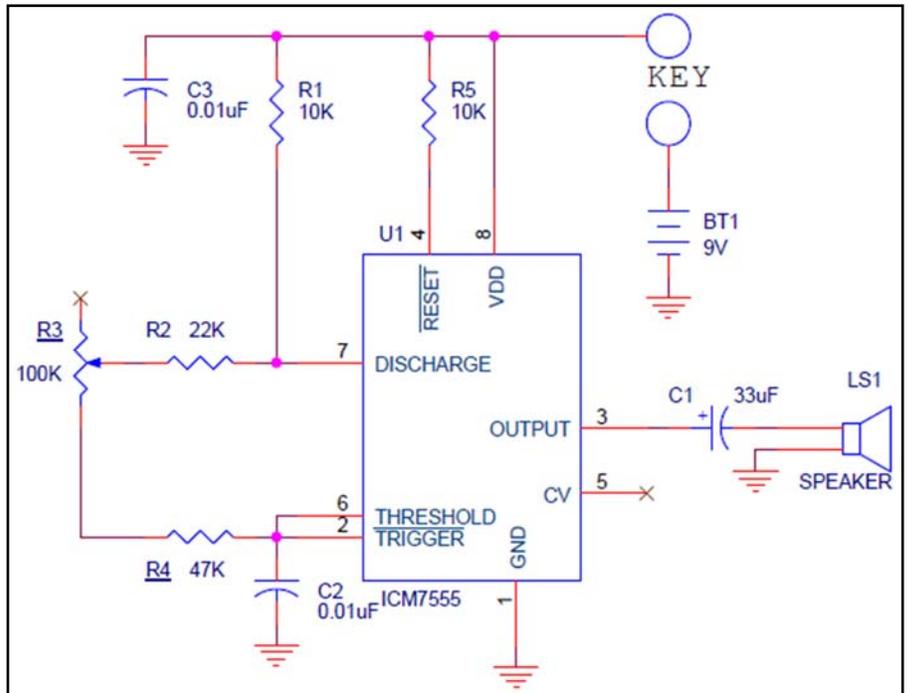
With just a handful of inexpensive components you will be able to build your CPO. You can find a data sheet for the 555 at most of the distributor's web sites. For example: <http://www.mouser.com/ds/2/465/fn2867-70630.pdf>

Code Practice Oscillator Bill of Materials

- BT1 9V Battery
- C1,2 0.01uF Capacitor
- C3 33uF Tantalum Capacitor
- Battery Terminals for 9V battery
- LS1 8 ohm speaker
- R1,5 10K ohm, 1/4W, 5% Resistor
- R2 22K ohm, 1/4W, 5% Resistor
- R4 47K ohm, 1/4W, 5% Resistor
- R3 100K ohm potentiometer
- U1 ICM7555, timer

If you have a well stocked junk box, you may have most of the components necessary for the CPO. I was missing 2 components, the ICM7555 and the 68K resistor. Replacing the 68K resistor was a simple matter of using a 47K, R4 and a 22K, R2 resistors in series. I had to "borrow" the 7555 from KF2B.

NOTE: The ICM7555 is a low power version of the 555.



**Final Schematic of the CPO**

The potentiometer is used to set the audio tone frequency. A pot is not necessary, you might substitute different values of resistors until you come up with the frequency you desire. An 82K resistor may be substituted for R2, R3 and R4. The audio frequency generated would be about 825Hz

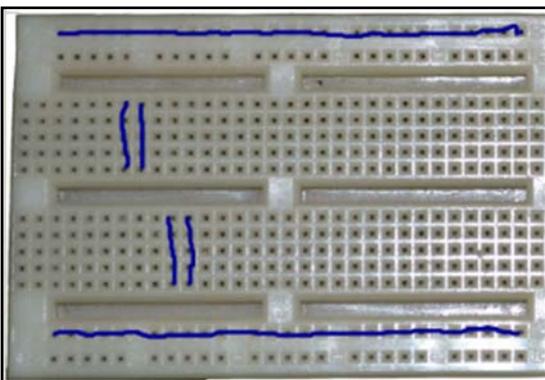
In the manufacturer's data sheet you will find a formula to calculate the frequency of operation for the 7555.

$$F = 1.44 / (C \times (R_A + 2 \times R_B))$$

$$C = C2, R_A = R1 \text{ and } R_B = R2 + R3 + R4$$

NOTE: R3 is the value of resistance between the wiper of the pot and the end of the pot connected to R4.

With R3 adjusted to 17K ohms the audio frequency that is generated is 770Hz. Substituting the values of C2, R1, R2, R3 and R4 into the equation, the calculated frequency is 791Hz.



