

10-91



price: \$1.50

# Zero Beat

October 1991

Hampden County Radio Association, Inc

Springfield, Mass

Our 44th ARRL Affiliated Year

## Next Meeting:

Friday October 4th

Guest Speaker: **Dave Robbins, KY1H**

(You saw his picture on the cover of the September issue of "CQ Magazine")

Topic: **Multi-operator Contest Super Station**

Doors open at 7:15, Technical Corner at 7:30

Meeting starts promptly at 8 pm

Next Board of Directors meeting: October 10 at KA1TBS's QTH

## Welcome New members!

Don Mish	N1JOI	Mark Formhals	N1IFW
Betsy Mish	N1JOJ	John Robertson	N1JBP
Scott Brough	N1JOH	Barbara Griffin	N1JOG
Norm Cournoyer	N1AFY	Lisa Nelson	N1JOF

## Radio Exams:

Westover AFB Pre-registration required!

Tuesday October 15th, 7 pm

Saturday Oct 19th, 6 pm

Saturday Nov 2nd, 6 pm

Tuesday Nov 19th, 7 pm

Saturday Dec 7th, 6 pm

Tuesday Dec. 17th, 7 pm

Westfield Evangelical Free Church

Walk-ins welcome

Monday, Oct 7th, 7 pm

Monday, November 11th, 7 pm

Monday, Dec. 9th, 7 pm

Contact Jeanette or Jack Plantinitis @ 413-786-1463

Nov. 2nd Minnechaug High, Wilbraham. 9 am

Contact York Phillips, K1BXE @ 413-566-3010

## In This Issue:

- New Club Award*
- Electro-static Discharge*
- SAREX Astronauts*
- Coax line loss determination*
- Tower Mounted Pre-amp control*
- WIJR's talk on antenna design*

## Upcoming:

- Club Auction Friday Nov. 1st, 7 pm
- YAGINEC for antenna designs*
- Achieving SSB signal Cleanliness*
- Receiver Noise Bridges*
- Special Marconi Memorial issue!*
- Special VHF Sweepstakes issue!*

## President's Corner

By

Bob Lafleur NQ1C

This past weekend, I participated in the amateur radio booth at the Eastern States Exposition. The booth was not sponsored by any club in particular, there were hams from throughout the northeast helping man the booth. We introduced the public to one aspect of amateur radio by taking messages from them to deliver to their friends and relatives. Many people had no idea that amateur radio provides this service. Working in this booth and talking to so many people about our great hobby was a real thrill to me.

We need to increase the public knowledge of what amateur radio is all about. A great way to do this is to set up displays at special events, such as the Big-E. Of course, the Big-E is a very large event, and takes a lot of planning and coordination to pull off a successful display, but smaller events can be organized and handled by a few people. Do you know of an event where an amateur radio display might be an interesting addition? If so, let us know, and we may be able to organize a club effort to run the display. We've done some of these in the past, with everyone involved having a good time. And each event always brings a few new faces into our group.

Would you like to work an amateur radio display at a public event? I personally know of a few people that I would call upon when organizing such an event. But maybe I don't know about you! So give me a call, and let me know that you'd like to help. I'll add you to the list and include you if we try to organize a demonstration.

I know, I know! I sound like an advertisement! But I feel very strongly that we need to increase public awareness of amateur radio, what it is all about, and how much fun it can be! Oh yes, and don't forget about the important services that we can provide. Many people have the impression of amateur radio as a mysterious cult, a group of electronic gurus, or a bunch of overgrown CB'ers!

So what can you do? Maybe someone you work with has been eyeing that HT you carry around all the time. Well, call someone up on the repeater, tell them you're going to put a guest on the air, and then hand him the HT and let him talk! That's legal you know, as long as you're there, and maybe he'll be hooked! How about that neighbor that is always complaining about TVI? Invite him over and show him your shack, make a few DX contacts for him. Maybe he'd really rather work DX than watch the football game, anyway. (Well, maybe he wouldn't give up the football game, but I'll bet he'd give up the gameshows!)

Bring a friend to our next meeting. Introduce them around, let them feel the excitement! Maybe they'll come to a future meeting with their own ticket in hand!

I'll see you--and your friends, at the next meeting!

73, Bob

## Technical Corner

By

Jim Davis KC1ZJ

Members are responding favorably to the concept of a Technical Corner. There still seems to be some apprehension to commit. This is understandable because this is a new idea and no one has seen how it will be conducted.

I understand that the project only allows for a few minutes to accomplish its goals. However, time can be set aside for more in-depth discussion or hands on. The time initially set aside was to find out how many were interested, the degree of involvement and the amount of material required. Extended sessions would be at the discretion of the guest speaker.

A sign up list prior to the meeting will allow us to estimate how much material to bring as well as which room to hold it in. If there is a large turn out, it may be used as a general meeting topic!

