



N.E.W.S. LETTER



The Publication of the North East Weak Signal Group

MARCH 2001

VOLUME NINE

ISSUE TWO

President: W1GHZ Paul Wade
V P: WA1MBA, Thomas Williams

CURRENT OFFICERS

Secretary: N1GJ George Jones
Treasurer: N1DPM Fred Stefanik

NEXT MEETING

**THE NEXT MEETING IS ON SATURDAY MARCH 17TH, 1:00 PM
AT THE HARLEY HOTEL IN ENFIELD**

**OUR SPEAKER WILL BE STEVE POWLISHEN, K1FO, ANSWERING THE QUESTION:
"SHOULD I BUY (BUILD) A PREAMP?
"IF SO, SHOULD I PUT IT AT THE ANTENNA?"
AND POSSIBLY STEVE'S KENWOOD TS 2000 COMMENTS**

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FROM THE PRESIDENT **PAUL WADE W1GHZ**

March meeting: We aren't planning any inclement weather for March 17, so come out to the next N.E.W.S. meeting and help make it a success. Our speaker will be Steve Powlisken, K1FO, answering the question:

"Should I buy (build) a preamp?"

"If so, should I put it at the antenna?"

If time permits, he may also tell us a little about his new Kenwood TS-2000 radio.

Club project? At the last meeting, KB1VC and I demonstrated some PCB design software and the "Miniverter" made using it. There is a short write-up of the Miniverter in this issue, but it really isn't ready to be a club project. But it might have inspired you to think about a better project - if so, please bring your ideas to the meeting. I'll be bringing another new board, for my 24 GHz project, to the meeting.

Contest: I heard and worked many N.E.W.S. members in the January VHF Sweepstakes, and hope you enjoyed it as much as I did. We had enough snow scatter to make a few 10 GHz contacts on Saturday, and a short six-meter opening to Florida on Sunday afternoon. The amusing thing was the calls coming out of Florida that I worked: 1W1, 6 W2s, 3 W3s, 4 W4s, 1 W5, 1 W8, 1, W9, 1 W0 Guess it was only open for snow-birds!

Summer meeting: We have confirmed the Knights of Columbus pavilion for the July meeting, July 21. Thanks to Tom, W1NWE. We had a great time there last year.

Paul W1GHZ

SECRETARY'S REPORT OF THE NEWS **BOARD MEETING 1-6-2001**

Due to transportation problems, President Paul Wade, W1GHZ, was not on hand to start the Board Meeting. Board member Tom Williams, WA1MBA, called the meeting to order at 11:50 AM. Also in attendance were Art, W1TDS, Bob, W1COT and Ron, WZ1V.

Art, W1TDS, brought up the possibility of meeting at Westover AFB to take a tour of a C5A. It would be in place of our usual May NEWS meeting. Also, it might be possible to arrange for a noon meal at the Base Mess. It will be brought up at the main meeting for further discussion.

Art also brought up the subject of placing a 10 GHz beacon on Mt Graylock in western Massachusetts. This will also be dis-

cussed at the main meeting. On the subject of beacons, the W9IP beacon in upstate New York is in need of some equipment. Maybe someone at the main meeting can offer equipment, ideas, etc. The status of the W1RJA beacon was also questioned.

Further discussion was held on finalizing meeting dates for the remaining NEWS meetings in 2001.

The meeting was adjourned at 12:03 PM.

SECRETARY'S REPORT OF THE NEWS **GENERAL MEETING 1-6-2001**

The general meeting was called to order by President Paul Wade, W1GHZ, at 1:07 PM. Attendees introduced themselves and the attendance sheet was passed around for everyone to sign in. Stan, WA1ECF, reported that he lost the race for ARRL EMASS SCM. Del, K1UHF, reported that he now has the new software required to put out the NEWS Letter. Tom, K1KI, ARRL New England Division Director, officially joined NEWS and also presented to The NEWS Group, the Gavel for finishing in first place in the ARRL 2000 VHF Contest, Medium Size Club competition. Tom also reported that Fred, N1DPM, won the Low-Power individual competition and K1TEO won the High-Power individual competition. Congratulations to NEWS and its members!

Everyone in the club was encouraged to enter the 2001 ARRL VHF Contest coming up on 20 and 21 January. It was suggested that we all look around for fellow NEWS members to work during the contest. It's a great way to build up your own score and boost NEWS in the Club competition. Be sure to fill out the club entry space when you send in your official results. If you send in your score electronically, you will need to send it in Cabrillo format. Paul, W1GHZ, has a program for converting to Cabrillo format on his WEB page: www.w1ghz.cx. If you need contest forms, they can be downloaded from the ARRL WEB Page.

