



CHEESE BITS

W3CCX

CLUB MEMORIAL CALL

ARRL
Affiliated
Club



CELEBRATING 50 years of VHF/UHF and MICROWAVE
DEVELOPMENT and COMPETITION in 2006

Volume XLVII

APRIL 2006

Number 04

PREZ SEZ

As we round the bend of fifty years, let us celebrate those who had the vision to create the Mt. Airy VHF Radio Club and those who have helped perpetuate its ideals. Where have we been and where are we going?

Photo documentation and

oral histories tell only part of the rich history of the group. The club newsletter, Cheese Bits, started in May of 1958, chronicles the years of club development, construction projects, and the member activities. Contest results in QST, along with display cases of First Place Gavels for the January VHF contest are a testament to the capabilities and activities of the club members. Various publications including QST, Microwave Update and the AMSAT Journal have articles detailing VHF, UHF and microwave construction and communication techniques that have been authored by club members. The club's EME 432 MHz DX-pedition to Baranquilla, Columbia in the mid-70's is detailed in both QST and 73 magazines.

There are many opportunities ahead, despite the sometimes gray clouds that seem to confront the status of amateur radio. With internet and cell phone availability to everyone who can afford to take advantage of the service without a test and license, the reasons for being an amateur radio operator have been questioned. Yet we see time and time again that it is the amateur radio operators who facilitate emergency communications, foster international good will, and continue to make technical and organizational contributions to society.

Just this past month two club members, Joe Taylor K1JT and Marc Franco N2UO, co-authored the EME contest summary in QST. Both were avid participants in the contest. Additionally, each has contributed to the state of the art with the development of the WSJT suite of communications programs, and a remarkable set of homebrew construction items, including transceivers, transverters, software defined radio, high-powered 1296 amplifiers, and

a large microwave dish and feed, now memorialized in the latest copy of the ARRL Antenna Handbook. Our members Paul Drexler W2PED, Bob McGwier N4HY, and Marc Franco N2UO were also pictured in the latest issue of the AMSAT Journal, as part of the team assisting in the design and development of a future amateur radio satellite

This past month, Homebrew Night featured some of the most ambitious projects I have ever seen. There won't be an end to the creativity and capabilities of the membership. Each and every project was impressive in its design and construction. In looking back at the pictures of Homebrew Nights of 30 and 40 years ago, and recently helping some senior club members clean out their basements and racks of homebrew gear, it was easy to see how the homebrew spirit has helped challenge the members and shape the club.

It's rather clear that we are continuing to share many of the themes that were initiated by our club founders. We share our knowledge, our radio and test gear, we give time to help each other, and we remain active on the airways. We unite to do radio contesting, and share in the highs and lows of the process and results. Common experience is the basis for friendship, and as a group we are great friends for each other. As I looked back at the pictures of the activities of the past 50 years, the faces have changed, the equipment is smaller and more powerful, but the central themes that united a group of VHF enthusiasts in 1956 are much the same today.

Let us glide into the next 50 years with vigor in all of our activities, regard and sensitivity for each other, and continue to share our knowledge and radio treasures. We will uphold Packrat traditions, remain a strong contributory group in the amateur radio community, and reap the rewards of our efforts.

73, Rick Rosen, K1DS



There may just be something to this..

— **The nice thing about being senile is you can hide your own Easter eggs.**

Pack Rats **CHEESE BITS** is a monthly publication of the
Mt. AIRY VHF RADIO CLUB, INC. -Southampton, PA.
 SUBSCRIPTION RATE: \$16.00 PER YEAR (USA)
 \$20.00 PER YEAR (CANADA)
 \$10 PDF only
 \$24.00 PER YEAR (ELSEWHERE)

We operate on a .PDF exchange basis with other non-commercial publications. Anything that is printed in CHEESE BITS may be reprinted in a not for profit publication, unless stated otherwise, provided proper credit is given. Deadline for articles and swap-shop is the monthly meeting date. Non-commercial swap-shop items free of charge.

Pack Rat Web Site: <http://www.ij.net/packrats>

SUBSCRIPTION and ADVERTISING MANAGER:

Bob Fischer, W2SJ 7258 Walnut Avenue, Pennsauken, NJ
 08110c (856) 665-8488 bobw2sj@comcast.net

EDITOR:

Doc Whitticar W3GAD 28 Twining Bridge Rd, Newtown, PA 18940
 215-968-6397 info@docstech.com

CLUB TREASURER:

Dave Mascaro, W3KM 1603 Mink Road Ottsville, PA 18942
 (215)-795-2648 dmascaro@motorola.com

TRUSTEE OF CLUB CALL - W3CCX

Ron Whitsel, W3RJW
 (215) 355-5730 W3RJW@aol.com

PACKRAT 222 MHz REPEATER - W3CCX/R

222.98/224.58 MHz, Churchville, PA

OFFICERS 2004-05

PRESIDENT K1DS, Rick Rosen rick1ds@hotmail.com

VICE PRES: K1JT, Joe Taylor

CORR. SEC: WA3EHD Jim Antonacci

Antonacci@worldnet.att.net

REC. SEC: K3EGE Bill Shaw K3EGE@aol.com

TREAS: W3KM Dave Mascaro dmascaro@motorola.com

DIRECTORS:

(2007) K3TUF Phil Theis phil@k3tuf.com

(2007) N0YMV David Willmore willmore@optonline.net

(2006) KB3HCL Dave Fleming kb3hcl@arrl.net

(2006) N3NGE Len Martin n3nge@dejazzd.com

COMMITTEE CHAIRMEN

January Contest N3FTI n3fti@yahoo.com

June Contest: N3ITT & KF6AJ

HAMARAMA: WA3DRC

VHF Conference: WA3EHD 215-659-4359

Awards Chairman WA3GFZ 215-884-3116

QUARTERMASTER: K3IUU, Bert Soltoff, soltoff@uscom.com

PACKRAT BEACONS - W3CCX/B

FM29jw Philadelphia, PA

50.080, 144.284, 222.065, 432.295, 903.071, 1296.251,
 2304.037, 3456.220, 5763.190, 10,368.140 MHz (as of 3/1/01)

MONDAY NIGHT NETS

<u>TIME</u>	<u>FREQUENCY</u>	<u>NET CONTROL</u>
7:30 PM	50.150 MHz	K3EOD FM29II
8:00 PM	144.150 MHz	N3ITT FN20kl
8:30 PM	222.125 MHz	K3TUF FN10we
8:30 PM	224.58R MHz	W3GXB FN20jm
9:00 PM	432.110 MHz	WA3GFZ FN20kc
9:30 PM	1296.100 MHz	WA3NUF FN20le
10:00 PM	903.125 MHz	AA3GN FN20ig
10:30 PM	2304.085 MHz	W3KJ FN20hg

& go to 3.4G & up after

Visit the Mt. Airy VHF Radio Club at:

<http://www.ij.net/packrats>

Editor's Column

Well it looks like winter is over, the sunspot cycle continues to decline and like all things measured in time the PACKRATS have passed another milestone as we celebrate our 50th anniversary.

By the time I get this to you the party will be over but the memories of a wonderful evening will last for many years to come.

As the seasons change it reminds me that we are all subject to change, whether it is by choice or forced upon us by circumstance. In my case, the wonderful world of digital imaging, color inkjet printers and prolific imaging software has finally taken its toll on my client base. Servicing conventional photographic providers no longer offers enough income. I have been fortunate to find a job that is flexible enough that, when I get one of those "Need you right away" calls I can adjust my work schedule and take care of the more profitable photographic service while having a regular job near home to keep finances on a more or less even keel. This has required some adjusting in my life style and needless to say it has initially been very exhausting.

Who say's you can't teach an old dog new tricks. I am doing pretty well in a new field as a microwave bench tech. But, alas, it has resulted in yet another late edition of CheeseBits staggering out of my computer in mid-month. I will try harder.

This is also the time for changes in the PACKRAT leadership. If you are asked to serve in one of the important positions please give it your serious consideration. We need good, dynamic leadership if we are to continue on for another 50 years as leader in the development of technologies and skills in the VHF/UHF/Microwave community.

As I understand it we are looking for some leadership for the June Contest too. There are plenty of opportunities for everyone to help out with the club effort at BIG POCONO PARK on the top of the mountain above Camel Back Ski Resort. 9 through 12 June 2006 We need many helping hands from Friday morning through mid-day Monday for this to be an effective and fun weekend for everyone.

Check the calendar on the facing page and you will see we still have a few of the Spring Sprints remaining, the SBMS 2 GHz and up Club Competition plus the conference and hamfest seasons is upon us. The first conference is the NEWS GROUP Conference in Enfield, CT followed the next week by the Southeast VHF Conference. The PACKRATS will be represented at both with presentations of papers and K1JT's keynote presentation at the SVHF Conference.

Recently we all saw the changes in the leadership for the ARRL with VHF Contester W5ZN taking the reins and in the Atlantic Division we appear to have a much more aggressive leadership team to support our section managers and local club efforts. Let these fine amateurs know you appreciate what they are doing for the advancement of our hobby.

Once again the 50th party is over "Pictures at 11"

Listen for the WEAK ONES

73

W3GAD Doc



WHATS HAPPENING

A LISTING OF INTERESTING EVENTS

1 APRIL 2006- W3IY MICROWAVE ACTIVITIES DAY—Hey it's in the morning and that still leaves plenty of time to get pretty for the party Saturday night so get on there and make some noise.

4 APRIL 2006 - 144 Spring Sprint—Single band 144, Sponsored by ETDXA—1900 to 2300

12 APRIL 2006 - 222 Spring Sprint—Single band 222 Sponsored by ETDXA—1900 to 2300 t.

17 APRIL 2006—PACKRATS BOARD of DIRECTORS MEETING at the home of Bill Shaw K3EGE, Havertown, PA call 610-789-8976 for directions. *GET THOSE TAXES DONE.*

20 APRIL 2006 - 432 Spring Sprint—Single band 432 Sponsored by ETDXA—1900 to 2300

20 APRIL 2006—Regular meeting of the Mount Airy VHF Radio Club. Awards night and a presentation by Roger Rehr, W3SZ, on his station and LINRAD.