Here's a list of guest speakers and topics:

- |        |  |  |
|--------|--|--|
| 10/4   | 1. Joe Giannetti, NA1X                       | Radio Maintenance                              |
|        | 2. Art Zavarella, W1KK                       | Loop type Driven Elements, Feedline and Tuners |
| 11/1   | ANNUAL AUCTION NO TECH CORNER                |  |
| 12/6   | SHOW AND TELL NIGHT!<br>(GIANT TECH CORNER!) |  |
| 1/3/92 | Paul Geng, KA1WER                            | Rover Equipment/Operations                     |
|        | 2. Stan Hilinski, KA1ZE                      | Contesting Techniques                          |
| 2/4    | Frank Potts, NC1I                            | Hardline cables & connectors                   |
| 3/6    | Fred Gore, KA1TBS                            | Soldering Techniques                           |
| 4/3    | 1. Jim Sebolt, N1DUI                         | Repeater theory & operation                    |
|        | 2. John Balboni, AC1T                        | Repeater Design                                |
| 5/1    | Charlie Dunlop, K1II                         | Basic station setup                            |
| 6/5    | ANNUAL MEETING & AWARDS BANQUET              |  |
|        | Technical Assistance Committee:              |  |
|        | Stan Hilinski, KA1ZE                         | Tower safety; Contesting                       |
|        | Frank Potts, NC1I                            | EME operations                                 |
|        | Fred Gore, KA1TBS                            | Electro-static Discharge                       |
|        | Bob Lafleur, NQ1C                            | Computers for ham radio                        |
|        | Yorke Phillips, K1BXE                        | VE program                                     |
|        | John Balboni, AC1T                           | Repeater design; lightning protection          |
|        | Jim Usailis, W1EQO                           | Vertical antennas; Radiation                   |
|        | Joe Giannetti, NA1X                          | Radio maintenance                              |
|        | Art Zavarella, W1KK                          | Antennas, tuners; traffic handling             |
|        | Paul Geng, KA1WER                            | Rover equipment and operations                 |
|        | Jim Sebolt, N1DUI                            | Repeater operations; FCC rules                 |
|        | Jim Davis, KC1ZJ                             | Program Coordinator                            |

**HELPING BY BEING INVOLVED TOGETHER!**

## Determining Losses in Coax Lines

By

Don Johnson K7UGQ/1

Three common and inexpensive pieces of test equipment are all that is needed to determine the db and power (quality) of any hunk of coaxial transmission line.

- A. Common SWR bridge
- B. Dummy load of the same impedance as the coax under test.
- C. Transceiver (signal source)

Attach one end of the coax under test to the SWR bridge, the other end of the bridge to the transceiver. Place the transceiver in the PTT (push-to-talk) position, disabling the VOX feature. Be sure to remove all antenna tuners and low pass filters if installed.

Attach the other end of the coax to the dummy load. Tune up the transceiver, being careful not to exceed the capabilities of the dummy load. With the SWR bridge in the FORWARD position, adjust the gain or setting knob to 10 on the scale.

Remove the transceiver from the tune position. Do NOT change the gain/setting knob!. Disconnect the SWR bridge and attach the test coax directly to the transceiver. Insert the SWR bridge between the test coax and the dummy load.

Place the transceiver in the tune position and make note of the SWR bridge needle. The reading should be less than 10.

Compare the reading with that found in the chart below to determine the amount of loss in decibels and input power.

SWR reading	Loss in db	Loss in % of power
8.91	0.5	10.9
7.95	1.0	20.5
7.08	1.5	29.2
6.3	2.0	37.0
5.0	3.0	50.0
3.98	4.0	60.2
3.16	5.0	68.4
2.51	6.0	75.0

Since operating frequency will greatly effect the performance of coax, (higher the frequency, the greater the loss), it is recommended that you perform this test at the highest frequency you plan to use the coax. Be sure the SWR bridge can be used reliably at the highest test frequency.

Just in passing, try this procedure using your two meter coax line. You might be shocked at the losses!

## Editorial

By

Jeffrey J. Duquette K1BE

### Vote For Strong and Ethical Leadership!

There's an election coming for Western Mass Section Manger. Incumbent Jean Hurtle KA1IFC is being opposed by Bill Voersich W1UD. As Affiliated Club Coordinator and Public Information Officer I have worked for both of these people when they were SM.

I want to request that you vote for Jean Hurtle, KA1IFC, and continue the good work she has been doing. Jean has tried many new ideas to get more club activity going in the section, she has always supported my efforts, and she replies to all letters and phone calls with an answer within a day.

I would normally not write this type of an editorial, but there have been slanders and lies spread about Jean via the repeaters in the Berkshires. Certain people stand to gain in a selfish and unethical manner if Jean is not re-elected. I strongly urge you to cast your ballot for a strong Section Manager, who'll continue to work for the good of Western Mass, Jean Hurtle!

### Club Auction

The club auction is November 1 and is being held at the Feeding Hills Congregational Church, routes 57 and 187, FH, Mass. This is where the club normally meets. The fun starts early, so plan on getting there before the good stuff is gone.

Spread the word and help us advertise this event!

Dig goodies out of the cobwebs in the cellar to sell. Remember, the smaller stuff sells best. No old TV chassis, blown up tube CB radios, etc. Club still only takes 10% of every sale, a bargain when many clubs charge 15% plus!

More information in the next issue of Zero Beat!

### Last Issue of Zero Beat!

This is the last issue of Zero Beat you'll receive if you have not paid your dues. We'll miss your smiling face, funny jokes, and contributions to the synergy of the Hampden County Radio Association.

### Newsletter Exchange

The HCRA welcomes the opportunity to exchange newsletters gratis with clubs outside of the area. Contact the editor:

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

## Zap-Zing Electro Static Discharge (ESD)

By  
Fred Gore KA1TBS

Static electricity, everyone has heard of it. Most often we think of it as the shock we receive after walking across a carpet and touching a doorknob. ESD is a serious problem which endangers the quality and reliability of components and modules that we all use.

ESD is the generation of an electric charge created by a contact and then the separation of two materials. The constant movement of clothes in a drier for example, will build up a charge on the clothing. Imagine one sock building up a positive charge and the other sock building up a negative charge. When those socks are pulled apart, you will hear a crackling sound, that's ESD! The discharge is approximately 6000 volts, sufficient to destroy most components we handle.