The W1RJA Motorola 2 meter beacon transmitter at the W1VHF site needs a new crystal. It should be in operation in about a month. The antenna will go back up on the tower when the weather is better. The controller is now rebuilt and working. Money given by the NEWS Group last year is covering the costs involved.

The W9IP aurora beacon is in trouble and needs some new equipment to put it back on the air. After discussion it was concluded that the old W1RJA Motorola transmitter would do the job. Moved and seconded that the NEWS Group send the old W1RJA Motorola transmitter to W9IP. Passed. It was decided to table the remainder of the discussion until the March meeting.

The question of placing a 10 GHz beacon on Mt. Graylock was brought up for discussion. The new unit would be placed in the

K1FSK monopole already in operation at their site. Del, K1UHF, is ordering the keyer chip. He needs to know the exact grid. There is still some question about fitting the equipment inside a 4 inch diameter pipe. NEWS should checkout other frequencies in use at the site. This will also be looked into and brought up at the next NEWS meeting.

Tom, K1KI, presented the NEWS Group with a Antenna CD as a gift from ARRL. A quick raffle was organized and the winner was Del, K1UHF.

Paul, W1GHZ urged NEWS members to pay their dues to our treasurer, Fred, N1DPM.

The remaining NEWS Group meeting dates were discussed. The next meeting will be held on 17 March. Art, W1TDS, reported that he was looking into getting the NEWS Group to tour a C5A aircraft at Westover AFB. The Club would meet at Westover for the tour and possibly have lunch at the Base Mess. The cost of lunch would be about \$10. A show of hands indicated lots of Club interest. The date will be either May 5 or May 19. Art will report final details at the March meeting. The summer meeting will be held 21 July, again at the K of C Picnic Grounds in Enfield. Bob, W1COT, will contact Tom, W1NWE, about arranging for the use of the K of C facility. The late summer meeting will be held in conjunction with the Eastern VHF/UHF meeting, 25 and 26 August at Enfield. The date for the November meeting will be finalized at the March meeting.

The 2002 Microwave Update Conference is tentatively planned to be held concurrently with the Eastern VHF/UHF Conference- probably in late October. The site would be in the Springfield-Worcester area. It was emphasized that both meetings would retain their own identities and share a common site and time. A committee was set up to help make all the arrangements. The committee will be chaired by Matt, KB1VC, and include Tom, WA1MBA, Mary, N1VH, Ron, WZ1V, Mark, K1MAP and Stan, WA1ECF.

Dale, AF1T, passed out some data sheets/catalogs to the group and a short break was taken.

Paul, W1GHZ, conducted a Duct-Tape auction. Everyone who bid got some real goodies ?? to take home. Part of the proceeds from the auction was turned over to the club treasury.

The final event on the program was a talk by Matt, KB1VC and Paul, W1GHZ, on PC board design and layout. Paul showed a two meter transverter built on a board designed using the techniques discussed. It was suggested that the NEWS Group might use this as a club project. The transverter was designed to work with a Radio Shack 10 Meter Transceiver.

The meeting was adjourned at 4:00 PM.

SOUTH EASTERN CONFERENCE

The SOUTHEASTERN VHF SOCIETY will host its FIFTH ANNUAL CONFERENCE April 20-21, 2001 at the Holiday Inn Select-Brentwood, in Nashville TN. The program will include presentations by antenna specialist L. B. Cebik W4RNL, EME enthusiast Bob McGraw K4TAX, Owen Wormser K6LEW and many other VHF+ operators.

In addition to the technical program/presentations and conference proceedings, there will be pre-amp noise figure testing (50-1296 MHz.), antenna gain measurements (144-2304 MHz.), a flea market, vendor sales & displays, the SVHFS auction, VUCC card checking, and annual business meeting. On Saturday night we will have the annual banquet with guest speaker Emil Pocock W3EP, author of the QST monthly column "The World Above 50MHz.", presentation of the K4UHF award and many door prizes.

The conference registration page is found at www.svhfs.org, follow the link to the conference info.

If you would like more details, or a copy of the current newsletter, or to be added to the SVHFS mailing list contact Robin Midgett KB4IDC via E-mail at KB4IDC@arrl.net. If you would like to give a presentation on a particular VHF+ related topic at the conference, please contact Dick Hanson, K5AND via E-mail at dhanson@southernstaircase.com. The SVHFS mailing address is SVHFS Inc., PO Box 1255, Cornelia GA 30531.

