

9-91

# Zero Beat

Hampden County Radio Association, Inc

Springfield, Mass

Our 44th ARRL Affiliated Year

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Next Club Meeting:

Friday September 6th

Joe Reisart W1JR  
Speaking on Unusual DX Events  
and Experiences

Joe spoke on the characteristics of the 902 Mhz band  
at a past club meeting and is a fascinating person  
who keeps the audience interested.

Feeding Hills Congregational Church, Feeding Hills Mass  
Intersection of routes 57 and 187.  
Doors open at 7:30 pm, meeting starts promptly at 8:00

Next Board of Directors meeting: September 12 at K111

Membership dues have gone up from \$9 to \$10.  
(We need the extra buck to pay for increased basic costs!)

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## 1991 CLUB OFFICERS 1992

President: NQ1C Bob Lafleur  
Vice-president: N1EPE Larry Lemoine  
Treasurer: N1AEH Greg Stoddard  
Secretary: N1DUY Jim Sebolt

### Directors:

K1CPJ Bob Cohen  
KA1QAS Scott Cohen  
K111 Charlie Dunlap  
NC11 Frank Potts

WA1YCA Tryon Cote  
WA1PLS Ed Goldberg  
KA1TBS Fred Gore  
N1DPM Fred Stefanik

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### Upcoming Events:

September 15  
Hartford Hamfest  
Vernon CT

Friday October 4th Club meeting

Friday November 1st Annual Club Auction

Friday December 6th Club meeting

### In This Issue:

*In Search of the Perfect Antenna*  
*Contest Ideas*

*Microwave Station Integration*

*Finding Radio Gear to Buy*

*Newcomer's Guide to HF Ham Rigs*

Greetings! I hope that everyone has had a happy and safe summer. This one sure flew by for me, and now it's time to start another season of the HCRA.

As the new president of the HCRA, I'd like to take a moment to introduce myself. My name is Bob Lafleur, and my callsign is NQ1C. I've been active with the HCRA since 1988. I was on the board of directors for the 1988-1989 and 1989-1990 seasons, and I was the Vice President for the 1990-1991 season. I was also the Zero Beat editor for those three seasons. I am the system operator for the WINY packet bulletin board and node system, which is located at my house in Springfield.

My radio interests include packet radio, VHF/UHF contests, the National Traffic System, and public relations for amateur radio. My non-radio related interests include computers, music, and photography. I work for a local bank as a computer programmer/technical specialist.

So how did I get involved in amateur radio? Well, back in the summer of 1977, a local ham Ray, K1CSB, took me under his wing to teach me the novice exam material. His wife worked at our local library, and Ray would come over to the library for an evening each week, and teach me code and theory. At the end of the summer, he gave me the novice exam, and I passed. Being only 14, my budget for radio equipment was quite limited, so my station consisted of a Heath DX-60 crystal controlled rig, a Realistic shortwave receiver, and two dipole antennas, one for 10 meters, and one for 15. I made lots of CW contacts, and had lots of fun. I took one of K1BE's upgrade classes in 1980, and later took the Technician exam in Boston, but I missed it by one question. By then the advent of the home computer, and later college, took priority over my radio interests. I sold my station at a tag sale, and my license expired.

In 1987, my uncle (Ed, who is now KA1RJB) called me and asked me if I knew how to go about obtaining an amateur radio license, and where he could find some books. I told him about the ARRL, and he bought a Tune In The World. I saw the book, and it re-sparked my interest in radio. After a little prodding by Bob McCormick WF1R, I brushed up on the code and theory, and went to an HCRA exam session, and came out a General. Later on that year, I upgraded to Extra. My original call was WB1FUV, and if you were active between 1977 and 1980, there's a good chance I worked you, as I worked more locals than anything else. It wasn't until I put up my tower last year, and took down the dipoles, that I realized what was wrong with them, and why they never worked very well!

If you're new to amateur radio, then I welcome you to come to the HCRA meetings and join in on our activities. We have an auction in November, a fleamarket in April, the VHF/UHF Sweepstakes in January, and Field Day in June. We also sponsor special events.

If you know someone who has recently gotten a new license, or who is interested in obtaining one, please let them know about our meetings. Our attendance is usually in excess of 75 people, and there's lots of good times and many great people to meet.

Hope to see you at the September meeting!

73, Bob.

## WINY Packet System

By

Bob Lafleur NQ1C

The HCRA affiliated packet system is located in Springfield. The system has been upgraded over the summer, and may undergo some more upgrades in the next few months. The following services are available:

The node SPFLD, W1NY-1 is available on 145.01, with decent coverage throughout Hampden County and northern Connecticut. This node is the main access point for the W1NY bbs. (bulletin board system) There is also a node available on 223.48, SPFLD2, W1NY-1. This node is mainly used for forwarding to link into Connecticut, but can also be used as a user access point. Both of these nodes are NEDA affiliated nodes, and carry the NEDA nodes list, and are capable of connecting to any other NEDA node. There is also a 440 Mhz backbone link that ties the nodes and bbs into the BERK packet repeater.

The W1NY bbs is linked to the node cluster at high speed. Once you're connected to one of the nodes, you can connect to BBSWMA for the W1NY bbs. Both the bbs hardware and software have been upgraded, and the system is now very stable. The bbs now runs on a 33 Mhz 80486 system, with G8BPQ node software version 4.04, and AA4RE bbs software version 2.12.

A new service, a TCP/IP switch, has also been added to the configuration. This switch has a TCP/IP user port on the 146.415/147.415 packet repeater located in Tolland, CT. This switch connects the New England TCP/IP group to the groups in Utica and Rochester, NY, with more links possible in the near future. This TCP/IP switch service allows TCP/IP users to connect and exchange information with other stations they were never able to connect with before. It also provides an interface between the W1NY bbs, and the TCP/IP world. The TCP/IP switch also runs as a DESQview window on the 80486 system.

I am hoping to upgrade the backbone link between the SPFLD node site and the rest of the network to a 9600 baud link. The combination of 1200 baud, and the shared repeater, has become overloaded with the increased data flow.

Please note that the 80486 computer was not purchased by the HCRA, and has absolutely nothing to do with this year's dues increase. Much of the equipment used for this packet system belongs to NQ1C, and carries the W1NY callsign as a club-affiliated system only.

For more information about packet radio, TCP/IP, or the details of this configuration, please contact NQ1C at (413) 736-0178.

## New Editor Takes the Helm

As your new *Zero Beat* editor, I wanted to share my thoughts about the job with you. I recall typing issues years ago on a toy typewriter, when the early word processing computer went belly up; all the interesting articles that members shared; reporting on adventures and doings within the club. I'm back again, so brace yourself!