Let's see how the parts are damaged. A printed circuit board and all components are designed to carry electrical current. When they are subjected to high voltage zaps the components and module are damaged. This type of failure is referred to as "device degradation". When a component or PC board is handled without static safeguards, (we'll discuss later on), the part or board can be permanently damaged. Rather than blowing immediately like a fuse, the component may develop a tiny crack too small to see or detect during testing. But under stress and use the part may fail in a few hours, days or months. These latent failures are nightmares, because you know it will fail when you most need it. Suppose the board or part failed right away when testing it for the first time. This is called "catastrophic failure".

So how do we protect our work area and equipment? There are clothes such as smocks, shoes, wrist straps, as well as protective mats, packing material, and other special materials available for the work area.

Some things that are high on the ESD list are the most common things we have on our workbench already: styrofoam and plastic cups, cellophane wrappers, cigarette packs, paper, packing material, and one of the worst we all use, regular masking tape.

Well, that's about it. When working on your expensive solid state gear, invest in a good grounding wrist strap, mat and ground your soldering iron. Invest now or pay the higher price later!

**FOR SALE:** Rutland RA4-50 four element six meter beam, as new, \$90.00; Junior Boomer, 2 meter modified beam, \$70.00; 9 foot stainless steel mast, 1 1/2 inch, \$50.00  
Jeff K1BE 789-1081

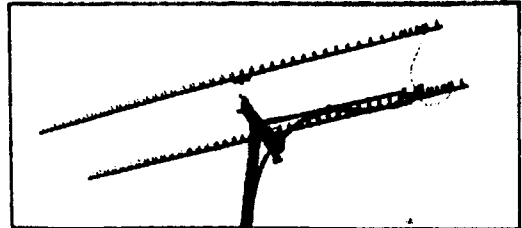
Method	ESD Voltages	ESD Voltages
	10-20% RH	65-90%RH
Walking across carpet	35,000v	1,500v
Walking across vinyl floor	12,000v	250v
Working on an average workbench	6,000v	100v
Common poly bags laying on bench	20,000v	1,200v
Work chair with polyfoam padding	18,000v	1,500v

### 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 \$285
SHF 1269K	1268-1272 Oscar Mode L	10mW	Kit \$140	Built \$285
SHF 2304K	2304-2308 MHz	10mW	Kit \$205	Built \$325
SHF 2401K	2400 MHz Mode S rev Conv		Kit \$155	Built \$255
SHF 3456K	3456-3468 MHz	10mW	Kit \$205	Built \$325
SHF LOK	540-600 MHz L.O.	50mW	Kit \$ 86	

### 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

# PRESENTATION ON ANTENNAS

delivered by  
Joe Reisert W1JR

## VHF and UHF Antennas

The spectrum above 50 MHz has special significance to the development of antennas and antenna arrays. This is the frequency range where you can build a really high gain antenna without owning a large piece of real estate. It is also the region where antennas can be tested easily in preparation for scaling them to the HF region. At the upper end of our frequency spectrum the antennas are more akin to optics. I'll divide this segment of the spectrum into two parts, the VHF and UHF regions. The two major types of antennas used in the VHF spectrum (50 to 225 MHz) are the collinear array and the Yagi structure. The collinear array usually consists of a group of 1/2 wavelength dipoles in front of a screen or set of half wave reflectors. In the later case, it technically could be called an array of two element Yagis. The unique thing about the collinear is the simplicity of the feed system which usually is an open wire line. The collinear is usually quite broadband, unlike most high gain antennas, and efficiency and gain can be quite high. The extended expanded collinear is a stretched out version that has less elements and was described in an article I wrote in Dec. '74 QST. Both the conventional and the extended expanded collinears were widely used in the days before good Yagi designs were available and are still in use by some 144 and 432 EME operators. This type of antenna has two main drawbacks: 1. It is large and hence it can be large enough, an expression the late Sam Harris, ex W1FZJ, used to use for antenna that couldn't stay up under adverse weather and 2. Its size usually prevents mounting other antennas on the same mast.

The workhorse in the VHF spectrum is truly the Yagi antenna. The first high gain VHF Yagi designs were published by Carl Greenblum (QST, Aug/Sept. '56), J. Kmosko, W2NLY and H. Johnson, W6QKI (QST, Jan. '56) and Dr. Hermann Ehrenspeck and H. Poehler (IEEE, PGAP, Oct. '59, pp 379-386). Unfortunately, these Yagis weren't always as good as claimed and had only fair cleanliness in the side lobe and front-to-back ratio. In Jan. '72 (QST pg 96 and March pg 101 corrections), Don Hilliard, W0EYE, now W0PW, published his 4.2 wavelength 15 element Yagi based on the unpublished works of Peter Biezbicke at NBS. Don and I urged Pete to publish his work and he finally did so in Dec. '77 in NBS Technical Note #688, now out of print. This publication was the result of extensive studies done by the NBS in the 1950's to develop high gain arrays for ionospheric scatter and included models with boomlengths of 0.4 to 4.2 wavelengths plus new

