



N.E.W.S. LETTER

The Publication of the North East Weak Signal Group



November 2010

Volume 19

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President: K1WHS, Dave Olean
Vice President: WZ1V, Ron Klimas

Current Officers
NEWSLetter Editor: W1FKF, Don Twombly

Secretary: W1GHZ, Paul Wade
Treasurer: WA1MBA, Tom Williams

Next Meeting November 13, 2010 Storrs Library 1pm

Presentation

N1DPM 144 MHz EME Installation

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Don't Forget

**The North East Weak Signal Group
2 Meter VHF and Above Net
Every Thursday at 8:30 PM Local 144.250
W1COT, WZ1V or K1PXE Net Control**

MEMBERSHIP in the N.E.W.S Group is \$15 per year. Apply to Tom Williams, WA1MBA. Email tomw@wa1mba.org You may download an application from our web page

<http://www.newsvhf.com/>

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The President's Corner

The November meeting on November 13 promises to be a good one. In addition to our regular meeting, we will get a hands on view of the N1DPM 144 MHz EME installation. Fred has promised to give us an inside look at what it takes to be successful on EME these days. He has built a very effective system. Fred always manages to wring the maximum performance out of things, so I am sure we will all learn a few new tricks from the Master.

We have some serious discussion ahead as we get into the planning for the upcoming 2011 VHF conference and Microwave Update next Fall. Bruce, N2LIV has been very sick and we need to iron out some things to keep things on track and make sure MUD is successful for our club. MUD is a very popular conference and attracts attendees from around the world. Organization and planning can make or break such events. I know Bruce and Paul have been working hard. We need to all pitch in and make the October MUD/ NEWS Conference a time to remember.

Looking at the minutes of our last meeting, I see that we have 78 paid up members and another small group of unpaid members who still need to re new their membership dues. It appears that we need to do some serious work to help swell our ranks. We need to do some public relations and outreach to make our VHF group larger more active. Looking at our Constitution, I see that we are tasked with

- A. Exchanging information with cooperation between members
- B. Promoting Radio knowledge
- C. Fraternalism

Improving individual operating efficiency

These are all positive and fun activities. I see that we can promote our group in a positive manner by stressing these FUN values to groups outside of our normal sphere of influence. In the past K1TEO and N1DPM have assembled a talk structure that can be used for presenting VHF weak signal operation to non VHFers. That presentation framework needs a little updating to bring it up to date. In addition, we need to promote the fun aspects of our weak signal hobby. We should work towards that goal and come up with a traveling road show to entice new members. VHF is a great summertime activity with 10 GHz activity, grid expeditions on 50 MHz, summertime tropo openings, hilltop contesting, roving, etc. I would propose that we stress the fun aspects of weak signal work, and do some serious missionary work to attract new members to our group and VHF in general. We are at a point where activity is very low on all of our VHF and UHF bands. I feel that we as a club should view this turn of events as a wakeup call. NEWS can generate a fun presentation and then market it to the general ham population in our area. Be prepared to discuss these topics and start thinking now about how you can help our club and our hobby.

There should be a little extra time should anyone have a show 'n tell project they wish to present. I am looking forward to the November meeting on Saturday Nov 13th. See you all there!

73

David Olean K1WHS

From our Secretary

Board of Directors meeting minutes Oct. 2:
Convened 11:30 AM at the Royal Buffet in Enfield.

Old Business:

WA1MBA reported the ARRL VUAC made a decision concerning coherent light rules. They now allow any monochromatic light source, which includes high power white LED's.

New Business:

W1FKF suggested to consider offering free lunch to speakers at club meetings. There was some discussion of limiting the offer to more distant traveling speakers. N1DPM suggested asking ARRL speaker, possibly KX9X or K1ZZ. W1TDS suggested getting a speaker on SoftRock receiver boards. N1JEJ suggested asking WO1U speak on Power Harvesting of the Airwaves or Class "E" 95 percent efficient Amplifiers. WA1MBA pointed out West Mtn Radio was sold and we should update our NEWS-letter ads accordingly for this and other ads. Board of Directors meeting adjourned at 11:47 AM.