**Proto Board**

$$F = 1.44 / (C \times (R1 + (2 \times (R2 + R3 + R4))) = 1.44 / (0.01\mu F \times (10K + 2 \times (22K + 17K + 47K))) = 791\text{Hz}$$

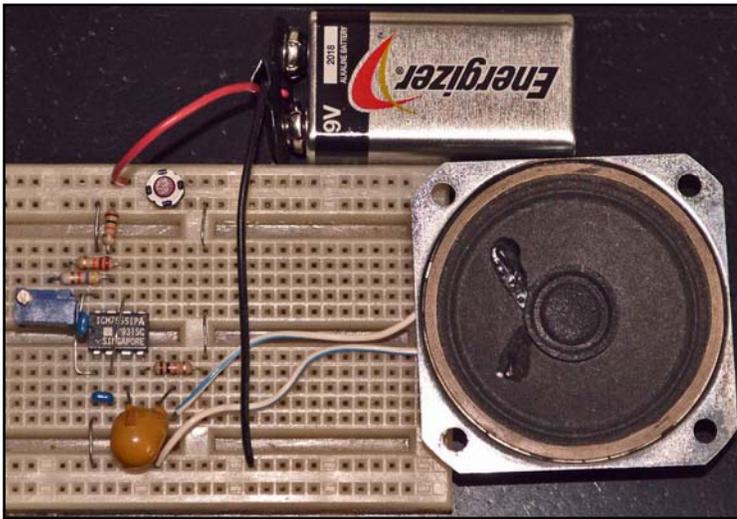
I used two different techniques to build the CPO. The first technique uses a proto board. There is almost no soldering using this method. The component leads are simply cut and bent to fit into the appropriate holes in the proto board.

This picture shows the connections that are implemented in the proto board. The blue lines indicate the common connections. The 4 horizontal rows, 2 at the top and 2 at the bottom, create common bus area for power, ground and other signals. The many vertical rows allow for up to 5 components to be connected together.

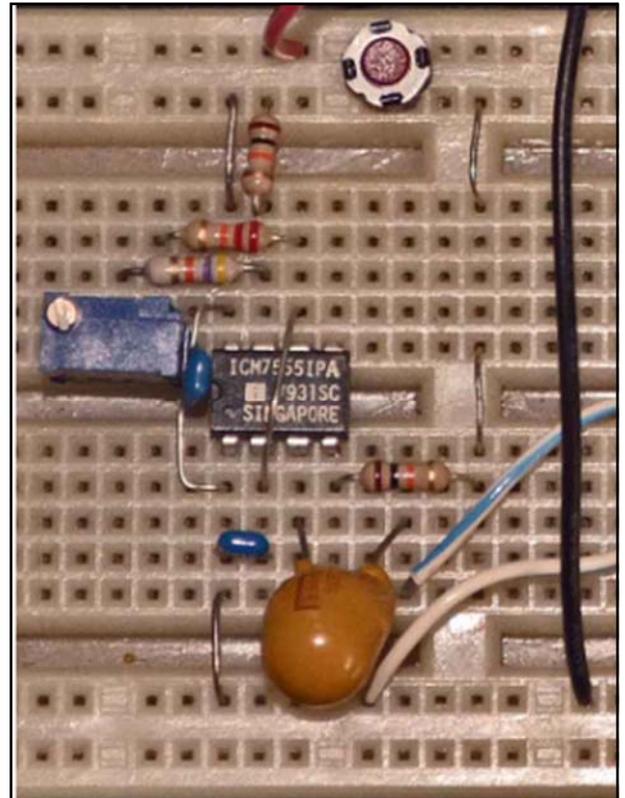
It takes some patience and practice to learn to estimate lead lengths necessary for connecting components together. Using the proto board, it is easy to build, test and change components as you develop your circuit.

In the pictures below, all the components and wires simply plug into the holes in the proto board. The only soldering that was necessary was to connect wires to the speaker.

This picture shows the complete circuit with battery and speaker. The small, red pushbutton is used in place of code key for testing the circuit. Pressing the button will turn on the CPO.



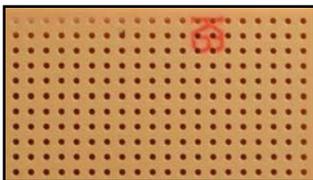
**Complete CPO**



**Close Up of Circuit**

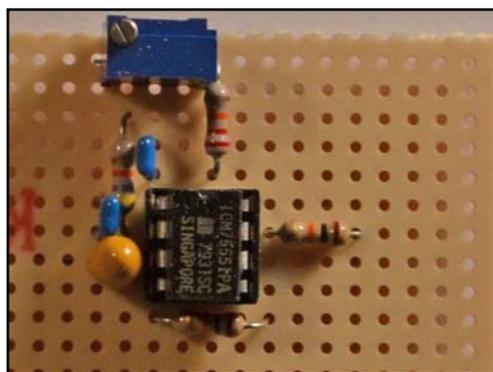
In the close up view you can identify some of the components and their connection. The 2 small blue devices are the 0.01uF capacitors and the large yellow device is the 33uF capacitor. You can also see the color bands on the resistor that indicate the value of resistance.

