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

April 2012 Edition

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At the **April 5, 2012 SBMS meeting** will have Courtney, N5BF/6 talk about the 32 GHz Lunar Gravity Ranging System on the NASA Grail system that is in orbit around the moon... 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- Brian, AF6NA talked about a high efficiency feed based upon the Kumar VE4MA design for a traditional dish. It is supposed to have around 80% efficiency. See a later page with the dimensions for a 10 GHz version of the feed. Tommy WA5ADO had an article in the 2006 MUD proceedings. Brian had a Sheppard's crook built out of copper pipe to show the feed for his dish. Bill, WA6QYR had purchased a Harris 3 w 10 GHZ amplifier for WA6EXV's beacon. Ed, W6OYJ reported on the find of a 16 ft aluminum dish in a San Diego storage facility which might be useful at OVRO. It was announced that George Tillitson K6MBL had passed away on February 4. George had invented the ROCKLOK system that enabled frequency locking of Klystron rigs of the past. This led to experiments of bouncing signals off hill tops and knife edge on 3335 MHz. George was one of the early members of SBMS. Rein W6SZ proposed that one of the projects of the SBMS be looking into long distance propagation over land using CW/WSJT tropo or EME modes. It was suggested that maybe corporate sponsors might be involved to help fund such and effort as did the European group that holds the tropo record over water.

Scheduling:
April 21-22 Southeastern VHF Society Conference Charlotte, NC www.svhfs.org
Apr 28-29 Dubus EME 2.3 GHz 00-24z
May 5-6 SBMS 2 GHz and Up Club Contest
May 26-27 Dubus EME 1.2 GHz 00-24z
June 9-10 ARRL June VHF QSO Party
June 23-24 Dubus EME 5.7 GHz 00-24z

June 24-27 Society of Amateur Radio Astronomers 2012 Conference National Radio Astronomy Observatory Green Bank, WV. www.radio-astronomy.org
August 4-5 ARRL August UHF Contest
August 18-19 ARRL 10 GHz and Up contest part 1
August 16-19, 2012 The 15th International EME Conference in Cambridge, England.
September 8-10 ARRL September VHF QSO Party
September 15-16 ARRL 10 GHz and Up Contest part 2
October 18-21 Microwave Update 2012 in Santa Clara Biltmore Hotel

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 $55 kit, $80 assembled plus shipping Dan W6DFW W6DFW@apex-scientific.com
For Sale: table mounted wood router $15; 16 element 2 meter skeleton slot antenna, $10; 8 ft solid aluminum dish, $50 (can transport to your site for mileage.); 6 ft fiberglass dish free; 7.5 ft TVRO dish free; 6ft motorized Az/El RV TVRO dish with control box $10; 10 ft TVRO mesh dish free; 10 to 20 ft aluminum thin wall pipe diameters from 1 inch to 4 inch (old HF full size beam parts); 120v 20a variac $20; Roll-a-round Sampson camera mount with quickset head $25 Bill WA6QYR bburns@ridgenet.net 760-375-8566.
For Sale- lots of microwave stuff. Let me know what you need. John KJ6HZ 951-288-1207.
Wanted- HP854 and or 8555 plug-ins for a HP141T main frame. Jason W6IEE W6IEE.73@gmail.com.
For Sale – new SMA attenuators DC-18 GHz 6dB and 20 dB $5 each Dick 714-529-2800 rabremer@juno.com.

Activity reports: Dick, WB6DNX did some 24 GHz omni antenna testing; Chuck WA6EXV got the beacon amp and is building some protective circuits; Bill, WA6QYRdid some bias board and amplifier testing on 10 GHz; Walt got a sweeper and learned how to use it, worked on a orthomode transducer; Courtney, N5BF indicated that the lunar Grail satellites are working; Pat, N6RMJ did some more work on his 10-24 GHzrig and played with some CW reader software; Rein, W6SZ has a funcube working 80 KHz to 1 GHz; Mel WA6JBD did some signal generator work; Jeff, KN6VR did some work on 1296 MHz antennas; Dan, W6DFW building some more slot antennas; Jason, W6IEE has a newer sweep generator; Larry K6HLH contacted Brian on 10 GHz; Wayne, N6QCU did some commercial microwave work; Brian, AF6NA built a shepard crook feed; Chris, N9RIN did some computer work16 people present.

