SAN BERNARDINO MICROWAVE SOCIETY, Incorporated

FOUNDED IN 1955

A NON-PROFIT AMATEUR TECHNICAL ORGANIZATION DEDICATED TO THE ADVANCEMENT OF COMMUNICATIONS ABOVE 1000 MC.

W6IFE Newsletter
May 2011 Edition

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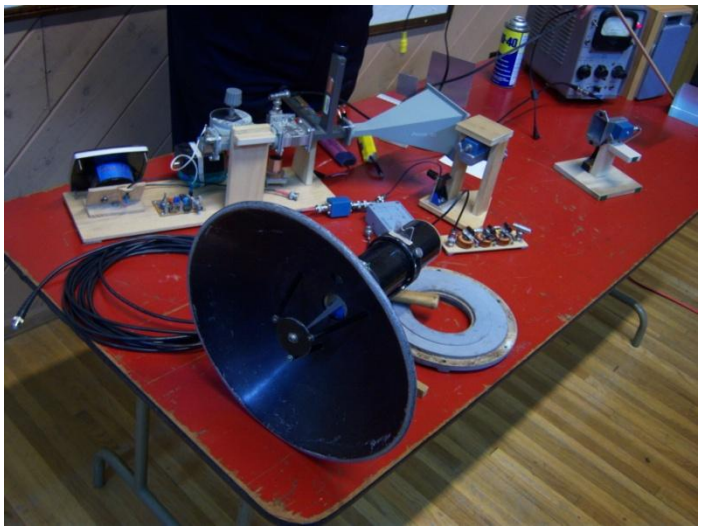
At the **May 5, 2011 SBMS meeting we will have Doug K6JEY** will do a talk on beginner labs and what gear to get at the beginner and intermediate level to start your microwave lab.

The SBMS meets at the American Legion Hall 1024 Main Street (south of the 91 freeway) in Corona, CA at 1900 hours local time on the first Thursday of each month.

Last meeting: At the April meeting the new 2011-12 SBMS officers were elected: Chris, N9RIN president; Brian, AF6NA vice president; Walter Secretary; Dick, WB6DNX Treasurer; and Tisza, KI6DBR social secretary. **Jacob Portukalian, KD5FEG** has been studying engineering at UCLA and presented a program on the classes and professors that are available in the microwave engineering area. **Walter Clark** gave a presentation on radiatometer experiments and the cassigrain type antenna. Dennis, W6DQ will donate an 8x8 projection screen to the American Legion for SBMS use. Pat, N6RMJ will be looking for a new digital projector and table to more formalize the presentations at the meetings. Putting up another big dish at OVRO was discussed since there are extra pedestals and control equipment available there. 26 people were present.

Jacob, KD5FEG talking about UCLA microwave classes.


Walter showing off his 20 GHz Cassegrain antenna.


Walter's gadgets for showing interference patterns and how they make up antenna gains. Various detectors and lenses Walter demonstrated gain.

The assembly of reflectors, detectors and sources Walter used to demonstrate antenna interference patterns.

Scheduling:
April 30- May1 SBMS sponsored 2 GHz and Up Club Contest.
June 2 Sidewalk EME by Doug K6JEY
June 11-13, 2011 ARRL June VHF QSO Party
June 17-18 trip to OVRO science trip will have a 10 inch telescope star party on 17th followed on 18th by a tour of the big dish. Contact is Doug, K6JEY.
June 18 ARRL Kids Day (good chance to introduce youngsters to microwave).
June 25-26 ARRL Field Day
July 7 TBD tech talk
July 16-17, 2011 CQ WW VHF contest
August 4 Contest preparation.
August 20-21 ARRL 10 GHz and Up contest first half
September 10-11 ARRL September VHF QSO Party
September 17-18 ARRL 10 GHz and Up contest second half.

Wants and Gots for sale.
For Sale 30w 1296 MHz PA kit $50 + $5 for US shipping Chris Shoaff cshoaff@yahoo.com
Wanted- a small piece of sheet lead to make a 1.5 in cube box. Dick, WB6DNX 714-529-2800
For Sale 10 GHz slotted waveguide antennas $70 kit, $95 assembled plus shipping Dan W6DFW W6DFW@apex-scientific.com
For Sale: a classic secretary desk with fold down main door. It has several compartments to place transceiver, tuner, and power supply with wires in back. You can put the whole station in a dark reddish wooden cabinet out of sight when door is closed. It is out and useful when door is opened. 18"Deep x 52" tall x 34" wide. $30 new condition.
Can be delivered to SBMS meeting. Bill WA6QYR bburns@ridgenet.net

