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

September 2007 Edition

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At the **6 September SBMS** meeting will be planning for the September portion of the ARRL 10 GHZ and up contest. Bring your extra stuff for another Square Deal Doug auction. 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/.

REMINDER- NO PARKING IN THE CHURCH LOT UNTIL CLAIRIFICATION IS MADE.

Last meeting-. Dick, K6HIJ donated 6 wr-42 waveguide switches to the Society and was reimbursed his costs of motor and parts. An auction sold them to the membership at around $60 each. Ed, W6OYJ indicated that some 57 QSL OVRO cards had been sent out but needed addresses for others. ARRL SW division ham fest on 7-9 September has several members talking on microwave. There was a lot of discussion on where folks were going on the first ARRL 10 GHZ and Up contest weekend. Mike, W6YLZ was looking for members who would like to be on the Mexico 10 GHz contest trip. 26 members present.

If you have moved, changed email address, or some how altered how you wish to receive this newsletter, you need to let Bill, WA6QYR know your preferences. bburns@ridgenet.net.

Scheduling

Sept 8-10 ARRL VHF QSO
Sept 15-16 10 GHz and Up second half
Oct 4 SBMS meeting TBD
October 18-19-20 **MICROWAVE UPDATE (MUD) 2007** Historic Valley Forge Philadelphia,

Nov 1 TBD
Dec 6 TBD

"Wants and Gots for sale".

For Sale- Programming sub-board for the Verticom and Stellex synthesizer. Assembled PCB, chip programmed for 11.880 GHz available from Chris N9RIN at: cshoaff@yahoo.com. SBMS member cost $6.00 not counting shipping.
Want- another SBMS member to operate in XE September 07 Mike W6YLZ
For Sale-I have a NOS Yaesu G-5500 rotator. It has never been on a mast. $575.00. Also I have a W0LMD Satellite Tracker Mini. For $75.00 This allows you to run your EL/AZ rotor under software control from several programs. i.e. NOVA.73 Bob WA6VHS
Radios for Sale
IC730 cosmetically poor, works good except for a flaky preamp. This problem has a known fix. Includes manual (copy), power cord and microphone. $50 or make offer or trade.
TS60 6m only 100w. Has intermittent local oscillator. Includes manual, power cord and microphone. Average condition. $50 or make offer or trade.
FT-726 good 'home' IF radio. Has 10m, 2m and 70cm modules, and may have the satellite board. Have schematic and manual pages for module installation. The microphone is a fancy Yaesu desk mic of the same vintage. $250 or make offer or trade.
Jeff Fort KN6VR 760-948-7227.jnjfort@verizon.net
For Sale--I am selling my old single 7289 amplifier. It is an N6CA design and has worked for years. It has the amp, metering, switches, knobs and blower in a nicely done panel and chassis. It is hooked up for air (Huge blower) but has a switch to turn on a pump for water-cooling. It has a separate fully enclosed and metered HV power supply. It runs at about 1200Vdc. The amp is set up for PTT and has a front panel bias knob. Very nice amp with spare tube. $400 plus shipping. Pictures available. All set to plug, tune and play. Doug K6JEY Long Beach, CA. 90806
Need test cable for HP141/8555a spectrum analyzer Dick K6HIJ 760-253-2477

Hello Microwavers, The 2007 SBMS/SDMG **"Tune-Up Picnic"** on Saturday July 28th in Fairview Park was a rousing success with a good turnout. The results are now posted on the SBMS web pages at http://www.ham-radio.com/sbms/sd/mdserpindx.htm
When you reach that page scroll down to the July 28, 2007 date. Click on that link for an adobe acrobat (.pdf) file to see the results of tests on 10, 24, 47, and 78 GHz. Just above the July 28 link is a new paragraph describing how to interpret the chart. Besides the test activity, a good time was had by all!
73s from Ed, W6OYJ remunn@earthlink.net