I am starting up a kit making service for assembling certain kits made by Down east Microwave. For those that do not want to make their own kits or maybe it's gotten too difficult, or just don't have the time or want assembled kit faster than DEMI can supply it. This one-man business so I will only be able to build a limited number per month. My price is the same as offered by DEMI assembled, plus shipping which should be medium-size flat-rate priority mail in the US. I am expecting to be able to deliver within 30 days of receipt of paid order. I am not carrying any inventory so this allows shipping time to obtain kits and any other materials, and time to test the finished product plus ship to the customer. At this time I am limiting this to the VHF/UHF 25w Transceiver kits. In a couple months I hope to add three amplifier kits from Communications Concepts, Inc. If there is a something special you want assembled contact me. My professional credentials are at: http://www.kl7uw.com/60NE.htm Ed Cole

There has been some interest in connecting to the SBMS meetings that appear on the internet. Try this: http://www.batc.tv/ch_live.php?ch=2&id=139

Aircraft Scatter across Bass Strait.

Last Tuesday (13/3), Rex VK7MO (aided by Joe VK7JG) and I completed a JT65c Digital Mode QSO via Aircraft Scatter across Bass Strait on 24 GHz. Rex and Joe were near Georgetown near the mouth of the Tamar River in Tasmania, while I was at Mt Liptrap, near Walkerville in Victoria. This contact established a new (and first)

Australian 24 GHz Digital Mode Record of 255.1 km. Direct signals were very strong (SSB level) on 10 GHz, but there was no trace of any direct signal on 24 GHz, despite Hepburn indicating a moderate level of tropo enhancement on the path. Later calculations showed that water vapour absorption on the path resulted in an additional 60dB of attenuation on 24 GHz, easily accounting for the lack of direct signals. We had positioned ourselves not far off a direct line under the flight path from Launceston and Hobart to Melbourne. By beaming at each other and upwards at the aircraft as they crossed our path, we received weak Aircraft Scatter signals from each other. There are few flights on that path so, with missing the first few flights due to setup problems (through the fog, I picked the wrong island to align on), the QSO took over 5 hours to complete. More details and some analysis of the QSO can be found here: http://www.vk3hz.net Regards, Dave VK3HZ

That's an excellent QSO, Dave!
It's interesting to wonder if the Bass Strait could be crossed on 24 GHz by low altitude tropo (i.e. evaporation duct or a thicker but still surface based tropo). I don't know what the limits imposed by water vapour loss are, or what the world record for this is. Recent tropo world records of 500-600 km have all been over land, it seems. I know VE3ZV and I did 210 km between two beaches on Lake Erie a couple of years ago with quite strong SSB signals (with a few km of 20-30 m high land at the path midpoint, so it wasn't strictly evaporation duct). But there's probably a lot of water vapour dB in the extra 40-odd km!
That thought got me searching...and I found an interesting Australian paper about evaporation ducting at http://www.kininmonth.com.au/about/oop_tencon.pdf .
I thought Figure 7 was interesting....showing how critical the antenna height could be at 24 GHz.73, Steve VE3SMA

Thanks Steve. We've been heading towards the conclusion that for best results, the path needs to be in the upper atmosphere as much as possible where water vapour content is lower to minimize the attenuation – hence the use of either high locations (driven by local geography, which is somewhat flat in old Australia) or Aircraft Scatter where much of the path is high up.
However, the paper you have spotted shows interesting results at very low levels so we'll have to look more closely at that – particularly to see if they've accounted for water vapour in the calculation of the path loss on 24 GHz.
Regards, Dave VK3HZ