Reservations for the Holiday Inn Brentwood may be made by contacting the hotel at 615-373-2600. The hotel website is found at <http://www.hotel-nashville.com/holidayinn/>; it also has informative links to Nashville area attractions & restaurants. A block of rooms is being reserved at a group rate of \$80.00 per night until March 2nd, 2001. Mention the SVHFS 2001 Conference to get the group rate.

Thank you for your consideration,
Robin Midgett KB4IDC
SVHFS Conference 2001 Publicity Chairman

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SINGLEOP SUPERSTATION

The whistle blows that night, like it always does, at 5:15. I take off my safety goggles, put on my Ray-bans, and walk out into the cool night, across the street, and into the bar.

My name's Walter, and I work in the lab at Extrusix. We make that orange stuff that pours and spreads and melts and looks and tastes like the stuff that cartoon people might call cheese. We make it for all the big fast food chains and we even sell it retail. If you've ever squirted a can full of ChezeOoze into your mouth, you've eaten the junk that I help make.

So, I walk into the bar and the place is packed. But I see an empty stool and belly up. The guy next to me is a taste tester with the company. I've never seen him before, but I know he's a tester, 'cause he's wearing the unofficial uniform T-shirt. On the back it says, in big orange letters, "Will Eat for Food." How anybody can stand that job, day after day, is beyond me. Besides the shirt, I notice a couple other things: He's got a pretty good glow on, and he's clutching a copy of QST in his hands.

"So, are you a ham?" I says. But he doesn't answer like you'd expect.

"Valentine's day, 1998," he says, "You know, I remember the last thing I says to her was 'Oh yeah? Well I been kicked out of classier places than this one.' Next thing I know, I'm lookin' at the doorknob that I installed in the door that I hung on the house that I paid for. She never let me back in; mailed my stuff to me and I've been living in an apartment ever since."

I grunt some kind of noise that I think might sound sympathetic. Then I look at the cover of the QST in his hands. He sees my gaze.

"Nice house on the cover, huh? Well it's mine. Or it used to be mine. Now its hers."

"Holy cow!" I says, "you sure got a really nice setup there. Must have been tough to take it all down and sell it after the divorce." I regret it as soon as I say it, but we've all been there once or twice -- you hear on the repeater that your buddy Silas has been given the boot and help him get the gear out of the house before the Sheriff or the ex-wife does it for him.

He corrects me, "I HAD a really nice setup. But that's her QTH. She added the second and third towers after I was gone."

Then I see the caption on the picture: "The Contest Superstation of W0XYF." I'd heard her on the bands: good fist, great signal, fast, efficient in pile-ups, and ears that can

hear bees burp in Uruguay. W0XYF had made a real mark on every band from 160 to 10 gigs, breaking single-op records left and right.

He sees the flash of recognition in my eyes. As if it were possible, he shrinks a little more. Now he looks like one of those balloon things in the Macy's parade after half the air's been let out. I order a beer, a Sam Adams somethingorother. "So, can I buy you one?" I ask.

"Thanks, but no... Bad ticker."

"On top of all that, you got a bad heart?" I ask.

"Naw," he says, "I dropped my watch in a glass of Sam Adams lager once and it hasn't worked right since. I've sworn it off. Too much stuff in it -- you know -- whatever they make beer out of. So, I'll have a Miller instead."

"Yup," I says, "not much beer in that."

"It all tastes the same."

We drink for a while, both staring straight ahead. I'm thinking about how, with taste testers like this guy, the quality control at the plant might not be all that good.

"You know, she got her first license to make me happy." He smiles for just a second or so, then the light in his face goes out again. "After she threw me out, she upgraded. That wasn't so bad. Then she got one of those vanity calls."

I didn't think she'd have gotten W0XYF at random. "Gee, that must have stung a little."

"A little," he admits. "But then she started contesting. She went into it with both feet and everything. Her first time out, she kicked some major butt in the Phone sweepstakes. Then she got into the VHF stuff. You know how a woman's voice seems to get through the QRM better..."

I grunt some encouragement to him. "Yup, I can see how a woman's voice would give her a bit of an advantage over you and me."

"That's what I thought," he says, "but then she kicked my butt in the CW sweepstakes, straight key night, the RTTY roundup, and even a slowscan contest or two. 'Course she was using my--uh her station, and I wasn't."

"Yup, that was probably it."