The second method for building the CPO is to use a perf board with no copper plating. This method requires soldering the components together and is a more rugged method of construction. Since the components are soldered together, extra care must be taken when building the CPO as it is much harder to correct a mistake.

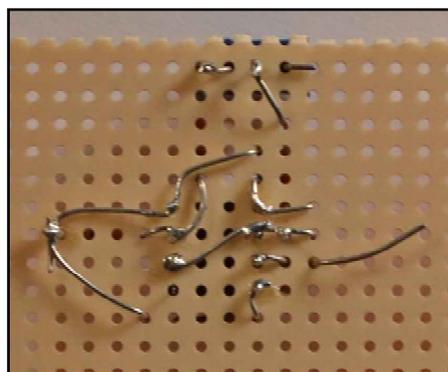


**Perf Board**

This picture is of a Perf Board with no copper plating. The board is usually made of an insulating material such as fiberglass or FR-4. The board is "perforated" with holes on 0.1" centers. This accommodates a wide variety of thru hole components.



**CPO Built on Perf Board**



**Wire Side View**

The pictures below are the exact same circuit as described for the proto board. The connections for the battery and speaker have been left off for clarity.

NOTE: The board is flipped left to right. The large yellow capacitor in the left picture would connect to the speaker. The wire lead in the right picture that is pointing to the right, is from the capacitor and would connect to the speaker.

Next month we will look at the details of building the straight key.

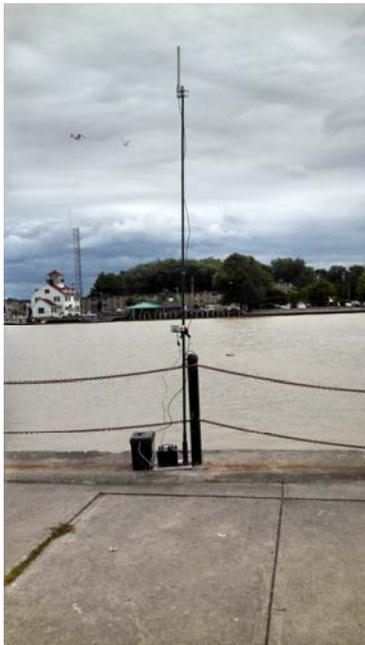
# Broadband—Hamnet

Ross Mazzola, KC2LOC

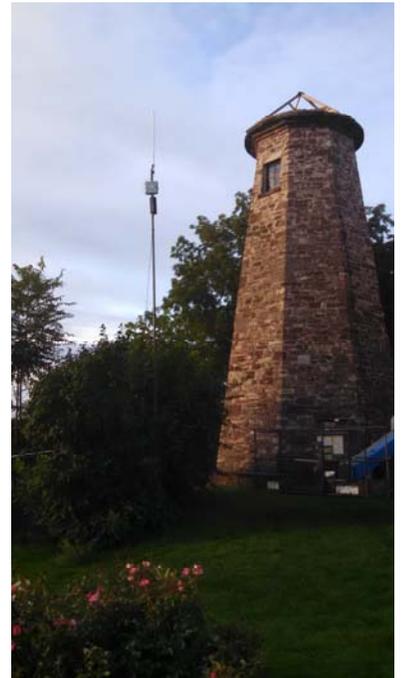
My interest in Broadband-Hamnet (formerly known as HSMM-Mesh) began after reading the cover story article in the July 2013 issue of *QST*, "A Broadband Ham Network Crosses the Finish Line," by Lynn Jelinski, AG4IU. The article explained how a group of amateur radio operators had developed a way to create self-meshing, wireless computer networks that would allow the transmission of different kinds of data- streaming data, messaging, web pages, even voice- using low-cost, re-purposed Linksys(R) wireless wi-fi routers. By using conventional high-gain, 2.4 GHz directional antennas and in some locations power amplifiers, the team involved with this public service event was able to provide a reliable network that was able to cover the entire course of a long distance marathon. What does any of this have to do with radios? Plenty as I later found out.

I have always had an interest in Amateur Television (ATV) but was never able to afford the equipment nor did I have the skills necessary to build a complete system for sending and receiving video. I also feel that there is a value in being able to provide served agencies with situational awareness through live video during a public service event, drill or actual emergency so when I saw that Broadband-Hamnet (BBHN) could transmit live video over the airwaves (2.4GHz that is) I decided to dive in.