General Meeting minutes Oct. 2:

Meeting convened at 1:15 PM at Longmeadow Library.
Treasurer's report:

WA1MBA reported we have 76 paid members, with 14 members still owing dues. The club has \$3875 in funds, much of which is needed for expenses such as news-letter, meeting place, and annual picnic. However up to \$500 is available for donations. For example, the club donated to the Library last year, as thanks for providing a low cost meeting place.

Old business:

WA1MBA discussed the ARRL VUAC decision concerning coherent light rules. They now allow monochromatic light sources, including high power white LED's. W1FKF was concerned they were not limiting the power of the light sources responsibly.

New Business:

The suggestions for upcoming speakers was discussed. Speakers from the ARRL, VE/K1OR/K1CA rovers, W1OU on Airwave Power Harvesting or Class E amplifiers were all discussed as possibilities. W1RIL reported that N2LIV was very ill in the hospital. WZ1V agreed to send a card on behalf of the club. WA1MBA reported on West Mtn Radio's sale and discussion. N1DPM reported we can charter a deluxe Wi-Fi, A/C bus round trip to Dayton for about \$170 pp if we can get around 54 passengers for the trip. A show of hands produced only a fraction of the passengers needed. .

Fred will try getting the word out further by email, etc., and look into pricing for a smaller group. W1FKF pointed out the implications of the club not having liability insurance for such a trip. WZ1V and others suggested a hold-harmless liability waiver could be signed. There was a 10 minute break.

W1RIL presented a subminiature 2M transverter complete with low power PA that fit neatly into a tiny mints tin. WZ1V with assistance from N1JEZ gave K1WHS's PowerPoint presentation of the September Multiop operation at Dave's hilltop QTH, which netted a 1.1 Million-plus score from FN43. There was discussion with the audience as it progressed, including WW1M/R describing pictures of his Rover setup. N1JEZ gave a presentation of his participation in the 10 GHz and up contest, with a discussion of the excellent tropo opening on the 2nd weekend with many distant contacts being made on 2M through 10 GHz. Mike read a report from K1MAP about the tropo from his perspective on the way down to the Carolinas. N1JEZ gave a presentation on his modified commercial broadcast high power solid state PA's converted to Amateur use, including a combined unit producing 1 KW on 432! Meeting concluded at 3:45 PM. -respectfully, WZ1V, stand-in note taker

From our Treasurer

The membership renewals is going well, and if it continues this way we should hit our normal membership level which I track at the beginning of the calendar year. If you have not paid your 2010/2011 dues, please make out a \$15 check to NEWS Group and send it to me at the return address on the last page of the NEWS Letter. I am also good in the QRZ.com database.

I have sent an updated membership database to Ron who has posted it on the website. If your call is not there, you probably are not current with your dues. Send me an email if you have a question.

We continue to have a healthy treasury. It was suggested at the last meeting that we be conservative with our spending because we are hosting the Microwave Update in 2011, and there could be unforeseen expenses. I won't go to MUD this year in California. It is the first time I will have missed it in 18 years - but things are quite busy at work. I may have to travel overseas in November, and so might miss the upcoming meeting.

73's Tom WA1MBA

For Sale: Hilltop ranch home w/ horse barn in Bristol CT on 5 Acres. 950' ASL ideal Contesting / DX site w/ 60' tower, multiple feeds, Line of sight to 3 states! Reduced! \$239,900. Own a dream QTH on top of the world! Details, photos, contact info at <http://www.wz1v.com/ranch.html>

Follow link to MLS listing. Serious inquiries only, thanks.

-73, Ron WZ1V

MICROWAVE UPDATE 2011

MUD 2011 will be Sponsored by the NEWS Group and held on October 13, 14, 15 & 16, 2011.