information on scaling and boom corrections. In August 1977 "Ham Radio" I published a full length article on the NBS report including all the necessary details to build your own Yagis and sketched several models for 50 thru 432 MHz. There are some errors in the NBS publication which are corrected in my article. Not correct was the gain of the 2 element Yagi which should be approximately 5.0 dBd, not 2.6 as reported by NBS (they must have had some measurement errors). The NBS Yagis are not the only Yagi designs available but they are easily duplicated and near the maximum gain attainable for the appropriate boom lengths. They have excellent patterns and are easily stacked for additional gain. One more point in passing. The trigonal reflector system in NBS 688 definitely is no good on the 3.2 wavelength and shorter booms. It actually reduces gain by up to 1.5 dB! By lengthening all three elements in this reflector system, I have been able to recover all the gain but no real gain improvement over a single reflector. I have not tested the trigonal reflector on the 4.2 wavelength designs. In Feb. 1978 QST, Wayne Overbeck, N6NB, published an antenna he named the Quagi. It is basically a Yagi using a quad driven element and reflector. It is low in cost using a wooden boom and fed directly with coax cable. DL9KR and others have done further optimization on the Quagi and have used arrays of 16 to do 432 MHz EME. This design could still use some optimization in gain and only a limited number of designs are available. Other versions of the Yagi have also been used including the log-periodic fed Yagi developed by the late Oliver Swan and now manufactured by KLM (See Ham Radio, Jan '76, pg 46). The log periodic antenna discussed earlier in this talk has never found much favor with amateurs since there is no need for the bandwidth and it has less gain than a well designed Yagi. Along these lines, we can now make high gain Yagis with clean patterns using the NBS designs. These antennas seem to stack well in larger arrays yielding the 20 plus dBs required for 144 and 220 MHz EME. One EMEer, Dave Olean, K1WHS, is using an array of 24 of the 2.2 wavelength NBS type Yagis stacked 8 feet apart for EME and he has worked stations all over the world who are only using single Yagis and moderate power.

Most recently, with the help of a large computer, a special program and a local person interested in the design of VHF antennas, we were able to develop a very unique Yagi, an 8 element one on a 12 foot boom for 144 MHz that had extremely high gain (greater than 11.5 dBd true gain) with excellent pattern (all lobes down 20 dB). It worked so well that I made 8 copies and first tested them on a 144 MHz EME DXpedition to Rhose Island where 25 stations were worked off the Moon in two nights of operation. Computers will undoubtedly be useful in the future as this work continues. UHF: The 420 MHz and up area is in a

transition region. Long Yagi antennas can be made with high gain such as the NBS and Guenter Hoch, DL6WU, types. The later designs are an extension of the Greenblum designs mentioned earlier and can be designed up to 20 wavelengths (see VHF Communications, #3 and #4, 1977, and #3, 1982). These designs show an increasing gain of approximately 2.2 dB for every doubling of the boom length which is about the maximum so far reported. Indeed I built a 9.25 wavelength (21 foot) 432 MHz Yagi using this design material and achieved a verified gain of almost 17 dBd at the 1981 Central States VHF Conference in Sioux Falls, SD.

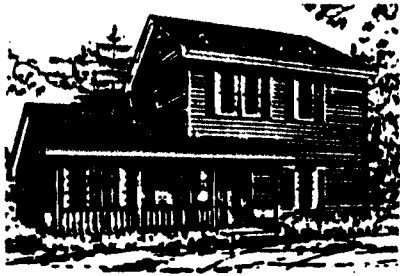
Long backfire ("A New Method For Obtaining Maximum Gain from Yagi Antennas", IEEE, PGAP, Vol 7, Oct. '59) antennas have been tried by the EMEers but gains have failed to live up to claims. The short backfire ("The Short- Backfire Antenna", H. W. Ehrenspeck, Proc IEEE, Vol 53, Aug '65) has been duplicated by myself and others and gains of approximately 15 dBi have been achieved. Perhaps more work should be done in this area as an array of short backfire antennas has the potential of higher gain without the problems of the surface tolerances on the parabolic reflector. Loop Yagi: Another popular UHF antenna is the loop Yagi developed in 1974 by Mike Walters, G3JVL (Radio Communications, RSGB, Jan '75 and Sept '78). Although it looks like a quad, it is distinctly different in that it uses wide but thin metal scraps for elements. Mike started out with wires but could never achieve high gains (like discussed earlier on quads). He recons that the wide but thin strap improves bandwidth and hence gain. The loops are bolted directly to a metallic boom thus solving the mechanical problems of mounting elements at UHF. It is a very practical antenna for 902 MHz and above and has worked well for me on 902, 1296 and 2304 MHz. G3JVL has even designed and tested to specifications a 10 GHz model. The principle designs use 26, 38 and 45 elements. The gain on the 45 element model (which is 16 wavelengths long) is 21 dBi! G3JVL has also published correction factors so that the loop width thickness and boom size can be scaled. Dishes: There is something esoteric about the parabolic dish antenna. It just has to work but the typical dish only has a 55% efficiency at best. Furthermore, it has a large wind surface. Therefore, it is not too popular except at frequencies where loop Yagis are no longer economical and for EME where it can often be mounted close to the ground. More on this subject later.

High Performance Arrays: I'd now like to turn to the subject of high performance arrays and more specifically EME (Earth-Moon-Earth) antennas. EME affords a unique property, viz. that due to the approximately 2-1/2 seconds it takes a radio wave to

