



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 2007 Edition

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At the **7 June** SBMS meeting will be David Glen, N6TEB. David is a SBMS member and he has been active in VHF and up roving since the 1980's, and he typically makes it to the top 5 or 10 rovers nationally. In June of 2005 he took the top spot for the first time. 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 gave a good talk on microprocessors in ham equipment. Thanks Dick. Welcome to new members **Richard Sparling, K2EY** of Bemus Point, NY and **Christopher Scott, W6CWX** of San Pedro, CA. An LCD projector was purchased by the Society to project our Tech Talks. 24 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

June 3 24 GHz VUCC
June 7 SBMS meeting
June 9-11 ARRL VHF QSO
June 23-24 Field Day
July 5 SBMS meeting

July 28 Picnic/ Tune-up party
 August 2 SBMS meeting
 August 4-5 ARRL UHF Party
 August 18-19 ARRL 10 GHz and Up contest
 Sept 8-10 ARRL VHF QSO
 Sept 15-16 10 GHz and Up second half
 October 18-19-20 **MICROWAVE UPDATE (MUD) 2007** Historic Valley Forge Philadelphia,



Dick, K6HIJ giving his tech talk on “Microprocessors and Microwave” at the May SBMS meeting.

Why is this subject is of interest. —

Low cost

Simpler Hardware Design

Changes are easier to implement

(software verse Hardware)

Good Technical support

How do we get started?

Don't wait until there is a critical need.

Choose a uC family

Collect the tools needed

Make something simple and non-critical

Get familiar with writing simple programs

Choose a micro-controller Family

Recommendations- Microchip PIC series

Why the PIC series? Excellent technical support, Low cost development tools, Readily available in small quantities, Widely used in the amateur community, My wife has microchip stock

Web support www.microchip.com

Recommended PIC controllers

Low end applications PIC 12F675- \$2.10 Mid range applications PIC 16F628A \$3.35

Beginning Programming Plan the project

Make a flow chart--Work from the top down, Document your work, Test the program in small pieces,

Document your work, Build a library of reusable routines

At the May SBMS meeting Chris N9RIN indicated he had a chip PCB that would program the Verticom synthesizer. He plans to make that available soon. Chris indicated that such a device could program on board the PIC as the Microchip kits.

A recommended programming kit to start with is Microchip PICKit2 - \$50 see at www.microchip.com

Another more project-oriented kit is in the May and June QST “Learning to PIC with a PIC-EL” by Crag Johnson, AA0ZZ. There is a lesson series Elmer-160 that goes with it. See American QRP group at www.amqrp.org. The Software comes from many different places listed in the QST articles.

“Wants and Gots for sale.

For Sale: HP 606A 50 KHz to 65 MHz Sig Gen \$20, Larry K6HLHK6HLH@sbcglobal.net

Want 4.0000 OCXO Dave, WA6CGR 310-977-0916

Want 12-v SMA relay John KJ6HZ 951-288-1207

Want Verticom 10 GHz synthesizer Frank WB6CWN 805-558-6199

Activity reported at the May SBMS meeting-Larry, K6HLH worked on his 1296 EME rig and is hearing sun noise; Chris, W6CWX worked on his 10 GHz radio; Doug, K6JEY worked on his 47 GHz rig, has new home in Camarero, and indicated at 1296 MHz net on Fridays 8pm 1296.1 MHz and Saturdays at 9:30 pm.; Juno KG6MQS worked on his 10 GHz radio; Dick, K6HIJ is building new 24 GHz waveguide switches; Steve AD6HT did some software work and is working on a Pcom rig; Mel is building a new 10 GHz rig and noted DC-DC converter noise problems; Dave, WA6CGR did some work on his 24/47/78 GHz rigs; Chris, N9RIN built some dc-dc converters, made a PIC board for Verticom, and did some 10 GHz work;

Ernie, W7ERN visited the lab and picked up parts to start on a 10 GHz rig; Don KF6QWC got a Wilton sweep generator; Tom, WB6UZZ did some oscillator work; Jeff, KN6VR built some 1296 MHz power dividers; Chuck, WB6IGP carried parts from San Diego and has some 47 GHz diodes available; Ed, W6OYJ brought up some draft papers by Greg Bailey on the conversion of the 6 GHz Qualcomm hardware; Kerry N6IZW has a tracking generator in work; Bill, WA6QYR worked on his Pcom rig; Chuck WA6EXV is still trying to get noise free 10 MHz references for his DSP-10 rig; Frank, WB6CWN is working on 2 24 GHz rigs and 2 10 GHz rigs for Mexico; Dick WB6DNX is working on his spectrum analyzer problem; John KJ6HZ is working on some Jupiter boards.