The conference will be held at the Crowne Plaza Hotel in Enfield, Ct. A block of rooms has been reserved for \$99 USD.

This is the location where the Eastern VHF/UHF Conference has been held for the past 10 YEARS or so.

Brief program outline to date:

THURSDAY 10-13-2011 OBSERVATORY TOUR IN THE AM, ARRL TOUR IN THE AFTER NOON, DINNER ON YOUR OWN, HOSPITALITY SUITE 7-11 PM. FRIDAY 10-14-2011 REGISTRATION, INTRODUCTION, SPEAKERS, AUCTIONS, DEMONSTRATIONS AND INDOOR SWAP & SHOP IN THE EVENING.

SATURDAY 10-15-2011 REGISTRATION, INTRODUCTION, SPEAKERS, AUCTIONS, DEMONSTRATIONS, VENDOR DISPLAYS, AFTER NOON TEST LAB

TO 50 GHz, INTRODUCTION TO MICROWAVES, BAND SESSIONS, EVENING BANQUET, TRIVIA QUIZ, DOOR PRIZES.

SUNDAY 10-16-2011 8:00 - 12:00am OUTDOOR FLEA MARKET, ANTENNA RANGE.

Further info to follow as it develops.

Thank you,

Bruce Wood N2LIV n2liv@arrl.net

Conference Chairman

Paul Wade W1GHZ w1ghz@arrl.net

Program Chairman

Miniverter for the Flex-1500 and Microwave Transverters
Paul Wade W1GHZ©2010
w1ghz@arrl.net

I recently received a new Flex-1500 transceiver from Flex Radio Systems. So far, I have only used it on 10 GHz for receiving, since the radio only covers up to 6 meters and I didn't have a suitable low-power transverter for the 144 MHz IF of my microwave transverters. However, it works really well – during MDS tests at the NEWS picnic last July, I was able to find a signal on the waterfall display before anyone could hear it.

Several years ago, I built a Miniverter¹, a minimal low-power transverter for 2 meters. The problem was, and still is, finding a suitable oscillator to convert to a lower ham band. I used a surplus 115 MHz oscillator, but it required a negative supply voltage and is flakey running upside down, with the case hot.

Since the Flex-1500 has a separate transverter port that will operate at any frequency up to 54 MHz, we have free range for oscillator selection. I started with the Miniverter artwork and added some updates; for instance, the Toko helical filters are no longer available, but newer, smaller Temwell filters are available from Down East Microwave. I also added a minimal sequencer to drive a relay and also an external relay while protecting the Flex-1500 PTT output from relay spikes. The internal relay is delayed to give the external relay time to operate. The Power-SDR software can be set to delay transmitter output as well – combined with the minimal sequencer, the switching sequence should be good for transverter control.

Miniverter-F

The schematic is shown in Figure 1.

Circuitry is minimal – oscillator, mixer, one MMIC each for transmit and receive, and an inexpensive relay for TR switch and power to the MMICs. Small attenuators on the IF and RF sides of the mixer might help with dynamic range. Overall gain is about 0 dB – on transmit, 1 milliwatt from the IF port yields one milliwatt to drive a microwave mixer. The PTT connection to the radio is a DB-9 connector, matching the radio output. The minimal sequencer is drives the external relay, then the internal relay after a short delay. You can bypass it and wire directly to the radio to save a few cents, which you will probably spend on post-age sending the radio for repair.

A completed Miniverter-F is shown in Figure 2 – it should fit fine in an Altoids tin, but you could get fancier, or just integrate it with a microwave transverter. Small coax is best for connections to the board, but twisted wires should be OK for short distances.

