



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 2011 Edition

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At the **October 6, 2011 SBMS meeting** we will have Dave, WA6CGR talking about the Smith Chart and its applications. 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. Paul Basay was our visitor. There was more discussion on the placement of the projection screen and the placement of the projector for presentations. The plan was to mount the screen and projector on 24 September. There was more discussion of a club project that everyone could participate in. A power detector for a rig; a remote control EME station at OVRO; another band beacon somewhere in the eastern valley; one of Walt's demo projector a microwave repeater were some thoughts. John KJ6HZ will head up a beacon project and Doug K6JEY will head up the OVRO remote station projects. 20 people present.

Results of the 2011 SBMS 2 GHz and Up Club Contest

Northern Lights Radio Society 7 Ops 17,581 points First Place

KB7NIE Tucson Arizona Group 1 Op 161 points Second Place

Certificates will be sent to the winners.

Don't forget to send your 10 GHz and Up contest scores in to the ARRL Contest Group soon!!!

Scheduling:

Oct 13-16 Microwave Update 2011 Crowne Plaza Hotel Enfield, CT W1GHZ@arri.net

Oct 22-23 50-1296 MHz ARRL EME contest 0000Z Sat-2359Z Sunday

Oct 22-23 EME 50-1296 MHz round 1 Dubus contest

November 3 TBD

Nov19-20 50-1296 MHz ARRL EME contest 0000Z Sat-2359Z Sunday
Nov 19-20 EME 50-1296 MHz round 2 Dubus contest
December 1 TBD
December TBD SBMS Christmas Party
January 5, 2012 TBD
August 16-19, 2012 The 15th International EME Conference in Cambridge, England.

Wants and Gots for sale.

For Sale: 30w 1296 MHz PA kit \$50 + \$5 for US shipping Chris Shoaff, N9RIN cshoaff@yahoo.com

For Sale: 10 GHz slotted waveguide antennas \$70 kit, \$95 assembled plus shipping Dan W6DFW W6DFW@apex-scientific.com

For Sale: 10 ft channel master TVRO dish. Mesh good to 12 GHz. 0.3 f/d \$50 OBO Brian 909-226-2015
brian.thorson@sce.com

Want: - several LO 10224 MHz oscillators like the Frequency West or Macom bricks Dick WB6DNX 714-529-2800

Free: 3 HP8690A sweep oscillators- no plug-ins. Bill WA6QYR bburns@ridgenet.net

Activity reports—Dick, WB6DNX and a party of 4 went to Signal Peak in the Long Beach area for the first weekend and plans to go to Chino Hills for the second weekend; Bill, WA6QYR went to Bird Springs Pass DM05wm and plans to go back on the second weekend; Ed W6OYJ went to San Miguel and Soladad and worked a lot of folks and plans to go to San Markos next; Walt went out with WB6DNX with his radiometer on the contest and had a demo planed for a meeting; Rein W6SZ made one contact ; Doug, K6JEY has a new dish good to 200 GHz and demo'd a Yaeger FC-1 10 MHz to 2.6 GHz handheld counter and powermeter for \$50; John, KJ6HZ had his 10 GHz rigstolen along with his car (got the car back less the rig); Jason W6IEE was out with a loaner rig from Dave WA6CGR and had fun; Dan, W6DFW plans to test his 24 omni antennas; Mel WA6JBD went to Potisi with his 4 ft dish and 30 watts and worked Chip N6CA at Mt Shasta 840 km in a 2 hour contact; Paul, N6DN had 44 contacts and fun; Jeff, KN6VR went to Frazier along with 9 others; Paul Basay talked about possible tour of Goldstone along with a technical group trip; Pat N6RMJ went to Sacramento and traveled south making lots of contacts with his group of 9; Chris went to Frazier and had 43 contacts.

Microwave Up Date

Hello. Just to let you all know, Jeff Kruth is still signed up to do MUD2013 in Morehead, Ky.....We just need a group of guys that are familiar with the operations of a MUD to step forward for 2012. Thanks and 73 Al W5LUA

The North East Weak Signal Group (NEWS) is proud to sponsor the combined Eastern VHF/UHF conference and Microwave Update 2011 Conference in Connecticut October 13-16, and the club is busy making preparations.

Our dedicated committee consists of volunteers from NEWS, the Mt. Airy VHF Radio Club (PackRats) and others, and we aim to please. We have a great program starting Thursday with a tour of the Haystack Observatory in Massachusetts, numerous speakers lined up to give Presentations Friday and Saturday, along with Vendor's displays, Lab Measurement sessions, both indoor and outdoor selling, YL / Family program, Banquet, door prizes, and much more.