I started my journey by going to the official BBHN website [www.broadband-hamnet.org](http://www.broadband-hamnet.org). Using the information that I found in the "Getting Started" section and after watching several YouTube videos, I purchased my first Linksys router off of Ebay for around \$25 and loaded the new firmware. Since then I have purchased several more routers from garage sales and Craig's List for anywhere between \$15-\$30, so look around but be sure you ONLY purchase models and versions that are listed on the the BBHN website. There was a recent upgrade to the BBH software that now allows the use of Ubiquity routers too. Be advised, however, that once you load the BBHN firmware onto your router it becomes a "mesh node" and can not be restored for use as a traditional wi-fi router. Setting-up the router was a bit intimidating since I only have marginal computer skills so I was pleasantly surprised when I plugged-in my computer and saw the BBHN status screen. Over the next several weeks I continued to learn more about BBHN and was able to set-up a second mesh node (this is what the re-purposed router is called) and installed a small video (IP) camera to it. It took a while but when I finally got to see live streaming video it was a big thrill.



I had the opportunity to demo the set-up a couple of times with the help of another "mesher" Jon Dickason N2JAC but our first real deployment of Broadband-Hamnet came this past summer at a Monroe County RACES exercise named Northern Border 2014. For this exercise, one node was erected on a temporary mast at the Charlotte Lighthouse. A second node was set-up at the edge of the Genesee River connected to a camera, and a third node sat on a picnic bench near the historic carousel at Ontario Beach Park. Jon also had some nodes of his own on the grounds of the US Coast Guard Station in Summerville, including one with a remotely steerable camera up in the cupola on the roof of the station which had great view of the mouth of the river and all of the vessels that were on the river that day. Along with video, all of the nodes were able to access an EmComm web page that was being served locally on a Raspberry Pi minicomputer and we were even able to send instant messages between nodes on the mesh. As with most first time deployments there were a couple of hiccups, but all in all the team was happy with the results.



So was any of this project actually radio related? Of course it was! The routers themselves are in fact 2.4 GHz transceivers. I built a high-gain, directional "cantenna" utilizing standard design principles. BBHN utilizes a line-of-sight communications mode so I learned about cable loss and terrain analysis. The entire mesh network can run off of battery power so we can deploy and provide useful services to our served agencies when all else fails.

I hope this article has piqued your interest in this melding of computer networking and amateur radio because we're always interested in having more mesh nodes available for whatever the event may be. If so, start by visiting [www.broadband-hamnet.org](http://www.broadband-hamnet.org) then feel free to introduce yourself at our next RARA meeting and I'll try to answer your questions.

# RARA RAGS OF THE PAST

Ed Gable, K2MP – RARA Club Historian

## 20 YEARS AGO, SEPTEMBER, 1994

QRP was definitely not the subject matter for the October meeting as Program Chairman Chris Reich, WB2DYJ, brought a talk involving Megawatts of power. The speaker, Dick Burkhartzmeyer, N2TOY, explained how your power company controls electrical transmission systems from many huge local power sources coming from coal, water and nuclear generation. While on the subject of meetings, it was also written that the Rochester DX Association invited Larry Reader, KE2VB, from the SCDXA, to talk on contesting from the Caribbean. Last month's RARA meeting brought some unexpected guests in the form of representatives from the New York State National Guard. They were looking to set up a search and rescue unit and wanted information on radio communications... so they came to RARA. Good choice. From the Want Ads you could buy a Yaesu FT-101B and TA33 yagi for \$400.00. Ramsey Surplus Outlet store in Victor, NY, remained a long term advertiser.

## 40 YEARS AGO, SEPTEMBER, 1974

Program Chmn Bill March, WA2CER, brought an interesting topic and a most capable speaker when he invited Bob Nezelek, W2CNS, to speak on local VHF and UHF activity. Bob's talk included the many different types of signals and modes now filling the upper portions of our spectrum. The Fall, 1974, RARA Novice code and theory classes have moved again, writes, Hitton D. Noggin, K0NK. The new venue is the RARA Radio room at CD Headquarters. The 12 week program met Mondays at 7:00 p.m. and was free. Membership Chair Bob Lauzon, WB2NSD, wrote to encourage dues payment at five dollars regular, two dollars associate and an additional dollar for family. From nearby Syracuse Vivian Douglas, WA2PUU, wrote to invite RARA folks to attend the Syracuse Hamfest on October 12<sup>th</sup>. While on that subject, it was announced that the 1975, RARA Hamfest, would be at the Fairgrounds on May 31<sup>st</sup> and the new Hamfest Headquarters would be at the Rochester Marriott Inn on West Henrietta Road. Rich Koehn, WB2SNA, wrote to report the great success of the 2<sup>nd</sup> annual RARA Campout at Hickory Hill campground in Bath, NY. Rich said that everyone enjoyed the tour of the Gold Seal Winery's processing plant and the post tour wine sampling party. Ramcomm Communications of North Chili, NY, featuring Tempo and Regency ham products, remained a long time commercial advertiser.