Email threads---

This thread has been most interesting and I can't help adding my comments. As has been mentioned earlier, an Rb oscillator is not a primary standard and needs adjusting to put it 'on frequency'. The manual for the Efratom FRK series oscillators (the black cubes) states that they are set at the factory to $\pm 5 \times 10^{-11}$. The adjust range is $\pm 2 \times 10^{-9}$, minimum. So they do need calibration to achieve the rated performance. As far as the received gps signal being overrated as a frequency standard, it depends on how it's used. Until recently I worked in a calibration lab. For our working frequency reference we had a Fluke 910R, a gps disciplined Rb oscillator. The readout on the front panel displayed the deviation from the "received" gps frequency, usually displaying better than 1×10^{-12} (.1 - .4 were common values). I assume that this deviation is an internally derived value that looks at the Rb oscillator versus the long term averaged received frequency. While the short term received accuracy of the gps signal might not be this good, the long term averaged gps frequency allows the internal Rb oscillator to consistently achieve the small parts in 10^{-12} . NIST will also provide a similar hardware/software system that will provide a NIST traceable uncertainty of 2×10^{-13} .

The gps system is also one of the primary ways that NIST does time/frequency comparisons from national laboratory to national laboratory. Using the common view technique, two different standards, at different locations, are compared against the received gps signal. After allowing for the position of the satellites, upper atmosphere propagation effects, phase of the moon, assorted baseball scores, what the technician had for breakfast, etc., etc., a correction factor can be modeled and applied at each site.

But the real point here is, do we really -need- 1×10^{-13} accuracy?? Probably not, as 1×10^{-9} will do just fine at 10 GHz. But it sure is fun. (What do you mean I'm off frequency?? Your 47 GHz signal is 2.3 Hz low. Are you using a tuning fork for a LO reference?)

73, Tom WB6UZZ

Geoff Blake wrote:

On Sat, 12 May 2007, Richard brown wrote: I'm going throw in my two penneth as well.

Unless you are doing some work for a third party who insists on a "calibrated" use of a frequency standard, to be honest you don't need to calibrate either Rubidium or Cesium standards. Both are physical constants, all you need to check is that your 10MHz is actually locked; if it's locked to the Rb source then it's on frequency. IMO GPS is cracked up to be more than it really is, the short term stability is not as good as a Rb standard, the long term stability is as good as the source its locked to. Proving anything is out of calibration, and I don't mean reading the cal label, is very difficult when you get the high orders of accy. There is a lot of pontification about frequency accuracy, who really cares if you are 100 Hz off frequency at 47 GHz. Whilst agreeing with you on the relative unimportance of 10^{-12} accuracy, a Rb standard is not primary, apparently the gas pressure in the cell affects the resting frequency at the 10^{-12} level. Also an Rb standard can be 'pulled' a little. AIUI, like the Cesium, the Rb has good long-term stability, whereas a crystal is better short term - but I am not an expert, there are several on this group. Why? Geoff

GPS/PLL info

For subscription please go to: <http://www.vhf-dx.net/mailman/listinfo/gps73>, Rainer

Darrell schrieb: For those interested and can provide input subscribe to: gps@vhf-dx.net

My thanks to Rainer for this opportunity to participate to communicate is PLL/GPS communications ONLY Regards & Thanks To Rainer (df6na@df6na.de) If I missed something Rainer PLEASE respond with correct information. Darrell

OWENS VALLEY RADIO OBSERVATORY TRIP JUNE 9-10, 2007

WELCOME to the third trip for teachers and students to the Owens Valley Radio Observatory near Bishop,

CA. We will be visiting the facility on the weekend of June 9. The trip offers students, teachers and student teachers the opportunity to experience science experiments, a tour of a major radio telescope and astronomy facility and the opportunity to do visual astronomy through several large telescopes. The facility is about five hours drive from Long Beach through both scenic and historically important locations such as Red Rock Canyon, Lone Pine, Mt. Whitney, Bristle cone Park, Manzanar relocation camp, Edwards Air Force Base and others.

