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

June 2008 Edition

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At the **5 June 2008** SBMS meeting **Frank, WB6CWN will talk on software defined radio (SDR) radios**. 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

Last meeting-Michael Scofield, N6OKG talked about RF Reuse over terrain and Geography. Michael is the manager of data asset development at ESRI in Loma Linda. Michael can be contacted at mscofield@esri.com. He is also a professor at Loma Linda University. His talk covered VHF, AM broadcast, TV and FAA long range radar. He has some great graphics on where stations were located and how propagation and terrain allowed some slight over lap of signals. The membership voted to host the 2010 Microwave update. It was learned that for the 2 GHz and Up contest we would be allowed the use of the Cactus Intertie system. The use of the LA 445.5 MHz repeater is also open but not yet links to the Cummings Peak machine. Possible future meetings talks could be a visit to an EME station such as WA6EXV 10 GHz, K6HLH 2 meter stations or future 10 ft dish at the “Lab” to see and learn what it is to put such a station on the air. President John was looking for direction the Society should be going. Mentoring of new members. Society projects such as the current 3.4 GHz rigs. Avago Technologies AMMP6425 device has 22 dB gain in 18-26 GHz SMT, 50 ohms in, 50 ohms out. 32 people present

Scheduling.
14-16 June ARRL June VHF QSO Party
28-29 June ARRL Field Day
3 July TBD
26 July Tune up party
2-3 Aug ARRL UHF contest
16-17 August ARRL 10 GHz and Up contest
13-15 September ARRL Sept VHF QSO Party
20-21 September ARRL 10 GHz and Up contest second half

20-21 September ARRL International EME Competition
18-19 October ARRL International EME Competition
15-16 November ARRL International EME Competition


Michael Scofield, N6OKG talked about RF Reuse over Terrain and Geography.

"Wants and Gots for sale".

For sale HP 8551/851 working spectrum analyzer and 8441 preselector combination. This is a one-owner unit before me and belonged to radio station KXRQ in Sacrament. Manuals. Tom Wulfet WA6GPIwulfert@cwnet.com Red Bluff CA$50.

For Sale Boonton 102A signal generator –120 to +10 dBm 520 MHz to 4.2 GHz am/fm Dick WB6DNX 714-529-2800

Want 10 GHz omni antenna Mel WA6JBD 951-212-8245

Want linear actuator from TVRO dish. 24" stroke preferred but any considered. John KJ6HZ kj6hz@amsat.org 951-288-1207

For Sale- National NC-183D SWL receiver plus manual $50, Halicrafters S-120 SWL receiver and manual $25. Bill WA6QYR bburns@ridgenet.net 760-375-8566.

Activity reported at the April meeting-.

Sorry my computer dumped the whole newsletter after I have printed it out. So scanned copies of pages were added here to complete it for emailing. Bill

18-19 October ARRL International EME Competition
15-16 November ARRL International EME Competition


Michael Scofield, N6OKG talked about RF Reuse over Terrain and Geography.

"Wants and Gots for sale".

Want: Linear Actuator from TVRO dish. 24" stroke preferred but any considered. John Oppen, KJ6HZ 951-288-1207

For Sale-Got your name from a list of Southern California Amateur Clubs. Am a long time ham here in Red Bluff. I have a spectrum analyzer, an HP 8551B, 851B, and 8441A preselector combination for sale. This is a one-owner unit before me and belonged to radio station KXRQ in Sacramento. It comes complete with manual and is in excellent condition. If there is a member of your group who is interested in this unit that goes well into the microwave region could you please have them contact me. Thank you very much. Tom Wulfert WA6GPIwulfert@cwnet.com