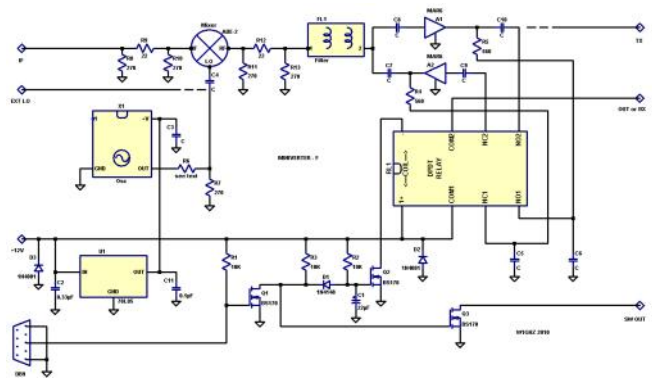


Figure 1 – Schematic Diagram of Miniverter-F

The ExpressPCB pattern is shown in Figure 3. Topside parts are labeled in silkscreen, but the RF parts are surface-mount on the bottom side. The bottom view in Figure 4 shows part locations.

A parts list is shown in the Appendix; everything may be substituted as desired, but only Temwell filters will fit in the holes.

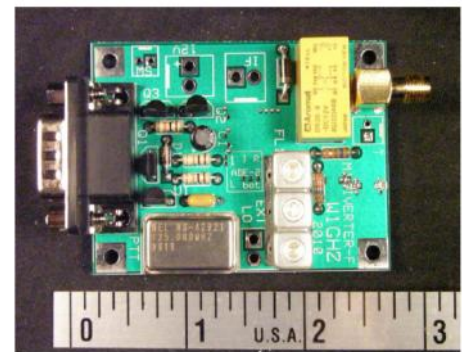


Figure 2 – Top view of Miniverter-F

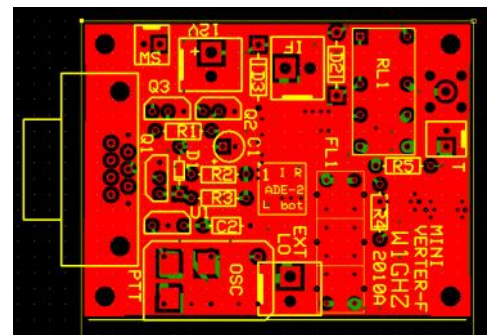


Figure 3 – PCB layout for Miniverter-F

Options, Questions and Answers

Almost any computer oscillator should work on this board – full-size, half-size, or surface-mount. I used a 125 MHz oscillator, which yields a 19 MHz IF, since I had a tube of them in the junk box. Other usable common oscillator frequencies are 100 MHz, 120 MHz, and 133 MHz. The oscillator I used has PECL outputs, which require a DC path to ground provided by R7. Oscillators with CMOS outputs have an output with too large a voltage swing, so a resistive voltage divider, R6 and R7, is recommended – the mixer wants to see 1 to 1.5 volts

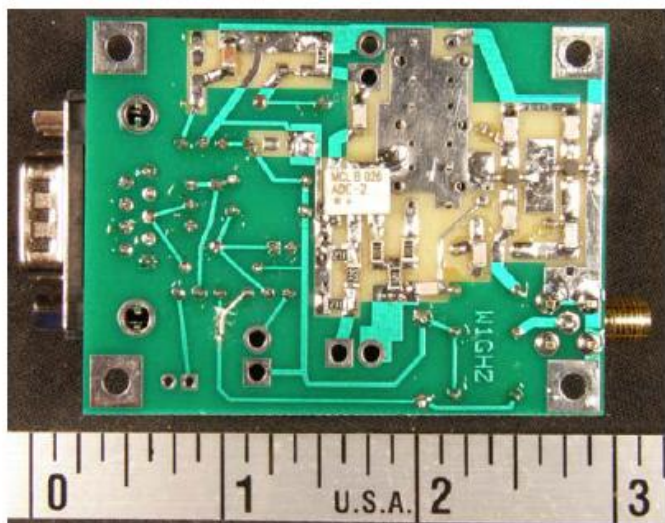


Figure 4 – Bottom view of Miniverter-F prototype

Of course, computer oscillators are never exactly on frequency. The Flex-1500 doesn't have a big knob either, but the panoramic display will show signals that are reasonably close. The software can correct for oscillator offset as well, to make the frequency read what you want. If you insist on exact frequency, since the radio and some transverters can lock to a 10 MHz reference, an external oscillator is required. Required LO power is +4 to +10 dBm. I've been looking at a little synthesizer by KD7TS – see his web page.