Making Printed Circuit Boards-

This article will describe how to go from a circuit idea to a professional looking PC board. Last year, Tom Curlee, WB6UZZ, sent an email to the SBMS reflector describing a PC service that will take your board layout and turn it into a finished PC board. The website is http://dorkbotpdx.org/wiki/pcb_order

What you need is to draw a schematic and layout the board using "Eagle" software. This software is free and easy to use. Once you have the ".brd" file, you send it to the address at the website. The charge is $5.00 per square inch of board. He will check the file and send the charges that you pay through Pay Pal. This will get you three double-sided FR4 boards, silkscreen both sides, solder mask, and plated thru holes. I have done very small boards, less than one square inch; my largest one so far is a two by three inch, which was $30 for three boards. The one problem with using his service is that it can take up to two weeks to get your boards back. He takes in orders and when he gets a large board he then sends it to China to get it made. When he gets the board back he then cuts each person's order out and send it to them postage paid. My last order was for two small circuits, which I paid $10.81 for six boards. I guess no order is too small. I have made my own PC boards using ferric chloride and besides being messy I could not do plated thru holes. So the boards had to be fairly simple. With plated thru holes and being able to put in a VIA to get from one side to the other is a big plus for me. The software will also make "Gerber" files that you could send to other board houses for a quote. I have not tried this yet. If you have any questions or want to see a one of my boards, let me know. Larry K6HLH k6hlh@sbcglobal.net.

How to Vertically space 1296 MHZ 20 DB gain Rhombics

Hello everyone. After a few hours in the wood working shop, I have a few Rhombics for 1296 MHz to put together and characterize.

W8DMR designed a version back in 1977 for 73 Magazine and WØOMI improved the design and tailored the Rhombic for 1296, QST, 1997. The 1977, W8DMR version was more for 400 to 900 MHz and I was able to log 8 states on TV plus VE2 Quebec TV.

This is from the South Central Missouri State line.

To get a reasonable estimate on Gain, I am going to measure the beam-width on, say, 4 of the Rhombics. Then this should give me a clue on how to vertically space the Rhombics for additional gain. My first thought is to space the Rhombics 1.0 Lambda vertically and feed each antenna with 300 Ohm line and in phase.

However, I feel that the antennas may want to be vertically spaced in multiples of 1.0 Lambda.

If anyone can send me a PDF of the rhombic antenna article of the August
1977 issue of 73 magazine, I would appreciate it.

Any help, comments or attempts to educate me will be appreciated.....Gary.....K5QNM.

One trick for stacking yagis at the maximum summing distance is to flip one of the yagis over so that they are fed out of phase between the top and bottom yagis and then adjust the spacing between the antennas for the minimum signal at the measurement probe. Once that separation distance is determined, then flip the yagi back over for optimum phasing for summing the two. This takes advantage of the math in that the difference pattern is very sharp whereas the summing pattern is very broad. You should be able to do the same thing with the 1296 MHz Rhombics since they are sufficiently small to adjust. You don't actually have to flip the Rhombic but simply reverse the feed sides for one of them at the feed point. At the measurement probe, place this in the far field of the antenna pattern and located at bore sight of the antenna beam; again, something that should be feasible at 1296 dimensions.

Ray, VK3ATN, stacked 4 Rhombics, 50 wavelengths on each leg (300 ft.), for 2 m. and made the initial EME contacts between Australia and the U.S. using 150 watts. I believe K6MYC (M^2 Antennas) was on this end with a steerable array. I also seem to remember that K0MQS was involved in the development of the Ray's stacked Rhombics and

the determination of the beam heading of Ray's rhombic array. Jerry, K0CQ, might be familiar with this work since K0MQS was somewhere in his playground. Ben/K4QF

Sometimes you have to modify that stacking distance to adjust the stacking plane sidelobes, wider spacing increases then much faster than the main lobe. And reducing the spacing cuts those lobes much faster than it costs gain. A refinement needed more for EME than for terrestrial paths.
Best I remember the K0MQS rhombic had four wires, spaced at the sides, fanned to a point at the feed and termination. The sides were 680 feet, I don't remember the spacing at the center supports between the wires or the side, but it wasn't very wide. I remember Dick saying it wasn't bidirectional with the termination off. For those few minutes a year when the moon got into its pattern it was a super EME antenna, I've heard SSB echoes on tape recorded by MQS of himself. The delay confused him and he answered himself on that tape. One year at CSVHF his 2m preamp measured 15 or 20 dB NF yet he was still making contacts with the rhombic via the moon. I didn't know that Dick worked with the VK station on headings but it make sense, since they would have needed a mutual window to make a contact and big Rhombics don't rotate.
Another thing about stacking is that it's a lot more frequency sensitive than an antenna like a rhombic or a log periodic which makes it difficult to get the benefits of stacking across the antenna's wide frequency range.
Wayne Green failed to get author's permission for publications beyond the magazine issues so he's unable to do collections or scans of the magazine.
73, Jerry, K0CQ