"No, not really. She came out tops in her section, tops in 0 land, and fourth place in the US for CW sweepstakes. Didn't do too much worse in the others."

I'm running out of things to say to him. We drink some more and stare at the bar some more. But there's a question inside me that I know I shouldn't ask, but it pops out anyway. "So, why'd she throw you out?"

At this the last bit of air seems to come out of him in a long sigh and a look that could make Mary Poppins stick her head in the oven. "As she tossed me into the front yard, she hollers at me: 'For my birthday you gave me a \$@(# blender. For our anniversary I get a @)#(! shop-vac. For cryin' out loud, is it too much to ask for ROSES ON VALENTINE'S DAY!'"

Not much you can say to that, so I just stare into my glass. He slides off the bar stool and turns to the door. Just before he leaves, he turns to me with a bewildered look on his face and says, "Jeez, I thought that a dual-band HT was a pretty nice gift."

(Editor's note: Remember, guys, Hosstrader's is on the 4th and 5th of May this year. Mother's Day is on the 13th. This means that you can do your last minute Mother's Day shopping at a real store rather than the flea market.)

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2 METER MINIVERTER **- A TINY TRANSCEIVER** **PAUL WADE W1GHZ ©2001**

Last fall I acquired a used 10-meter mobile rig, an HTX-100, with the hope of using it as an IF radio for microwave transverters. Since most transverters have an IF output of 144 MHz or higher, an intermediate transverter was needed. It would have to be small enough to fit inside the radio, inexpensive, and have adequate performance for microwave operation.

Down East Microwave offers small transverters for 144 and 432 MHz for this application. Some time ago, I tried to fit the 432 MHz version into another HTX-100, but it didn't quite fit, so I ended up trading the whole mess for something else.

The problem with the DEMI transverter is that it had the same LO oscillator and multiplier circuit as their big high-performance transverter, and the LO took up most of the space. For 144 MHz, a smaller oscillator circuit might be possible - at a flea market, I found some canned computer oscillators for 115 MHz, perfect for a 29 MHz output. The oscillators have the same footprint as a 14 pin DIP IC.

Printed Circuit Board: I was ready to build a dead-bug transverter on a bit of perf board when heard about an outfit called ExpressPCB. They offer a "MiniBoard Service" - three boards made overnight for \$59 - and they provide free software. With a PC board, I could make this transverter more robust, and make it possible to duplicate.

I looked at the web page (www.expresspcb.com) to see what was really offered. The boards are quality construction, double-sided with plated-thru holes, but the catch is that they have to be exactly one size: 2.5 by 3.8 inches. However, you can put as many copies of a circuit as you can fit on each board. If the transverter were small enough, I could fit more than one on a board.

I sketched out a basic transverter: oscillator, mixer, filter, and a couple of MMIC amplifiers. Then I downloaded the free software and starting seeing how it would fit. The software included footprints for surface-mount resistors and capacitors, which seemed like a good way to keep things small. However, footprints for RF stuff, like Toko helical filters, are not included, so I had to learn how to make them - basically placing the required hole sizes and locations, then "grouping" them together. (Note: the finished hole size after plating is 5 to 7 mils smaller than the drill size shown in the software.) Then the whole pattern can be added to other boards using cut-and-paste.

After I had all the components drawn on the screen, I printed out the pattern and stuck the components into the paper to make sure the footprints were correct. Then I started wiring the circuit together on the bottom of the board (green color), leaving the top for a nice ground plane. After some squeezing, it was clear that I couldn't fit more than two transverters on each board, but I did have a little extra space for a small relay, so I added one plus a PTT circuit. All the wiring fit on the bottom except for one short crossover on the top surface; then I covered the top (red color) with copper for a ground plane, except for clearance holes for component pins.

The final step was to copy the whole circuit to the other half of the board, so that each board has the pattern for two complete transverters, requiring just a snip to separate.

Circuit: The final circuit is shown in the schematic diagram, Figure 1. All the components are available from Down East Microwave and Digikey, my preferred sources for small quantities. The board layout is shown in Figure 2, and Figure 3 is a photo of a couple of finished units. The layout diagram only identifies locations for the larger components, but the circuit is simple enough to trace out from the schematic. Besides, no self-respecting VHFer ever builds something without improving it somehow!

Although the layout only shows surface-mount components, the photo clearly shows two ¼ watt resistors with wire leads. The explanation is simple: the resistor dissipates nearly 200 milliwatts, and my board layout only had room for a 1/16 watt (0603) resistor. Oops! The improved layout in Figure 2 has two parallel resistors in a larger size at R6 to handle the power, so the next version can be all surface-mount on the bottom.