21-23 APRIL 2006 – Annual VHF CONFERENCE - Sponsored by the N.E.W.S. Group, Enfield CT

28-29 APRIL 2006 – Annual VHF Conference - Sponsored by SVHF, Greenville, SC

29-30 APRIL 2006—SBMS 2GHz and up Club Competition—see announcement on page 9

6 MAY 2006 - Spring Sprints 903 and up 0600 til 1300 (local time). ALSO *Microwave Activity Day* get on the air, listen for the weak ones, and work them too.

7 MAY 2006 - Warminster Amateur Radio Club Annual Hamfest, At the GRANGE in Penns Park, PA

11 MAY 2006—PACKRATS BOARD of DIRECTORS MEETING

13–14 MAY 2006 - Spring Sprint 50 Mhz 2300 to 0300 UTC

18 MAY 2006—Regular meeting of the Mount Airy VHF Radio Club. Dayton will probably reduce the ranks, but this is the final planning session before the JUNE VHF QSO PARTY and the W3CCX Expedition to Camelback.

9–13 JUNE 2006 - June VHF QSO PARTY and W3CCX Annual Trek to Camel Back

All meetings are announced on the regular Monday Evening Nets. (See Page 2) - Board meetings of the Mount Airy VHF Radio Club are open to all members. Teleconferencing for members is usually available. Regularly scheduled meetings of the PACKRATS are held at 8 PM in the basement meeting room at the Southampton Public Library on Street Road in Southampton, PA. Meetings are open, not only to the membership, but to any party interested in VHF/UHF/Microwave contesting, equipment design and construction for use on the VHF/UHF and Microwave Frequencies or amateur radio in general.

HOME BREW NIGHT



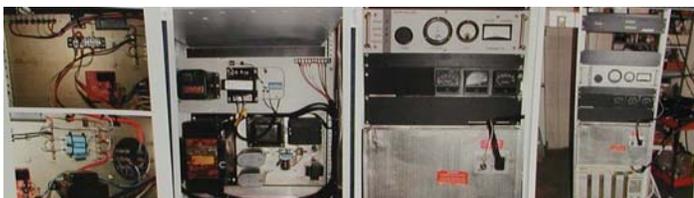
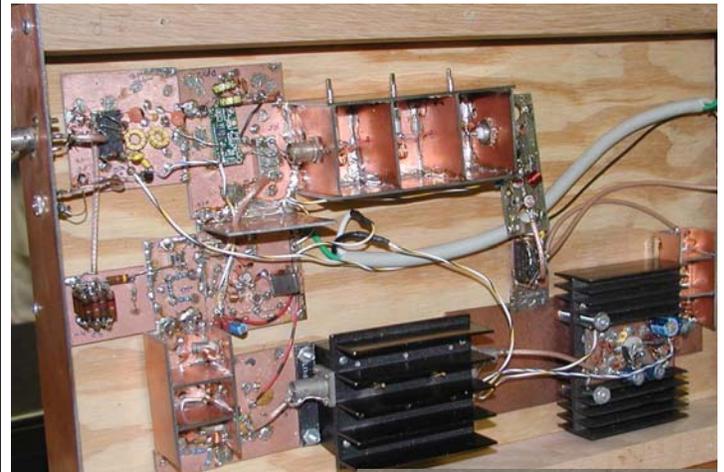
Our panel of Judges prepare to review the quality of the projects



Lenny Wintfeld, W2BVH, gave us a tour of his zero budget, handcrafted modular construction 2 meter transverter

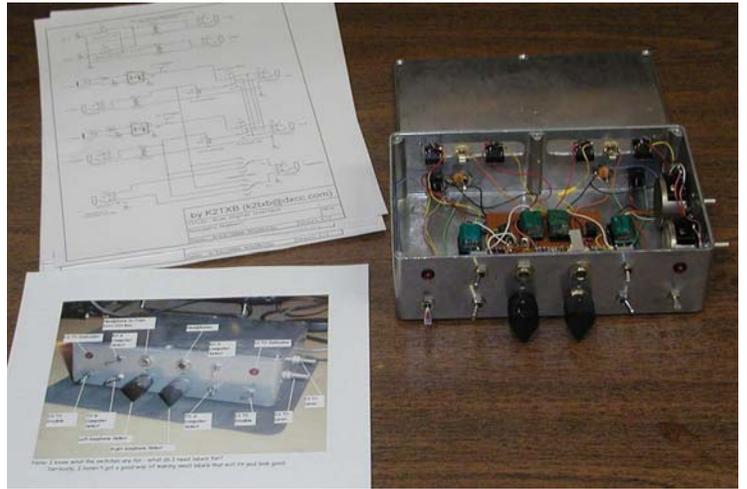


Len Martin, N3NGE, points out some of the finer details of this 1298 cavity amplifier