the **RARA RAG**

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**ROCHESTER AMATEUR RADIO ASSOCIATION, INC.**

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NO. 2

### OCTOBER PRESENTATION

Last month we had great fun seeing live Amateur Fast Scan Television presented by George Lloyd, N2UIO; and Bill Hanes, KB2BLS. They enjoyed addressing RaRa and were pleasantly surprised with the amount of interest shown by the audience. Both George and Bill were given complimentary memberships as tokens of our gratitude for their fine performance.

From their micro-power UHF MHz equipment, we go to the other extreme for our October presentation. Dick Burkhartzmeyer, N2TOY, is going to explain how he controls, as his vocation, multiple transmitter sites, each of which is capable of many Mega-Watts of output. They are all synchronized in frequency, and linked together by networks of transmission lines that span the eastern seaboard. Furthermore, his transmitters are powered by coal, water, and nuclear reactors! Dick's transmissions are literally heard around the world, and at all times. Unfortunately, Dick is not allowed to modulate his carrier, and he is restricted to a single frequency of 60 Hz. He fascinated me when he first began to explain how "his" new control center operates, so much so that I asked him to come and 'share' (Oh! How I hate that word) his experience with us. If you like anything at all about electricity, you should definitely attend the next meeting on October 7th. May I suggest you bring an extra pair of socks? Your first pair will be knocked off!

### RDXA PROGRAM:

**DXing in the Caribbean by Larry, KE2VB, from the SCDXA**

Date: October 18, 1994 – 7:30 p.m.

Larry's presentation will be a slide show and discussion of DXing and contesting from the Caribbean. Larry will tell us about his DX operation during the 1993 CQ WW, with the ins and outs on how to set up your own DXpedition, including tips from his own experience. This is one RDXA program you will not want to miss!

### MEETING NOTICE

October 7, 1994  
Henrietta Fire Hall  
3129 East Henrietta Road  
8:00 p.m.

*Electrical Transmission Systems*

### HENRIETTA DUATHLON A SUCCESS

The Henrietta Duathlon was run on September 11th and started at the Sperry High School in Henrietta. The Duathlon consisted of a 3.5 mile run, followed by an 11 mile bike ride, ending up with a 1.5 mile run.

Many thanks to the amateur radio operators who made this yearly event another success. The public service event was headed up by Dave Payne (KA2J), with assistance from George Platteter (AA2FO), David Weiss (N1DOU), Mike McNamara (KB2CHP), and John Dickason (N2JAC).

### RaRa AUCTION ANNOUNCED

REMEMBER that the meeting of November 4th will be our annual auction, so start thinking about gathering up all the great junk that you've accumulated, then take it to the curb. Bring what good stuff is left that you no longer need and put it into someone else's hands by an exchange for some legal tender. A lot of new hams need ways to get on the air, so demand will certainly be up. Repeat after me, "November 4th ... Auction ... November 4th ... Auction ..."

### RaRa RAG CLOSING DATE

October 14th. Please submit all articles and ads prior to this date.

# NEWS FROM AREA CLUBS

## MONROE COUNTY ARES / RACES NEWS

The Monroe County Amateur Radio Emergency Service, Inc. holds its meetings on the fourth Thursday of each month. Anyone interested, members and non-members, are welcome to attend.

The next ARES Meeting will be held on: **Thursday, October 23, 2014, at 7:00 PM.**

Meetings are held at the **Greater Rochester Chapter of the American Red Cross HQ, 50 Prince Street, Rochester, NY 14607.** (Located behind the Rochester Auditorium Theatre, 885 Main St. E.)



**ARES NET:** Monroe County ARES/RACES meets on the air every Thursday of the month at 8:00 pm, on the 146.61 MHz (-) 110.9 Hz PL repeater. The only exception to that are nights when we hold our regular meeting, generally on the 4th Thursday of the month.

**WEB:** [www.monroecountyemcomm.org](http://www.monroecountyemcomm.org)

**NBEMS:** Want to learn about Narrow Band Emergency Messaging System (NBEMS)? It's the latest and easiest way to "Go Digital!" Bring your laptop computer and 2-M handheld transceiver. We will conduct an NBEMS clinic after every meeting through June 2015.