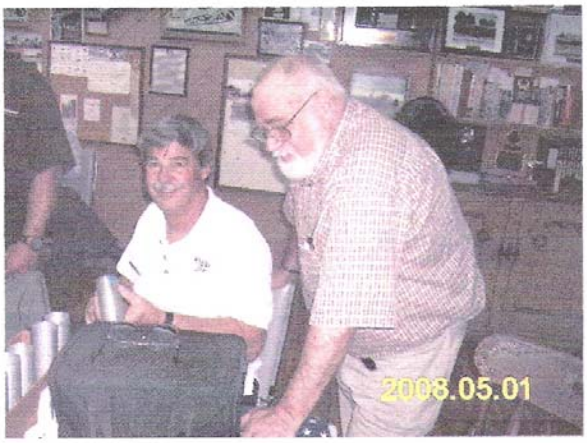
For Sale-Boonton 102A signal generator –120 to +10 dBm 520 MHz to 4.2 GHz am/fm $200 Dick WB6DNX 714-529-2800.

Want 10 GHz omni antenna Mel WA6JBD 951-212-8245.

Activity reported at the May meeting-, Rich, KQ6EF indicated he is a Railroad Engineer and does lots of traveling, has an Echo Israel oscillator and announced Paul W1PEDis building a sub harmonic mixer for 24 GHz; Ed, KE6FJU did some ATV work; Mark, KD6WLY new to club; Mel, WA6JBD did some Cactus work; Doug, K6JEY has a 8 w TWT on 24 GHz to work with a 180 w sine inverter; Bill, WA6QYR did some 10 MHz GPS work; Chuck, WA6EXV did some work on his Endwave 24 GHz rig for his antenna range; Jeff, KN6VR refurbished the shop; Larry, K6HLH did some 2 mtr EME work, has M squared yagi 36 ft long and 1500 watts; Joonho, KG6MQS is testing his 24 GHz Endwave unit; Dick, K6HIJ built a bunch of feeds for 10 GHz, spent time reworking JPL fortain antenna analysis program; Frank, WB6CWN built 2 DB6NT converters for east Coast friends and is rebuilding a 10 GHz rig for Maurice, and has a Trimble Thunderbolt GPS 10 MHz item off Ebay; Dick, WB6DNX has his spectrum analyzer working; John KJ6HZ has his brick oscillator working. Several members checked in on ATV- N6IFU, N6ESL, N6MEM, W6BZZ AE6QU, WA6CGR, and W6QIW.

E-Mail threads

The link below takes you to a collection of .98meter Prodelin dish antenna data compiled by Rex KK6MK.
There are a few more dishes left. Frank
Rex says: Here's a zip with a collection of stuff I gathered. http://www.xertech.net/pub/Prodelin_98.zip
There is a tif file in there which is a drawing I made that combines feed location from technical docs on the Prodelin page, along with measurements I made of the feed support from one I kept.
The f/D in the docs and from something on the box label seems to be .8 (much farther feed than most.) I haven't done any experimenting yet to verify the accuracy of the feed placement on my drawing but I think it should be very close to correct.
-Rex, KK6MK



Jeff, KN6VR left and Dick, K6HIJ had some 10 GHz feeds for the 1-meter Prodelin offset feed dishes that were obtained a few months back. The feed is an aluminum pipe friction fit on to a milled WA1IMU aluminum piece that has the WR90 flange pattern but in a circular guide form. Patterns were made of the feed in a dish on Chuck's WA6EXV range. Next is a dual band 24 GHz 10 GHz version of the feed.

1.7 GHz satellite information-NOAA 17-18 1698/ 1707 MHz RHCP 40 dBm EIRP 2.5 MHz bandwidth 665.4 KBs bi-phase-L. GOES 11-12 +48 dBm EIRP BPSK modulation 293 KSPS NRZL 600 KHz BW.
Web sites:
ED's http://home.att.net/~emurashic/
Satellite:
http://goes.gsfc.nasa.gov/test/goes.databook.html.
http://noaasis.noaa.gov/LRIT/
http://www2.ncdc.noaa.gov/docs/klm/index.htm
http://www.noaasis.noaa.gov/NOAASIS/ml/gateway.html
http://homepage.ntlworld.com/phqfh1/status.htm
Tracking Program info: http://celestrak.com/software/satellite/sat-trak.asp
Orbital elements: http://celestrak.com/NOROD/elements/
Commercial vendors: http://goes.gsfc.nasa.gov/test/goesvendors.html
Earth Observations group http://www.geo-web.org.uk/