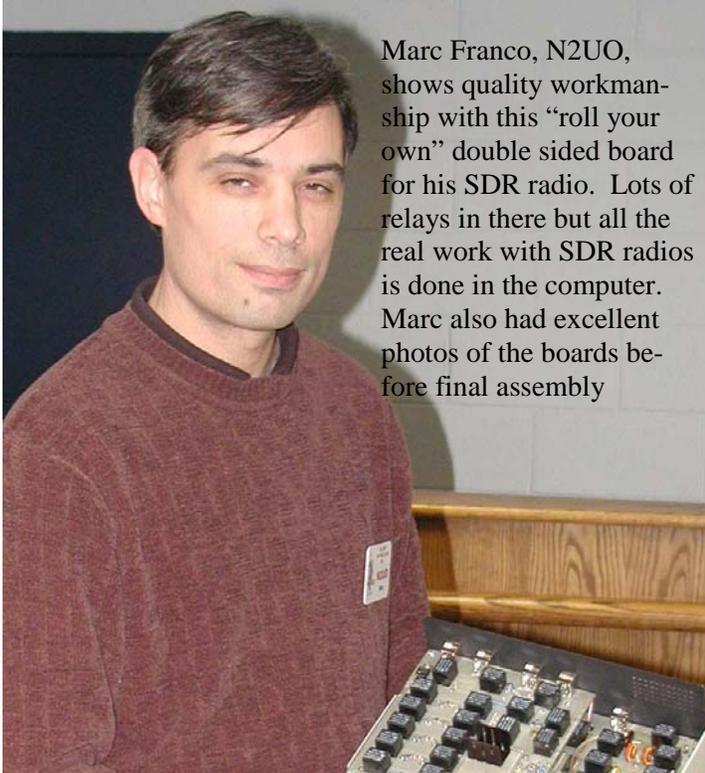


Dave Wilmore, N0YMV, shows his his AmQRP antenna analyzer with an added signal synthesizer. He also showed and a quality monitor for LOs and amplifiers with a bar LED





Russ Pillsbury, K2TXB, explains some of the finer points of his interference free switching system for to use 2 computers between 2 transceivers. Another fine junkbox creation.



Marc Franco, N2UO, shows quality workmanship with this “roll your own” double sided board for his SDR radio. Lots of relays in there but all the real work with SDR radios is done in the computer. Marc also had excellent photos of the boards before final assembly



Phil Theis, K3TUF goes over some of the finer points of his water cooled 1296 amplifier



A 96MHz Direct Frequency Synthesis source

By Sam Jewell, G4DDK

One of the features of my home brew 23cm transverter is that it has the facility to connect an external high stability local oscillator at 96MHz in place of the built-in 96MHz OCXO. This could be a frequency locked source, such as one of the various Reflock units, another free running OCXO or a DDS based unit. However, I have been intrigued by the idea of the 'old' technology of direct frequency synthesis for some time and when Brian, WA1ZMS, described his DFS systems at the Martlesham RT; I thought it was time to try the idea for myself. This technique is capable of extremely low phase noise, coupled with high stability and 'unfussy' design.

The DFS is basically a fixed frequency generator. The need for extensive filtering can make frequency changing a real problem. A DFS can, in principle, be built for any frequency requirement. However, some frequencies can require extensive frequency manipulation, not to mention filtering. For this reason it may not be practical to design and build a DFS for, e.g. a beacon where the final frequency is an odd 'offset'. Most local oscillator base frequencies are relatively easy to generate from a 5 or 10MHz high stability source.

Figure 1 shows the block diagram of the 96MHz DFS.

Figure 2 shows the circuit schematic of the DFS.

In my unit the 10MHz source is a high stability, low noise, GPS disciplined OCXO. The 10MHz signal is multiplied by 9 using a pair of Schottky diodes to produce 90MHz. The diodes produce a comb of frequencies at 10MHz spacing and the following filter selects the wanted harmonic at 90MHz. A two-stage amplifier increases the level to +7dBm (easily – some attenuation is needed). The first stage uses one of the ubiquitous 'MAR6' devices that were made available at a recent MUD and which are quite plentiful, even in the UK. These particular MAR6s are believed to be SiGe devices and have a very respectably low noise figure at 90MHz. This is followed by a MAV11 to increase the level into the SBL1 mixer LO input.

In parallel with the x9 multiplier the 10MHz is also fed to a 2N2369 level shifter (to TTL level) before driving the clock 2 input to the SN74196. Drive level is not too critical with this arrangement. I used an SN74196 because I had some and SN7490s are getting hard to find! CMOS can be too noisy in this application. 74F series would be better for low noise, but weren't readily available.

The SN74196 divides by 5. The resulting comb, with strong fundamental at 2MHz, is then tripled in the second 2N2369 stage before filtering to select the wanted 6MHz signal.

This is connected to the IF input to the SBL-1 mixer.

