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

October 2007 Edition

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At the **October 4 SBMS** meeting will be at talk by Dick K6HIJ on the design of a 24 GHz waveguide switch and measurements. 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- Tom Fagan, WB7NXH ARRL Arizona Section Manager and Carl Gardenias, WU6D Orange section manager were on hand to talk about things coming up in their areas. There was a lot of discussion on where folks were going on the second ARRL 10 GHZ and Up contest weekend. Welcome to new member Dennis Benischek, ND7M of Riverside. 25 people present.

Scheduling

October 18-19-20 **MICROWAVE UPDATE (MUD) 2007** Philadelphia, PA
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- Qualcomm rectangular PLL board Chris N9RIN cshoaff@yahoo.com.
For Sale 10w 10 GHz TWTA with working power supply $60 Joonho KG6MQS

Want 24 GHz waveguide switch Paul N6DN
Need test cable for HP141/8555a spectrum analyzer Dick K6HIJ 760-253-2477

Articles noted- In the Summer 2007 CQ VHF there is an article by Wayne, KH6WZ on building a 10 GHz rig. Also by Gordon, WB6NOA on the annual 10 GHz attempt by N6CA to Hawaii. And by Pat, AA6EG on the Jamesburg EME efforts. October World Radio has an article on Paul, WA6PY and EME work.

Activity reported at the September SBMS meeting- Dick, WB6DNX cleaned up shop; Chuck WA6EXV working on a 10 GHz power amp at the 40w level and a new 10 GHz rig; Bill, WA6QYR finished a new 24 GHz rig and repackaged a 10 GHz amp; Doug, K6JEY has new signal generator and will be doing 2 talks at MUD; Kerry, N6IZW has daytime laser filters and made 21 mile contacts, and has new optical spectrum analyzer; Chuck, WA6IGPhad gold Qualcomm boards; Ed, W6OYJ worked on Mt Soledad to Mexico on 300 mw; Jeff, KN6VR was on Santa Ynez will lots of contacts; Tom, WB6UZZ had some lo problems; Chris N9RIN had some LO problems; Paul N6Dnwas out for the contest; Pat, N6RMJ had rig problems; Gene K6BNN rebuilt 10 GHz rig; Dennis ND7M is new to Riverside; Mel, WA6JBD new 10 GHz rig; Dick K6HIJ fixed SBMS mike cap and did some wr42 work; Joonho KG6MQS has new transverter and FT817 radio; Mike, W6YLZ reported on Mexico FMRE 75th anniversary call signs, had dish fall over and broke waveguide-now new dish; Larry, K6HLH worked on tower rig; John KJ6HZ building new 10 GHz rig; Frank, WB6CWN finished second rig to go to Mexico for hams there.

Email threads
Hello Peter, The 8484 power sensor will not work with the 431C power meter. The 8484
power sensors are used with the 435A and later model power meters. The 431C and 432A and their military variants used thermistor mounts like the 478A and its waveguide versions like X486A, P486A, etc. and later the 8478A coaxial thermistor mounts that are good to 18 GHz.
On the 431/432, looking at the front of the panel connector, the pins are numbered, starting from the gap at the top of the connector.
Pin 2 is immediately left of the gap; Pin 1 is immediately right of the gap.
Going anti-clockwise from pin 2 is pin 3, then pin 4, then pin 5. Pin 6 is
in the center of the connector. The pin functions are:
Pin 1 - RF thermistor connection to the power meter RF bridge
Pin 2 - isolated ground for the RF thermistor
Pin 3 - Temp compensation thermistor connection to the power meter
compensation bridge
Pin 4 - isolated ground for the compensation thermistor
Pin 5 - no connection, unless my drawing is wrong and it's actually the
chassis ground for the RF thermistor, it's hard to read
Pin 6 - chassis ground for both thermistors
Regarding the P421A detector, the cutoff frequency for TE1,0 mode in WR62 is 9.486 GHz, so the detector should work at 10 GHz, with probably somewhat lower efficiency. It will probably work at 24 GHz as well, again with somewhat reduced efficiency. We used them as detectors for leveling loops in sweeper systems many years ago. I may have a P421A around here somewhere, but it could take ages to find it.
Hope this helps! 73 de Steve, WB0DBS