## ROCHESTER RADIO REPEATER ASSOCIATION, RRRRA

RRRA will be starting up its 3rd Friday of the Month meeting beginning in September. The meeting will be held at the Pittsford Town Hall Basement starting at 7:30 pm. The 2014 officers are Bob Shewell, N2HJD President, Rob Bruno, KD2GCG Vice President, Ed Wilkonski, KC2WM Secretary, and Joel Rossbach, N2EZV Treasurer. Hope to see you there.

## SQUAW ISLAND AMATEUR RADIO CLUB, SIARC

The Squaw Island Amateur Radio Club (SIARC) meets every second Wednesday of the month at 7:00PM at the Ontario County Safety Training Facility, 2914 County Road 48, Town of Hopewell. If we have VE testing we meet at 7:30PM with VE testing starting at 6:30PM.

The next regular meeting will be on October 8th at 7:00PM.

## GENESEE VALLEY AMATEUR RADIO ASSN.

Welcome back after the summer, if you can call it that. We are always looking for new members.

Our next two meetings are September 28th and October 26, testing at 5:30pm, followed by meeting at 6:30pm. We meet at the Livingston Co. Government Center, 2 Court St. Geneseo, room 205/206.



We are planning on presentations at both of these meetings on home brewed antennas. If you would like to show off your antenna, with directions on how to build the antenna, contact Billy Boyd, N3DSP, at [n3dsp@lafireline.net](mailto:n3dsp@lafireline.net)

## DRUMLINS AMATEUR RADIO CLUB

Our meetings are held the third Wednesday of each month. Doors open at 7:00pm, meeting starts at 7:30pm at the Wayne County EOC, 7376 Route 31, Lyons. VE sessions held before the meeting on even months. Talk-in before meeting on 146.685-.

## ROCHESTER VHF GROUP

The Rochester VHF Group holds monthly meetings on the second Friday of the month between September and June. Meetings begin at 7:30 PM and are held at the Spencerport Wesleyan Church, 2653 Nichols St. (NY Route 31) in Spencerport. Visit our website [www.rvhfg.org](http://www.rvhfg.org) for details.

The Rochester VHF Group sponsors an informal On-Air Net every Monday at 2100 local time on 144.260 MHz USB and a 6 Meter Net every Thursday at 2100 local on 50.200 MHz USB.

More club information can be found by visiting [www.rvhfg.org](http://www.rvhfg.org) or just calling in any Monday or Thursday night. All are welcome to check in to these nets.

### Microwave Update 2014

The annual Microwave Update (MUD) conference will be held on October 24-25, 2014 in Rochester, NY.

The Rochester VHF Group (RVHFG) is hosting MUD 2014 at the Rochester Marriott Airport Hotel. Microwave Update is an annual technical conference and includes presentations by leading amateur radio microwave experimenters. Attendees from all over the world have the opportunity to discuss the latest technical developments and operating achievements taking place in the 902 MHz-and-up amateur radio frequencies. There will be test equipment for measurements including noise figure up to 47 GHz. The conference will conclude with the Saturday evening dinner banquet. For early arrivals on Thursday, there will be a tour at the nearby Antique Wireless Association (AWA) Museum.

For full details and registration, go to the Microwave Update 2014 website [www.microwaveupdate.org](http://www.microwaveupdate.org).

The call for papers and presenters also appears on the website.

## ROCHESTER DX ASSOCIATION, RDXA

The next RDXA meeting is Tuesday October 21st starting at 7:30PM. The meeting will be at the Monroe County EOC, 1190 Scottsville Rd.

## AMATEUR RADIO ASSOCIATION OF THE SOUTHERN TIER, ARAST

The Amateur Radio Association of the Southern Tier is proud to announce their 39th annual hamfest Saturday September 27, 2014. Doors open for the Flea Market at 6:00 AM. Looking to buy from one of our vendors? The doors open for the inside vendors at 8:00 AM.

As usual everything you've come to expect from our hamfest is included; free parking, one flea market slot per admission ticket ,a fox hunt is planned, FCC Exams( Walk-ins accepted), Food will be available (breakfast will be served around 7:00AM) with a great time to be had by all.

Admission is \$6.00 in advance and \$8.00 at the gate the day of the event. More details are on our website : [www.arast.org](http://www.arast.org)

Camping is available for a small fee (County Regulations and we have no control on that).

Advance tickets are available from any board member and should be available at the September RARA meeting. Prizes haven't been announced as of this writing so go to the website for all the updated information.

So save the date Saturday September 27, 2014 for the Elmira Hamfest at the Chemung County Fairgrounds in Horseheads NY.