The RF output from the mixer contains not only the wanted 96MHz (90MHz + 6MHz) signal but also the various other products of mixing. Two-stage filtering is used to clean up the spectrum. No attempt has been made to provide wideband termination of the mixer.

A four pole (three would do, but who's counting?) LC filter removes all products well-spaced from the wanted 96MHz prior to the first amplifier. The output of the LC filter is then amplified in another 'MAR6' before the signal enters the 3 pole crystal filter. This is the stage which intrigued me the most. I hadn't built a VHF crystal filter previously and I was keen to try out the technique. I exchanged many e-mails with Brian, WA1ZMS, about these filters and tried several techniques including the 'phasing' design used by F5CAU in his 96MHz DFS. Whilst the phasing filter gave similar filtering characteristics to the LC matched designed used, insertion loss was a major problem due to the high termination impedance.

One of the secrets to the filter is to use small value trimmers across the small inductance across the crystal. These trimmers need to be carefully adjusted for best filter response and each interacts with the others! Adjustment can be tedious, but it is worthwhile persevering. Finally the filter is followed by another MAV11 to achieve the desired output level of +5 to +7dBm.

The TTL chip and both transistors are fed from a 7805 regulator, whilst the MAR and MAV devices are fed from a 7808 regulator.

Construction does not use a PCB; instead a half Euro-card (160mm x 100mm) with copper ground plane on one side and with IC pads and power tracks on the other was perfect for the job. I housed the DFS in a Maplin extruded aluminium case with a BNC connector for the 10MHz input and an SMA for the 96MHz output.

References:

F5CAU Web page - perso.wanadoo.fr/f5cau/page_10.htm

WA1ZMS – ARRL Proceedings of Microwave Update 2004, Irvine, Texas

WAVEGUIDE FILTER DESIGN SOFTWARE

Waveguide filter design software (46Kb) can be downloaded from the technical info page of my website. www.dc2light.co.uk

I am looking for other related material, especially the slotted waveguide design software, anyone have a copy that will run on a PC? or just the .bas file.

Software for the site must obviously be nominally open source, or at least not have distribution restrictions.

I have plenty of server space and am happy to collate and host such software. Cheers, Mark GM4ISM