The goal is to put a variety of information and technical articles in every issue of *Zero Beat*. It can only be as good as you, the members, make it. Bylines will be under every article, because many other newsletters reprint the articles, and I want to give credit where credit is due. Frandy Johnson, N1FJ, has volunteered to be an associate editor. Other associate editors are needed (you can have any fancy title your heart desires!). Does anyone want the job of pasting on the labels and dropping each issue off at the Post Office?

I have almost a complete set of *Zero Beats*, going back to the very first issue. I have an almost complete set of MTARA *Intermods*, Pioneer Valley RC, and other club newsletters. I'm a firm believer in reprinting articles from past *Zero Beat* issues and other club newsletters. These are worth seeing again! Art Zavarella, W1KK; John Balboni, AC1T; Gent Lam, WA1CQF; Ed White, W1NPL; Fred Stefanick, N1DPM; Mike Ludkiewicz, W1DGJ; and many others have real writing talent. In the files is a lot of club history that will help the new members understand our traditions. I intend to reprint them. Percy Noble, W1BVR, Art Zavarella, W1KK, Bob Stephens, W1MM, and others, bring us back to the days of the very beginnings of our hobby!

If you receive newsletters from clubs outside of Western Mass, or magazines that most of us don't normally get, please share them with me. If you need them returned, I can photostat the articles. It's not a problem to write and ask permission to reprint things. I'm happy to do it. Ron Beauchemin, WB1ETS would often write away when an article interested him. I'd love to have someone like Tom Frenaye, K1KI pass on some of the various New England newsletters he receives every month. There's a gold mine of very interesting articles out there!

My mailing address is:

*Jeffrey J. Duquette K1BE*  
18 Anvil Street  
Feeding Hills, MA 01030-1530

My home phone is (413) 786-7856. Don't phone after 9 pm, I go to bed early. My day phone, Mondays through Fridays is (413) 730-2584. If you get the answering machine, press # to skip over it and leave a message. FAX

number here at work is 730-2997.

Small ads are free to members, but must be ham radio related. Business ads from past advertisers will continue, but with larger type. If you own a business, want to send a personal "best wishes" to someone, birthday greeting, or whatever, you can purchase an ad at very reasonable rates. Consider running your business card every month in *Zero Beat*. It will only cost about \$5.00 per issue, and greatly benefit the club.

Donations will be accepted to benefit the newsletter. Tell us what you want done with the funds and we will try to comply! Otherwise it'll be spent to make the issues bigger and better.

Hampden County Radio Association needs your support to be a great club. Attend the meetings, share your talents, write articles about what you've been doing, participate in the activities! See you in September!

## Congratulations!

Howard Pomeroy has passed his Novice license and is now KA1ZCY. "I did it thanks to all the help and encouragement club members gave me, but especially due to Art Zavarella, W1KK"

Nick Duquette is now N1JJD!

Lisa Nelson is now N1JOS!

Don Mish is N1JOI, Betty Mish is N1JOJ!

Scott ? is now N1JOH!

Other graduates of the club licensing class, let *Zero Beat* know what your new call is so we can share it!

Will we sponsor another class this year? We need you to volunteer to help.

## Field Day 1991

It was another very exciting Field Day this past June. Numerous club members set up on the field next to Agawam High School for a radio weekend. Band conditions were mediocre, but not the enthusiasm of the hams. You'll be proud to hear that most of the operating was done by new members, the very youngest hams, and people who were participating in their first Field Day. And what an impressive score: about 14,000 points! That will put the club near the top ten again.

Too numerous to list everyone's name, we will mention Art Zavarella, W1KK and George Corigan, "The Doc" set up a solar powered station with the help of a four year old! John Balboni, AC1T, wrote a super article that appeared in the *Agawam Advertiser*. Maybe John will bring a copy to the September meeting. A job well done by all who participated.

## Space Communications

By

Jeffrey J. Duquette K1BE

I did a presentation at the Springfield Science Museum April 21 in celebration of Earth Day. Part of the display was on energy efficient light bulbs, and the other half was on satellites: Earth resource series, television and of course OSCAR. Charlie Dunlop, K1II, Ned Carpenter, NB1R, Jerry Griffin, WA1PGT, and Yorke Phillips, K1BXE helped explain amateur radio to the public. Jerry and Ned set up a color display monitor on the IBM and had a satellite tracking program dazzle the people. Once they bit on that hook, OSCAR was explained. I would have set up a working ham station but the OSCAR passes that day were mediocre.

Moving into flights of fancy, I wonder why a repeater or transponder could not be set up on the moon? My thoughts are that it would feature high gain antennas aimed automatically at the earth. Which frequency would be best to use? I don't know but my thoughts are that we should build it to use several, but only one at a time. The receiver on the moon's end would use MASAR circuits, easily kept cold up there in the vacuum of space. It would take the weak signals received, store them until it is their turn to go, and boost them in power for the trip back to earth. Perhaps a packet type addressing system would work best, with very different software than terrestrial ones?

A passive system could also be built. Monsanto has a new process to attach metal particles to anything, and perhaps a very light weight plastic material could be stuffed into a can and then be released to expand into a large reflective surface. And I do mean large. Why travel that far to put in something that isn't gigantic? Maybe we could "spray paint" gold from a low flying ship all over a crater of suitable size? Or use a rocket ship cluster bomb that rains down gold and coats the crater! Ideally a bulldozer would preshape the crater to a more suitable radar dish symmetry!

Another whimsy I have is to put up a series of low earth orbit OSCARs that use cellular phone type technology and automatically pass you onto the next satellite as they pass out of range. (LOS) Amateurs would use say the low end of two meters for uplink and the cellular satellite technology and software would switch you unnoticeably between various birds. Downlink could be on 450 or higher. A dozen or so at a time could be launched, with boost motors for adjustment of their orbits. The ultimate repeater (transponder)! The jammers would love it anyway. I suspect if the rules allowed it during the January VHF contest, the HCRA members would orbit one of those giant mylar film balloons to reflect radio signals off of. Anything to get that additional multiplier. H-m-m-m, let's check that rule book!

## Annual Membership Dues

Dues for the Hampden County Radio Association are \$10/year. As a member of the HCRA you will receive 10 issues of Zero Beat, possible special notices of meetings, the ability to vote for officers and directors at the annual meeting, and the ability to submit your score towards the club score in radio competitions like the January VHF contest.