Performance: The transverter provides about 5 dB gain in each direction, just enough to cover any stray losses between a microwave transverter and the IF radio. Maximum drive on transmit should be less than 0 dBm; the output power is then about right to drive the microwave mixer. Receive noise figure with a MAR6 MMIC should be in the 3 dB range, more than adequate with a decent microwave front end. The helical filter does a decent job, with LO and image down 30 dB or so, but not good enough to transmit on 2 meters -

another filter would be needed before the power amps.

Oscillator: The oscillator operates at the LO frequency, so there are no extra birdies from frequency multiplication. However, this limits our choice of IF frequency unless we are buying huge quantities. I was fortunate to find some 115 MHz oscillators - they turned out to be ECL oscillators, requiring -5 Volts, so I had to install them backwards and insulate the case with some tape.

There are some other possible oscillators in the Digikey catalog. One choice would be 120 MHz, resulting in a 24 MHz IF; any HF radio made in the last 15 years includes the 12 meter band. Another possibility is a programmable oscillator: Digikey carries one made by Epson. I got a couple programmed to 116 MHz, for a 28 MHz IF. On the spectrum analyzer, phase noise is not as good as the fundamental crystal oscillators. By ear, there is a definite increase in noise, enough to hamper weak-signal operation - these oscillators are probably only good for FM operation. I also tried a programmable oscillator from another manufacturer; the phase noise was even worse.

How to get your own PC board: You can get your own PC board by ordering it from ExpressPCB. First you download their software from www.expresspcb.com, then download the miniverter file at www.w1ghz.cx/miniverter.zip. Install the software on your PC and use it to open the minivert.pcb file. If you don't wish to make any changes, pull down "Layout" on the tool bar and select "Order boards via the Internet," and you'll have

them in a few days. But I'm sure you'll want to make some improvement, so feel free to modify the layout.

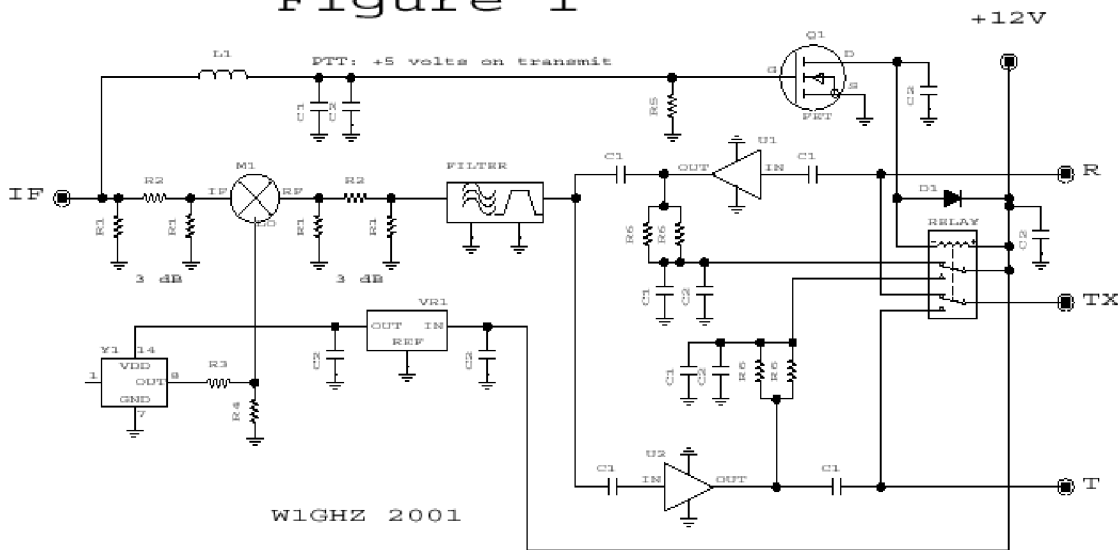
The minimum order quantity is 3 boards for \$59, which can make six transverters since I put two patterns on each board, so you might want to share an order. Another alternative would be to replace one of the transverter patterns with something else, so that you get two different circuits on each board - just make sure it fits in the same space. Any change from the fixed board size requires a much different price schedule.

Even if you don't want to make a miniverter, you might want to look at the layout and try modifying it to get a feel for the PCB software. Perhaps you will be inspired to come up with another design.