Joel Knoblock W3RFC

www.therfc.com

The R.F.Connection

213 N. Frederick Ave. #11WWW

Gaithersburg, MD 20877 USA

World wide shipping via FED-EX or US Post OFFICE

Tech Line 301/840-5477

Order Line 800/783-2666 All major credit cards taken

Fax Line 301/869-3680

Hours: Monday-Friday 9:30am-5:30pm Eastern

NE3I

Robert A. Griffiths

Attorney at Law

KLETT ROONEY LIEBER & SCHORLING

A PROFESSIONAL CORPORATION

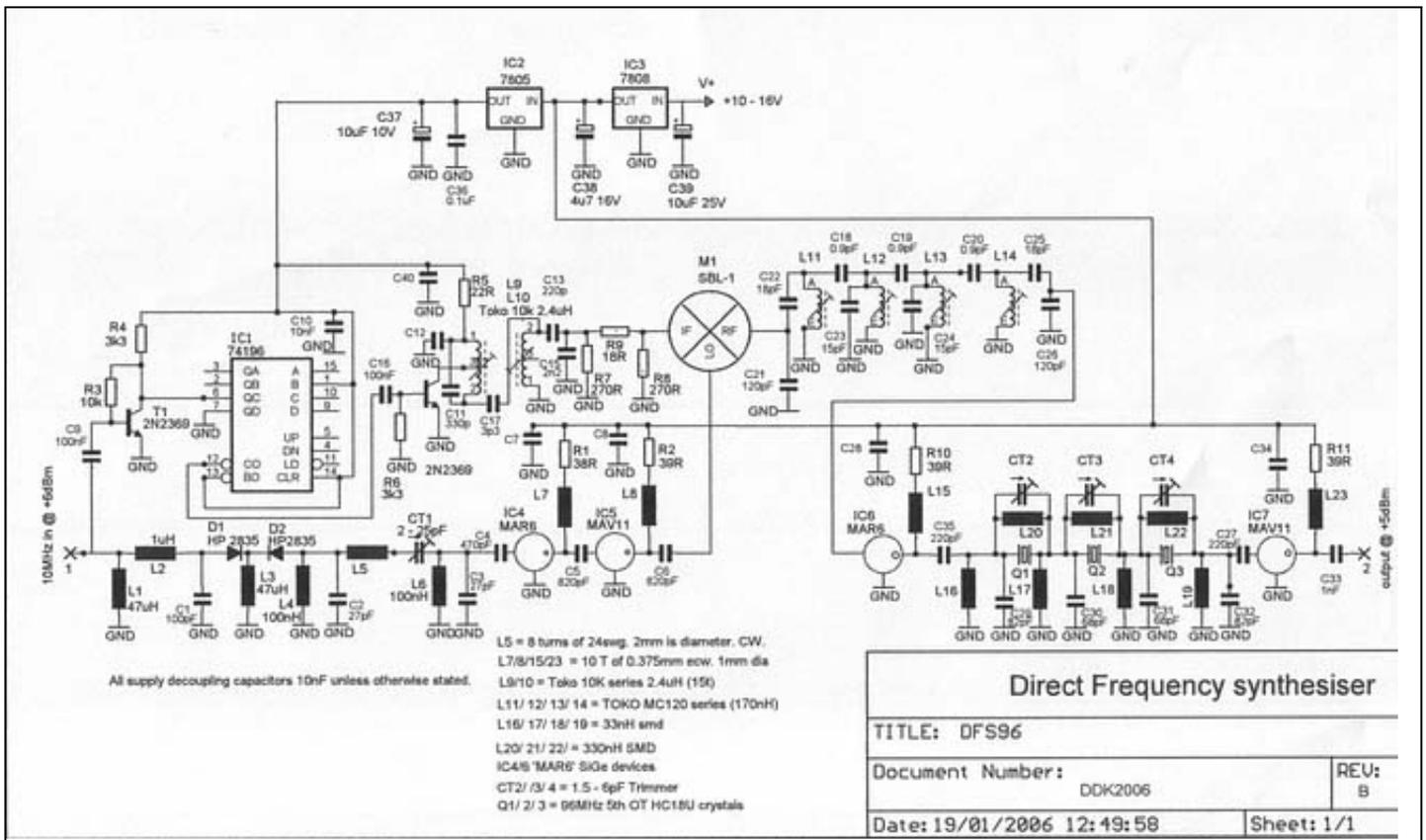
12th Floor, Two Logan Square

Philadelphia, Pennsylvania 19103-2736

(215) 567-7857

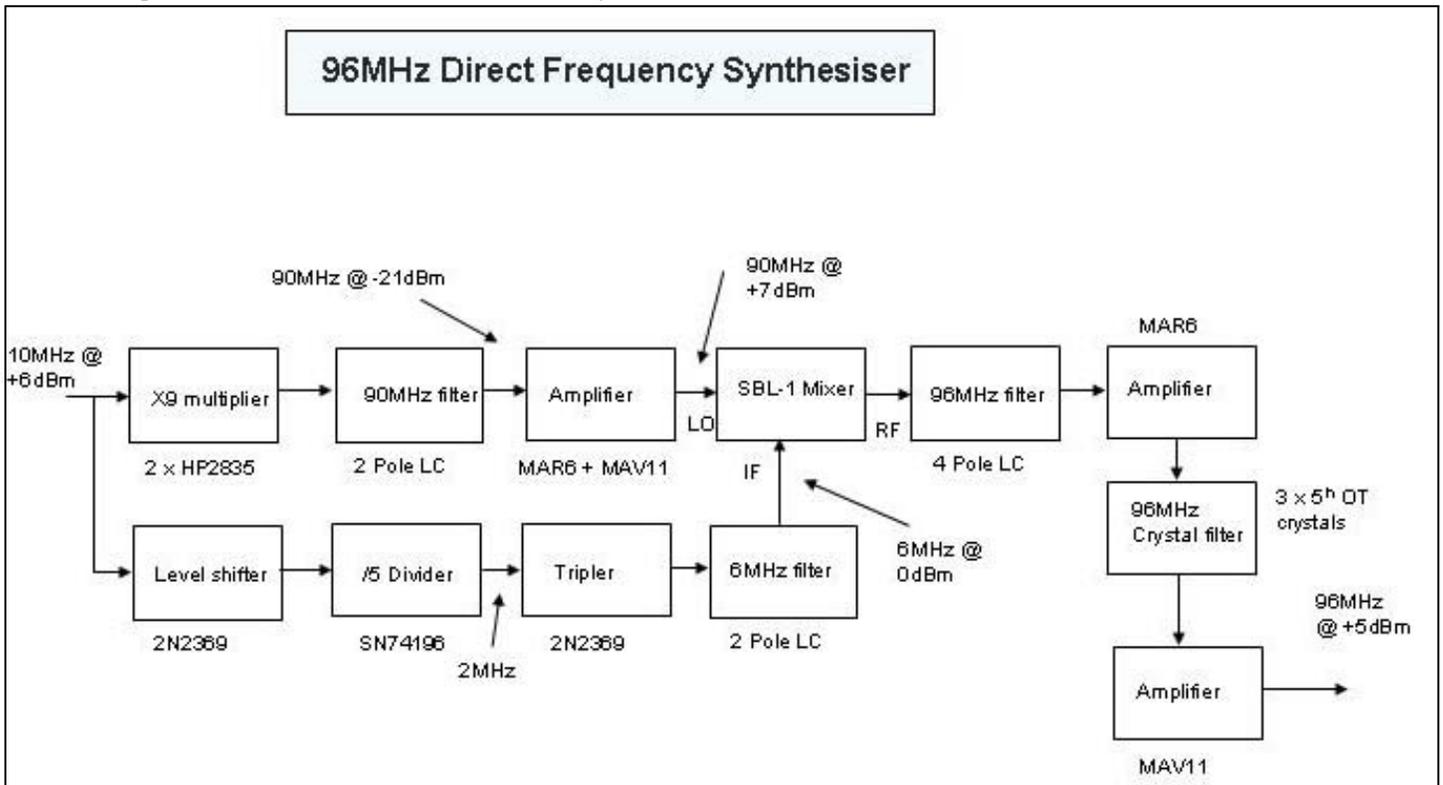
FAX: (215) 567-2737

e-mail: rgriffiths@klettrooney.com



ERRATA: There is a mistake in the DFS96 circuit published in SP. The MAR6 and MAV11 bias resistors are shown as 39R. This was a hang-over from a previous iteration where the devices ran from the +5v supply. The correct value should be 100R for an 8V supply as drawn. It is worth repeating that the MAR6 used in the DFS96 is the SiGe version. This was missed by at least one reader. You can use the Si version but the bias resistor needs to be increased in value. Using the 8V supply and assuming 15mA at 3.5V then the resistor should be 300R. G4DDK

This article was originally published in SCATTERPOINT, March 2006—SCATTERPOINT is edited by Peter Day G3PHO for the European VHF/UHF and Microwave community.



FIRST ANNUAL W3IY MEMORIAL ROVER AWARD PRESENTED TO DAVE GLENN, K6TEB

I received the plaque yesterday and I want to let you know how very honored I am to receive this award. Although I only spoke with Bill, W3IY a few times via email in those correspondences I was able to see what a positive influence he has made on vhf and above contesting. I will make every effort to continue in the spirit of camaraderie, friendship and mentoring as we endeavor to "leave no ham behind" in the thrill that makes contesting so much fun on the upper bands.

I have been doing this since the late 90's and after a few mountain top adventures I tried roving and was hooked by the thrill of making the long haul contacts in seemingly impossible conditions. Not to mention having the contest start all over for you every time you change a grid square. Sure keeps it from being boring. I have also used these contests to introduce Ham Radio to some of the youth I came in contact with. They can relate to the competition and the science aspect of our hobby. One of them is now licensed Greg Savage KG6EPM, he first came along as my logger and