Ben, could you do the same thing in RX mode since antennas are reciprocal?
Tune in a distant beacon with the antennas pointed at the horizon and then adjust the spacing until the RX signal strength is at a minimum.
73 Jim, W4KXY

I have that issue of 73 magazine. The article is so full of wrong concepts and bad information that I won't spread it about. Better to go back for the original article, "Improved Antennas of the Rhomboid Class," RCA Review, 1960, pages 117-119, by Laport and Veldhuis which is on line but provides some of the wrong data in the 73 magazine article. 73, Jerry, K0CQ

A ground reflection multipath from a distant beacon will drive you batty. 73, Jerry, K0CQ

Yep, good point. I didn't think of that. 73 Jim, W4KXY

Yep. Horizon gain can just as well be a horizon null if the geometry is right. At 1296 MHz, I'd think you could get the signal source up in the air (maybe at a 2nd floor window or deck) to avoid the ground reflections. An Omni-directional loop pulled up in a tall tree with a rope should also be o.k. if you can get away from nearby reflectors.
I visited VK3ATN around 1973 and still have some good slides (for the young, that's ancient technology that goes with my slide rule and drawing board) of his Rhombic feeds, the four layers of antennas, and the azimuth steering system he developed with ropes and pulleys. As I recall, he said he got about 7 minutes of moon window a month until he installed the steering mechanism. Then, he could double his window to 14 min. a month. He also said after working the U.S. on multiple occasions, he sent his Nuvistor preamp to someone here to have the noise figure measured. It was 7 dB! Ray got a lot of mileage from running a hardware store with lots of electric fence wire available. Birchip, Victoria, Australia was also as flat as a pancake with short, scrub trees. It reminded me a lot of W. Texas with Mesquite trees. Lots of sheep and wheat fields, too, but that gave us lots of options for a forced landing when cruising the countryside at 200 ft. ASL in a single engine plane. It was hot as hell, too, but the pilot always carried a cold six-pack for the comfort of himself and the passengers. One other thing of interest was the Rhombic terminating resistors. Since Ray didn't have high power loads (600 ohms as I recall), he had made some 600 ohm, parallel line from Nichrome wire which had about 10 dB loss, one for each Rhombic. Then, the terminating resistor only had to dissipate 10% as much power. Ben/K4QF

On 4/18/2011 4:52 PM, Ben wrote:
> Yep. Horizon gain can just as well be a horizon null if the geometry
> is right. At 1296 MHz, I'd think you could get the signal source up
> in the air (maybe at a 2nd floor window or deck) to avoid the ground
> reflections. An Omni-directional loop pulled up in a tall tree with a
> rope should also be o.k. if you can get away from nearby reflectors.

The Omni source antenna makes reflections more likely to make problems for pattern checks. Tilting the range is a help for elevation reflections.
>
> I visited VK3ATN around 1973 and still have some good slides (for the
> young, that's ancient technology that goes with my slide rule and
> drawing board) of his Rhombic feeds, the four layers of antennas, and
> the azimuth steering system he developed with ropes and pulleys. As I
> recall, he said he got about 7 minutes of moon window a month until he
> installed the steering mechanism. Then, he could double his window to
> 14 min. a month. He also said after working the U.S. on multiple
> occasions, he sent his Nuvistor preamp to someone here to have the
> noise figure measured. It was 7 dB! Ray got a lot of mileage from
> running a hardware store with lots of electric fence wire available.