With this combined conference only a month away, it's not too late to make your plans, or decide whether you might want to give a talk. Please visit the microwave update website: <http://www.microwaveupdate.org/> where you can keep track of what is developing for the conference - and you can register on-line using the website.

We've negotiated a great package deal with the hotel and we're passing the savings on to you. Click on Registration and check out our "early"

Full Registration package, which includes the entire Conference and both Friday Lunch and Saturday Banquet at an incredible price! Please join us for this premier Conference in October.

Thank You!
Tom WA1MBA
Publicity volunteer

Email thread on building H-frame structures for antenna arrays .

Here is where I need advisement please. 1.5 inch aluminum is 89 pounds per 100 feet while EMT is 111 pounds per 100 ft. 2.0 inch aluminum is 119 pounds per 100 feet while EMT is 141 pounds per 100 feet. If I go with EMT I would paint the product to prevent rust for many years. I will be using a TVRO actuator rotor for elevation. The antenna will be on a 16 foot high tower with tilt over capability. Has anyone used EMT? Will it hold up to the stress of wind loads? Will 1.5 inches be OK or go with 2.0 inch materials. Each antenna only has about 1.2 square feet of wind load. Also if anyone has diagrams of their "H" frame construction I would appreciate this as well. I have several now, but more the merrier! Thanks and hope to be on 2M EME again soon. 73 John W9JN EN54dn

Hi John, Fortunately the antennas that you are planning to use have fairly short booms. The twisting moment that they will have on their vertical masts will not be great. That being said conduit, steel or aluminum, electrical tubing are soft materials and not really suitable for antenna supports. The same can be said about irrigation tubing and it generally is thin wall - that is why it's so inexpensive. Also there is no type of clamping arrangement to attach a yagi boom to round tubing, no matter how tight it is clamped (even when greatly distorting the round mast) that will remain in place and aligned. Eventually after a few wind storms it will rotate a bit around the vertical mast and your bay of four will no longer be parallel.

The best approach (from much experience), is to use square tubing. Not only is it stronger per diameter than round, but it makes it very simple to mount and align your yagis, and they will stay aligned forever. I have generally used 2" square x 1/8" wall tubing for the vertical masts and three or four inch square (thicker wall) for the horizontal boom. For your yagi lengths, you can probably get by with as small as 1 1/2" square vertical masts. Alternately a couple of smaller (than 4") diameter square tubes can be bolted together (or spaced about 1' to 2' apart) for the boom. Since you only are spacing by 10', you can often find up to 2" square tubing (in 10' lengths) in larger hardware stores in their metals section. If you need to splice for a longer length, you can use a piece of round tubing inserted into the two pieces (buted together) and bolted in place. You can also use a couple of pieces of aluminum angle, and use them splint like, on the outside of the two pieces. Make sure that the angle that you get has sharp, not rounded inside corners. Short lengths of angle can also be bolted on to booms and masts to make it stiffer and stronger in critical areas.

Unfortunately EME system building needs to be quite a bit more robust, both mechanically and electrically, compared to one for terrestrial use. Being a perfectionist, particularly in the RF details, will make a difference in your system's performance and success, especially with a small one like yours.

BTW, on my current 4 yagi (20', 13 el) 2M array, I am using a linear actuator for elevation control.

GL and welcome to the planning and building end of EME. 73, Chuck, W7CS

Jerry, I hadn't thought of using fencing material. It is heavier wall than EMT, I believe, plus being galv. it resists rust. I could not afford galv. Schedule pipe so usually ended up with Rustoleum primer and flat-gray paint. But paint will scratch off allowing some rusting. Generally the rust is surface only and does not affect the strength (Only the appearance). Iron rust has a property that seals underlying metal from further oxidation (sometimes). But galv. is a plus. I have some experience with the material as we once had an eight dog chain-link kennel. The satellite class Az-el rotators need a lot TLC in setting up to balance loads as much as possible (don't forget the weight of the coax lines). Most commercial yagis mount position does not take that into consideration. If you use an actuator it is not as important as they are rated to hold a 10-foot dish (78 sq-ft) in 70-mph. I used the Von-Wiese actuator as it is heavier than the STD TV dish super-jack type. I bought mine (new) in 1998 for \$99 (but that was wholesale as I was a dealer). The tube has a little rust in one place but works flawlessly. BTW my Saginaw-Thompson 36-inch actuators handled the 16-foot dish (201 sq-ft) in those 60+ winds last fall. The 2-1/2 inch angle iron frame didn't. Anything more than using medium-small 2m yagis, I would opt for