How good are the Temwell Filters? The transmit conversion gain vs. frequency is plotted in Figure 5 – pretty flat from 144 to 147 MHz, with no tuning.

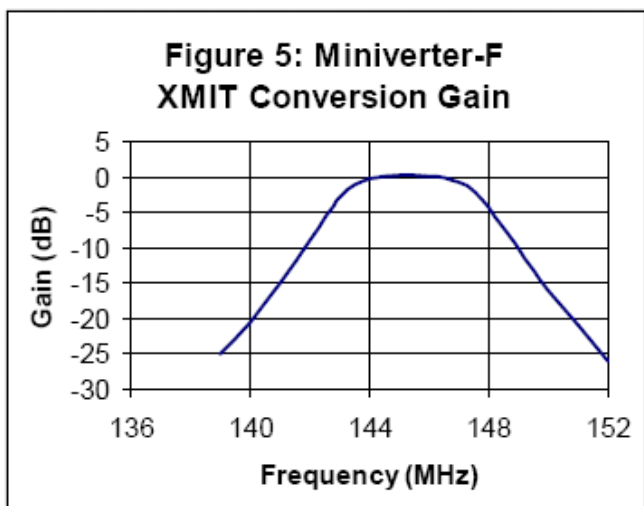


Figure 5: Miniverter-F XMIT Conversion Gain

What about other bands? Some microwavers prefer a 432 MHz IF – it has some advantages, particularly for 10 GHz and up. Simple – just change the helical filter and use an external oscillator or synthesizer. Down East Microwave has interchangeable filters for 144, 222, and 432 MHz. The inexpensive relay has adequate performance thru 432 MHz, but not much higher.

Why didn't I use power from the USB? Because the computer makes enough noise and birdies without a direct connection.

Can it be used with other radios? Of course. You'll have to figure out how, and apply an X-Acto knife as needed.

Is there a high-power version? Call Down East Microwave.

Availability

If there is any interest, I'll have some boards made, and Steve at DEMI is willing to kit up the parts. You provide the soldering and eat the Altoids mints.

Reference

1. P. Wade, W1GHZ, "2-meter Miniverter," *N.E.W.S. Letter*, North East Weak Signal Group, March 2001, pp. 5-6.

Miniverter-F Parts List

W1GHZ 2010

<u>RefDes</u>	<u>Value</u>	<u>Type</u>
C1	22uF (or more for longer delay)	Electrolytic
C2	0.33uF	Chip or leads
C3-C10	"C" = 470 to 2000pf	Chip
C11	0.1uF	Chip
D1	1N4148 or 1N914	Axial lead
D2,D3	1N4001 to 1N4007	Axial lead
R1-R3	10K	1/4 watt
R4-R5	560	1/4 watt
R6	zero for PECL osc, 270 for CMOS	Chip
R7	270 for PECL osc, 270 or less for CMOS	Chip
R8,R10,R11,R	270	Chip
R9,R12	22	Chip
Q1-Q3	BS170 FET	TO-92
RL1	DPDT	DIP
FL1	Temwell Filter 144 MHz (or 222 or 432)	3-pole
U1	78L05 Voltage Regulator	TO-92
X1	100 to 133 MHz oscillator	Can or SM
DB9	D-sub connector	mate with Flex-1500

Note: Chip caps and resistors can be 1206 or 0805 size

Appendix

Harris pallets using the BLF177 FET

[Bob DeVarney W1ICW](#)

I finally completed the 2 meter SSPA based on two Harris pallets using the BLF177 FET. Getting a little over 600 watts out with probably 7 - 10 watts drive (I only have one good wattmeter so I can monitor input or output, but not both) I have not checked efficiency, nor am I terribly interested in it at the moment.