traverse the 450,000 mile path to the Moon and back, the EMEer can make improvements to his antenna system and actually hear the difference by listening for his own echos. Furthermore, EME antennas have such high gain (typically greater than 20 dBi) that you can listen to the noise generated by the sun to measure beamwidth, patterns and hence determine actual antenna gain (see "Requirements and Recommendations for 70-cm EME", J. Reiser, W1JR, Ham Radio, June '82) as well as system noise figure. Large Yagi arrays are becoming increasingly popular especially for EME. WB0TEM has 24 5.75 wavelength 19 element Yagis on 432 while K1WHS has 24 14 element 2.2 wavelength Yagis on 144 MHz. Both stations have big signals and are able to work small (1 or 2 Yagi) stations off the Moon. However, the really big EME stations use parabolic dishes up to 40 feet in diameter! The advantages of a dish for EME operation are numerous despite the low (55%) efficiency (some commercial antenna manufacturers have claimed up to 80% efficiency but use cassegranian feed systems that are quite complex). First off, the feed system can be changed to permit multiband EME. Circular polarization is also possible by using dual dipole feeds or the W2IMU multimode horn. Dish type antennas are usually much quieter on reception because of low side lobes and hence are very desirable with the low sky temperatures experienced on 432 MHz and above. On 432 MHz where linear polarization is still predominant, the most efficient dishes are using the EIA symmetrical "E" and "H" plans and works well with a dish with a 0.45 to 0.5 F/D ratio. VE7BBG has such a feed with a W2IMU horn built into the center and has made cross band (23 to 70 cm) EME QSO's. A single dipole in front of a splasher plate is definitely not recommended due to its unequal "E" and "H" beamwidths! We still have a long way to go to improve efficiency and the offset parabola recently introduced to EMEers by W2IMU from Bell Labs has considerable advantages if the construction can become feasible for amateurs. Summary: The VHF/UHF frequency region is a good test bed for developing and improving antennas. Recent developments in the Yagi and loop Yagi have greatly advanced the state of the art in VHF/UHF communications. Antenna patterns have improved and hence the noise temperature of the antennas used is now more compatible with the state of the art preamplifiers. The NBS Yagi data now gives everyone interested a recipe for a suitable antenna without guesswork. EME antennas have taken a big leap forward in performance and made EME operation almost commonplace. We still need to do more work in the area of low loss feed systems especially for Yagi arrays.

(End)

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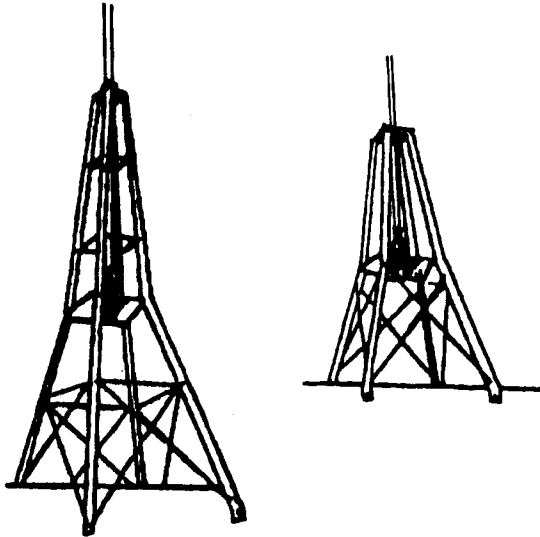


## Roof Mounted Towers

By

Jeffrey J. Duquette

Many homes today are designed like the one in this picture, with a family room off to one side, maybe over a garage. This presents a unique opportunity to put up a tower that will support large antennas. You've all seen the light weight roof mounts like the one pictured below. The advertisement claims you can have 21 square feet of antenna in 90 mph winds with this roof mount. Ha! No matter what the sales literature says, you can't put a large antenna system on this! (Unless you don't care that it may blow right off the roof.)



The design I'd recommend is bracket mount a Rohn 25 by installing a peaked roof mount, (PR25G) an eight foot flat top section, (25AG), and a house bracket. (HB25AG).

The drawing to the right shows the basic set up. The roof mounting bracket is lag bolted into the roof, hopefully into the joists. Apply weather proofing compound liberally. The house mounting bracket should be installed with 1/2 inch or larger bolts, that pass through the exterior wall and a 2x6 mounted inside the wall horizontally, across as many of the wall studs as possible. If you don't have access to the interior wall space, lag into the studs. Use large washers and tighten the bolts until the washers dig into the wood.

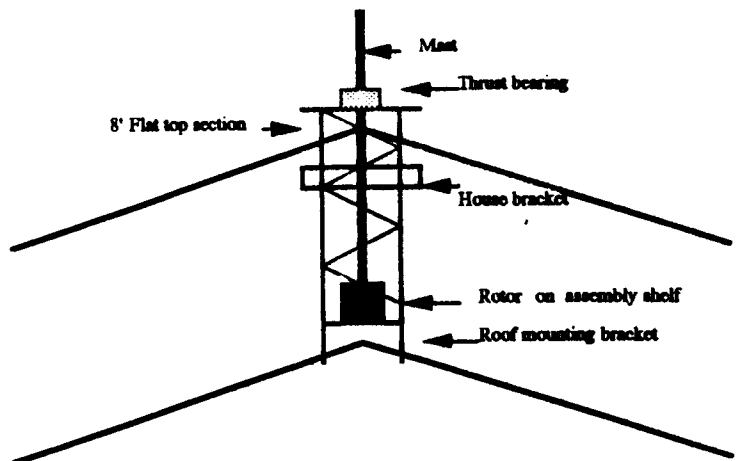
The section of 25AG is installed like any other Rohn section. Don't forget to install the plate for your rotor and the rotor itself prior to putting it on the roof mount. I

recommend using the lowest rung on the 25AG. A load bearing should be installed at the top where the mast passes through. (See W1JP's article on calculating the moment or load you can expect from different wind loads and what the different sizes of mast can withstand without failure in past issues of Zero Beat.) You can purchase a thrust bearing or make one from wood, plastic, or Teflon. (See my article on homemade bearings in past issues of Zero Beat.)

You can climb onto the higher roof using the tower as a ladder, to drop the mast into place. Antenna installation, changeover, and maintenance is much easier because you have a nice, solid roof to stand on. I would give figures for how big you can make the antenna farm, but without knowing which mast, and how long it is, they would not be valid. Suffice to say that the mast is what will fail, not the tower!