Heavier-wall tubing (sched-40 AL will handle it). If you are installing a large 432 array in high wind areas, talk to KL6M for his experience (has 100+ mph several times per year). MY max winds were 65mph with maybe a gust at 70. Usually I see 45-50 in high wind wx. The four M2-xpol20 on m2 H-frame have survived 13-years and several wind storms of this category. I did break the AL ring gear in my Ham-III rotator in a 30-hour long storm of 60mph sustained wind and upgraded to a Ham-IV (steel ring gear). Ed

Since my call was mentioned in this, I will chime in: I used 1.5"

Aluminum tubing from Texas Towers (2 pieces of 6' tubing with an insert of one size smaller to splice two pieces for each upright). I first used this to support 4 x 15 ft yagis on 144, and later to support 16 x 5 ft yagis on 432. The main key to my success with this was TYING IT OFF WHEN NOT IN USE. It withstood over 100 mph winds as a result. And this was all with a tiny U100 rotor for elevation. That required some serious balancing. 73 Mike, KL6M BP51dc <http://www.qsl.net/kl6m>

John. I used 1 5/8 Galv. Fencing Pipe for a pair of 2M12's. Very Sturdy, but heavy! It was meant to be a 'Temporary Solution'... 11' for the H Boom... then 3' droppers of the same on either end. I used an Old Kenpro Rotor to elevate it...and it did last a 'couple years'...but the 'Lil Gal' just could not take the Load I guess...so it finally became a SK! I just removed it and it has a 'few Rattles' inside... Have not taken it apart to see what finally gave on it as of yet. AL is much lighter..but using an actuator to move yours..I am sure it would be fine. The Galv. Fence Top Rails are much cheaper than AL..I think I got two 21' lengths for around \$50..back then, two 20' lengths of AL were \$350 ! (It has come down considerably since then!) I have AL for my next project..4x 2M12's using 11' Schedule 40 for the H Boom... and a pair of 11' .085 wall for the Vert. The Rotor will be a Yaesu 5400... (So I hope it lasts a few years anyway!) May be a bit much for her as well...but we shall see! Good Luck on your project!
Jerry VE6CPP VE6Jee/p

Hello moon gang! I really appreciate ALL the very good suggestions. I had a couple tell me that large diameter EMT might work; while others said no way should that be used. The same was said for aluminum electrical tubing. I will take into consideration all the info and choose a product that will last for the longest period of time. Where I live is a heavy wind load area and now I feel that spending more may be best for the pocket book in the long run. It sure is great to see that so many are interested in helping others.....THANK YOU! 73 John W9JN EN54dn

I forgot to mention I used a main cross boom of the galvanized fence material previously mentioned, the horizontal part that is approx 1-1/4" diameter. 73 Mike, KL6M BP51dc <http://www.qsl.net/kl6m>

Email thread on cleaning relay contacts--

Hi all, I have read somewhere that one can clean relay contacts by running some AC voltage through them. Any ideas what voltage level will do the trick and are there any precautions to doing this. My Transco 11300 Y relay is having a problem. Thanks, John

The decent referenced web page applies DC and pounds the contacts. Thing is the contacts have developed some silver oxide that conducts once it has a few volts to break down the oxide. I think next time I use Transco's for receive, I'm going to wire in some DC through the contacts, what Ma Bell called a "sealing current" to break down the oxides.

I've had this in low level audio switches without precious metal contacts. Acts open to audio; check it with an ohmmeter, shows connected, then carries low level audio until its switched again. I think 5 volts and 5 or 10 milliamps will be sufficient. I didn't have that problem with gold contacts.

I had the same problem in the servo input metering for the Collins 821A-1 Diagnostic Panel that I designed and built. Silver contacts after some use would not show a meter indication until the error was more than a volt (it has

been 48 years and I don't remember the exact meter indication anymore), then the meter would jump to the error and then track through zero so long as the switch wasn't opened (running a manual pot to check servo position). The quick cure was to take the switches apart and get the contacts plated with gold which the Collins factory could do. The production cure was to purchase switches with crossbar palladium contacts. I didn't keep track of which was more cost effective, though I suspect the gold plate was most expensive with all the handling it required to take the switches apart to protect the insulation stack from the plating bath fumes and that the gold was too thin to last for years while the crossbar palladium contacts were factory options and probably good for the lifetime of the transmitters. These were open flat spring multi-pole switches so they weren't hard to take apart, just each set of contacts then had to be connected by soldering so only the contact end got the gold.