Later on I will characterize the amp much better, but I am just happy not to have let the smoke out after all the self-inflicted issues I have had (and NO, I didn't touch the bias pot !!) I did adjust the input tuning to the pallets slightly to minimize the power going to the reject load on the output combiner. It is essentially nil.

I am using the W6PQL Amp Controller board. I am switching the DC to the pallets through a 30 amp lighting relay from the automotive store. Each pallet is fused separately at 15A. The relay will probably be a future failure point. I may end up having to parallel two of them to get the current handling I need. It is driven from the sequencer on the W6PQL board, so if something goes real wrong, the 'PQL board will shut it down, and shut down the DC to the pallets.

Next, I need to work on SWR monitoring to feed back to the 'PQL board. A simply loop of wire and 1N34 diode to rectify it placed on top of the reject load on the output combiner should give me the negative voltage the 'PQL board is looking for.

Power supply is an ASTEC/HP/COMPAQ computer server supply capable of 50 volts at 55 amps continuous duty from a 220 VAC supply. Another eBay purchase for 48 bucks shipped. I have enough capacity left over to run a converted Harris pallet on 6 meters which coincidentally happens to be my NEXT project.

I had to step the 50 volts DC input down to either 24 or 12 for the 'PQL board; I chose 12 and used an off the shelf Ericsson 18 watt dc to dc converter (eBay for 8 bucks shipped) for the purpose.

Since I am then driving the bias from 5 volts, I made a separate 5 volt regulator board that comes off the bias supply point on the 'PQL board.

I am using Anaren combiners for input and output. Boards for the combiners are by Ron, VK4DD, and the aluminum heat sink slabs for them I made myself.

The chassis was a reused chassis for a SEA 220 MHz ACSSB repeater. I had to make up a new front panel from scratch. That was one of the most time consuming parts of the whole project. Only thing left is to stencil the lettering for the toggle switch and the PWR, XMIT, and FAULT LEDs.

Many, many, many thanks are due to Mike, N1JEZ without whom this project would have been nearly impossible, and Mike WO1U without whom it would have been quite a bit more difficult. And of course my wife who didn't balk even though I had to buy three replacement sets of FETs because I DID touch the bias pot.

I feel like I should be passing around cigars on the birth of a new son...

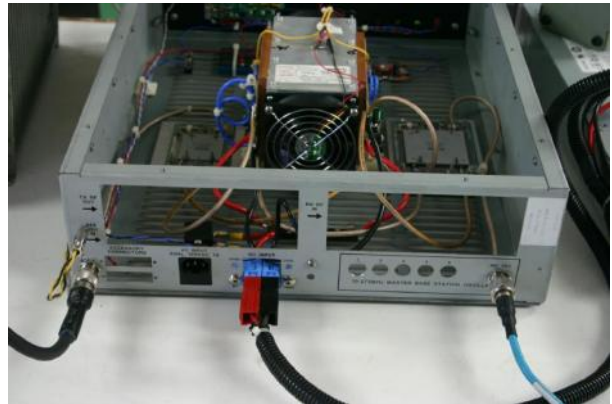
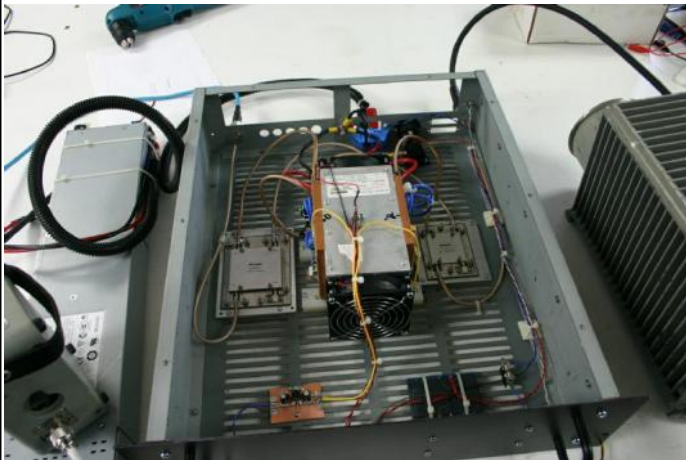


kw slug, showing 600 watts on the meter !!!