Here is a link to the observatory:

<<http://www.ovro.caltech.edu/>><http://www.ovro.caltech.edu/>

Here is a link to Dr. Millar's project with the dish:

<<http://www.ham-radio.com/sbms/ovro/>><http://www.ham-radio.com/sbms/ovro/>

Be sure to look at the photo gallery

The trip is not sponsored by any group, so participants come on their own. Parents should accompany all students who are minors. Car-pooling is encouraged. The cost of the tour is free. The only expenses are personal for lodging and food. Participants should RSVP Dr. Millar. You can camp out under the dish, or at local campgrounds. There are several local motels available as well.

We will go up on Saturday June 9th and back on Sunday the 10th. Please plan to be there by 2pm. In the afternoon we will have a science demonstration by one of the astronomers at OVRO (properties of liquid nitrogen) and a tour of the 130foot dish antenna and operations. We will go to Bishop for pizza and then back again for visual astronomy at the foot of the dish at night. We will have several large telescopes there and LOTS to see in the sky. Most participants will stay overnight- you can camp at the dish or get a room in Big Pine at the Bristle cone Motel. They have a special rate for us. Please RSVP to me if you would like a room.

The next day you can visit the area- The Ancient Bristle cone State Park, Carma Infra Red Radio telescope at Pine flats, the Sierras, head south to Lone Pine for the movie museum or John Muir Trail head. There is a lot to do. Yes you can bring your kids along; it will be a great trip for them.

Please let me know if you are coming ahead of time and give me your cell phone number so we can coordinate who is where and help with directions.

Here are the directions: Go North on I-5 to I 14 through Santa Clarita, Palmdale, Mojave, Red Rock Canyon and Inyokern. At Inyokern the road changes to I 395 but still keeps going north. Keep going through Little Lake and Lone Pine. Go on to Independence and Big Pine. That will take you about 4.5 hours. Although just 14 miles south of Bishop, the Owens Valley Radio Observatory is located closest to the town of Big Pine. At the northern tip of Big Pine, by a large pine tree, starts Highway 168. The only public access road to OVRO is via Highway 168. From Big Pine, turn onto Highway 168 and follow the road east. After approximately 2 miles you will cross the Owens River. Once across the river, turn down the first paved road to the left, Leighton Lane. Below is a map. Once on OVRO property, go to the biggest dish. We will be parked under it and inside or standing around. From the entrance gate it is the dish that is straight ahead.

This is our third trip and all have had a great time. If you are a University of Phoenix student teacher, this is good for about 30 hours of observation.

Please let Dr. Millar know if you have any questions. Email me at <<mailto:dmillar@moonlink.net>>dmillar@moonlink.net or call me at 562 810 3989.

Hi Darrell,

Have you told Tac32 that the serial port has no handshaking? I've used Tac32 with many Jupiter's with no problem.... Another NMEA aware program I use is VisualGPS<http://www.visualgps.net/73>, Mike, N1JEZ
From: "Darrell" <ve1alq@nbnet.nb.ca>

To: <microwave@echo.valinet.com>

Sent: Tuesday, May 08, 2007 11:08 AM

Subject: [Mw] Jupiter GPS

Has any used Computer based software to communicate with this Jupiter GPS Engine?? It all look great; clock is ticking, 10Khz, etc. I have only Tac32 on this Laptop, and would like to confirm how many Sat's it is actually seeing. I would expect Tas32 to accept generic NEMA Proto call, and to my knowledge all jumpers are correct...but Tac32 tells the Port is busy. When I hang an Oncore on the came Port it finds it with no problem. The Jupiter is telling Tac32 the Port is Busy???