10 GHz JT65 is the way to go for contest DX……. by John Jaminet, W3HMS.
The recent experiences of Rex, VK7MO and colleagues VK3HZ and VK7JG show that JT65 is usable at 10 and 24 GHz. For me, it is funny how ideas come together. I saw Mike, N1JEZ's fine MUD 2011 presentation on the FT-817 and FUNUBE Dongle + PC and waterfall for seeing DX on millimeter band QSOs. I have certainly been mindful of my own JT65C experiences on 23 cm EME (over 280 QSOs) and my 10 GHz roving experience in SSB/CW. Then one day, the light really came on….I have all the gear in hand now to work JT65C on 10 GHz and realize the 10-15 db advantage offered over CW.
Thinking of the tough QSOs made with our New England colleagues on 10 GHz, I realized that I had made several QSOs in 23 cm EME where I had not even heard the other station; I just saw his line on the waterfall and the decoded signals. The JT65C protocol already offers what we need for a QSO, i.e. both calls, signal report, and a 4 digit grid square…..but….I know sending a 6 digit grid square is easily doable in free form as I do it most every QSO. The equipment needed is the usual 10 GHz set up with an IF rig Offering a data port for connection to an interface device, in my case a Signalink USB and my laptop PC. In adding this, I am not reducing my ability to do CW or SSB one bit just adding digital. For precise timing, my hand held GPS, car GPS or cell phone will give me the exact time if a change is even needed. I use Dimension 4 on my PC and it seldom needs changing. For frequency precision, the VK tests have shown stock equipment works OK so we need not have precise dials just be able to set them to specific frequencies. I see using the 23 cm EME approach in using 10368.065 USB as a key frequency with 5 KHz slots above and below that but any agreed frequency is doable.
The use scenario I envision is to set-up the QSO attempt as we do now on 2m or cell…stations beacon to fix frequency and pointing then switch to JT65C for the QSO. The question of who call first can be resolved by agreeing on the liaison channel before hand or using a protocol I have heard of but not used: western station calls 2nd...or is it the reverse?? At any rate, that can be agreed before hand by all or just the 2 stations at QSO time. Oh, the Doppler, yes, set to 0 Hz, HI!! For power budgets, assume more is needed as JT65C is 100% duty cycle and the XMT cycle is 47 seconds followed by one minute and 13 seconds in receive until you XMT again.

For stations in a mutual service area that desire to try this approach, please contact me by EMAIL and we can arrange the test for a few days later as is mutually convenient. 73, John, W3HMS

More WSJT thread

I have tried JT65 during the fall contest for more than 7 years. It works. They only problems were the setup time for all of my equipment while roving, and also very little cooperation from other contest participants to join me on this mode. I brought up this topic for discussion at several meetings of the 50MHz and Up Group of N Calif. and the usual response is that I am usually the only member willing to run a laptop with my radio. That is also why I have not been able to convince others here to use a SDR and Winrad.73, Jeffrey Pawlan WA6KBL

Jeff has a very valid observation and one has to wonder why, when so many of us also do eme. JT-65 is now the standard for 6m and 2m eme (and probably on 222). It is less used for 432 and 1296 but there is some use of JT65 on eme there. Above that on eme JT65 seems to have trouble with phasing issues with moon echoes. But for VHF thru mw terrestrial it would seem a natural for extending weak-signal activity.OK I get it about hauling extra equipment. But surely some of you use spectrum programs on mw when portable?

Second item I want to bring up is a new SDR that is just now started delivery to hams who made advanced orders. I'm referring to the new Elecraft KX3 (160-6m) 10w direct-conversion SDR. There will be shortly an offering of a 144/50 embedded transverter making the radio perfect as an IF for mw. I am so sure of that I sold my FT-817 and waiting delivery of a new KX3. I am also listed as a beta-tester of the KX3-2M transverter, so will have some news on it not too far off. http://www.elecraft.com/KX3/kx3.htm. The foot print of the KX3 is about the same as the FT-817 with a control panel that resembles the K3 (weighs 1.5 lb.). It does not require a computer for normal modes including RTTY and psk-31. Fully QSK on CW. RX only draws 150ma. JT65 will still require a small interface cable and computer to run. A real plus for those interested in LF is that the KX3 operates down to 310-KHz so will operate in the new 600 meter ham band. I am not associated with Elecraft in any manner so just my personal observations. 73, Ed KL7UW

Hi Jeff.....well, the lack of interest can kill anything as you have described....hope this infection has not spread East, HI!!!.....73, John, W3HMS.

Paper call for MUD2012

It's not too early to start working on your paper, presentation and/or workshop for MUD 2012!