Farm stores still carry steel (zinc plated these days) electric fence wire in quarter or half mile spools at fairly reasonable prices, and electric fence insulators work for antenna insulators, especially the ceramic ones.
Birchip, Victoria, Australia was also as flat as a
> pancake with short, scrub trees. It reminded me a lot of W. Texas
> with Mesquite trees. Lots of sheep and wheat fields, too, but that
> gave us lots of options for a forced landing when cruising the
> countryside at 200 ft. ASL in a single engine plane. It was hot as
> hell, too, but the pilot always carried a cold six-pack for the
> comfort of himself and the passengers. One other thing of interest
> was the Rhombic terminating resistors. Since Ray didn't have high
> power loads (600 ohms as I recall), he had made some 600 ohm, parallel
> line from Nichrome wire which had about 10 dB loss, one for each
> Rhombic. Then, the terminating resistor only had to dissipate 10% as much power.
When the rhombic is that long he probably didn't need the lossy feed line to the load. Design techniques for Rhombics generally neglected the fact that power was radiated from the traveling wave so that the longer the rhombic, the less power reached the termination. In the K0MQS case not enough reached the other end to be reflected when not terminated to allow EME from that reflected wave. E.g. even unterminated, the very long rhombic like both those stations used didn't waste significant power in the termination.
> Ben/K4QF
73, Jerry, K0CQ

All , Building an Array of 4 x 10 element DK7ZB for 144 Mc When I look to the Table by Lionell VE7BQH I find optimal stacking distance H = 3.87M en V=3.60M That's the current size of my H-Frame
Reading up on internet found an article http://www.grantronics.com.au/docs/StkYagis.pdf
It's a story about “understacking “of yagis .In fact trading gain for pattern
In this article a distance (in wavelength) is advised by the formula 57/3dB (3dB being the openings angle at -3dB of a single Yagi) Advised is also a factor of 52/3dB Using the even “better” factor of 52/3dB it should be 1.485 x 2.08 = 3.09 M.
The -3dB points for a single DK7ZB (10 element) is about 35 degrees (not 100 % sure here!!)
Gives me a stacking distance of 57/35 = 1.63 wavelength that multiplied with the wavelength at 144.1 Mc (2.08) gives me a stacking distance of 3.39 Meter

The Vertical distance should be 88% of the Horizontal distance when using a yagi with a boomlenght of 3 wavelenghts Gives me a vertical distance of 3.39 x 88% = 2.95 M (using 57/3dB) or 2.71 M (using 52/3dB)
H-frame is still in the garden... And not “in the air”
I can make it smaller...no problem at all!!
But I am seeking advice of stations that are using 4 x 10 element DK7ZB's could you please let me know your used stacking distance
I live a bit in the country side not too many noise sources around, my current system is a single 17 element Cushcraft without elevation I will only use these yagis for EME work...mast is only 5 meters above ground And yes...I would like to get them into the air to try making a QSO with the Dutch expedition that is scheduled for “The Gmbia “. I failed to make a QSO with them on their previous trip to Mauritius... I simple could not hear them on my moonrise...73's Rick. PA1BVM

Hi, look at this for help to your question: http://www.wa5vjb.com/references/preamp-Cookbook.pdf
Tom W2DRZ
http://www.w2drz.ramcoinc.com/
http://www.w2drz.ramcoinc.com/ProgNotes.htm

15th International Earth-Moon-Earth Conference EME 2012
Cambridge: 16-18 August 2012

In 2012 Cambridge will be the venue for the 15th International EME Conference – the first time the UK has hosted this prestigious event. The UK Microwave Group (in conjunction with the RSGB), hosts of the 15th International EME conference, are delighted to announce that the venue for this conference is to be Churchill College, Cambridge. The facilities have been inspected by the organizing team and provide excellent accommodation, lecture theatre, meeting rooms, restaurant and bar on a single site.
The organizing team is working to develop the program for delegates. This will include an optional pre-conference tour and a family program. The main conference will take place on the 17th and 18th August 2012 with the optional tour on 16th. Accommodation will be available from the evening of the 15th August for those wishing to arrive before the tour. More details of the program will be announced as the plans are confirmed.

The Conference

EME, short for Earth Moon Earth communications involves using the Moon as a passive reflector to enable beyond the horizon communications on frequencies where this would not normally be possible. The very small signal levels involved demand that all the station components, antenna, preamplifiers, transmitters and signal processing have to be optimized to achieve the required system performance.
These conferences provide an opportunity for those involved in this challenging, science based aspect of amateur radio to exchange ideas leading to improved techniques in EME communications.

The Place

The University of Cambridge is one of the world's oldest universities, a leading academic center, and is a self-governed community of scholars. Its reputation for outstanding academic achievement is known world-wide and reflects the intellectual achievement of its students, as well as the world-class original research carried out by the staff of the University and the Colleges. With its long history in both wireless and radio astronomy it is a very appropriate venue for the International EME Conference in 2012. From the production of the wartime “19 set”, through the discovery of Pulsars to the commercialization of Bluetooth, Cambridge has been a center for wireless and astronomical research for over 70 years.