The club meets the first Friday of every month, except July and August, at the Feeding Hills Congregational Church, Feeding Hills, Mass. This is West of Springfield. Take route 57 West and at the intersection of routes 57 and 187, turn right. The church is immediately on your left!

You may sign up at any meeting by seeing the club treasurer, Greg Stoddard N1AEH,  
1500 Mapleton Ave  
Suffield, CT 06078

or you may send your payment along with name, address, call, and license class to HCRA, P.O. Box 482, West Springfield MA, 01090-0482.

Feel free to contact any of the officers listed on the front of this newsletter if you have any questions about the club.

### Communication Accesories

Fred Gore KA1TBS

413-569-3579

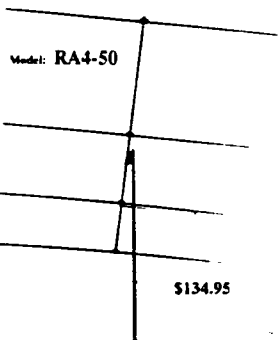
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DEALER INQUIRIES ARE INVITED

CALL OR WRITE FOR OUR NEW CATALOG!

# Newcomers' Guide to HF Ham Rigs

By Vince Yakovavich, AA4MY  
(From the Raleigh (North Carolina) ARS's Exciter.)

"But the new rig offers 100 "memories", while some of the "antiques" don't even offer a digital display!" Yup, you're right again! But remember, unlike the VHF/UHF FM spectrum, HF is not "channelized." HF stations will be scattered randomly on the band—never will you find them exactly where you programmed your memory for yesterday! Net operation? "Plus or minus QRM" is heard on many HF net preambles. Your HF "memory" will never get you exactly on the frequency of your favorite net. You'll always be up and down the band anyway. Unless you plan to make heavy use of autostart RTTY, HF packet or AMTOR, I doubt you'll ever need a memory on HF. Keyboard entry of frequency? Perhaps good to get you in the desired band segment, but not much more. Digital display? Impressive to look at, and perhaps nice to have. But crystal calibrators (about \$20 to build, if your "antique" doesn't already have one built in) and mechanical displays have been the frequency reference for years—and yes, the new rig's high-tech synthesizers have to be calibrated against WWV, just like the \$20 calibrator...

Solid-state finals vs tubes. No doubt about it, tubes are getting difficult to find, but they can be found. "Tubes are expensive!" Yes, they are—but you can replace them. Ever try to get four matched RF-type transistors? Ever changed a set mounted in a heat-sink buried within the bowels of a tightly packed maze where even Japanese-sized fingers fear to go? More likely than not, the average ham wouldn't attempt to replace the finals in a solid-state rig (if he could find a matched replacement set!), while changing a tube presents little, if any, problem. Tubes have other advantages, too. They're more forgiving when it comes to that "ideal" 50-ohm resistive match we hams always seek, but seldom obtain. At 2:1 SWR, a tube will work just fine—a newer rig will go into a limited "foldback" to protect the transistors. Three to one? Tubes are still perkin' along...transistor? Forget it! One disadvantage though: You'll have to learn to peak the grid and dip the plate. Hand-eye coordination. Watch the meter—twist the knob. Yup, those "hams of olden days" sure had it rough...

Speech compressor? DXers swear by 'em. Many ragchewers swear at 'em! If you need one, they exist as "after-market" devices for the older rigs, not to mention the "build your own" method.

A lot of the "features" on the newer rigs amount to high-priced, useless frills. What newcomers in quest of an HF rig really need to do is seek out an experienced ham who has knowledge about the older rigs. Ask what kind of rig he or she uses. Ask what he or she likes or dislikes about it. Most hams are delighted to show off their shack and give you hands-on exposure to their setups.

The following are considered the "standard of performance" in that "classic" age of 10 or more years ago. Most can be found in hamfests, flea markets or in trader publications for around \$200-600: Collins KWM-2A, Drake TR4-C and TR-7 transceivers; Yaesu FT-101, Kenwood TS-130, TS-520 or TS-820, Collins S-Line, Drake T4C and R4C (separate transmitter and receiver), Heathkit SB-301/SB-401 (separates). These were the "Cadillacs" and "57 Chevies" of 10 or so years ago—solid, proven performers and parts are still readily available.

Be cautious, though—not all the rigs in this era were "gems." Although some of their rigs were winners, manufacturers such as Swan, National, EICO, et al, have had models that left a sour taste in the ham community. Until you're more knowledgeable about the ins and outs of specific models, stick to the "Cadillacs" like Collins and Drake.

Got a little more to spend? ICOM IC-745 (my current HF rig), Kenwood TS-830, TS-430. \$600-800 range. Solid performers (even if they are semitransistorized!).

Just for fun, let me play devil's advocate. Let's assume that you, Joe New Ham, has to have that kilobuck+ special. It's a steep price to pay, no argument. But keep in mind that the "cost" of this hobby is mostly "up-front money." In the long run, hamming isn't expensive when you look at dollar cost vs hours of enjoyment.

Compare it to other hobbies: Bowling—pretty inexpensive, eh? After you buy your equipment (\$75-100), you can look forward to dropping an additional \$10 every time you visit the lanes for a couple hours of fun. A couple times a week, over the course of a single year, you've already paid more than that new transceiver costs! Golf has its greens fees, and you're limited to daylight and (for all but the fanatics) fair weather. Not so with HF ham radio. Twenty-four hours a day, rain or shine, you can sit down and enjoy your investment, making new friends, learning about faraway places and perhaps helping others in life-threatening situations.

If you're still doubtful about the hobby, seek out an experienced ham to consult and/or shop with, and go for one of the "classics" of recent time. Get on the air. It won't take you long to become "hooked" on HF hamming. It's day and night compared to VHF/UHF repeater operation. Besides, you'll always be able to sell it at a hamfest if you ever lose interest.

But if you're convinced that ham radio is for you, go ahead and look at those kilobuck+ specials, visit your friendly credit union if necessary, and go for it!

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## Massachusetts Amateur Radio Operators

Novice:	2213
Technician:	3124
General:	3247
Advanced:	2630
Extra:	1643
TOTAL:	12,857

## Finding Radio Gear to Buy

By

Jeffrey J. Duquette K1BE

New hams have been asking where, besides flea markets, can they purchase the equipment they need. I'll briefly discuss mail order, and leave it to you to get the phone number from the ads, then list the local amateur radio outlets. The most common way for hams to purchase radio equipment these days is through the mail. That's why there are no local stores! What do you do if you don't know what the radio looks like? Well, read the ads in the various magazines, visit a friend's station, or just plain ask people. Most will gladly describe why they bought the transceiver they own. If you know what the gear is, Ham Trader Yellow Sheets are the best place to look for items. (HAM TRADER Yellow Sheets P.O. Box 2057, Glen Ellyn, IL 60138-2057)

Here is a listing of area radio stores and directions from Springfield. They are in no particular order.