----- Original Message ----- From: "peter" <peter-at-pe1dlg-dot-tmfweb.nl>To: < microwave@lists.valinet.com> Sent: Saturday, August 18, 2007 5:52 PM Subject: [Mw] HP C34 431c mount connector and HP P421A
Hello I have a power meter from HP and can't find the mount pin connections it is a strange looking connector but that is HP. It is a C34 431C a military off the 431C.Can I use an 8484 power sensor with this meter? And how to connect it if (it is possible). And can some one tell me more about a crystal detector from hp the data I have collected so far HP/Agilent P421A Waveguide Crystal Detector, P Band / WR62, 12.4-18 GHz. The diode used I think is: Part Number = 1N26 Manufacturer Name = Various
Description = General Purpose UHF-MW Mixer Diode Semiconductor Material = Silicon Frequency Band = K Noise Figure Max. (dB) = 13.1@Pin (W) (Test Condition) = 1.0m@R(L)(Ohms) (Test Condition) = 100z(if) Min. (Ohms) IF Impedance = 300z(if) Max. (Ohms) IF Impedance = 600f(test) (Hz) Test Frequency = 24G Package = DO-37 Military = N
Can I assume that the out put impedance is between 300 and 600 Ohm or is there an internal resistor inside? And can I use it also on 10Ghz and 24Ghz? Greeting peter PE1DLG

Microwave brick type 52 Calif. Microwave.
The main oscillator tunes from about 1100 MHz to 1500 MHz. The total brick multiplies your crystal freq. by 36 to 39 depending on the xtal freq. and the osc. Tuning. The step-recovery diode and a filter are located in a removable section directly under the label. Screws are hidden under the tag.
I took a 96.000 xtal (the regular type with wire leads), took the SRD multiplier section off the main oscillator, and tuned the main osc. To 1152.000 MHz (plus or minus). Harmonics of the 1152 signal are easily useable to 5760. A threaded BNC female screws directly into the hole where the SRD probe used to be. A small piece of copper, the same size as the SRD capacitive coupler was soldered to the bottom of the BNC. This makes a great moderate signal source for 2.4, 3.4 and 5.7 GHz. The output is much greater than 10 dbm at 2.4.
I took a second brick and repeated the process but replaced the filter section with a filter section from a macom brick at 10.7 GHz. I had to tap a couple of 4-40 holes in the brick to hold the screws of the Macom SRD unit. With a little tuning, the brick puts out a nice LO or moderate signal source at 10368 MHz. The multiplier for this is 108. One could put a different crystal in for LO use.
The transistor can crystals are available from the usual suppliers at a good price.
>From: "Mark Korroch" <KORROCHMA@michigan.gov>To: <microwave@lists.valinet.com>
Subject: [Mw] California Microwave Brick LO Date: Tue, 21 Aug 2007 09:15:24 -0400
Can anybody here tell me the frequency range of a California Microwave "Brick" L.O. I have here.
The part number on it is: 52-005744-02Assy: 42-006162-02
Thanks, Mark, WB8TGY

To the Microwave group -I have been following the thread on absorber materials. Almost everyone has been describing electric field type (carbon based material), like found in an anechoic chamber. Mixing carbon with glue is messy. I have been fixing up two chambers recently, UGH! Back in the good old' days at Westinghouse ESD in Baltimore, we used stuff from Emerson&Cuming that had FERRITE powder mixed in an RTV-like base. Coated all sorts of stuff to suppress leaks, etc. If you don't have ferrite power, get a stack of old cup cores, or fly back cores, or ferrite beads, and SMASH them up, sift with cheese cloth and keep pounding until you have small enough pieces to create a fairly uniform coating! If you don't have the exact material for 10 GHz, that's OK, it will still be lossy (may take a heavier coat). Add to a non-corrosive (i.e. electronic grade) RTV (GE has some nice ones...) and away you go! Spread in nice even coats, let dry, and add more if needed. Homemade stuff looks ugly, but it still works. Remember, loss can be created in either electric or magnetic field domains. Now you all can fight about whether this is right or wrong, or why it’s bad to break up ferrite material, or how tough this is to do, OK with me. All I know is, the Eccosorb sheet I have is HEAVY with ferrite material, and for leak, reflection stoppage, the RTV like stuff is how the big boys do it! 73 Jeff Kruth WA3ZKR

At work we have gotten sample packs from Emerson and Cumming Microwave and also from Cumming Microwave. I don't know if they could be prevailed upon to help hams out, but it might be worth a try. These sample packs included several different types -- The rubber sheets, different types of foam, etc. Eccosorb can be easily cut with a sharp knife if you want it thinner. We cut a whole bunch of it when we build our anechoic chamber. Gary Reed WE9Y Laird Technologies Holly, MI

Greetings to all again.
This is a success story related to this subject!
A week or so ago I posted a description of a problem I was having with a 1990's design 10 GHz quadruple-amplifier design (DL6NCI) that I had constructed from a PCB obtained from the Eisch Company in Germany. No one replied (message posted on two uWave reflectors!) so I was on my own. Presumably not many amateurs have been using this design. Through the addition of many 1 pF and 10 pF ATC capacitors at critical places and the gluing of three ferrite beads at other critical places I eventually 'won' the battle and the unit has been delivering around 200 mW of clean output power, but only with the lid off! The quest was on to find suitable absorptive material.