The city of Cambridge is a delight to visit in any season: be inspired by the museums and art galleries, relax in its many pubs, restaurants and cafes and explore the independent shops around the historic market place.

What next?

More details of the venue, lecture program, tours and partners programs will be posted to the Conference web site www.eme2012.com

Activity reports from the March SBMS meeting: Dick, WB6DNX did some repeater work along with power supply and Wouxun KGVU3D radio sales; Chuck, WA6EXV is continuing on the propagation studies with Larry, K6HLH and is building a sub reflector for his 10 ft dish; Bill, WA6QYR is still having problems with his 1296 system in measuring sun noise; Ed, W6OYJ indicated the 1296San Diego beacon is now horizontal polarized on 1296.300 MHz on Mt Miguel aimed NW. the San Diego Microwave Group meetings are third Monday of month at Kerry's house (N6IZW); Dennis, W6DQ has a working 1296 rig; George K6MBL is doing some TV experiments; Tom, WB6UZZ did an LMB modification for Walter; Michelle, W5NYV is studying Digital Modulation at UCSD; Courtney, N5BF has a 1296 box on the air; Viannah, KG6GXW is having fun with amateur radio; Chris, N9RIN built a 13 GHz source for Doug, K6JEY; Jason, W6IEE has a 1296 and 10 GHz rig; Jacob, KD5FEG has a 2.4 GHz LO kit; Mel. WA6JBD is testing a 24 GHz slot antenna for Dan W6DFW; Dan, W6DFW is building 24 GHz slot antennas which are being tested by Mel and Chuck; Dave, WA6CGR did some testing on Tony's (KC6QHP) 47 GHz rig at the lab; Larry, K6HLH has been listing to beacons; Pat, N6RJM has his 2.4 GHz tower down and has been helping the local ARES group; Doug, K6JEY did some 47 and 79 GHz work.

----- Original Message -----
From: "Maximo EA1DDO_HK1DX" <ea1ddo@hotmail.com>
To: <moon-net@list-serv.davidv.net>
Sent: Friday, January 21, 2011 2:14 PM
Subject: [Moon-net] 144 MHz preamp DX style
Hi, this is a question to the 144 MHz preamp experts.
During the last times most of the 144 MHz preamps are "Contest" type, thinking in a location surrounded with different contest stations, usually central Europe and US. I guess this kind of examples are PA3BIY, HA8ET, etc. looking for a high IP3, most of them based on ATF53143.The question is What is the ideal/best DX 144 MHz preamp? When I say DX is thinking in a location away from any other, for example a remote island, with no more hams around. Main target could be gain and low noise, and no matter about IP3. Any suggestion?
Thanks. 73, Máximo - EA1DDO & HK1DX

Gentlemen
The latest VK3UM EME Calculator update (Ver 7.08) is now available.
It has been further enhanced to provide
* twelve additional 432MHz Feeds Types added (thanks to SM6FHZ data).
* expanded Feed Type comparison window to enable comparison of Feed Type characteristics.
* all Feed Type characteristics have now been converted to polynomial equations for greater accuracy
* Feed Type cross reference page expanded and now provides direct links to each feed type.
* a fixed focal length calculation option has been added for those who may wish to extend their dish!
* Receiver Performance Calculator now includes ability to use Home and DX data. (3 options now)
* Quick set up and 'How to" chapters added. (Choosing your Feed Type ... extending your Dish)
* Additional Opening screen (for new users) to provide a direct link to the Quick set up procedure.
* The ability to vary the on screen Hint display delay (or turn it off).
Thanks to Ingolf (SM6FHZ), Charlie (G3WDG), Dave (G4RGK) and others for your suggestions and help.
Download direct from www.vk3um.com Regards Doug VK3UM.

Serge As you stated, maybe it is not relevant what the sigs of the Graves radar do compared to others.
Just as you mentioned, there are a number of factors which may be the cause of lower reports, like
Vy sharp pre amp frontend, detuned array for 143 etc.
I had a look at my log and there I always made notes of special events or circumstances and read a shout in my logbook that ra6ax (=rn6bn) had -4 as a record, but a few months later it was -2.
I also remember that time, that stations here in PA had better
reports or the same, even they had less antenna gain.
So receiver factors like a clean frequency w/o noise and maybe even soundcard differences make just that bit of difference.