(203) 621-2252

### ROGUS ELECTRONICS INC.

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JOHN ROGUS

Route 91S to exit 18, look for route 691 West. About 5 miles, exit #4 in Southington. Go to traffic light, straight for 500 feet, left side is a gold house, Rogus is in the rear. (It's on route 322, which used to be Rte. 66) They carry Rohn 25 towers, and other radio equipment, of course. Open M-F 9 to 5; Sat 9 to 1 55 minute drive

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NEWINGTON, CT 06111

Route 91S to exit 28, (just past Colt building) route 5/15 South, first exit, (route 175 West, Berlin Turnpike. Go by Newington Children's Hospital, down hill to Main Street (176), left on route 176, 1 block to light, American Savings Bank on corner, turn right there, stay right at a "U", Sunoco station then Lentini's on the left. White building.

### About 45 minute drive

[one mile to the South is the ARRL and W1AW!]

Does not sell Rohn 25G. Store hours not listed in my notes. Call and check before driving down!

### Ham Radio Outlet Salem NH

Mass Pike to exit #10, route 290, to 495 to 93, Exit #1 (NH). Go to traffic light, turn left route 28 North. (similar to Riverdale Road!) Salem Market Place on the right hand side. 2 hour 10 minute drive. Sells Rohn 25, no sales tax in NH. ("Live Free or be stuck in Massachusetts")

### Rivendell Associates Derry NH

1-603-434-5371

Mass Pike to exit #10, route 290, to 495 to 93, Exit #4 (NH). Up the ramp, turn right at the top, first left, between a Citgo station and Sunoco station is Londonderry Road, store is on the right. [Just up the road from HRO!] Open M-Sat 10 to 5 2 hour, 15 minute drive. Sells Rohn 25, no sales tax in NH.

### Communications Accessories

Fred Gore

40 Birchwood Road  
Southwick, MA 01077  
413-569-3579

If you're in the market for a top-of-the-line Rutland antenna for VHF through UHF, Fred is the one to get it from. (or TVRO goodies!)

Route 57 West from Springfield, just past the Southwick High School on the left is Birchwood Road. Call to make sure he's home first. 10 minute drive

### Down East Microwave

Bill Olson W3HQT  
Box 2301 RR 1  
Troy, ME 04907  
207-948-3741

Sells the best 903 through microwave antennas and transverters. Troy isn't on a map, except for topos, so forget driving there! Even the Post Office only stops by once a week! Besides, UPS would be upset if you drove up to buy something.

### Advanced Receiver Research Box 1242

Burlington, CT 06013  
203-582-9409

Sells the best preamps available, for HF through 450 Mhz. Jay Rusgrove is well known to club members. Call for information or if you need help choosing a preamp. You can drive here, but it's easier to have it UPS'd.

## "A" & "K" Indices Relationship

The solar flux is a measure of the intensity of solar electromagnetic radiation. A number of different frequencies are monitored by the Algonquin Radio Observatory in Ottawa. The measurement at 2695 Mhz is normally reported. The solar flux index (SFI) has a range of 60 - 400 units. There is a positive correlation to both the sunspot number and the maximum usable frequency. (MUF) The solar flux is reported on a daily basis, updated at 1818 UTC. (universal coordinated time)

The "A" index, measured at Fredericksburg, VA is a measure of geomagnetic activity ranging from 0, (extremely quiet) to 400, (very disturbed) units. The "A" index is reported on a daily basis, updated at 1818 UTC.

There are a few occasions when the solar flux and "A" counts have been changed between 1818 UTC and three to six hours later. The updated accounts seem to occur when there is extra-ordinary activity, and more analysis yields more accurate data.

The "K" index is a quasi-logarithmic index of geomagnetic activity, ranging from 0 to 9 units, taken at boulder, CO. It is updated every three hours.

Solar activity is described by WWV during broadcasts as very low, low, moderate, high, and very high. A forecast in these terms is also part of the hourly broadcast. The terms relate to the regions on the solar disk capable of producing disruptive flares.

Broadcasts which include reports of the indices occur daily at 18 minutes past the hour and are transmitted on all WWV frequencies. (10 Mhz, 15 Mhz etc) The reports are useful to VHFers in determining possible conditions for 6 meter (50 Mhz) F-2 DX as well as 6 and higher band aurora. Six meter DXers look for the "A" index <15, K index <3, and SFI >190. If these values are present concurrently, you can bet on 6 meter DX! SFI does not play a significant part in the occurrence of aurora, however the A and K are good indicators. When the K exceeds 4 and the A increases concurrently to greater than 25, look for aurora on all bands above 50 Mhz!

## Contacting The Club President

Comments or ideas can be communicated to our illustrious club president at the address listed.

Bob Lafleur NQ1C  
45 Ionia Street  
Springfield, MA 01109  
Telephone: 737-8503

## MICROWAVE TRANSVERTERS

**SHF SYSTEMS** No tune linear transverters and transverter kits for 902, 1269, 1296, 2304, 2400, 3456 MHz. All use 2m i.f.g13.8V. Kits include mixer and L.O. P.C. boards, xtal and all components. Built units include I.F./D.C. switchboard, connectors and compact low profile housing. Other frequency options in amateur band available.

SHF 900K	902-906 MHz	50mW	Kit \$139	Built \$265
SHF 1240K	1296-1300 MHz	10mW	Kit \$149	Built \$265
SHF 1269K	1268-1272 Oscar Mode L	10mW	Kit \$140	Built \$255
SHF 2304K	2304-2308 MHz	10mW	Kit \$205	Built \$325
SHF 2401K	2400 MHz Mode S rev Conv		Kit \$155	Built \$255
SHF 3456K	3456-3460 MHz	10mW	Kit \$205	Built \$325
SHF LOK	540-580 MHz L.O.	50mW	Kit \$ 66	

## MICROWAVE AMPLIFIERS from DOWN EAST MICROWAVE

Linear Power Amps  
for SSB, ATV, FM, 902—1296—2304—3456MHz

2304 PA	10mW in 5W out	1240-1300 MHz	\$140
2318 PAM	0.5W in 18W out	1240-1300 MHz	\$215
2335 PA	10W in 35W out	1240-1300 MHz	\$325
2340 PA	1W in 35W out	1240-1300 MHz	\$355
2370 PA	5W in 70W out	1240-1300 MHz	\$695
3318 PA	1W in 20W out	902-928 MHz	\$275
3335 PA	14W in 40W out	902-928 MHz	\$335
1302 PA	10mW in 3.0W out	2304 MHz	\$400
901 IPA	10mW in 1W out	3456 MHz	Write or Call

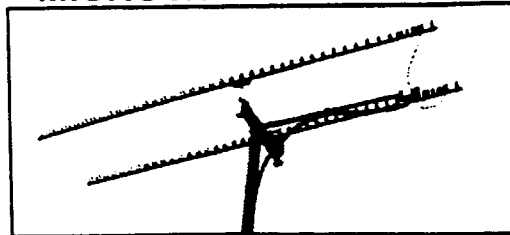
T/R Switching available, all 13.8 VDC

Low Noise Preamps & preamp kits—432, 902, 1296, 1691, 2304, 2401, 3456 MHz, 5.7 and 10 GHz.