Regards & Thanks, Darrell

Jupiter GPS engine:

I bought a 'pack' of 5 receivers from "The Wireless Guy" on ebay. Great service. Search for his current GPS receiver listing at item number 320096576404. The price is less than \$15 each, delivered. Also, check out his other GPS adds. He has some 'kits' available that also include the active antenna. The Jupiter units have the 10 kHz output that can be used for reference locking your LO or frequency standard. These units do have more jitter than the timing version of the Jupiter (the Jupiter T - I think), so you might not get the 10⁻¹² accuracy a commercial disciplined standard would have. But, unless you are trying to run SSB at 476 GHz, these should do fine for a microwave standard. Disclaimer: I haven't actually had one of these units fired up yet. N6AX and I are working on the locking circuits and references, but haven't got to the point of powering up hardware. Any other experiences or opinions (Opinions? Not on -this- list!) Out there? 73, Tom WB6UZZ

Subject: 3Dfix Tommy do you have any more of the 3Dfix PIC chips and the info on 3DfixLCD and chip? Bill, Yes I have them. All the versions are \$4 each plus shipping (I can ship 2 or three chips in the US for \$1...envelope+postage basically).

Everyone is having trouble finding LCD's right now. I have a possible substitute (Hantronix) but I am trying to find the time to see if it incompatible with the current software (and so far, no time). The other version is the single LED type. It's simple, not much soldering or parts required and it works well. Let me know which one(s) you want and an address. I'll send them and after you get them you can send the money. Cash or check is fine, as I do not have PayPal. Schematics attached. Any more questions just let me know. 73 Tommy W1AUV tpsully@verizon.net

Subject: 3Dfix

I am not sure if you all have been made aware of Tommy's (W1AUV) excellent design work to make a simple GPS Receiver Lock circuit(s).

Take a look at these web pages for all the information (NO COMPUTER REQUIRED!):

http://www.ham-radio.com/wa6vhs/GPS/3DFix%20LED%20only%20with%20pics%20_4_.pdf

AND:

http://www.ham-radio.com/wa6vhs/GPS/GPSfix%20LCD%203-18-2006%20_4_.pdf

The above web pages are the only place that I know of for retrieving this terrific information.

PLEASE NOTE THAT THIS IS FOR THE GPS RECEIVER LOCK. NOT FOR A VCTXO LOCK.

Tommy's email address is tpsully@verizon.net 73 es GLJerry W7QX

And here's another project using the Jupiter.

<http://members.aceweb.com/kd7ts/html/TU140/TU140%20Jupiter%20GPS.html>

many thanks to KI4PNV, WA6VHS and ON4IY for sharing ideas.

Mike KD7TS

San Diego 24 GHz beacon A 24 GHz cw beacon was established on 1/10/06 and is now operating on Mt. San Miguel, southeast of San Diego in Grid Square **DM12MQ**. The Lat/Lon is 32 deg 41.80 min North and 116 deg 56.09 min West. Frequency is **24.192050** +/- 500 Hz and it is identified every 2 minutes as K6QPV/B. The elevation of the beacon is 2565 ft and radiates a 34 dBm horizontally polarized signal toward the LA basin.

For the 2GHz and Up Contest Participants-The Mt. Miguel 10 GHz beacon is presently operating on 10.368070 +/- 5 KHz.