The **Mid-Atlantic VHF Conference** will be held in Blue Bell, PA on Saturday Sept 27and the Pack Rats HAMARAMA will follow on Sunday, Sept 28. Hospitality Friday eve, Sept 26th; hotel info and locations to follow
Presentations for experienced VHFers and special sessions for VHF beginners
Please submit your papers to W2PED Paul Drexler via email: pdrexler<at>hotmail.com
MSWord Format preferred.
Questions? Contact conference team:
WA3EHD jjantonacci<at>verizon.net
KB1JEY michael<at>bassettconsulting.com
KA3FQS ka3fqs<at>gmail.com
K1DS rick1ds<at>hotmail.com
www<dot>packratvhf<dot>com

I am building a 10GHz rover and I want a signal source for 10.368. I am looking for something that I can build and put down range (about 40 feet to the back fence, that is.) Any ideas? 73 Allen WB6RWU

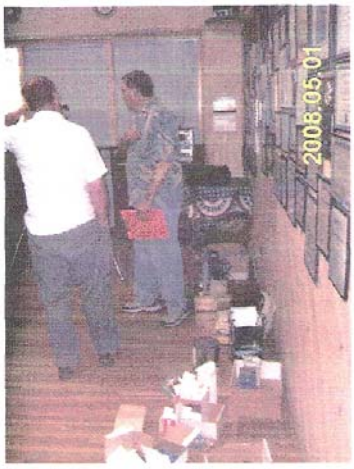
Allen, I made such a source - see http://www.n4mw.com/projects.htm A 64 MHz crystal oscillator chip into an MMIC comb generator. Uses 9v battery and 7805 regulator. 10.368 GHz range is 200 feet. Frequency stability is surprisingly good. My source is configured for 10 GHz using small horn mounted on tripod. I have some of the 64 MHz oscillators available if you need one. Dave Meier N4MW www.n4mw.com

What I use is a 96 MHz crystal oscillator phase-locked to a 10 MHz OCXO driving a DEM MicroLO (without the oscillator circuit) to get 1152 MHz out. I use that to drive one of WA5VJB's 2.3 - 11 GHz LP antennas with a diode across the feedpoint (I think it was an HSMS8202 in the junque box). It gives me output in all the weak-signal segments up to 10 GHz with no problem and is very stable and accurate. 73, Zack W9SZ

Allen: Be careful with simple sources that begin with 12, 24, 48, or 72 MHz oscillators. If you're using a 144 MHz IF rig, you'll need to suppress the 144 MHz harmonic from any of those sources very thoroughly, or you may think you're hearing a 10368 MHz signal, but ....
32 (or 64 or 96) will get you to 10368 without that problem. Rich W2RG

Allen, Have a look also on a similar description with a 48 MHz Oscillator at: http://dpmc.unige.ch/hyper/28.pdf
See page 19 73s Eric F1GHB

With the proper modifications, I think this might be practical for what you want it for:
http://www.g0mrf.freeserve.co.uk/source2.htm James W8ISS



Free "Goodies" on the floor at the May meeting. Tom, WB6UZZ had carried in a large amount of wire terminations of various sizes that a company was dumping in the trash. Often times there are good things that show up at a meeting that some one is dumping or "Square Deal Doug" gets to auction off for benefit of the bringer and society.