Parts list: (All Rohn designations)  
 25AG 8' Flat top section  
 HB25AG House bracket 15"  
 AS25G Assembly shelf for mounting rotor  
 PR25G Peak roof mounting bracket  
 TB3 Thrust bearing for 2" masts

P.S. I have all of the above items, brand spanking new, plus a used HD-73 rotor, and a special order aluminum 2" mast about 14 feet long. You can have everything for \$500, my XYL didn't think much of this ideal



## Reprinting Articles

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# Tower Mounted Preamp Control

By  
Fred Stefanick N1DPM

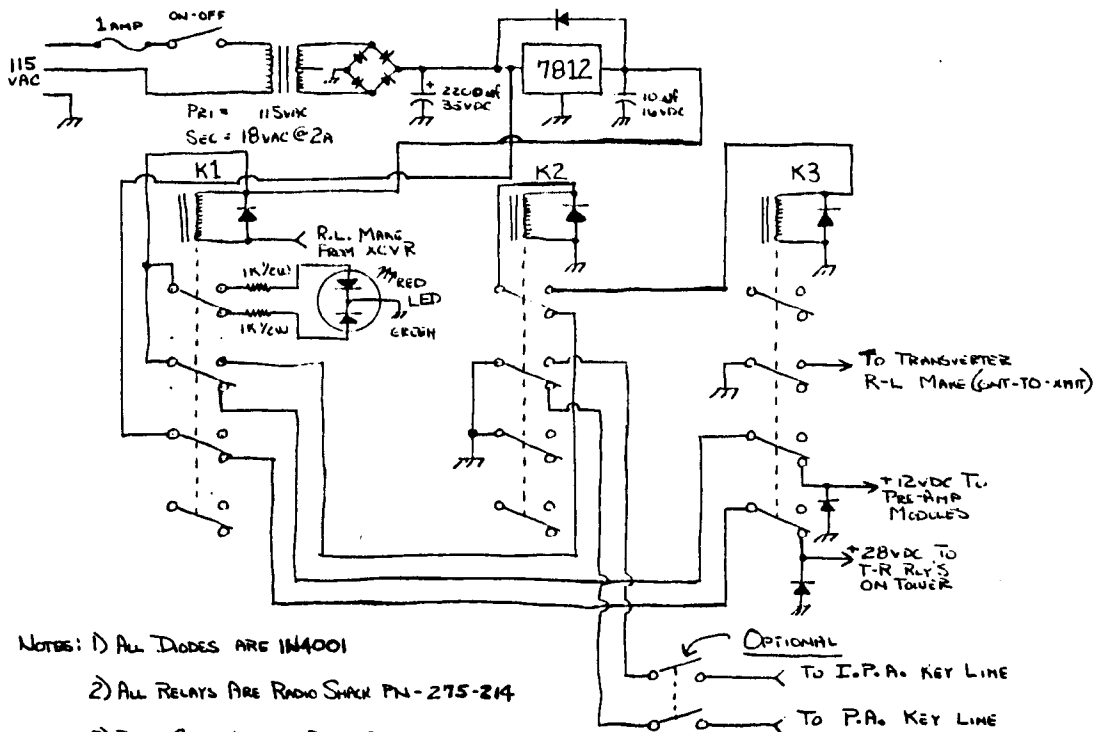
In an effort over the past four to five years to perfect my tower mounted GASFET preamps, I've arrived safely at this system. First this applies only to those of us running transverters or that are capable of utilizing the "two feedline system". Also the unit has self-contained power supplies, and is capable of handling up to six bands worth of preamps! All the parts for this unit are available at your local Radio Shack store at minimal cost, in comparison to the cost of a blown preamp. The coax relays used should be high quality with enough isolation so that the preamp doesn't get damaged. Proper minimum isolation is shown in the table below. Two relays could be put back to back for increased isolation, with the coils wired in series or parallel.

To insure trouble free operation the coax relay coils should have diodes installed across them to prevent turnoff transients. This unit, along with controlling the tower preamps and T-R switching, also provides sequentially switched outputs for the R-L make on your transverter, intermediate amplifier, and your high power amplifier, with a standby or operate switch or switches for the amplifier.

I have successfully used this system on three bands: 144, 220, and 432 for about one year. Semi-breakin CW operation is safe because of the proper sequencing, even at 1.5 KW! Good luck with the new tower preamp and see you on the bands!

73 de Fred N1DPM  
Reprinted from April 1987 Zero Beat

Transmitter power output in watts	Minimum safe isolation in dB
1	30
10	40
50	47
100	50
200	53
500	57
1000	60
2000	63



- NOTES: 1) ALL DIODES ARE 1N4001  
 2) ALL RELAYS ARE RADIO SHACK PN-275-214  
 3) DUAL COLOR LED IS RADIO SHACK PN-276-075

N1DPM - TOWER GAS-FET SEQUENCER CONTROL



## Financial Report

By  
Greg Stoddard N1AEH  
Club Treasurer

<u>Bank Balance June 2, 1990</u>	<u>\$2276.34</u>
<b>Revenue:</b>	
Memberships:	\$1537
Flea market	732.85
Donations	486
Auction	300.50
Callbooks	218.25
Coffee	150.80
Raffles	90.50
<b>TOTAL REVENUE:</b>	<b>\$3515.90</b>

<b>Expenses:</b>	
Zero Beat	\$927.86
Insurance	812.68
Postage	803.56
June banquet	446.19*
Meeting hall	280
Field Day	288.70
Repeater (electricity)	210
Donations	166.20
Christmas banquet	165
Speakers	49
Miscellaneous	38.44
<b>TOTAL EXPENSE:</b>	<b>\$4187.63</b>