Activity reported at the **August meeting-** Dick, WB6DNX has his 24 GHz rig working and checked it out at the picnic; Chuck, WA6EXV has a design of a 10 GHz ss power amp for he and WB6CWN; Bill, WA6QYR is working on his 24 GHz rig and antenna; Ed, W6OYJ has 24 GHZ VUCC #32 and reported on the tune up party and San Diego optical repeater; Jeff, KN6VR has been doing some testing of the thermal characteristics of his DB6NT transverter; Mel, WA6JBD doing some cactus work; Tom, WB6UZZ has been testing his 10 GHz rig; Chris, N9RIN has been working on his 10 GHz rig; Kurt, K6RRA took photos at the tune up party; Pat, N6RMJ now has house with working radio room; Steve W6QIW has a 80w 1296 MHz power amp; George, K6MBL talked about his entry in to microwave thanks to SBMS at age of 24 and career in microwave; Dick, K6HIJ has been working on some cavity designs and had his HP8555 die; Joonho, KG6MQS did some Qualcomm work and has ebay test equipment; Mike, W6YLZ worked on his dish after it blew over; Larry, K6HLH modified an NEC synthesizer; Dan, W6DWFhad his computer die; John, KJ6HZ did some work on his rig;

10 GHz contest Mexico adventure discussion
This weekend Miguel W6YLZ, Dan K6NKC, and Bernardo XE2HWB and I participated in the ARRL 10GHz and Up Cumulative contest from Baja California, Mexico, operating at two spots along the Baja Sur (south) coast. Miguel, Dan and Bernardo set-up on the Vizcaino Peninsula in DL27, while I continued another 430km down the Baja coast to the small town of Puerto San Carlos in DL34wt.
San Carlos sits at the tip of a western bulge in the Baja Peninsula and has been visited by hams before, including Jack N6XQ and Chip N6CA who reported the reception of both two meter amateur and

commercial FM stations during their visits there back in the mid 90s. Jack later returned with 10GHz gear and attempted to work an 800-mile path up the coast to Chip N6CA, Dave K6OW and myself set-up near Santa Barbara. 10GHz signals were not heard that day, but Jack worked Santa Barbara on 2meters, which sparked this ham's interest in the path.
Now, more than ten years later, I visited San Carlos during the August microwave contest weekend hoping we could connect with one of the dozens of stations out in the field. It turned out to be a record-breaking day and a half on 10GHz.
I made 53 10GHz contacts from DL34wt this weekend. The longest contacts were with Gary AD6FP at 1460km, then with N6CA and KH6WZ who were just a little closer in at 1448km. In fact, the NA 10GHz DX record was broken five times during the weekend, first by W6QIW at 1315km; then by N6CA and KH6WZ at 1320km, 1426km and again at 1448km; and finally on 8/19/2007 at 0845 with Gary AD6FP operating at CM96wa at 1460km (907mi) which should be the new NA 10GHz record. The AVERAGE contact distance for all 53 contacts was 1178km and the accumulated score on just two log pages is over 65k points!
I want to thank everyone who supported this effort, including the San Bernardino Microwave Society members who went out to the coast and into the hills, the fellows from the 50MHz and Up group in Northern California who came down and added to the success, to the hams who checked in with Miguel and myself on the hour on 40meters during the long trip down and back, and to our Mexican compadres Bernardo, Antonio and Dr. Levy of the FMRE. This was a group effort with shared rewards. My greatest pleasure comes from the participation and support we received from so many. Thank you all.
I encourage those who participated in this fun weekend to share here on the reflectors their recollections of these long contacts we made and see that your longer contacts get into the record book with sufficient details.
See you on the air, Frank WB6CWN / 4C2WH

Great going Frank! In addition there was a QRP contact. Chris W6CWX was using my DB6NT transverter and a 16db gain horn. He worked you two way 59 from Signal Hill. It was Chris' first microwave contact at 1275km.Yes, quite a weekend, Doug

Tripods and compass
As has been suggested before, the Oregon Rule Company (http://www.oregonruleco.com/) manufacture a wide variety of adhesive-backed compass roses with nicely engraved degree markings which can be adapted to your tripod without much difficulty. Makes pointing a whole lot easier John, N6AX

I use a Wayfinder-7000 compass. It's a Flux-Gate device and can easily be calibrated to ignore local magnetic fields. I use one on a FIM-41 Field Intensity Meter and once calibrated it ignores the magnets in the meter and speaker. It has one-degree resolution and you can put in the local declination so you can use it for magnetic or true north alignment. Carry a spare 123-type photo battery with you. I've been very happy with mine and the way it performs.
See: http://www.amazon.com/dp/B000078WXK/ref=nosim/?tag=newmusictunes4-20
Burt, K6OQK