33LNA	preamp .6 dB NF	902 MHz	13.8V	\$ 95
23LNA	preamp .6 dB NF	1296 MHz	13.8V	\$ 95
13LNA	preamp .7 dB NF	2300-2400 MHz	13.8V	\$130
1691LNAWP	preamp 1 dB NF	1691 MHz mast mounted	13.8V	\$140
4017LNAK	preamp kit	400-1700 MHz	.6 dB	\$ 40

Preamp kits for 2304-10 GHz Write or Call

## MICROWAVE ANTENNAS



Loop Yagis, Power Dividers, Stacking Frames, Complete Array of 902, 910, 1269, 1296, 1691, 2304, 2401, 3456 MHz. For Tropo, EME, Weak Signal, OSCAR, ATV, Repeaters, WEFAX, Commercial point to point. Available in kit form or assembled and tested.

3333LYK	33el	loop Yagi Kit	902 MHz	18.5 dBi	\$ 95.00
2345LYK	45el	loop Yagi Kit	1296 MHz	21 dBi	\$ 95.00
2445LYK	45el	loop Yagi Kit	1269 MHz	21 dBi	\$ 95.00
1844LY	44el	loop Yagi (assem.)	1691 MHz	21 dBi	\$105.00
2355LYK	55el	Superlooper Kit	1296 MHz	22 dBi	\$108.00
1345LYK	45el	loop Yagi Kit	2304 MHz	21 dBi	\$ 79.00
945LYK	45el	loop Yagi Kit	3456 MHz	21 dBi	\$ 79.00

Other models available. Call or write for catalog.

## DOWN EAST MICROWAVE

Bill Olson, W3HQT  
Box 2310, RR1 Troy, ME 04987  
(207) 948-3741

FAX: (207) 948-5157



# Contest Ideas

By  
Jeffrey J. Duquette K1BE

The January VHF Sweepstakes is the club competition event of the year. We'd like you to also participate in the ARRL DX contests, phone and cw. Who's willing to champion it for the club and lead us to a victory?

The HCRA has always done well in the January contest. The past scores and place overall are listed every January Zero Beat. What those numbers don't tell you is what the people were like that made it all possible. They have left something of themselves behind that challenges the torch bearers of today to strive to contribute. Excellence only results from putting yourself out 100% and trying to beat last year's effort or the "opposing" clubs or beating any seemingly impossible goal. If you set ho-hum goals you'll never have that great satisfaction of saying aloud "I did it!".

W1NY needs to add more microwave bands for the January contest. Anyone willing to help finance adding 2304 or higher bands? Just knowing others are available on the band to work is a big incentive. Let us know you're interested.

The Mount Airy VHF Radio Club, (Pack Rats), and the Rochester (New York) VHF Group are the ones to beat. They are so far ahead of us that it is a true "impossible" goal! The Pack Rats think they have a lock on this contest. Ah, but what if we did. I can hear the gnashing of teeth in Pennsylvania and New York!

What would it take? Well, we have about eight stations right now that operate on 5 bands. We would need about 30+. And today's top performers would have to get on another two bands and work seven bands plus every contest. We would have to get professional with our rovers. Bigger and better and smarter all around. They represent a significant point advantage if there were more of them and they worked more of the home stations from different grids.

I see the scores and logs so I know that one of the problems is that not enough available grids are worked on the bands. Some logs come in with 200+ 2 meter FM contacts, and only FN32 & FN31! Add in six other grids and BOOM!, a fourfold increase in score! Do the same thing on 446 and BOOM! an eightfold increase in a score! All very possible!!!! And very little money to spend on small beam antennas to get it. Many members have 222 also because they are using the local repeaters. The potential is tremendous!

The new technicians can make a big difference in '92. If

more of the area clubs could get on in a bigger way, watch out! Quaboag Valley ARC won in the limited category in 1991, their first year of participation! MT Tom ARA could blow them away easily, if they decided to. Ah, competition!

Test all of your equipment weeks before the contest. Don't do what I did and find out 432 is dead after the contest started! Need an antenna or rig to use on different bands? Don't wait until the day before, ask at the December meeting, put something in Zero Beat, make your needs known. There are many crystal rigs and other equipment out there just gathering dust. Do you have something to loan out? Let Zero Beat know and we'll play matchmaker.

Station isn't set up? Use your callsign at a friend's house who's not able to work at his own station because he's out of town or down at a multi-op effort for most of the weekend. Go play rover by moving between grid squares or be an operator at one of the multi-operator efforts. W1NY will train you and you'll have the pleasure of using the club call in a top-notch competitive station.

Can't sit at the radio for the entire weekend? Get on during the activity hours if possible. When you work someone on two meters, ask if they are on other bands. Use the little time you have wisely.

You're new and have no idea what this is all about? Glad to explain it! It's so simple you only have to jump in and get your feet wet and you'll understand what's happening! KA1VED jumped in in '91 and won an award! Corner me at the next meeting or give me a landline.



**WE WON!!!  
I CAN'T BELIEVE IT!!!!**



# Microwave Station Integration

By

Greg McIntire, AA5C

Why integrate? Consider building and operating an HF station with 6 discrete radios instead of a six band transceiver.

### Physical considerations:

- A. Locate your equipment so that it can be operated from one position.
- B. Use a common form for all transverter chassis.
- C. Use common controls for all transverters.
- D. Allow lots of chassis space for future expansion.
- E. Rack and stack to conserve space and permit easy access to the back and inside of all transverters.

### Controls:

What should be controlled in a typical microwave station?

- A. IF switching
- B. PTT switching (T/R)
- C. Coax and antenna relay switching
- D. Antenna mounted preamps
- E. Rotors
- F. External equipment (TWTA's etc.)
- G. Power supplies

What factors should be considered in microwave station control?