Hola Microwavers, I've been working on a 10GHz rig the last few evenings that had a clean carrier on the spectrum analyzer, but had a buzz when listening with receiver on the bench using open waveguides for TX and RX. I could even hear the buzz when listening to the transmitter on the 10Ghz portable rig from down the street.
Today the sidebands were gone UNTIL I turned on the two tube florescent light above the bench, at which time the buzz returned. It looks like the motion of the ionized gas in the lamp tubes provide enough amplitude and frequency (Doppler) modulation to nearby 10Ghz signals to be quite noticeable, even at a distance. Frank WB6CWN

Frank- this was noticed back in the tube/klystron full duplex days and was used as a signal source similar to the air moving fans for generation of Doppler signals. The 30 MHz IF frequency driven crystal in a can antenna out on the fence post was another signal /test source. Others have noticed florescent bulb noise more lately with the narrow band rigs. Bill WA6QYR

Microwave brick---Hi Dave, Its been pointed out here that the crystal oscillator in these bricks is extremely sensitive to DC voltage changes, even mill volts. You'll find a short article I wrote in the 2007 MUD

Proceedings about reducing the warm-up time and improving the temperature stability of these bricks by isolating and regulating the DC supply feed going to the crystal oscillator. If the heater DC input is also isolated, it can be kept powered up continuously significantly reducing the warm-up time to seconds rather than 15 minutes.
See you on the air, Frank WB6CWN

From: "Dave Sublette" <k4to@arrl.net>
To: "Microwave Reflector" <microwave@lists.valinet.com>
Sent: Friday, November 23, 2007 12:51 PM
Subject: Re: [Mw] Brick Oscillator stability
Hi Doug, Interesting comments. I have seen comments on this reflector that sometimes the oven control circuit stays on all the time. That might be my problem. I need to find a way to look for that .My frequency counter is locked to a 10 MHz reference generated by my Z3801. The reference is on all the time. There should be no drift due to the counter, 73,Dave
Doug McGarrett wrote:
On Friday 23 November 2007 10:36, Dave Sublette wrote:
Good morning, Since posting my general question on brick oscillators, I have fired up one of the units that I have. It is running at 10.683295 GHz. It has been running three or four days in my shop, which has experienced a temperature swing of about 20 degrees F, or less. I have been recording the frequency and have observed about a 10 kHz difference between high and low frequency readings at the 10.6 GHz output. My question is, does this seem to be normal or typical stability for one of these units? This seems to me to be a bit high for only 11 deg. C ambient change. The crystal heater ought to reduce that to a fraction of a deg, and it should be operating around the turning point of the crystal. Look at the ARRL handbook, the chapter on oscillators. There (in my 1995 edition) they
show a set of curves for a crystal. They show the turning point as 25 deg, but for an ovenized oscillator, the turning point is around 70 deg C. If the oven is working properly, the crystal should hardly move over a relatively small local ambient change, although it will move over long periods of time--weeks, months, and years. In other words, once thermal stability in the crystal and associated components has been reached, I would expect less than 10% of what you are observing. Also: has your frequency counter thoroughly warmed up? Maybe it's not the brick that's drifting! --wa2say

Hi All, Here is a link to an electronic device datasheet site. I have been using
this for years. It has been very useful. http://www.datasheetcatalog.com/
Enjoy, Steve, ad6ht

WA7SKT, K0CQ & The Microwave Group de K2RIW 5/09/08
Dear Loren, Jerry and The mw Group, Loren asked a great Yagi Design question concerning the First Director spacing, Impedance Matching, and Gain (it's repeated below).

PAST YAGI DESIGNS -- A number of Yagi designs have used a close spacing of the First Director as an Impedance Matching Device for the Driven Element. I've been told this is one of the claims in the patent for the F9FT antenna designs. That was considered to be an effective method. However, the use of
modern computer modeling programs (with experimental confirmation) has shown there is a better way.

SEPARATE THE REQUIREMENTS -- I say the adjustment of the Parasitic Elements should be done to optimize the Gain, or a particular Sidelobe Pattern, or a particular G/T performance, or a particular Front-to-Back Ratio (the adjustments are all slightly different). The adjustment of the Impedance Match to the Driven Element is a separate and independent function, and that function should not be allowed to compromise the other performances.