Summary: The Miniverter is not going to be a kit, at least until we find a good source for oscillators. But that wasn't my intent in writing this; the idea was to illustrate what you can accomplish with a simple and inexpensive source for PC boards. I've made enough PC boards with icky chemicals in my basement that I can assure you that using a mouse is a much better way.

So think about that idea for a small project that you never got around to building, and do something about it. Then share the files with the rest of us to copy and improve.

MINI - TRANSVERTER Figure 1



W1GHZ 2001

- | | |
|---------------------------------------|---|
| C1 - 500 to 1000 pf, 0603 chip | R1 - 300 ohms, 0603 chip |
| C2 - 0.1 uf, 0603 or 0805 chip | R2 - 18 ohms, 0603 chip |
| L1 - 1 uh RF choke | R3 - 300 ohms, 0603 chip |
| M1 - TUP-1 mixer | R4 - as needed for LO level |
| Q1 - VN2222 or similar FET | R5 - 100K (not critical), 0603 chip |
| VR1 - 78L05 3-terminal regulator | R6 - 400 ohms, 1206 chip (1/8 watt) |
| U1, U2 - MAR-6 MMIC | Filter - Toko 272MT - 1006A helical |
| Y1 - 4 pin CMOS oscillator (see text) | Relay - Omron G5V-2 or Radio Shark 275-213A |

FOR SALE OR SWAP

Kenwood TS-820, TV-506 transverter, VFO-820. Only known problem is flakey digital display. Dial is accurate..... \$500
DEM 28-144 XVTR. Runs full 25W output when driven by the TS-820, currently set to 10W to drive a brick..... \$225
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All prices plus shipping from RI. Bob, K1RWK, 401.539.6051, rknott@rinet36.org
Bob Knott, c/o WSBE-TV, 50 Park Lane, Providence, RI 02907

Hughes 1177H X Band TWT. 10 watts plus at 10 GHz..... \$300
HP 5370A Time Interval Counter..... \$100
HP 5326A Timer Counter..... \$50
(2) HP 8620C Sweep Oscillators..... \$50
HP 8620A Sweep Oscillator..... \$50
HP 431C Power Meter..... \$30
Wavetek 907 7-11 GHz Signal Generator..... \$300
Boonton 42C Power Meter w/4210-4E 200 kHz to 18 GHz head & cable..... \$200

All items plus shipping, Bruce N2LIV

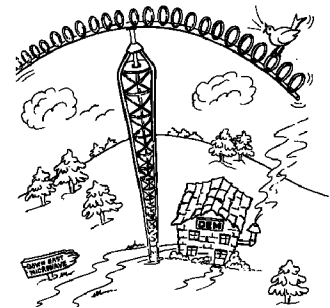
ULTIMATE TVI FILTERS FOR WEAK SIGNAL OPERATORS!

Commercial CATV quality 75 ohm traps tuned to 50.125 and 144.200. These filters are weatherproof and temperature compensated with attenuation at the tuned frequency of >100 dB. Loss across the entire VHF and UHF television spectrum is typically under .5 dB. They have a male F connector on one end and a female on the other. They will solve your fundamental overload problems on the band frequency they are tuned for. They are \$15.50 each plus \$5.00 shipping and handling per order. I will bring them to the meeting so you can save the shipping.

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**STEVE KOSTRO, N2CEI, 954 RT. 519, FRENCHTOWN, NJ. 08825 PHONE: 908-996-3584, FAX: 908-996-3702
WEB PAGE: <http://www.downeastmicrowave.com/>**

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THE NEXT N.E.W.S. MEETING SATURDAY MARCH 17TH, 1:00 PM
ALL ARE WELCOME TO THE DIRECTORS MEETING AT 11:30 AM
AT THE HARLEY HOTEL

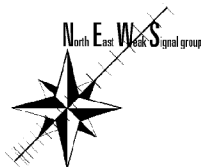
OUR SPEAKER WILL BE STEVE POWLISHEN, K1FO,
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"IF SO, SHOULD I PUT IT AT THE ANTENNA?"
AND POSSIBLY STEVE'S TS 2000 COMMENTS

**DON'T FORGET YOU NEED TO ATTEND MEETINGS
FOR THE CLUB ARRL COMPETITION!!**

**Harley Hotel of Enfield, CT (FN31qx) (15 miles north of Hartford, I-91 to exit 49, if
Southbound left off exit - 1st right / if Northbound right off exit - 1st right).**

North East Weak Signal Group

**c/o N1DPM
Fred Stefanik
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