- A. Safety
- B. Speed and ease of changing bands
- C. Equipment protection
- D. Lightning protection
- E. Operator induced damage
- F. Liaison links
- G. Availability of parts
- H. Antenna configurations
- I. Ease of maintenance
- J. Harmonically related bands

### Recommendations:

- 1. Use sequenced T/R switching in each transverter
- 2. Provide a local transmit enable switch on each transverter.
- 3. Provide local power supply switches on each transverter.
- 4. Centralize IF, PTT and antenna / coax switching
- 5. Use fail safe relays for connecting antennas to transverters. (defaults to "open" position with no power applied, for lightning protection.)
- 6. Enable TWTA's only when the selected transverter is in the transmit mode. This reduces the probability of transmitting into your receiver, no load on the system, etc. It is also a positive means of reducing TWTA noise in receive mode for weak signal work.
- 7. Switch termination resistors across preamps and receiver inputs when transmitting.

### Power Supply

- 1. Bussed or local power supplies can be used.
- 2. Consider building your transverter for portable operation. Operation from 12-14 volts is desirable.
- 3. Local switching and fusing is handy for maintenance, transverter protection and LO warmup.
- 4. Regulate locally for LO's and other voltage critical functions, especially if you are operating off a bussed supply.

### Antennas

- 1. Locate all antennas on one mast, to simplify aiming.
- 2. Limit antenna gain on higher frequencies.
- A. Less than 5 degree beamwidth is difficult to point, but is generally not a problem until 5760 and 10368 Mhz.
- 3. Rotors normally brake in 5 degree steps, a digital readout to 1 degree is desirable.

### Summary:

- 1. Make your station simple to operate to reduce and eliminate mistakes.
- 2. Make band switching fast and simple.
- 3. Maximize your different band/grid contacts in band openings and contests.
- 4. Provide well designed protection for yourself and your equipment.
- 5. Make things accessible for maintenance and modifications.

Tnx North Texas Microwave Society

(Editor's note - There were drawings with this article but they were too tiny to read, so they were not reproduced here.)

## Review of the RA7-50 Rutland Arrays Giant 6 meter beam

By

Jeffrey J. Duquette K1BE

I bought one of the RA7-50 6 meter antennas from Rutland Arrays\*. I had previously purchased the 220 and 432 antennas made by Rutland, and was most impressed. The tower has been raised and this is replacing the RA4-50, a smaller beam, because I want a bodacious signal on 50 Mhz! I can't put up a stacked set of 3 beams like Fred Stefanick, N1DPM, so this is the next best thing. It's a BIG antenna, with a 26 foot mast!

I assembled this 7 element beam in about 60 minutes. Mechanical construction is very solid. There were no burrs to cut me or other problems with the pieces. (One piece of element tubing was tight, but a little oil fixed it.) I thought the antenna went together easily. The thing I disliked the most was the U bolts for the elements. Tough to line them up with the holes, too. I devised the gentle use of a rubber mallet as a way to fine tune them so they'd line up. Once they were on, I felt they would hold fine. I did strip the

threads on one and don't have a substitute. Will have to look in the junk box. Thing I liked best were the element plates, which I felt were very well made.

I don't assemble the boom until last. (Never was good at following instructions!) I put the various elements together, then the boom in two sections, attached the elements to the boom, then put the two boom pieces together. The driven element was done last. I still have a problem aligning elements. Anyone who knows a good way, speak out!

Feedpoint impedance is 50 ohms, with a weather proof N connector. VSWR at 50.250 is expected to be 1.1:1. I measured 1.05:1 using a cheap meter! The boom is 26 feet long and the measured gain is 12.6 dbi.

Everything on this antenna is rugged. The matching network is simplicity itself. All the trademarks I like in any work I do!

One thing I always do on antennas is to mark each section as it's assembled so that I can take it apart and put it together quickly without instructions. For example, I mark each section by its name, D-1 and then mark on the elements as it is assembled. 1-1. That would be where the element went into the splice tube, 1 marked on the element, 1 marked on the splice tube. The opposite side would be marked 2-2. Then I just line up the numbers when I reassemble it. And all elements are numbered 3-3, 4-4, 5-5, etc. The antenna I bought from Rutland for 144 (FO-15) used color stripes to align the masting. The red goes to red, the blue to blue. Makes it harder for dummies like me to assemble the boom or elements backwards.

I purchased the FO-15 for 144 Mhz, replacing a modified Cushcraft Junior Boomer. The 220 Rutland beam was re-cut for 222.2, and I replaced the driven element matching network. (I broke the old one taking the antenna down, it wasn't anyone's fault except my own.) The 432 beam was rechecked too. I think the reason it didn't work last January is a faulty N connector put on the feed coax by the chief klutz. The center conductor was soldered so far in the coax that it did not mate with the female connector. I have since repented my sins, read the QST articles on installing connectors and learned how to do it right.

I put up three microwave antennas from Down East Microwave\*\*, but that's the subject of a different article. (If you've never seen those antennas, all I can say is it's a good use for old beer cans. But Bill always sounds funny when you talk on the phone with him. I wonder if that's how he gets all those empty cans!)

My overall impression of the Rutland antennas is excellent

mechanical quality and design. See you on the air and during the contests. Look for me on seven bands; 50, 144, 222, 432, 1296, 903 and 2304 from FN32!

\*Available locally from Communications Accessories in Southwick 569-3579. Ask for Fred.

\*\*Available via phone Down East Microwave, Bill Olson, 207-948-3741

## Share Your Knowledge!

By

Jim Davis KC1ZJ

I'm looking for help! There are many members who need guidance when it comes to basic knowledge or skills. It may be old hat for you to say, install an N connector, but to someone who's never done it, it can be nerve-wracking. Would you be willing to volunteer your expertise? (semi-expertise, too!)

Let's get together after or before every monthly meeting and just discuss topics. Perhaps we could do a future meeting, too. Let me know what your special areas of expertise are, or what you'd like to help fellow hams learn how to do the right way, from the very first.

Return to Jim Davis:

NAME: \_\_\_\_\_ CALL: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

TOPICS:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

## What to Do with old Zero Beat issues?

Why throw it away, wrap smelly fish, or use it to line the bottom of the canary's cage? Instead mail it with your next QSL card! You may be pleasantly surprised at the result.

## Club Building Project

The club may sponsor a building project using Down East Microwave transverter kits for 903. Cost would be about \$200 each. See Fred Stefanik, N1DPM if you're interested!

## Zero Beat Deadline

Two weeks before the club meeting is the deadline for submission of award winning manuscripts and ads to Zero Beat.