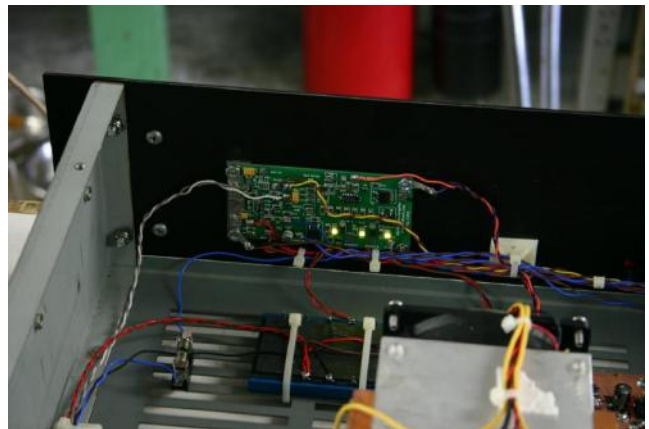


Front view, keyed up

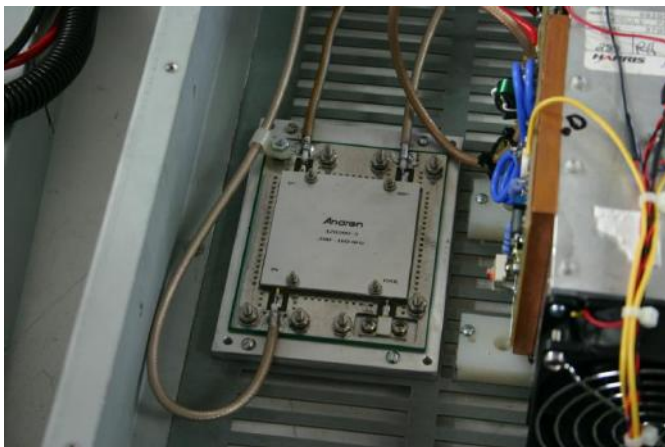
Top view inside. Temperature sensor mounted to the center of the heat sink. 2 fans, 1 pushing, 1 pulling. Silver heat sink in the center, with pallets on either side, vertically mounted



Rear view. It's previous life becomes apparent.



W6PQL Amp controller board detail. Three-step sequencer. Dc to dc converter just visible in front of it.



Output combiner detail. Rated for 700 watts continuous duty..

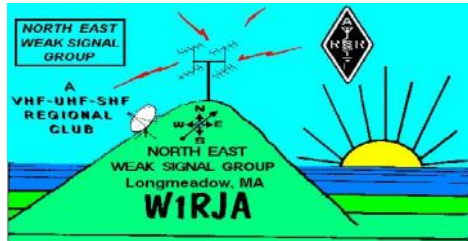


5 volt bias supply

To: Ham Radio Friends

As many of you know I have spent the last 4 months in and out (mostly in) the hospital with various blood and urinary track infections resulting in kidney damage and ensuing dialysis. I have now been home since October 2 and am getting used to a new life style, on disability and doing physical therapy at home. I thank everyone for their support, prayers, phone calls and emails. I also especially thank those who are helping on getting my ham station back on the air, mainly Steve W1SMS for work on my 50, 144 & 222 Solid State Harris amps and Mike on my R&S 432 Solid State amps. These 1.5 KW units should make me well heard again. I can not get downstairs yet so am not able to hook up my Icom 756 Pro's and new Elecraft 2, 222 & 432 transverters yet. I hope to be on for the January contest and attend the January NEWS meeting. May make November if someone else is coming up from the island. Best and thanks to all.