Now is the time to write up your latest project before the summer operating season (and the paper deadline) is upon us.

The 50 MHz and Up Group is hosting this year's Microwave Update conference from October 18 to 21 in Santa Clara, CA, (near San Jose and San Francisco). Please see www.microwaveupdate.org for more info on the conference schedule, location and hotel info.

This is the first call for conference papers, presentations and/or workshops on technical and operational aspects of microwave weak signal amateur radio in the centimeter, millimeter and sub millimeter to light wavelengths. Some suggested areas of interest include:

- Antenna design, simulation, construction, measurement, application
- Station and Rover design, packaging and operation
- Operating techniques, software and other aids
- Propagation modes and enhancements
- Emission modes (ATV, digital modulation, wide area packet networks, Etc)
- Practical effects and limits of phase noise, antennas, multipath, scatter on various emission modes
- Microwave components (affordable and available modern commercial components)
- Microwave components (homebrewed or surplus)
- Microwave building blocks (LNAs, PAs, LO chains, Mixers, Synthesizers, Filters, etc)
- Transverters (fixed and rover, single and multiband)
- Beacons
- Repeaters (microwave bands and/or unusual modes like ATV, packet WAN)
- Construction techniques (SMT, wirebond, microstrip, waveguide, substrates, homebrew)
- Measurement (gain, phase, S-parmeters, noise figure, phase noise, etc) equipment and techniques (tuning amplifiers or filters, optimizing noise figure, measuring phase noise, antenna patterns and gain) ranging from professional to homebrew/shoestring budgets
- CAD (preferably free or low cost) for circuit, antenna, path and system simulation and design

- Conversion of surplus microwave equipment
- or, suggest your own topics

Papers can be short notes to full length technical papers, original work or just handy hints and tips. New designs or surplus conversion tips, professionally engineered or hacked on a shoestring budget.

Tutorials and overviews are also welcome to summarize current know how and to help and encourage newcomers.

Papers will be published in the proceedings and may also be selected for presentation at the conference. Some topics may be organized and presented as workshops (for example, construction and measurement techniques).

The deadline and formats for the submission of papers and presentations will be announced shortly.

Please feel free to send ideas for papers that you would like to see or that you plan to submit.

Questions, papers or ideas for papers should be sent to this address:

mud2012papers at gmail dot com

If you don't get a confirmation response within a few days, please

Check with me at miclevel at comcast dot net to make sure that your paper wasn't eaten by a spam or bandwidth filter somewhere. Looking forward to seeing you and your presentation at MUD2012,

Mike Lavelle, K6ML 50 MHz and Up Group MUD 2012 Technical Program

Simple weak signal source

I am looking for a simple 10 GHz signal source circuit schematic for a backyard antenna a range. Nothing fancy or expensive. Is there such a thing? 73, Allen WB6RWU

2m 2 watt rig, diode detector mount and antenna. Drive the DC side of the detector with 146.030 and tune for the 71st harmonic at 10368.130.

You could drive with 144.000 and tune for the 72nd harmonic at 10368.000, but the 144 MHz drive will probably leak direct to your IF rig.

You may find it handy to go AM modulated so you can used a HP415 meter and reject the signals from other sources in the neighborhood that aren't modulated at 1 kHz. A broad band antenna and DC detector will see those other communications signals and wreck your tests.

73, Jerry, K0CQ

Allen, I'm with you on that search. I hope you get a lot of response.

Here's my two cents.

For very low level signal that is broad band, run current through a microwave diode above its reverse breakdown voltage. So it won't burn out you have to limit it to a few milliamps. I find that a detector in a cavity wave guide, normally used as a detector works great. It's broad band so it might be of limited value to you because its level is so low. For radiometer work I find it invaluable. (I've tried lots of microwave things reversed biased and the best one is the most common: a 1N23.)

As for a narrow band source there's something even cheaper than a Gunn diode in an old motion sensor and that's a new motion sensor from China:

http://www.ebay.com/itm/Free-Shipping-Wireless-Module-Microwave-Doppler-Radar-Motion-Sensor-/270868530550?pt=LH_DefaultDomain_0&hash=item3f1105c576

This is just one of many for under $10. Check eBay for Doppler Radar Motion Sensor.