## New Goodies

Members are encouraged to bring new equipment, building projects, or anything they think might interest fellow hams to any club meeting and show it off.

## In Search of the Perfect Antenna (Without Gimmicks!)

By

Fred Stefanik N1DPM

After reworking my tower last summer, I became a bit puzzled. I increased my tower from 45 to 70 feet of Rohn 25G. My 2 meter antennas were a pair of Cushcraft 32-19 Boomers, one at 46 feet, and the other at 58 feet, with the 12 foot spacing as recommended by Cushcraft. My phasing lines and power divider were not the best, including 20 year old RG11AU. In the effort to streamline the installation on the new tower, I purchased one of the new super Yagis: a KLM 2M-16 LBX, which is 16 elements on a 28 foot boom! Figuring 2.7 dB stacking gain, and approximately 1 dB phasing loss I felt the two 32-19's should compare to one 2M-16LBX. With the LBX mounted five feet above the top of the tower, I also felt that the added 30 feet above ground should make an impact on antenna performance. Needless to say I was more than slightly disappointed. After being on 2 meters with a high performance station since 1979, including a tower preamp and a kilowatt, I found I could no longer work Virginia regularly. This did not make any sense!

My good friend Stan Hilinski, KA1ZE, noticed the same type of results with his LBX at 135 feet on top of a 1,000 foot hill in Tolland, CT. After some discussion with Stan I felt it was time for a change. About four years ago Stan had eight Cushcraft 214-B Junior Boomers up on the side of his 120 foot Rohn 45G tower. He took them down and went back to HF contesting a few years ago. We decided to put them to use again, with four for me and four for him. Checking to see how the 214-B was designed, it turned out to be basically a 2.2 wavelength NBS antenna with a *gimmick*, the trigonal reflector.

All we were after was high performance Yagis without any gimmicks. We proceeded to clean up the eight antennas and remove the trigonal reflectors. The first problem we encountered was that all of the SO-239 connector center pins were corroded beyond belief! John Balboni, AC1T, noticed the same problem with his 214-B. He contacted Dave Olean, K1WHS, at Cushcraft. Dave recommended that the back side of the connectors be sprayed with a clear urethane or clear Krylon. This will seal the connectors. New center pins are available from Cushcraft at a nominal cost.

The next step is to remove the trigonal reflector. The proper reflector spacing is 0.2 or 16 3/8 inches, the same as all the directors. It was easy to drill these accurately with a machine shop at our disposal. John did his with a hand drill with very good results. Even if your holes are slightly off, you can still bend the reflector element to align it properly.

Next came checking the element lengths to be sure they met

the NBS specifications. Low and behold I found that they were all short for an antenna that is to be used between 144.0 Mhz and 144.3 Mhz. As shown in figure 1, some are 1.0% short, some 1.5%, and the driven element is 0.5% short. A little bit of logic tells you that if you were to manufacture two 2M Yagis, one would be for SSB/CW and the other for FM. Remember that 2M FM activity occurs between 144 and 148 Mhz. Knowing this you might center the SSB/CW antenna at 145 Mhz and the FM Yagi at 147 Mhz. Eureka! A few simple calculations and you will see that the 214-B is cut for about 145.25 Mhz or so. There is still the percentage problem. Why was the whole Yagi not scaled up by the same amount?

Due to the lack of ability to create aluminum rod, I decided to use the hacksaw and file method. Shortening D4 through D9 by the amount shown in figure 1 will adjust the antenna so that all the elements are cut for the same frequency. Referring to an article in HAM RADIO by Joe Reiser, W1JR, no boom correction is required with the Cushcraft style of mounting.

Now on to the driven element. In every article I've ever seen on Yagis, all of them say that the driven element length is not critical except for matching. The stock element length is acceptable on the 214-B. Digging deeper into the matching system you will find it is a T match without capacitors. The most important thing in this match is the 180 degree 1/2 wave coax balun must be the correct length. It does not make any difference if this phase line is 50 ohm (RG213) or 75 ohm (RG11). The 75 ohm will give a little broader bandwidth because it is closer to the ideal 125 ohm mean impedance. The Cushcraft balun as it comes is one inch too short! The proper length should be calculated by:  $1/2 \text{ wavelength} = 492/144.2 \text{ Mhz} = 3.4119 \text{ feet or } 40.943 \text{ inches}$ . Adjusting for the 0.66 velocity factor yields 27.02 inches. The desired operating frequency is 144.2 Mhz. On Cushcraft antennas you should allow two inches for the female connectors on the antenna. The correct resultant length is 25 inches tip to tip. The stock Cushcraft length is 24 inches. This length is important because if it is too long or short it will skew the pattern. Odd lobes will pop-up and the antenna gain will decrease as the parasitic elements are no longer centered. Always use a high quality coax of known characteristics, such as RG213. The correct length for a 214-FB FM Junior Boomer would be 24.5 inches.

Now for the antenna tune-up. Trial and error determined that the T match setting for 2M SSB/CW operation should be 10 1/16 inches from inside to inside as shown on figure 2. Cushcraft's old dimension was 6 5/16. The simple way to measure this is to go 4 1/2 inches from the center of the connector center pin to the inside of the T bars. Keep this balanced! As not having done a 214-FB you will have to do

some experimentation yourself if you have the FM model of the Junior Boomer.

The one last thing to consider would be a boom support, not to remove any boom sag, but to strengthen the antenna for ice loading. Frank Potts, NC1I, lost twelve 214-B's in ice storms when he was contesting from Washington, Mass.

The 2.2 wave NBS/Cushcraft/N1DPM 2m 12 element Yagi has a really clean pattern with one clean main lobe and a couple of small rear lobes. The front to back ratio is on the order of 20 dB to 25 dB, and the gain is unchanged from the 214-B's claimed (inflated) figure of 15.2 dBd. The real gain, as specified in the NBS notes, is 12.2 dBd. I believe the NBS notes more than the manufacturer's!

If you are so inclined to put up multiples of these, they should be stacked at: 9'7" vertically (H-plane) and 11'2" horizontally (E-plane). These stacking distances are courtesy of Steve Powlishen, K1FO, and were computer generated for best pattern versus array temperature. Good luck with your new *gimmick free* VHF Yagis. By the way, as for this article's title, if there is such a thing as a perfect antenna, everyone should have one! Use what works best for you.

Reprinted from October 1986 Zero Beat  
There is a part II to this article!