Talk-In available on the 147.36 (+) (no tone required).

Need more information visit our website at [www.arast.org](http://www.arast.org) , Click on the fall hamfest link.



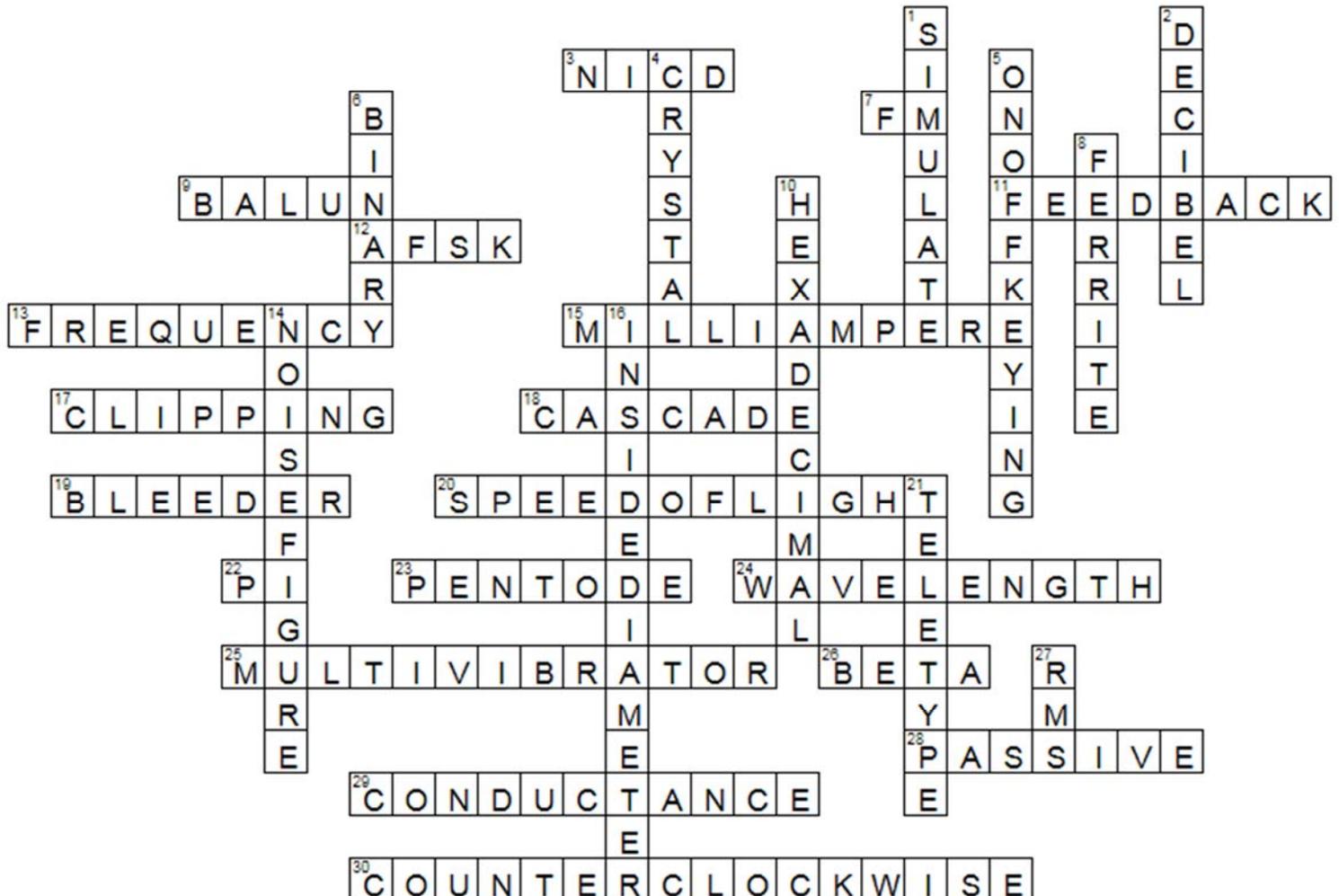
**2014 New York QSO Party  
October 18 – 10:00 AM**

Once again RDXA will sponsor the NYQP. Whether a casual or experienced operator, the NYQP has something for everyone. Just make 50 contacts and you are eligible for a plaque. You're a Rookie contender? No problem! There is an entry class just for you.

You don't need a world class station for the NYQP. Stations are looking for NY and are always strong. Join us for up to 12 hours of fun. Details at RDXA.com.