BANK BALANCE JUNE 19, 1991 \$1604.61

Balance: Repeater equipment \$2301.77  
Balance: HF equipment 479.90

\*( \$260 radio + about 100 + left and coming)

### Congratulations!

Lisa Nelson N1JOF  
Bobbi Griffin N1JOG  
Scott Brough N1JOH

### New Associate Editor of Zero Beat

Welcome:  
Norm Jacques N1GYN  
25 Columbus Ave  
Holyoke, MA 01040

Norm can scan pictures into his IBM, or type articles for you. Contact him at 536-3990

Now carrying Coy Antennas  
for 144, 222, & 440!  
Four foot boom with rear mount,  
perfect for apartment dwellers, rovers.

We carry Belden cable, Amphenol connectors!  
Visa, Mastercard, or cash.

## Editorial Comment

By  
Jeffrey J. Duquette K1BE

If you just skipped over the financial report, shame on you for not caring about the club! If you're not someone who can balance a checkbook, let me say that the club spent more money than they took in last year. Shades of Mike Dukakis!!!!

The dues were raised this year for the first time in years. The dues were always intended to cover basic expenses: Zero Beat printing, postage, meeting hall, insurance, etc. Postage is going up again to 30 cents, and Zero Beat is costing 75 cents per issue to print. At ten issues per year, that is \$10.50 for each member. And I had hoped to put out several big issues, which cost even more money to print!

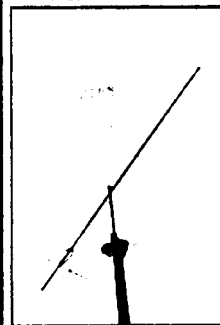
The bottom line: dues can go to \$15 per year range to cover basic expenses, or the board of Directors can cut back on everything. The surplus in the budget is the result of years of scrimping and saving. We'll spend most of that this season if we just repeat everything done last year. What do you as a member want? Zero Beat could be issued every other month, and have fewer pages. Or postcards could be sent out regarding meeting notices.

Tell the board of Directors what it is that you want, a "no-frills" club or a vibrant, alive organization. Ask for a dues increase next season that meets the survival needs of the Hampden County Radio Association!

### PRESENTING THE RAB-2UWB

EIGHT ELEMENTS, TWO METERS, ULTRA WIDE BANDWIDTH  
THE PERFECT MATE FOR YOUR ALL MODE TRANSCEIVER

Model RAB-2UWB



\$84.95

#### ELECTRICAL SPECIFICATIONS:

Gain ..... 13.3 dBi +/- 25  
E-Plane beamwidth ..... 40 deg  
H-Plane beamwidth ..... 45 deg  
Bandwidth ..... 4 MHz  
Sidelobe attenuation  
1st E-Plane ..... -20 dB  
1st H-Plane ..... -14.5 dB  
SWR < 1.5:1 144 to 148 MHz  
F/B ratio ..... 22 dB

#### MECHANICAL SPECIFICATIONS:

Length ..... 11 ft. 9 in.  
Stainless Steel hardware  
except U-Bolt  
Mast ..... up to 1 1/2" diameter  
Wind survival ..... 90+ MPH  
Aluminum: 6061 T-6  
Element Insulators: Black Delrin  
Coax connector: N-type  
Weight: 3.5 lb.

#### ALSO AVAILABLE

FO12-144, FO15-144, FO22-432, FO25-432, FO33-432, FO16-220, FO11-440  
POWER DIVIDERS ..... FO22-432 ATV ..... STACKING FRAMES

We supply those hard to find parts for the home builder  
1/4" Delrin insulators \$9.50/50, 1/4" Stainless keepers \$8.75/50  
Add \$3 UPS S/H for each antenna \$5 West of the Mississippi  
PA residents add 6% state sales tax  
SEND FOR OUR NEW CATALOG TODAY

#### RUTLAND ARRAYS

Communications Accessories  
Fred Gore KA1TBS  
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## Astronauts Appreciated By Local Hams

By

Norm Courmoyer N1AFY

This is a story that I thought you might enjoy. This story starts in late July when I learned that two of NASA's astronauts were going to visit my place of employment. This is something that occurs on occasion. They usually visit in order to bestow the prestigious Sliver Snoopy Award to deserving people. This award is an astronaut award for outstanding performance on the Space program. I was told that Jay Apt and Jerry Ross would be visiting. When I heard that these two people would be the ones to visit I suddenly realized that they were part of the all ham crew of STS-37 which flew in April 1991. This was a historic mission for Amateur Radio. The SAREX (Shuttle Amateur Radio Experiment) was performed in which the first ATV signals were received by the shuttle while in orbit.

My thoughts turned to something that had not been done before to my knowledge. Why not give the astronauts a memento of their special mission and SAREX? I proceeded to make some contacts in order to try to do this. After much conversation I finally got permission to make the presentation. I got together with some other hams that also work at Hamilton Standard and came up with the design for the presentation. Together with K1YON and K1VGR we collected as many QSL cards from employees that we could get in a very short time. The ARRL sent us the front cover from the QST that showed the crew with the shuttle. We took this along with the QSL cards and arranged them in a frame with a Gold Plaque, personalized for each astronaut.

We were invited to have steak and egg breakfast with the astronauts in the senior staff dining room at HSD. After breakfast the presentation of the "Snoopy Awards" were made and then we were given the opportunity to make our presentation. Both Jay and Jerry were very pleased and surprised. We had some very interesting conversation about Amateur communications in Space. The day finished off with some pictures and some very fond memories for us.