WE DID IT THE HARD WAY -- In the past, many amateurs were lulled into miss-using the First Director as an Impedance Matcher. They believed achieving a good Impedance Match to the Driven Element would required a considerable amount of mechanical intervention, such as using a particular Delta Match, using a Folded Dipole Feed with different diameters for the Folded Structure, a T Match with a precise setting of the T Length, etc. We
now know this is not true.

DELTA-MATCH GAIN LOSS? -- By the way, a Delta Match that is directly connected to a coaxial transmission line is not a good Balun; it creates an Imbalance that will allow the transmission line to radiate. This may be a reason such Yagis sometimes do not perform as well as expected.

A BETTER WAY -- We recently learned that achieving "a perfect impedance match" to the Driven Element (such as a VSWR of 1.05:1 or better) is rather easy.
To summarize, it simply requires three actions:

1. Select the correct Balun that creates low-enough input impedance
2. Lengthen the Driven Element until the R component is raised to 50.0 ohms
3. Add a Shunt C to cancel the remaining +X (inductive reactance) component.

WHERE IS THE INFORMATION? -- You will find a few thousand words that better explains this Yagi (or other Dipole-like) Impedance Matching technique if you go to:
<www.wa1mba.org>
At the bottom of the first page you will find, "Yagi Impedance Matching Info", click on it. On the next page you will find, "A description of the concepts of Yagi matching", (as well as the other two Monopole Reactance Charts) click on it.

WHY THE RELUCTANCE -- When you follow this procedure, often you will end up with a Driven Element that is slightly longer than the Reflector. This seems to horrify some amateurs. They mistakenly believe a Yagi will only perform correctly if the Director is the longest Element. The Parasitic Elements do all the work -- the driven element only has to radiate in a Dipole-like manner, and present a good impedance match to the transmission line.

Jerry, K0CQ has said, "NEC simulations of Yagis don't show gain dependent much on the driven element dimensions. So the driven element details aren't modeled but determined experimentally."

WHAT IS THE BENEFIT -- Achieving a "perfect impedance match" is very desirable, particularly for EME and Satellite operations. In each case it is desirable to acquire the lowest possible Noise Figure. Your LNA will only produce the Noise Figure you saw on the Automatic Noise Figure Indicator if your antenna ALSO looks exactly like 50.0 ohms resistive.

1/64 INCH YAGI REQUIREMENT? -- This may be excessive. My good friend George, W2KRM was the manufacturer of the "RIW Products" 19 Element Yagi kits. George wasn't sure of the sensitivity of the element lengths; therefore he (or someone else) may have stated this requirement. I believe that a (+)(-) 1/16-inch accuracy is adequate for Element Lengths, as long as the error is not additive. The Element Spacing is even more forgiving -- if it is not additive. However, the 3/16" Element Diameter is critical, and mounting the Elements with Insulated Shoulder Bushings is critical. I recommend an approximate 1/64" chamfering of the ends of the Elements. A lack of chamfering will change the apparent electrical length of the Elements, and that deficiency would be accumulative.
73 es Good UHF/SHF/EHF/EME/Satellite DX,
Dick, K2RIW

---------- Forwarded Message ----------

Subject: Re: [Mw] Antenna question
Date: Thursday 08 May 2008 10:38 pm
From: "Dr. Gerald N. Johnson" <geraldj@storm.weather.net>
To: Microwave list <microwave@echo.valinet.com>