**Solution to September 2014 Crossword Puzzle**

**September Puzzle**





**DOWN**

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# THE AMATEUR'S CODE

Originally written by Paul M. Segal, W9EEA (1928)

## THE RADIO AMATEUR IS:

- |                    |  |
|--------------------|--|
| <b>CONSIDERATE</b> | Never knowingly operating in such a way as to lessen the pleasure of others.   |
| <b>LOYAL</b>       | Offering loyalty, encouragement and support to other amateurs, local club, and the American Radio Relay League, through which Amateur Radio in the United States is represented nationally and internationally.            |
| <b>PROGRESSIVE</b> | With knowledge abreast of science, a well built and efficient station and operation beyond reproach.   |
| <b>FRIENDLY</b>    | With slow and patient operation when requested, friendly advice and counsel to the beginner, kindly assistance, co-operation and consideration for the interests of others. These are the hallmarks of the amateur spirit. |
| <b>BALANCED</b>    | Radio is an avocation, never interfering with duties owed to family, job, school or community.   |
| <b>PATRIOTIC</b>   | With station and skill always ready for service to country and community.  |

## VISIT THE RARA WEBSITE!

Did you know that your club's website ([www.rochesterham.org](http://www.rochesterham.org)) offers these features and more?

- Photos of meetings & events (you might be in there!)
- Info on upcoming meetings/programs
- Rochester Hamfest information!
- Online membership & renewal
- Track and redeem your Reward Points
- Public service info & sign-up
- VE testing info
- Back issues of the *Rag* in PDF
- Officer contact
- List of past presidents
- Online membership directory
- Order RARA logo products
- Useful Internet links
- Ham Radio 101 – tons of tutorial info, plus net & repeater listings



# FOR SALE

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I'm moving – need to have it removed by mid-October!

\$1400

### Additional associated equipment

- As new Mosley Pro 57B w/ boom support system \$975
- (2) Balun Designs (#2112) 2:1 balun's (Full Wave Loop's) \$70 ea.
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- Heathkit SA-1480 Remote Antenna Selection Switch \$135
- (3) Large Fiberglass Enclosures (inquire about pricing)
- (2) 8' Copper ground rods \$10 ea.
- 10' Mast (2" OD X ¼" wall) \$75

Contact Ron – WB2RCB – 585-322-2166 or [rketchum@earthlink.net](mailto:rketchum@earthlink.net)

All can be seen at my website: [www.wb2rcb.com/antenna1.htm](http://www.wb2rcb.com/antenna1.htm)

# Online Only Auction

Sound Recording, Musical Accessories & Ham Radio  
Opens Mon. Sept. 22nd Ends Sun. Oct 5th



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For more information: [Editor@RochesterHam.org](mailto:Editor@RochesterHam.org)

# RARA OFFICERS

## OFFICERS

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## DEPARTMENT HEADS

<b>Awards/ Raffle Administrators</b>	Jay Hamill, KC2TCM Sabrina Hamill, WD2STK	
<b>Club Historian</b>	Ed Gable, K2MP	
<b>Club Station Trustee</b>	Jim DiTucci, N2IXD	<a href="mailto:n2ixd@arrl.net">n2ixd@arrl.net</a>
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<b>Hamfest Producer</b>		
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<b>Refreshments Coordinator</b>	Tom Austin, KA2GXX	
<b>Webmaster</b>	Frank Schramm, WB2PYD	<a href="mailto:wb2pyd@gmail.com">wb2pyd@gmail.com</a>

## NOVEMBER RAG DEADLINE

OCTOBER 15, 2014



**RARA meets at 7PM on the  
first Friday of each month;  
come join us at:**

Henrietta Fire Co. #1  
3129 East Henrietta Road  
Henrietta, NY 14467

**[Get Directions](#)**

## ROCHESTER AREA RADIO CLUB CONTACTS

### Antique Wireless Association (AWA)

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### Drumlins Amateur Radio Club Ltd. (DARC)

Glen Bruemmer, KC2YGH: [kc2ygh@yahoo.com](mailto:kc2ygh@yahoo.com)

### Fisherman's Net Amateur Radio Club

Jim Sutton, N2OPS: [jim@otrym.org](mailto:jim@otrym.org)

### Genesee Valley Amateur Radio Assn.

Bill Boyd, N3DSP: [N3DSP@lafireline.net](mailto:N3DSP@lafireline.net)

### Monroe County ARES

Jim DiTucci, N2IXD: [n2ixd@arri.net](mailto:n2ixd@arri.net)

### Orleans County Amateur Radio Club (OCARC)

Terry Cook, K2EYS: [k2eys@ocarc.us](mailto:k2eys@ocarc.us)

### Rochester Amateur Radio Association (RARA)

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### Rochester DX Association (RDXA)

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### Rochester Radio Repeater Association (RRRA)

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### Squaw Island Amateur Radio Club (SIARC)

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