Waveguide data
Folks, My website http://www.wa1mba.org/ has included for several years both an RF connector page and a Waveguide page. These have been copied (with permission) on other sites and used by companies and educators. Others have published an array of pages on the web that also cover these topics, and in some cases do a very good job.
Included in my waveguide page are the cutoff frequency and a calculator so that you can figure losses in normal operating range of your waveguide, and also losses below cutoff if you need those data to design a filter.
Note that it is quite possible to successfully operate coaxial cable above its "cutoff" frequency (which is actually a frequency at which the coax adds waveguide prorogation modes, and is more rightly called the "moding" frequency). For instance, I have used 1/2 inch Andrew hard lines at 10.368 GHz and 7/8 inch at 5760 for years with no problems at all. My motto is that if I can afford the time for failure, give it a try and

I might succeed. Tom WA1MBA

"Tapping 2-56 Holes" and "Waveguide Question…acid" are interesting threads [could not resist pun]. Having taped thousands of holes – and broken more than a few taps in the process, I have some suggestions to add.

Most of the suggestions submitted are excellent, particularly those by Jerry concerning the percent depth of thread.

The "Machinery's Handbook" (which any machinist/machine shop should have) provides extensive information (similar to Jerry's words, + more detail), tables, tolerances and formulas concerning threads and tapping. This includes a factor not yet mentioned: tap drill hole size verses engaged thread length; the longer the engaged length of the screw, the larger the tap drill hole possible while maintaining 'holding strength.' In thin sheet metal you may want a full depth of thread to prevent pullout, while in thick metal with long screws, 50% depth of thread (or less) is acceptable. "In general, if the screws enter more than one and one-half times the diameter, one-half of the full thread diameter is sufficient" (i.e. 50%). For smaller-sized threads they recommend using drills slightly larger than those listed in their tables to reduce tap breakage. This book and others also list the lubricants to be used when tapping different metals; there are significant differences.

Also only mentioned once is the condition/sharpness of the tap. A machinist I knew who did precision work for the National Bureau of Standards (now NIST) threw a tap away after using it for tapping SIX (yea 6) holes! Few of us can afford that, but thinking that a tap can be used for hundreds of holes in steel, aluminum, brass, etc. is folly. I normally buy two or more taps of the same size, use one, and put the rest away. If the tap I am using starts to bind or give me problems I pull out one of the unused ones and try it. If the new one cuts much more easily, I pitch the dull one. [Also, if I break the tap I am using I have a spare and do not need to make a trip to the hardware store to find that they are out, and my project is dead in the water.]

Keeping the tap square with the hole is very important. For small sizes I do not like the suggestion to chuck the tap wrench in a drill press or mill: too much inertia, pressure, etc. as mentioned by others. Very little pressure is necessary to start a tap; it should pull itself into the hole. The guide rod in the end of the wrench idea is good, as is free floating the wrench in the chuck. I took a piece of rod, chucked it in the press/mill/lathe and filed/turned a cone on the end; this fits into the hole in the end of most wrenches. Make sure the tap, wrench, etc. are in-line. The tapping machines, guides and the tapping blocks that have been suggested also work well. Another trick for deep holes with long screws is after boring the tap hole, counter bore for a short length a hole the outside diameter of the tap, this will start the tap squarely. There are special tapping devices with torque clutches for use in (running) drill presses and milling machines; they are quite expensive.

For tapping 2-56 and smaller the use of a standard tap wrench is a disaster waiting to happen. Use the type wrench that looks like a precision, small screwdriver, or pin vice. These have a spinner top, a knurled body about ¼ inch in diameter and a chuck device at the bottom to hold the tap. They may have a hole through the body to insert a torque bar – avoid using this feature if possible; you want fingertip control of the ¼ inch shaft. (I often use this type 'micro' wrench for 4-40 taps in delicate or difficult work). Hobby shops sell these as well as small taps and brass screws.

The ¼ to ½ turn forward, ½ to 1 turn back to break the chip is standard procedure. When tapping a deep hole, remove the tap frequently and clean it and the hole of chips and re-lubricate it.

