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

July 2005 Edition

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At **the 7 July meeting** – 76GHz equipment progress Kerry Banke K6IZW. We have had some exciting developments. "Banke Labs" has been hard at work modifying some surplus equipment.
The auction-
Folks are to bring something to the auction off during the meeting for the benefit of the Auxiliary Fund, which is to provide extra monies to the treasury for MUD05 expenses. Here are three categories of sales:
1. Whatever it brings, give it to the club.
2. Starting bid needs to be met or it goes back to the owner. If it goes over that, it all goes to the club.
3. Starting bid needs to be met, the club gets a percentage of the final bid.
Put a tag on the items so that it is known which category they fit in.
There will be no more bidding for some one else to take something home.
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. Check out the SBMS web site at http://www.ham-radio.com/sbms/.

Last meeting- Dave, WA6CGR had his lab equipment at the meeting to measure noise figure and power at frequencies up to 47 GHz. A number of members took advantage of the test time to measure their equipment. Welcome to new member Daryl Owen N6QPK of Anaheim. Welcome to visitor Thomas de Lellie KN6EI of Alameda and Ray Grace, WA6OWM of Redondo Beach. 28 people present.

Scheduling.
Tune up party at end of July.
4 August Contest preparation and places. Find out where people are going during the 10ghz and up contest, get information on locations and maybe form a team.
6-7 August ARRL UHF Contest
20-21 August ARRL 10 GHz and Up contest
1 September Contest prep, Owens Valley project update and prep, and Microwave Update rep.
10-12 September ARRL September VHF QSO Party
17-18 September ARRL 10 GHz and Up contest
6 October- Microwave Update preparations.
3 November- Microwave Company rep on latest microwave developments we will have someone in from industry to talk about the latest developments. Door prizes!
1 December- History of Radio Astronomy- We hope to have a guest speaker.
YY December- Christmas Party at The Lab and Gift Exchange
5 January 2006- OVRO-SBMS Update and Report. Details of the Owens Valley Radio Observatory project with pictures and sound.
2 February 2006 - 1296Mhz High Power Amplifiers. Members will share their projects and results. Want to build an amp? Join us for a presentation by those who have had experience building them. Both solid state and Tubes

"Wants and Gots for sale"
Wanted- WR90 to SMA adapter Richard KB0EMR ReemeeRchrd@aol.com
Want manual for HP 8621B sweeper 100 MHz to 6 GHz Chuck WA6EXV 760-377-4972
Want 2.5 GHz PLL board Chris N9RIN 949-388-3121
Want manual or info on Kenwood TK931 900 MHz radio WB6DNX 714-529-2800
Want manual or schematic for Tech 147 NTSC generator Neil Scott

MICROWAVE UP DATE 2005

Chairman:	Pat Coker, N6RMJ of SBMS
Planning Committee:	Pat Coker, N6RMJ of SBMS
	David Peters, KI6FF of WSWSS
	Dennis Kidder, WA6NIA of SBMS
Presentations:	Chip Angle, N6CA
Publicity:	Wayne, KH6WZ
PRIZES:	Dave Glawson, WA6CGR
Registration & Finance:	Dick Kolbly, K6HIJ
Family Program:	Mel's wife—need name
Surplus Tour:	Mel, WA6JBD
Location:	Sheraton Cerritos Town Center

The SBMS web site has a MUD 2005 sub site. Dave WA6CGR has five companies donating prizes. Three or 4 vendors are on line to be in the flea market. More help will be needed at the registration table.
Dick, K6HIJ working on a display for MUD.
Microwave Up Date 2005 Call for Papers
MUD 2005 will be held this year in the Los Angeles area on October 27 thru the 31st. As the Technical Program Chairman this year, I would like to invite interested authors to present a paper(s) for the 2005 conference.
Microwave Update is the premiere microwave amateur radio conference on the planet. Many people around the world collect the proceedings from this conference since it represents the current state of the art in microwave amateur radio. This is a great opportunity to get your ideas and papers published! You don't have to give a talk to get your paper included in the proceedings.
Electronic submissions in Word, WordPerfect or text format accepted by email or CD. Usual drawing formats also accepted with your paper(s).
Cutoff date for inclusion in the proceedings is September 5th, 2005. If you are interested in writing and/or presenting a paper for the 2005Conference, please send me an email or write to:

N6CA PO Box 35 Lomita CA 90717-0035 email: n6ca@ham-radio.com
Please contact me as soon as possible with an abstract or even a general idea. This will help the conference team with its planning activities. For more information about the Microwave Update 2005 see:
http://www.microwaveupdate.org
73 Chip N6CA

> Registration Desk helpers- looking for volunteers, wives or anyone to help man the registration booth from Wednesday October 26 afternoon or Thursday October 27 thru Saturday October 29, please contact Dick Kolbly K6HIJ 26335 Community Barstow, CA 92311 760-253-2477 dick@eventhorizons.com

Owens Valley Radio Observatory Project

Chuck, WA6EXV and Bill, WA6QYR went up to the big dish on Friday 10 June to check out cabling and wires running from the control room to the feed. Mark met us and had some data on the wiring but needed to have it checked out for accuracy. The three of us checked the wiring from the control room patch panel to the feed point patch panel and the cable going on to the receiver box at the feed. There were a few wires that were open or grounded, but enough were found to allow Chuck to continue building the control box. The coax cabling was also checked out both with a signal generator/ power meter and an MFJ 695 analyzer. There are 5 RG-214 type cables and 8 RG-58 cables. Again there were enough for sending 10 MHz reference signals and 144 MHz transceiver signals between the two locations.
Chuck now has enough parts to begin construction of the 1296 MHz and the 10 GHz transverters that go into the "receiver" box, which is placed at the feed.

Activity Reported at the June SBMS meeting- Gary, K6KVC put SBMS meeting on the local ATV net again. Dave, WA6CGR worked the VHF contest and has a 2 GHz rig built; George, K6MBL is writing about medieval times on flashlight frequencies" for MUD; Dick, K6HIJ purchased material for 24 GHz waveguide switches; Chip, N6CA rebuilt the 1296 rig from Hawaii after 25 years on the air, the 10 GHz rig is gone to Hawaii, is building a cheap power monitor and it will be on the web site soon, learned how to build pc boards on Express PCB; Ed, K6ODV made 3 contacts during the VHF contest; Larry, KG6EG worked the contest; Wayne, KH6WZ worked the contest on both 10 and 3 GHz; Jeff, KN6VR built the 1152 board for a weak signal source; Pat, N6RMJ worked the contest and got a 900 MHz rig; Gary, K6MEM has a 902 radio, new 1296 amp, and the 3 GHz rig works; Bob, WA6VHS has a 900 MHz radio; John, KJ6HZ did work on 2 and 3 GHz rigs and has a pyro-joe 10 GHz rig; Dennis, WA6NIA has 23 GHz rig on air and is moving the 10 GHz rig to the size of FT817; Ray, WA6OWM is interested in microwaves; Rich KG6JKJhad fun during the contest with a 10 GHz loaner rig; Tom, KN6EI is working on "Hornet" ship museum; Ed, W6OYJ having fun with 802.11b communications; Bill, WA6QYR picked up some salvage from Jawbone canyon yard; Chuck, WA6EXV gave the contest a try, has the OVRO control box built, and is working on the "receiver box" which is 3 ft tall 20 inches in diameter and weighs 70 pounds empty; Dick, WB6DNX picked up a rubidium at the swap meet; Mel, WA6JBD is working with the NEC boxes and has a 5.7 GHz rig with 3 db NF and 100 mw; Chris, N9RIN got his 3 w amp into the 10 GHz rig and picked up a 5.7 GHz rig on ebay.

Beacons-
Heaps Peak DM14kf 34.14.2.4n 117.8.25.2w 8kft horz 1296.0-.2 MHz in 2304.6-.8 MHz out
Frazier Mtn DM04ms 8013 ft 10,386.3104 MHz 1.4w 14-dBi-omni horz.
Palos Verde DM03ts 1300 ft 10,368.300 MHz 1.6w 14-dBi-omni horz.
San Diego DM12mq 32.41.8n 116.56.09w 10,368.070 MHz 14 dbm 10db omni horz
Santiago DM13fr 33.42.690n 117.32.020w 5664 ft 10,368.330 MHz 0.5w 10dbi horz
ATV: 2441.5 MHz in 5.9 GHz out 10.368.4 MHz in 3460 MHz out