I asked when we might see an orbit that would make it possible for us to communicate with the shuttle

and join in the SAREX communications. Jay told me that a polar orbital flight was being planned for 1993.

This has been a very memorable experience for me which I will remember for a very long time.

One final note, Jay Apt is N5QWL and Jerry Ross is N5SCW. They both can be reached via Johnson Space Center Amateur Radio Club Station W5RRR. Jay told me to contact him at any time through the club station.



## More Than You Ever Wanted To Know About The Mailing Label On Zero Beat

By

Jim Sebolt N1DUY

I have manually entered all of the membership data into my database file, which will now produce the Zero Beat Mailing labels. If any errors have gotten into the data, the new format has built in verification.

Introducing the new mailing label format. The first line looks like this:

WV1XYZ C V E A 123 M 10/91

<C> Class of operator license

E=extra, A=advance, G=general, T=technician N=noVICE

<V> VE Accredited

V=VE extra, V=VE advanced, N=no, X=not eligible, Z=unknown

<E> Emergency Communications

A=ARES, B=ARES&CD, C=CD (RACES) N=NO, Z=UNKNOWN

<A> ARRL member

L=life, A=individual, A= family, N=no, Z=unknown

<123> Data Base Record Number

<M> HCRA member type

L=life, I= individual, H=household, F=family in household, E=associate

<10/91> Month/Year membership thru

If ??? appears at the end of your street address line, please supply a complete address, as the ZIP+4 could be more accurate. Please verify information and advise me of any corrections or changes. The labels are printed a month or so in advance, so any updated information will not appear on the next mailing.

## HCRA VHF/UHF/SHF AWARDS

### New Awards For Club Members

As a member of the HCRA, you can now earn an exclusive award. The intent of this award is to create and improve interest and use of the VHF, UHF, and SHF (microwave) bands. Along with the increased activity, this will also promote technical expertise in the VHF-UHF-SHF frequency spectrum, which our club has been known for throughout its' history!

#### RULES:

1. To be eligible for this award, you must be a member in good standing of the Hampden County Radio Association..
2. Points earned in any ARRL VHF/UHF-SHF-EME contest count towards these awards.
3. Scores must be listed in QST to count towards the awards. This is how your score will be confirmed.
4. Three categories of awards will be available:
  - A. 10,000 points!
  - B. 100,000 points!!
  - C. 1,000,000 points!!!
5. Points for these awards are cumulative, contest to contest, with no time limit.
6. Points for these awards will be scored per the appropriate ARRL contest entry rules. (See rule #3.)
7. Awards contest commences on January 1, 1992.

#### CATEGORIES:

1. MULTIOPERATOR: Any station with more than one operator regardless of the number of bands you're on.
2. SINGLE OPERATOR: Any station with only one operator.

Multioperator category will also encompass the ARRL's "LIMITED MULTIOPERATOR" category. It may also include the "ROVER" category if the maximum allowable operators for that category are used. (2)

Single operator category will include "QRP-PORTABLE" and the "ROVER" category if only one operator is used. This category will also include all of the operators of a multioperator station that are HCRA members.

For example, W1NY turns in a score in the January VHF Sweepstakes of 150,000 points. W1NY has 5 operators that are HCRA members: NC1B, NC1I, AC1T, W1KK, and

N1DPM. W1NY would be listed in the multioperator category with 150,000 points. AND the five operators would be listed in the Single Operator category each with 30,000 points. (150,000 divided by 5 = 30,000) This is to encourage multioping without losing your "personal" single operator status for that contest.

Note that N1DPM and the others can also operate his home station and rack up additional points in the single operator category!

Let's say that W1NY had a 6th operator that was not an HCRA member, then the 150,000 points would be divided 6 ways giving individual operators 25,000 points each. This is done so that multioperators are not tempted to run with "hired guns", but to draw on the resources within the club.

#### HOW TO ENTER:

A postcard with your callsign and points submitted sent to K1BE are all that is necessary. You do not have to submit logs or photocopies to the club. However, the score is not officially counted until listed in QST's contest report. This is to make sure it is sent in. Multioperator stations should send a more complete listing, perhaps a copy of the summary sheet.

Jeff Duquette, K1BE, 18 Anvil Street, Feeding Hills, MA 01030-1530 will coordinate this and keep all of the records.

Calls will be printed in Zero Beat periodically (June, September, and January), with totals to date. (This assumes the results were available from QST in time.)

While you must be a club member to qualify, you are NOT required to submit your scores for the HCRA during club competitions. (We'd have no way of knowing, anyway!)

#### AWARD PRESENTATIONS:

Awards will be presented at the annual June banquet. The awards for 10,000 and 100,000 point categories will be a frameable certificate. These will be numbered! (Who'll get #1?) The award for the MILLION POINTS category will be a nice plaque.

Let's all get out there and strive to win some of these awards and get activity level up on ALL these bands, not only during contests but at other times as well. Remember, we lost 220-222.0 Mhz primarily because the groups that wanted it showed the FCC that the amateur community was not using that frequency spectrum!!! LET'S NOT LET THAT HAPPEN AGAIN!

# First Class

Next Meeting:

Friday October 4th

Guest Speaker: **Dave Robbins, KY1H**

(You saw his picture on the cover of the September issue of "CQ Magazine")

Topic: **Multi-operator Contest Super Station**

Doors open at 7:15,

**Technical Corner at 7:30**

Meeting starts promptly at 8 pm

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!

**Hampden County Radio Association, Inc.**

**P O Box 482**

**West Springfield MA 01090-0482**

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