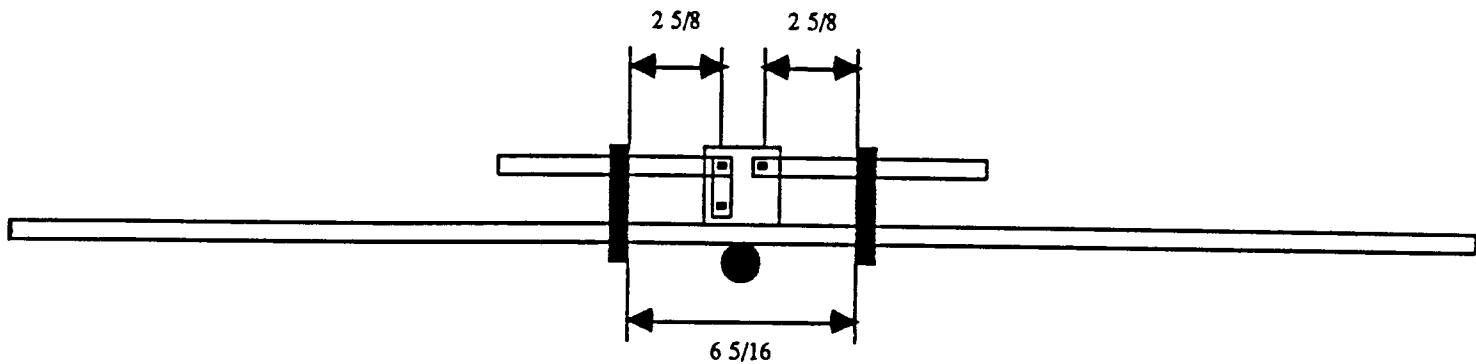
### 2.2λ 12 Element NBS/N1DPM Yagi

Frequency = 144.5 mhz

Spacing 0.2λ = 16 3/8 inches

Element	Stock Length	Percent of Error	Corrected Length	Remove each end
Reflector	40 3/16	-1.5%	40 3/16	0
Driven	38	-0.5%	38	0
Director #1	37 7/16	-1.5%	37 7/16	0
Director #2	36 9/16	-1.5%	36 9/16	0
Director #3	36 1/16	-1.5%	36 1/16	0
Director #4	35 9/16	-1.0%	35 3/8	-3/32
Director #5	35	-1.0%	34 3/4	-1/8
Director #6	35	-1.0%	34 3/4	-1/8
Director #7	35	-1.0%	34 3/4	-1/8
Director #8	35	-1.0%	34 3/4	-1/8
Director #9	35 9/16	-1.0%	35 3/8	-3/32
Director #10	36 1/16	-1.5%	36 1/16	0

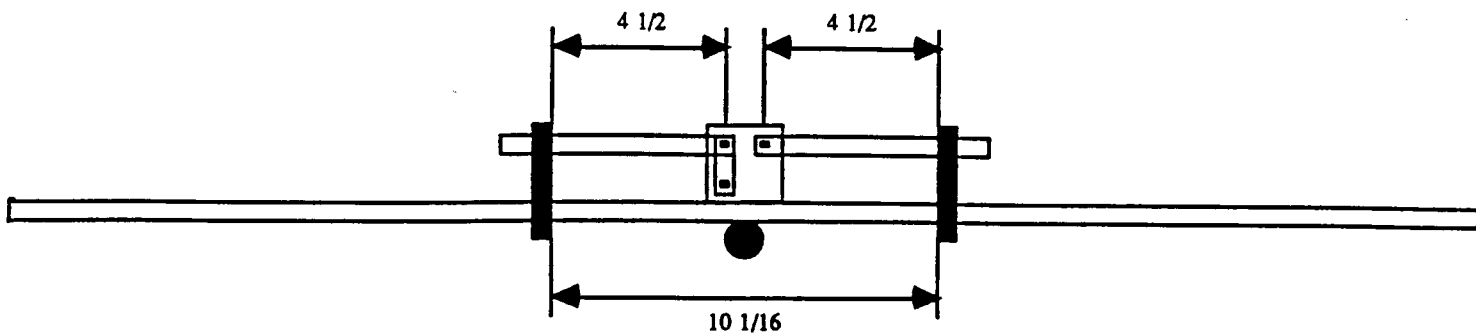
Figure 1



Stock Jr. Boomer

Figure 2

### NBS/N1DPM 12 Element 2.2λ



# Hampden County Radio Association, Inc.

P O Box 482  
West Springfield, MA  
01090 - 0482

## *Application for Membership*

Call Sign: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: (    ) \_\_\_\_\_ - \_\_\_\_\_ Listed: Yes \_\_\_ No \_\_\_

License: \_\_\_\_\_

Studying \_\_\_ Novice \_\_\_ Technician \_\_\_ General \_\_\_ Advanced \_\_\_ Extra \_\_\_

ARRL: Life Member \_\_\_ Member \_\_\_

VE: Advanced \_\_\_ Extra \_\_\_ Expiration: \_\_\_ / \_\_\_ / \_\_\_

Regular HCRA Membership is \$10.00 Additional family members residing at the same mailing address are FREE - no additional charge (please fill out reverse side for each family member) If you are under 18 years of age, dues are only \$5.00. Please consider including a donation to help support the club's future projects. All donations are tax deductible to the extent of the law.

Membership Dues \$ \_\_\_\_\_

Donation \$ \_\_\_\_\_

Total Enclosed \$ \_\_\_\_\_

Mail this form and a check made payable to HCRA, Inc. to:  
 HCRA, PO Box 482, West Springfield, MA 01090 - 0482  
 or bring to any club meeting.

### Scholarship Memberships Available

If any current member of the HCRA finds themselves in a financial situation where they can no longer afford to pay club dues, they should contact the treasurer. In certain cases the treasurer has been authorized to waive the yearly dues such that the individual can continue their status as a full member of the HCRA. Under this resolution only the treasurer and the individual involved would know of this arrangement.

If you find yourself in this situation please contact  
Greg Stoddard, NIAEH  
1500 Mapleton Ave  
Suffield, CT 06078  
(203) 668-5143 or see him at a meeting.

### HCRA Meetings

The club meets the first Friday of every month, except July and August, at the Feeding Hills Congregational Church, Feeding Hills, Mass. This is West of Springfield. Take route 57 West and at the intersection of routes 57 and 187, turn right. The church is immediately on your left!  
Doors open at 7:30 pm, meeting starts promptly at 8:00 pm.

**Next Meeting**  
**Friday September 6th**  
**Feeding Hills Congregational Church**  
*intersection of routes 57 & 187,*  
*Feeding Hills, Mass*  
**Guest Speaker: Joe Riesert**     **WIJR**

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