OFF the internet-
Hello everybody -Can some of you give me some advice? I want to work towards being active on microwave bands "someday". I am leaning towards starting with a 10Ghz setup. I know that one of the first things I need is a rig to use for IF. From the reading I have done, it seems typical to use a rig capable of 2M SSB or CW for an IF. I have read that some people use 10M (HF) for an IF for weak signal VHF, but I don't know about 10M with microwave transverters. I'll probably be operating portable, so it would

be nice if whatever I get lends itself to portable operation.
So here's the questions:
1. (Assuming 10 GHz) Is a 2M all mode the right kind of rig to get for IF?
2. Is one of the "DC to Daylight" (all bands, all modes) rigs suitable? How well does the rig need to "hear"? The weak signal folks don't seem to care for FT-817/857/897 or equivalents, they say they are deaf.
3. It seems like liaison activity is 2M SSB. Is that so? Do most people in portable operations use the same rig for liaison and IF, or do they usually have two 2M all mode rigs (one for IF, one for liaison)?
4. If you were starting over again with a moderate budget, what would you get?
Thanks for the help. Hopefully you'll hear me someday. 73 Greg Porter N6MOQ Paso Robles, CA CM95

Greg, The IF radio frequency of choice is 70 cm as the image is 850 MHz away. This makes the filtering in the transverter easy. 2M is a little more problematic, but filtering using 1/2 " pipe cap filters easily overcomes the image problems. 10 M requires either super filters on 10 GHz or an extra conversion. 10 M rigs, especially large base station types often offer superior and multiple types of filtering compared to VHF/UHF all mode rigs. The choice is between better performance and portability for an IF rig. Some VHF/UHF rigs offer a choice of filters, and regardless of output power, you are only going to be able to use 20 mW or less to your transverter. This clouds the choice of an IF rig. If you can find a used rig with blown finals the reduced price might make the decision for you.
Last but not least, you will be listening for weak signals, calculating headings, adjusting elevation, operating most likely outdoors, using an antenna of less than 6 degrees of beam width, trying to keep logs and rig safe from the elements including wind. Having the ultimate IF rig with multiple filters, modes, and second receivers operated by layers of menus should be enough to keep you from finding all but the strongest signals on the band. Simple radios, and a portable transverter is the best way to start.
Liaison is typically done on UHF FM repeaters. I use a handheld and a 3element beam. In some areas 2M is used. Biggest problem is many operators go to sites that have many powerful repeaters on them. Good filters for both bands are a must if you are hill topping otherwise all you will hear is intermod in your liaison rig.
Another point when constructing a transverter do not cheap out on shielding. Some sites have so much R.F. vehicles have had to be towed 3-4blocks away before they will start. Many vehicle alarms will not turn off. In this environment every ounce of shielding is worth its weight in gold. I doubt if I will start over, each year I add some improvement to my rig. This year was an extra 3 watts of power for a total of 4 W. For me this has been an evolutionary experience and it this year will be my 10 year of contesting on 10 GHz NB.
Looking forward to hearing you on the air on 10 GHz, Art, KC6UQH

1. (Assuming 10 GHz) Is a 2M all mode the right kind of rig to get for IF?
Greg, Most people use 144 MHz. I use direct conversion to 28 MHz using double balance mixers (available on ebay or surplus). Band pass filters are very easy to make for the 28 MHz IF. They have about 1.6-db losses and a good return loss (swr). Construction info for these filters is at:
httphttp://www.ham-radio.com/n6ca/microwave/filters/10368-28bpf.html

2. Is one of the "DC to Daylight" (all bands, all modes) rigs suitable?
How well does the rig need to "hear"? The 817 are a very popular rig for ALL IFs since it can be used at 28 thru 432 easily. Is has great sensitivity and is small and not too expensive. They work fine but I like bigger numbers on the freq display so I use a modified Elecraft K2
Most people out here in Southern California use 440 FM for liaison and hardly use SSB on 144 MHz. We have many 440, 220 and 900 linked systems available for liaison. That means you don't have to mess around with a vhf antenna, just use your mobile rig and whip ant. That puts all of your effort into the fun stuff.... microwaves.
In the 2003 and 2004 10 GHz and up contests there were over 65 stations workable in Southern California. That's a bunch of guys running around with their radios. Great fun!
73 Chip N6CA