It's also possible to loosen the set screws at the base of each coil or the Transco and extract coil and moving contact for cleaning while exposing the fixed contacts for further cleaning. I'm not convinced that is a permanent solution, while the sealing current may be a long term solution.

I've not yet tried the sealing current, but I know Kenwood had a similar problem in the TS-430 receive band pass filters which they cured by adding sealing current and more radios had an option for cycling the reed relays at an audio rate to batter oxide off the contacts in the low level sections.

73, Jerry, K0CQ

John, - This has worked for me. Connect 12-V ac (not dc!) in series with an automobile head lamp and the relay contacts. Cycle the relay 4 times. Do this for both sets of contacts. The relay will be as good as new. This was suggested many years ago by W8MQW and written up. Good luck! 73' Ken - W1RIL

Many relays have a lowest current rating - as Jerry K1CQ said. Typically its 5 to 15 milliamps unless contacts are mercury whetted (not anymore because of the dangers of mercury) or plated with platinum, palladium or gold. I only recently learned this when I tried to use a programmable logic controller to switch a TTL signal. There was just not enough current to guaranty a contact. The fix was to add extra current load to the circuit. In the past, I have had receive problems after years of service with Transco relays, which transmit just fine. Now I understand the problem. I replaced several relays and rejuvenated the ones taken out of service using the 12VAC and headlight trick that Ken W1RIL mentioned in an earlier post. (I learned it from him). If that doesn't work, I throw the relay away. Tom WA1MBA

In switches like those from Micro switch and Cherry (snap type sensitive Switches) silver based contacts handle 10 to 15, sometimes 20 amps. But they oxidize. The cross bar precious metal contacts don't oxidize but handle less than 1 amp. Also the cross bar design puts a lot more pressure per square .001 inch banging two sharp edges together (to crunch bugs and oxides) than the normal button contacts that handle current in silver. For some reason (probably material cost) the relay and switch makers don't make high current precious metal contacts. It might be that the power dissipation in precious metal button contacts is unreasonable at 20 amps too.

It's not so much a minimum current rating as a minimum voltage to break down the oxide to get a good connection, though the arcing power of a small current may not clean as well as a bit greater current. Something we have to learn because the industry hasn't catered to our needs as far as I can tell.

I think the cure is to use sealing current like the phone companies did with central office relay contacts in the days before solid state. They had the same problem and that was their solution where precious metal contacts would have cost more money than even the monopolies had.

I think that tossing Transco's is not a solution though when they don't clean easily one wonders what is left of the contacts. Fortunately the contacts of the Y types are easily exposed for cleaning up with a file if the high current doesn't clean them.

To me that headlight as the current limiter may be abusive of the contacts, e.g. enough current to burn away good contacts. Remember that a headlight draws several amp, as much as 10 to 20 operating current, but cold the resistance of a tungsten filament is 15 or 16 times lower, so the inrush to a cold 10 amp lamp is more like 150 amps if the circuit resistance didn't act as a current limit. Relays and switches rated for tungsten lamps have much more robust contacts and a T as part of their current rating. Transco relays don't appear to have that T rating.

I'd much rather limit the current with a resistor; say an ohm to limit the current to 12 amps which is probably still more than the RF current rating. Remember a KW at 50 ohms takes only 4.5 amps. And in most ham applications the contact surface that carries the transmit power doesn't carry the receive signal. It would be desirable to have sturdy silver contacts for the transmit side, and precious metal contacts for the receive side, but I've not seen that as an option. Though in such things as antenna selection matrices on top a tower, the same contacts carry both transmit and receive and I plan on using a sealing current there. Probably put a shorted quarter wave stub at each antenna for grounding the feed line center and for rig and relay lightning protection. It will also reduce induced RF from some bands. Might be optimum to use a 5/4 wave on the 2m so it's not resonant at 432 for that cross band protection. It gets harder to keep the higher frequencies out of the lower band coaxes with a single stub though. I need to consider that more thoroughly. I'm thinking a run of very large coax shared by relays or diplexers up top may have lower overall loss on most bands than a gaggle of affordable coaxes, like LMR-400 size. And be no more costly. But the possibility of relay or contact failure has to be addressed to make the relay or switch up top practical. 73, Jerry, K0CQ



Doug, K6JEY on Signal Hill with his 47 and 79 GHz rigs working Tony KI6QHP at 2 km during the 10 GHz and up contest. Doug's comment on his 16 inch dish on 79 GHz was that it was darn hard to point.

Look for Brian, AF6NA's article next month on this years contest.



Mel, WA6JBD holding his 10 GHz transverters with an Omni-slot antenna that he has used mobile with success. 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-

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