My system had 18.5 dBd but my own echoes were lots of time not audible. But one day condx were soo good (and surprisingly not predicted as very good in the W5LUU calender) that I could even hear my SSB echo. I never heard that before and after again. Off course I have doubted sometimes if my system was 100% OK, but results in the ATP and contests always proved that system functioned well.
So condx are a real important factor and I would not be surprised that one day you'll have even better results :-) If such a day is present, maybe it's good to look at Graves and use that report as a reference for your system.
73 Oene PA3CWN

Op 6-1-2011 18:08, serge szpilfogel schreef:
> Now I heard the radar off the moon. It certainly did not overloaded my receiver. The fact is my Icom 275 is not tune for 143mz my preamp is not tuned for 143 MHz& my antennas are not cut for 143 MHz. So how relevant is my testing??? the best I saw was -16db not great when Kb8RQ is -8& rn6bn is -4 db
> Serge Szpilfogel 50 Faders road Bayside.Nova Scotia B3Z 1L7 Canada VE1KG@hotmail.com

>> Date: Thu, 6 Jan 2011 07:34:40 -0900
>> To: ve1kg@hotmail.com
>> From: kl7uw@acsalaska.net
>> Subject: Re: [Moon-net] 143050 RADAR SIGNAL OF THE MOON
>>
>> Apparently the radar is a CW signal so should produce a good trace on
>> SpectraJT or Spectran, etc. JT-65 should give a signal level same is
>> it will give on a birdie. I will have to take a look, myself, now
>> that I have the new WA2ODO preamp installed.
>> 73, Ed - KL7UW, WD2XSH/45

Serge, I didn't read what the GRACE radar was using for polarity, but could that explain the lower signal level? I doubt that tuning only 1-MHz will affect your receive sensitivity that much. Receivers and preamps tend to be wideband and antennas don't drop off that much for receive performance (SWR in Tx is another issue but you are not transmitting on 143). Could it be Faraday?
DD0VF running with 4x 8-elem sees the radar at 0 to-5 on JT-65.
I don't recall if you have polarity switching on your antenna.
73, Ed - KL7UW

Now I heard the radar off the moon. It certainly did not overloaded my receiver. The fact is my Icom 275 is not tune for 143mz my preamp is not tuned for 143 MHz & my antennas are not cut for 143 MHz. So how relevant is my testing??? the best I saw was -16db not great when Kb8RQ is -8 & rn6bn is -4 db Serge Szpilfogel 50 Faders road Bayside. Nova Scotia B3Z 1L7 Canada VE1KG@hotmail.com

Thanks, for this info.
This makes for a really interesting signal to find and may be a good beacon to measure 2m-eme conditions. Often, I have troubles finding the Moon in the west as my azimuth calib. is off on my Ham-IV rotator. This will help when mutual Moon is visible (I get a second EU Moon window on high dec days at the last two hours before Moon set). May be a good test of system performance averaged over time.73, Ed - KL7UW

Hello Serge,
Both Rob PE1ITR and Steffen DD0VF have some info about it on their webpages.
I've seen the sigs going just above 0 dB in WSJT.
http://www.itr-datanet.com/~pe1itr/graves/
http://www.qslnet.de/member/dd0vf/EME.html
73 Oene PA3CWN

On Joop suggestion I am listening to the French radar off the moon on 143.050 & I wonder if WSJT decodes this signal as a line & would give me a db reading. I am trying to see how good my receiving system is & what should the readings be?? does any one know???
4X17EL here Serge VE1KG

The gang at the April SBMS meeting discussing stuff while **Dave, WA6CGR** (center) sells off some 10 amp 24 volt switching power supplies. The San Bernardino Microwave Society is a technical amateur radio club affiliated with the ARRL having a membership of over 90 amateurs from Hawaii and Alaska to the east coast and beyond. Dues are $15 per year, which includes a badge and monthly newsletter. Your mail label indicates your call followed by when your dues are due. Dues can be sent to the treasurer as listed in the banner on the front page. If you have material you would like in the newsletter, please send it to Bill, WA6QYR at 247 Rebel Road Ridgecrest, CA 93555 or, bburns@ridgenet.net, or phone 760-375-8566. The newsletter is generated about the 15th of the month and put into the mail at least the week prior to the meeting. This is your newsletter. SBMS Newsletter material can be copied as long as SBMS is identified as source.

San Bernardino Microwave Society newsletter
247 Rebel Road
Ridgecrest, CA
93555
USA