Greg, Art has made a number of good points. The higher the IF frequency, the easier to filter out the mixing products. However most folks on the band, especially beginners, are using kits or manufactured

transverters. Most of these transverters are designed to use a 2M IF and do a decent job of filtering. Downeast Microwave and DB6NT units use 2M IF, butDB6NT may make ones with different IF choices. Check the web site to be sure. Art is one of the minority of microwavers who has assembled a high performance rig of his own design from parts and surplus components. This approach allows more flexibility in choosing the IF frequency, but requires considerable skill and is not recommended for your first microwave rig.
Some of the really serious microwavers who try to work really long distance QSOs use HF radios because of their higher performance and the availability of options like DSP, variable bandwidth, IF shift etc. which is rare on VHF radios. While some like N6CA have been able to make a single conversion from microwave to 28 MHz, it is easier to add a second transverter to convert a 2M (or other) IF radio. Since the bulk of the performance of a microwave system is determined by the front end of the microwave transverter, you can get away with older 2M-10Mtransverters with mediocre performance like the Microwave Modules units, which are pretty inexpensive on Ebay.
The FT-817 is a very good IF radio and is quickly becoming the IF radio of choice for a large number of microwavers. It can handle any IF you are likely to want to use and has some nice features like a built in keyer and several levels of power. As noted above, the mediocre performance of the FT-817 doesn't hurt you too much on microwaves. For the average user, its small size, low weight and flexibility make up for the small difference in performance.
Another consideration is how you plan to interface to the radio. There are many schemes out there, but some require modification to the radio. Inexpensive older 2M all modes are a bit easier to justify hacking a brand new rig. Most of the mods can be reversed if you ever decide to sell the rig. Modification is not always necessary since you can use an interface like the Downeast Microwave TC or AOS series of kits but is sometimes preferable. The Kenwood TR-751 is a popular radio that is fairly inexpensive on the used market. Try to avoid radios with LED displays like the TR-9000 because they are difficult to see in the sunlight.
Liaison is determined by regional preference. Most of CA uses 70 cm FM while the east coast uses 2M SSB. I don't know what the Midwest or south uses. Regardless of the frequency, you definitely want to have a separate radio for liaison. The reason for this is you need to use both at once. When you're listening for someone on the microwave bands, you need to be able to monitor the liaison frequency to coordinate the attempt. You need to coordinate aiming, frequency and who is sending to whom in real time during the contact. For this reason it is desirable to have the liaison radio positioned close to the microwave rig.

If I were starting out with a sizable budget, I would get a DB6NTtransverter and use an FT-817 IF rig. If my budget were smaller, I would get a surplus commercial unit (like a M/A-Com) to convert and use a used 2M all mode IF rig.

Since you plan to get on the microwaves in the future, I also recommend becoming active in your regional microwave club. From your QTH, the 50MHz and Up group and SBMS are both worth staying in touch with. You should be able to work people from both groups during the contests. You may even be able to borrow a rig to start with for one of the contests (like the June VHF contest or the August/September 10 GHz and Up contest.) Since microwaving is typically not "plug and play" it becomes very important to have others to help you get on the air. I also recommend operating with someone else because, as Art described, there are plenty of pitfalls in just finding and working other stations. As you mentioned, 10 GHz is the best band to start with due to the high level of activity. It is by far the most popular microwave band in CA (possibly excluding 1296) and you can easily work several hundred miles with a moderate performance set-up.

In case you missed it, KH6WZ has described many of the trials and tribulations of getting started on the microwave bands in his Beginners Column in CQ magazine over the last year or two. If you can find them, they would be well worth reading.
Please let us know if there is anything else we can do to help you get going on the microwave bands.
73, John Oppen, KJ6HZ

73's Bill

Dr. Mark (left) and Chuck, WA6EXV in the control room of the Owens Valley Radio Observatory 40 meter dish. The panel directly behind Mark is the one we will have patch cables to the feed. The panels to the left of Mark control the movement of the dish.

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 under 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, bburns@ridgecrest.ca.us, 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.

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