On Thu, 2008-05-08 at 19:04 -0700, Loren Moline WA7SKT wrote:
Hello, Back in the old school Yagis were constructed with element spacing of say .15 wavelength and lots of times the elements were all spaced the same distance apart. A length was calculated for the driven element and the reflector was made 5% longer and the first director 5% shorter and if tapered the remaining directors were shortened by 5% progressively. Now with today's computer generated optimization I notice the first director is very close in front of the driven element and also the spacing of elements gets progressively wider with each director.
My question is this. What effect did it have to move the first director so close to the driven element. Was this done to help the driven element impedance be closer to 50 ohms or did this have more to do with antenna gain?
I bet we all learn from these answers! Thanks! Loren WA7SKT
if you check the director spacing you will find eventually they reach a spacing of 0.4 wave and stay at that as you go forward.
There have been yagi designs with constant length and spacing directors without taper, and some (like the longer NBS) with tapers in both directions, often a longer director furthest out front. (Copied for the CC 3219 and 4215 or whatever it was). What this shows is that there are several ways to accomplish the slow wave structure that cause the focusing and so the gain of the yagi.

The works published in UKW Bericht and VHF Communications by DL6WU in the 80s (as I recall) on optimal yagi design are the first to design a yagi that works well by theoretical means. The characteristics of a DL6WU yagi include: The driven

element Z is 50 ohms or 200 ohms with a folded dipole. The first director isn't too close to the driven element. Director spacing taper smoothly from about .08 or .1 wavelength up to 0.4 wavelengths then don't change any more. Director lengths taper smoothly from the first to the last director. He bases director lengths
on reactance change or phase angle. He emphasizes that wide first director spacing to get the feed impedance up.

K1FO and computer optimized Yagis tend to squeeze the first director close to the driven element. Its been noted by K1FO and DJ9BV that such a close spacing tends to knock the impedance of the driven element way
down, like 15 or 17 ohms which takes the T match to get up to 200 ohms for the Balun. And some have noted that when the driven element is loaded down that far that the measured antenna efficiency never is as good as computed or as measured on a design where the first director spacing is greater. I'm sure the many muses published by K1FO will mention that occasionally.

NEC simulations of Yagis don't show gain dependent much on the driven element dimensions. So the driven element details aren't modeled but determined experimentally.

The performance of an original DL6WU yagi beats the NBS yagi by maybe half a db per wavelength of boom. A computer-optimized yagi beats a DL6WU by about that much, at some costs. First the driven element impedance tends to go down which can cause that efficiency drop from the close spaced first director, and then the element spacing, boom effect, and lengths become more critical making construction a bit more difficult. The DL6WU Yagis are most tolerant of construction details. The most critical of 432 Yagis were developed by K2RIW, his 19-element
design. He demanded element length precision to +/- 1/64th inch, and when that care is taken that yagi comes up at 15.05 to 15.1 dBd at antenna measuring contests. It's so consistent that it's the US standard gain reference for 432. With a pair of them at about 75 feet, I've heard CW signals off the moon at moonrise by ear without a preamp on the radio. 73, Jerry, K0CQ

Re: [Mw] Antenna question
Date: Yesterday 10:41:35 pm
From: "Dr. Gerald N. Johnson" <geraldj@storm.weather.net>
To: Microwave list <microwave@echo.valinet.com>
Reply to: geraldj@storm.weather.net

On Thu, 2008-05-08 at 19:14 -0700, Loren Moline WA7SKT wrote: One correction the driven element might be balance fed so substitute 200 ohms for 50 ohms in that case or say 50 ohms with a gamma match.
Loren WA7SKT
Gamma matches above 100 MHz or so has tended to be parts of Yagis that missed their gain claims by several dB as if the asymmetry of the gamma match upset coupling from the driven element to the long array of directors. But then Kent uses a J shaped asymmetrical element to save on a Balun and makes them work for 8 or 10 element Yagis.
73, Jerry, K0CQ

Bill, WA6QYR 10 GHz rig out on Atolia Hill DM15eh during the SBMS 2 GHz and Up contest. Bill had a long his 2 GHz gear also. No contacts were made from this site in the northern desert to this in the "LA" area. Bum propagation over the 70-mile path neither to Secret Site 51 where Pat, N6RMJ was located nor to other sites this day.

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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