73's Bruce N2LIV



N.E.W.S. Group

Membership Application

Name: _____ Call sign: _____ Grid: _____

Street: _____

City: _____ State: _____ Zip: _____

Phone (home) _____ - _____ - _____ Optional (work) _____ - _____ - _____

Email _____

ARRL member? Y N Electronic Newsletter Delivery? Y N

Operational Bands (circle) 50 MHz 144 MHz 222 MHz 432 MHz 903 MHz

1.2 GHz 2.3 GHz 3.4 GHz 5.6 GHz 10 GHz 24 GHz 47 GHz

76 GHz Light Other (list)

The North East Weak Signal [N.E.W.S.]Group is being established to form a camaraderie among fellow VHF-UHF-SHF enthusiasts, and support a convenient means to exchange technical information. We currently have 6 meetings per year, held at a centrally located facility, and provide a "NEWSLETTER" that is distributed 2 weeks prior to each meeting. Any contributions to this publication are appreciated and can be sent to: Don Twombly, W 1FKF 23 Maura Dr. Woburn, MA 01801 Email: donw1fkf-news (at) yahoo (dot) com. Dues are \$15/year. Remember, this group is formed by VHF'ers for VHF'ers.

Mail to:

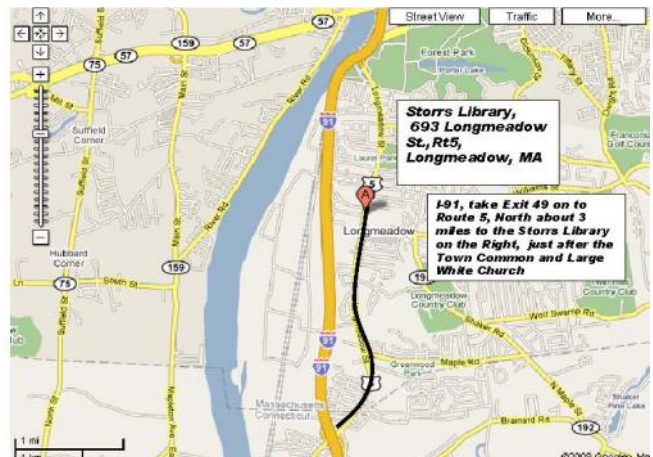
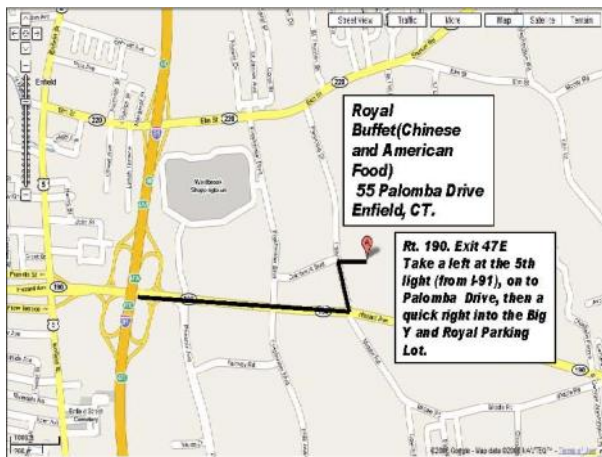
North East Weak Signal Group

c/o WA1MBA Tom Williams PO Box 28

Shutesbury, MA 01072

Email: [tomw \(at\) wa1mba \(dot\) org](mailto:tomw(at)wa1mba(dot)org)

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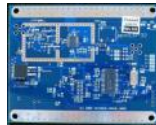


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Next Meeting November 13, 2010
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1-4 PM
Presentation

N1DPM 144 MHz EME Installation

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North East Weak Signal Group

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