You have to figure out a way to attenuate them though and that can be hard.

Even this has too much power for my work and I'm looking forward to others to submit microwave tunnel diode circuits that produce microwatts of microwave.

Walt

Hi Guys.....look for an old/new C band Sat LNB as the 2nd harmonic is 2x the LO of 5.150 GHz...I used back in WB Gunnplexer days.....2d harmonic was strong enough even then....some new models are MUCH more stable.....73 es GL, John W3HMS 25 Feb 12

If you have a 1296 transverter with an 1152 MHz LO you probably already have a good 10368 MHz weak signal source. Better yet take an 1152 LO signal into an any two ports of a double balanced mixer with its output connected to a WR75 or WR90 transition. Other multiples of 10368 will also give you a signal source. Dex

Allen, I don't know what all you need to check out, but you might want to consider the Weak Signal Source from DEMI. I use it to check out all the bands from 902 up to 10368 before I go on a roving trip. Works well, is reasonably rugged, easily powered from a small 12V battery and is not terribly expensive 73 Jack WA2IID/r

For sale:
A Low Level Microwave Radiating Signal Source for Testing Microwave Transceivers in the Field:
In short a radiating signal source that can be set up and adjusted to produce a radiated signal of known amplitude and frequency that can be received by the microwave receiver then adjusted to a signal level, frequency and modulation to evaluate the receiver.

A complex superhetrodine circuit is involved and these signals are difficult to contain. For this reason the frequencies that are used are not common to the equipment under test. Since 10,368 transceivers usually use a 144 or 432 MHz intermediate frequency with a 10,224 or
9,936 MHz local oscillator frequency it is advisable to avoid these.
Due to the complexity of fabrication of microwave equipment it is advisable to use common parts where possible. Since I found the DEMI 10 GHz transverter board useful when combined with a hollowed out aluminum block with aluminum covers and closely spaces retainement screws a satisfactory approach to construction of 10 GHz transverters the same approach was selected to build the signal source.

A 185.150 crystal was available leading to a LO of 9998.1 MHz and yields an IF of about 370 MHz which is supplied from a common laboratory signal generator which can supply frequency, modulation and signal level control.

In general the Oscillator, LO, IF and signal generator signals are in the range of 0 to 50 mill watts and most likely 10 mw. Thus it is possible to pass the Oscillator signal at 185.15 over a long length of coax for over 100 feet. The same goes for the signal generator signal.

The output of the transverter used for the project can be adjusted to 10 mw and attenuated to around one micro watt internal to the housing of the transverter so as to use its housing to suppress extraneous output. From that level down ward the signal level can be controlled by the output of the signal generator.

Further various checks can be made in, on and about the system with a power meter and monitored with a spectrum analyzer.

The result involves a buried plastic pipe for the cables, a couple of posts in the field with a sealed metal box containing a simple feed horn antenna, power supply.

The oscillator is a precision TCXO. Virtually any VHF/UHF laboratory signal generator could be used.

I used an HP 8657A which has a very wide range of output making it very convenient.
Burt Hart N2YYU

I've been using something I threw together some time ago. I start with a 96 MHz crystal oscillator phase-locked to a 10 MHz OCXO source (KD6OZH circuit). I use the hairpin filter/MMIC amp sections of an old KK7B no-tune LO board to multiply this to 576 MHz, and then another multiplier and filter to get an 1152 MHz signal. I drive one of WA5VJB's 2 to 11 GHz etched PCB log-periodic antennas with this, with an HSMS8202 diode across the feed point of the antenna. Drive power to the antenna is about +17 dBm. Probably any diode that would fit would work here to generate harmonics.
This produces adequate power to be received across several hundred feet at 2304, 3456, 5760 and 10368 MHz. I can get less distance at
24192 but I can hear the signal 50 feet away on that band.
The use of the 96 MHz basic oscillator frequency gets around the problem of using a 144 or 432 MHz IF. None of its harmonics are close.
73, Zack W9SZ

Allen, Consider one of WA5VJB's Vivaldi antennas with a simple surface mount diode across it as a harmonic generator. You can drive it with a 96, 108 or 1152 MHz source and have markers for all of the ham bands up to 24 GHz. An oven stabilized source would be ideal for best stability and accuracy, but you don't really need to go that far if all you want to do is have a test source in the field or for tweaking your antennas at home.
Brian

The old Microwave newsletter technical collection described a simple source.
48MHz xtal oscillator and doubler with a 2n3866 used to drive a standard mixer diode mounted in waveguide, the sort of thing that may be kicking around in the junk box.