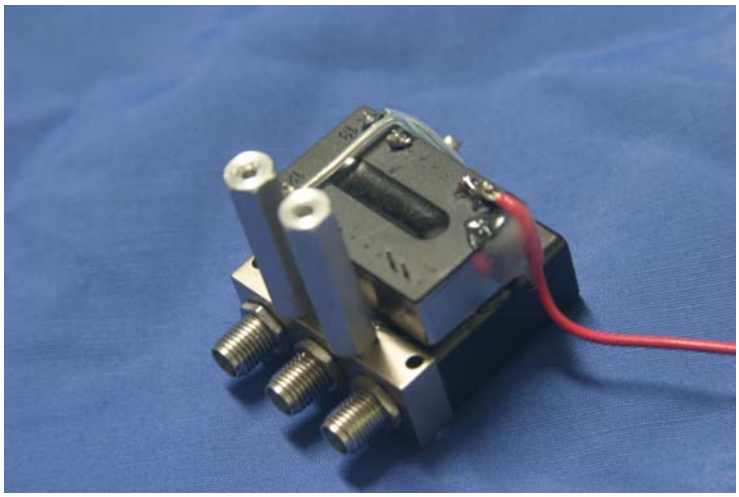
The employees of 'happy home owner,' supermarket hardware stores, in general know little or nothing about taps (and nuts, bolts, etc.). Some time ago I asked the local Ace if they would order me ¼-36 and 3/8-32 taps/dies; they very forcefully and knowledgeably denied such things existed, until I showed them several – then: 'ordering such specialized items is not our business.' A variety of taps are available in many sizes/threads, standard/plug/bottoming (very useful to finish blind holes), right hand/left hand, deep hole, spiral, 2/3/4+ flutes, special ones for different metals, etc. A talk with your local machine shop can be a real eye-opener.

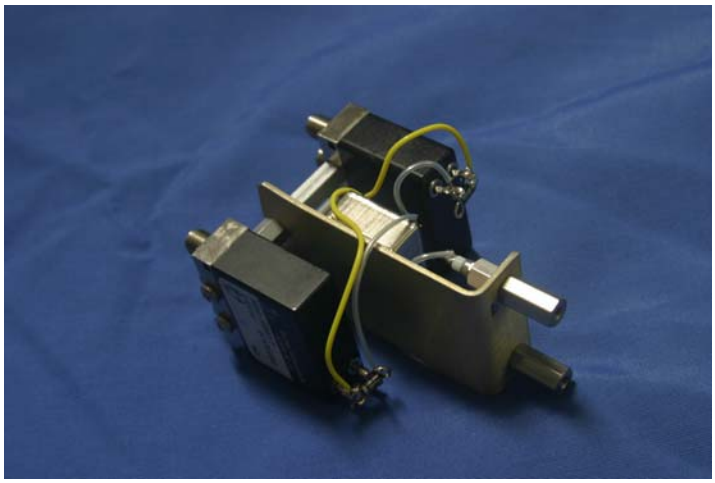
I have a metric tap set, bought in Germany, which uses three taps to thread a hole. The tips of the first tap's cutting threads are ground off to about 50% of the screw's outer depth of thread diameter. The second tap is about 75% of the final OD depth of thread. And the final tap is the full thread diameter. (Note that this is OD of the tap/screw, not ID of the tap hole.) These taps are very easy to use, each requiring little force to cut the sequential threads. My local (U.S.) machine supply house got me several small metric sizes in the same triple tap scheme that the original set did not contain. They told me that Unified Thread

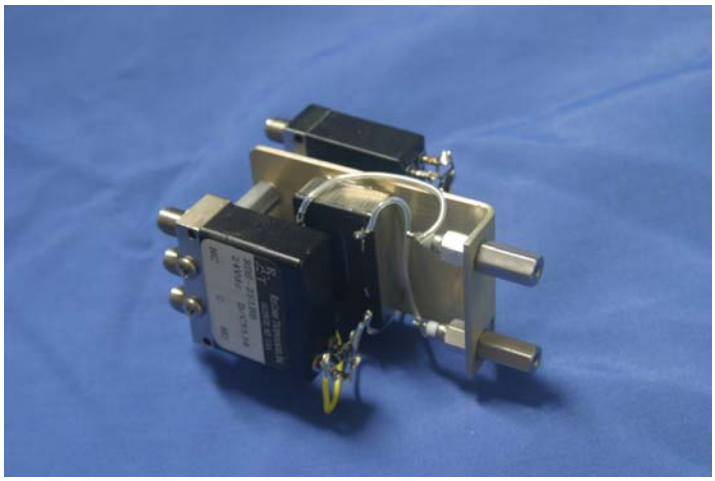
(UNC &UNF) sizes could be obtained on special order.