The Mount Airy VHF Radio Club, Inc.

Rover Recognition Award

David W. Glenn, N6TEB

You are hereby acknowledged as an outstanding rover station, operating during the ARRL VHF, UHF and Microwave competitions in 2005. Your use of multiple bands from several grids, supplying hundreds of contacts to other operators, demonstrated the rover spirit exemplified by Bill Seabreeze, W3IY.



now is my second op when Glenn KE6HPZ isn't available. I have also written my own logging program that several hams use and every contest I try to make at least one improvement in my setup.

Thanks again, Dave, N6TEB

Here is a link to some more photos

<http://www.ham-radio.com/n6teb/>



Atlantic Division Member
Appointed to an ARRL
Advisory Committee

It gives us great pleasure to announce that Joe Taylor K1JT of Princeton, New Jersey has been appointed as the Atlantic Division's representative to the ARRL VUAC (VHF/UHF Advisory) Committee. Joe has long been active with VHF/UHF contesting and well recognized in those areas.

Please join us in welcoming Joe to the new committee assignment.

Bill Edgar N3LLR Atlantic Division Director

Tom Abernethy W3TOM Division Vice Director

FROM: Atlantic Division News Update 3 Mar 2006

If A Dog Was the Teacher, you would learn stuff like:

Money will buy a fine dog, but only kindness will make him wag his tail.

When loved ones come home, always run to greet them.

When it's in your best interest, practice obedience.
Humm! Sounds like rules for a happy marriage. ed

**SAN BERNARDINO
MICROWAVE SOCIETY
2006 2GHz and up
CLUB CONTEST**

THIS IS A WORLD WIDE CONTEST

In the spirit of stimulating more activity in the microwave bands, the San Bernardino Microwave Society (SBMS) members came up with the 2GHz and Up Contest.

The contest period is April 29 to April 30, and runs for 24 hours.

This contest should encourage activity and level some of the microwave contest playing field. The contest would involve activity from 2GHz and up, and center around club activity. Members tally up their scores and add them to other members' scores to make up a Club Score.

This years complete rules are at the following link both in PDF and .txt formats http://www.ham-radio.com/sbms/club_test/2ghz_up_test.html

We are looking for ways to improve participation any suggestions comments please contact

N6rmj@sbcglobal.net

THANKS

N6RMJ PAT

C3i[®]