They work well; levels are low but good to 10s of m for narrowband.
I can scan and email the article if required.
Mark GM4ISM

Simple antenna range implies using something like the HP415 detector. These are wideband by definition.
Crystal harmonic marker sources are unsuitable for use with these since there may be appreciable output at sub harmonic (and harmonic) frequencies.
Antennas may well have responses at these frequencies, leading to measurement errors. Well filtered or even fundamental sources are to be preferred. The source also needs to be amplitude modulated with 1 kHz for sources to work with the HP detectors.
73 de Sam, G4DDK/W5DDK

The problem with 48 as the crystal is many use 144 as the IF and the third harmonic of 48 is 144. That makes 96 MHz better.
Last year I used the 384 MHz output of my HP8640B signal generator feeding the "DC" side (good to 1 GHz) of an HP 423A detector which has RF rated to 18 GHz. I used it directly connected to my transverter (with attenuators and depended on the filtering of the transverter. The signal wasn't clean but it was easy to set for MDS (by ear) with a poorly working transverter and then to add attenuation with the same VHF drive frequency power level to see if my changes were improvements. They were.
Using a waveguide mounded mixer or detector diode gets some filtering from the waveguide.
Now the signal required for detection with a transverter is a whole lot less than required for the detector and 415 meter. 73, Jerry, K0CQ

1. I would bet that this is a puck-stabilized oscillator, in which case, you won't be able to move it very much-- maybe a MHz or so, if that. Anyway, I ordered a couple to play with myself.
2. The original post asked for something to use on an antenna range, so that's not a weak-signal requirement-- you want a reasonably big signal, so there's something left when you rotate the antenna and get down in the valleys between the sidelobes. You'd need even more signal if you're going to use a VSWR meter and crystal detector to make the measurement.
3. If you need attenuation, this is an ideal place for the waveguide-beyond-cutoff attenuator, assuming you can shield the source sufficiently that the leakage doesn't overcome the attenuated signal, You need to couple the signal into a much smaller guide than would support the frequency, then make a traveling pickup to a coax jack. For X-band, I should think a 24 GHz guide might be small enough.
(I haven't calculated what kind of jack/ connector might fit; you might just have to put a loop on the end of a piece of RG174, and put the connector on the outside end of it.)
--Doug, WA2SAY

This source concept is very useful and I have successfully scaled it for quite a few bands. Just to give some different ideas, here is how I solved the dimension challenges of waveguide at 76 GHz, comparable to the idea of soldering a Schottky Diode across a WA5VJB Vivaldi or Log Periodic:
http://www.kolumbus.fi/michael.fletcher/76g_src1.jpg
The signal source is an ex-12 GHz radio link PLL cavity LO from the seventies. Nice and clean CW carrier when multiplied to 76 GHz using a BAT-14 Schottky Diode. A block diagram showing the junk box stuff used:
http://www.kolumbus.fi/michael.fletcher/76ghzmrk.gif
As for the noise source discussion, you can also use standard Neon lamp stuck in the waveguide. This worked fine for me at around 10 GHz specifically for radiometric testing (a Dicke switched affair).
Setting the lamp at a suitably slanted angle, you can even get a reasonable matching with the waveguide opposite end terminated.
For NF measurements, you need to be aware of the Thot/Tcold matching problem, in addition to the calibration issue, be the noise source solid state or gas discharge.
Michael OH2AUE

For us weak-signal types, how would you put this exactly on a frequency, say 10368.005 MHz, and make it stable there? Seems if you want accuracy and stability, you have to spend more than $10. I think it can be done for under $100, though. 73, Zack W9SZ

Brian, AF6NA with his Smart Redirector at the February SBMS meeting. 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 760-375-8566. 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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