I had forgotten the Coke trick to remove a broken tap. I have successfully used nitric acid to remove taps in aluminum. It does eat away the aluminum, but seemingly more slowly than the steel tap. Once the tap is out you can drill out the hole for a larger tap and screw. If you have to use the same size screw, there are inserts to replace stripped holes or put a 'hard' thread in soft metal. Kits for these inserts are available from machine shops and supply houses. In several instances I have made my own inserts using a tapered rod and drill, forcing the rod into the hole from the back and then re-drilling and re-tapping the hole. If the tap broke off above the hole or slightly below the surface I can sometimes back it out with vice grips or careful hammering with a nail set/drift punch. For large taps (e.g. ¼ inch or greater) you may be able to grind a grove in the tap with a Dremel tool and back the tap out with a screwdriver. Or try welding a rod/bolt to the end of the tap. If you can get at the bottom of the tap, e.g. a through hole or bore into a blind hole from the backside, you can often 'blow out' the tap with a drift punch or press. You might try one or more of these methods if the Coke/acid loosens the tap some.
If you are trying to remove a broken tap from a valuable assembly and/or cannot use the above methods, there are specialized (and probably expensive) tap extractors. These are rods with an square/flats on one end to fit a wrench, a collar and thin fingers that slide into the hole and between the broken tap's groves between cutting flutes. You clean out the groves, slide the fingers down the groves, lock the fingers with the collar and back the tap out with a wrench. The smallest I have is for a size four tap, it is quite delicate, and thus I doubt they come smaller. A friendly machine shop might loan you one. A second 'precision' method is to erode/burn the tap out with an EDM machine; talk to a specialty machine shop or possibly an automotive engine rebuilding facility (they may use an EDM to burn out broken/frozen head studs).
Good luck, John WD4MUO/0

Here is what I have been doing with the Traco DC-DC converters made available by Dick Bremer, WB6DNX. These little units are very good, nice and small, and since they are a good price, we can implement them as" point of load converters" at each relay. This way there is no "power droop" that can cause a relay to not actuate when you need the contacts to flip.
Here are some photos of this idea. The converters are glued to each relay, and 12V is fed into the converter, making the 24V SMA relays 12Vunits. The double-SMA relay unit is used to split the 144MHz IF input (the NC contacts are connected together for receive, and the NO contacts are used to switch an attenuator in and out to reduce the 2W from the IF rig to a more mixer-friendly power of about 15dBm (about 18 to 20dB attenuation). Of course, these converters can also be used with waveguide relays, as well as anything else needing up to about 75mA at 24VDC. I will be using these sub-assemblies in my next 10GHz rigs, based on the Qualcomm Lamb Chop units. Wayne Yoshida KH6WZ







http://f6fvy.free.fr/qthLocator/fullScreen.php
I posted this last month, but it's such a good tool for August contest planning that it's worth another look. Enter your four or six digit grid at the bottom of the page or click anywhere on the Google map to see the grid square. Use the hybrid or satellite view to see your QTH and where the grid crossings are in hi res. Have fun. Frank WB6CWN

One end of the line up of rigs at the July “Tune Up party”

The other end of the line up of rigs.

Ed, W6OYJ directing the measurements of rigs..

Wayne's 24 GHz rig.

I know I stuffed it in here some where…..

ED and Pat, N6RMJ talking about the performance of the rig…

Thanks to Kurt, K6RRA for the “Tune Up Party” photographs.

Kerry, N6IZW at the instrumentation table during the "Tune Up Party Picnic" in July. Thanks to Kerry and the San Diego Microwave Group for their work in testing every ones rigs.

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.

San Bernardino Microwave Society newsletter
247 Rebel Road
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93555
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