**Top Quality, Performance, Durability, Cost
Others make claims, C3i[®] Delivers**

Call, FAX, or E-mail or Order from our Web Site

**Our K1FO and K1JX VHF and UHF Antennas are proven
Performers in Contest after Contest @ K8GP / FM08fq**

GO WITH THE WINNERS

VISIT OUR HOME PAGE TODAY FOR MORE DETAILED INFORMATION

<http://www.c3iusa.com>

1-866-207-7126 + pin # 6408

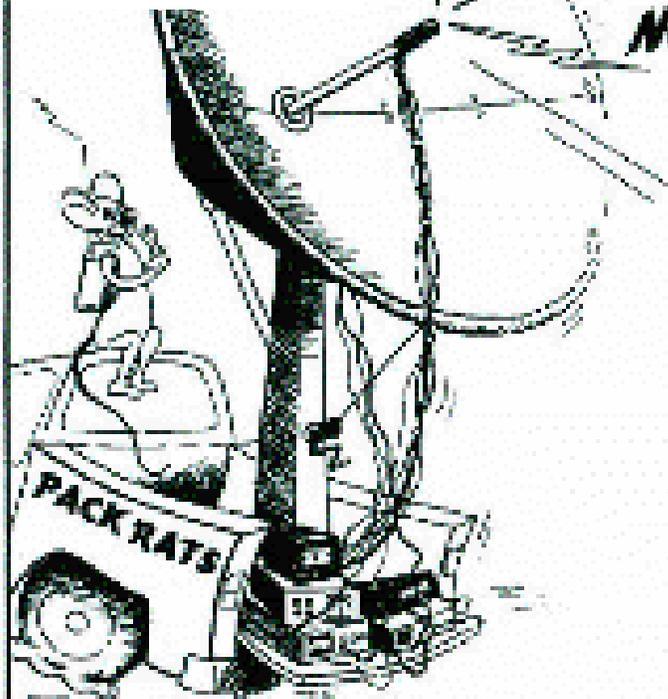
Owormser@c3iusa.com

sruffin@c3iusa.com



CheeseBits
c/o Doc Whitticar W3GAD
28 Twining Bridge Rd
Newtown, PA 18940-9704

MEETING NOTICE

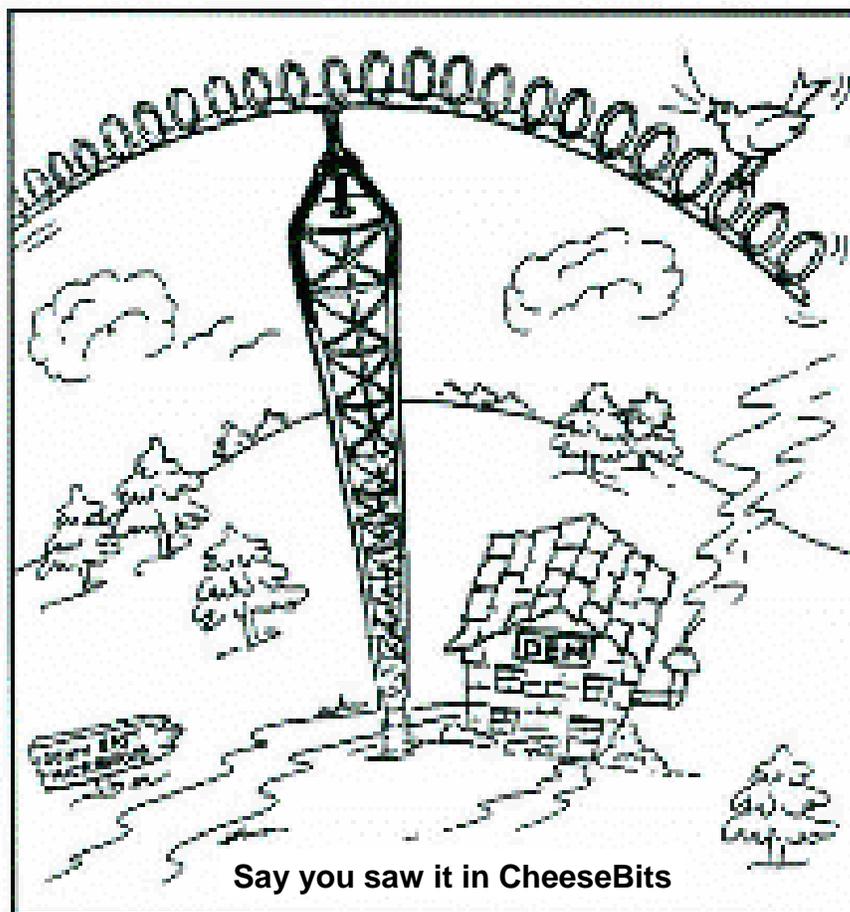


LOOKING AHEAD:

INSIDE:

FIRST CLASS

MT. AIRY VHF RADIO CLUB, INC.



Say you saw it in CheeseBits

DOWN EAST MICROWAVE

Manufacturers and Distributors
Of VHF/UHF/SHF Equipment and Parts
50 to 10,368 MHz

- Microwave Loop Yagis
- No-Tune Linear Transverters
- Linear Power Amplifiers
- Low Noise Preamps
- Coax Relays, Coax Cable, Connectors
- Crystals, Chip Capacitors, MMICs, Transistors, RF Modules

For All Equipment and Antennas:
Steve Kostro, N2CEI
954 Rt. 519
Frenchtown, NJ 08825
Tel. 908-996-3584
Fax. 908-996-3702

<http://www.downeastmicrowave.com>