Not having slabs of commercial ferrite absorptive material available, a few days ago I started making inquiries and doing Google searches. Then, lo and behold, the current thread appeared on this reflector. Within the last half an hour, I have grabbed one of those magnetic advertising 'things' from the fridge

(didn't need it, really!) And cut a couple of 'slabs' of it to neatly cover the whole area underneath the microstrip side lid of the box in use. (Being a tinplate box, the fridge magnet material naturally holds itself against the inside of the lid..... easy!)
My report: One layer did not eliminate the tendency to oscillate with the lid in place, but it sure altered things compared to having no absorptive material. Also, the output power was reduced by around 5 dB, and very dependent on the position of the lid - not satisfactory! Adding a second neatly fitted layer, cut so this layer magnetically 'hugged' the first layer, has now solved the problem. Output power with the lid in place is now more than 200 mW, and clean. Fridge magnet material is a winner in this situation!
The need for two layers here seems to relate to Tom's explanation of electrical wavelength within the absorptive material. The material I have used measures 0.61 mm in thickness (0.024"), which includes the thin layers of advertising material.
In relation to other comments, in a few situations of instability of 1.3 GHz and 2.4 GHz amplifiers, I have successfully used some of that conductive foam that is normally used to store CMOS devices. That material was totally ineffective in the current 10 GHz situations. So, one satisfactory report from Down Under! 73Doug Friend, VK4OE Brisbane, Australia.

Tyler,
There has been one "bra" (as they are called) made of absorber designed to reduce radar returns for automobiles. It looks just like an item that some people put on their cars to cut down on bug messes and pings from pebbles. I don't know if it works. The two biggest microwave reflectors from modern automobiles are grillwork and headlamps. Next is the radiator (which is the biggest reflector in a fiberglass Corvette). We use a LOT of absorber in my business. The carbon foam stuff is broadband, but not very good until it is a good fraction of a wavelength thick. Preferably 2 or 3 wavelengths. At 10 GHz it's impractical inside enclosures. Carbon foams can be suspended in air if you want. The loaded RTVs can be a lot thinner. The ferrite loaded stuff is typically tuned although it will work some even if not the right thickness or formulation. Ferrite loaded RTV is almost always applied directly to a metal surface where RF currents are highest. There is a carbon-loaded plastic that is quite good but not generally available, and there are many carbon and graphite loaded RTVs, which can be applied in many situations. For the E field, there are some really very good mixtures of RTV, Graphite and Iron that get lots of absorption in a small thickness, and are suitable both against metal and open air applications. This stuff is very hard to find.
The problem with most of these RTV mixtures is that although they are lossy, they are also reflective. Many pre-formed materials have a bumpy or articulated surface to make a gradual match. These work much better than those without. This adds thickness and so is not good for quieting down cavities. Those situations are best served with ferrite or graphite loaded RTVs, and best with tuned thickness for the frequencies of interest because by tuning the match is much better. Tuning is a matter of getting the electrical thickness to be an odd multiple of a quarter wavelength. Because the dielectric constant can be high with ferrites, this can be considerably thinner than free space quarter wavelength, perhaps as much as one-fourth the free space distance. The more odd quarter wavelengths, the more absorption, but also the narrower the bandwidth of effective operation. Tom WA1MBA

You can find this item in MATERIALI VARI title
http://www.rfmicrowave.it/ita/catalogo.php direct link to pdf is http://www.rfmicrowave.it/pdf/varie_3.pdf
Francois F1CHF

Photos from the second weekend of the 10 GHz and Up contest on Frazier ---

Gary, AD6FP on Frazer DM04ms doing the code the hard way with clip lead to Doug, K6JEY on Pinos DM04kt 15 km away with 79 GHz.

A view from the other side of the 79 GHz rig showing the Icom computer transceiver operating on 1296 IF with Palm for a small portable rig.

Gary's 47 GHz rig with 30w TWT.

Gary, AD6FP on Frazier Mtn DM04ms with his 10/24 GHz rig. Gary made upper band (10, 24, 47,and 79 GHz) contacts to Doug, K6JEY and Helen, KI6LQV on Pinos DM04kt 15 km away. Helen does the code well.

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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