For more information: http://www.ham-radio.com/sbms/beacons/sd_bcn/sd_bcn.html

Beacon ID WB6IGP/B

The Mt. Miguel 24 GHz beacon is on 24.192030 GHz +/-500 Hz. Beacon ID K6QPV/B

Greg

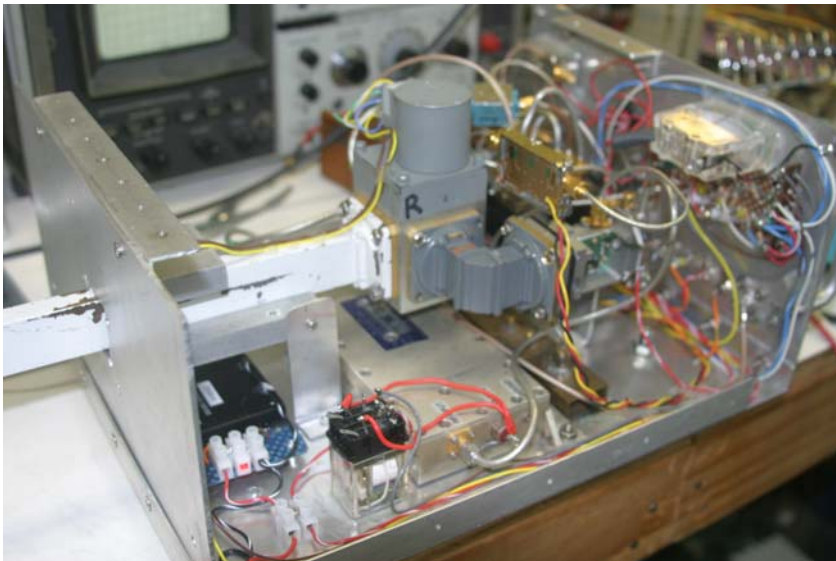
K6QPV

“Procrastinator” X-Band Rig Status Report de Wayne KH6WZ

Here are some random images and text on the progress of the X-band radio I am building for Dick, WB6JDH. This project has gotten a lot more complex and time-consuming than I anticipated. However, this should be a fairly decent rig and so far, the receiver is operational and has been tested. I have mixed feelings about this rig, however, since the receiver is performing better than my “optimized” rig, “Ms. June.”



Above: Preliminary chassis layout of the parts.



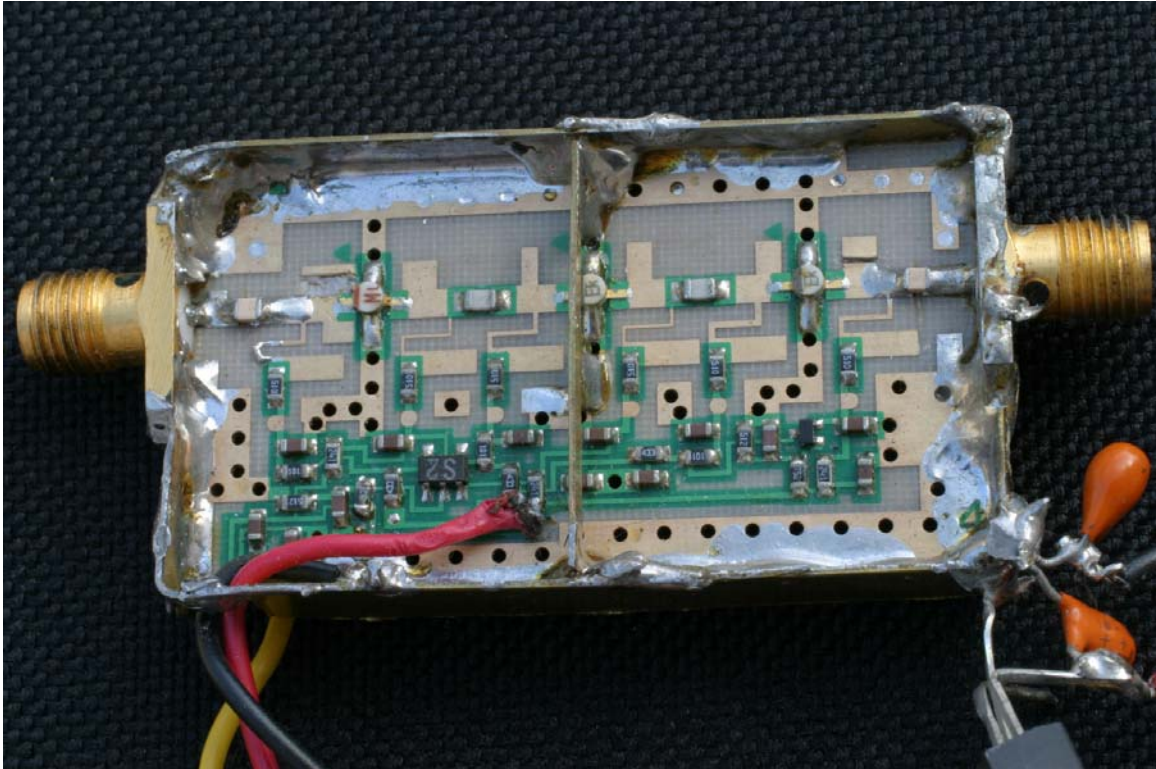
Receiver and DC control circuits completed. The receiver has two LNAs.



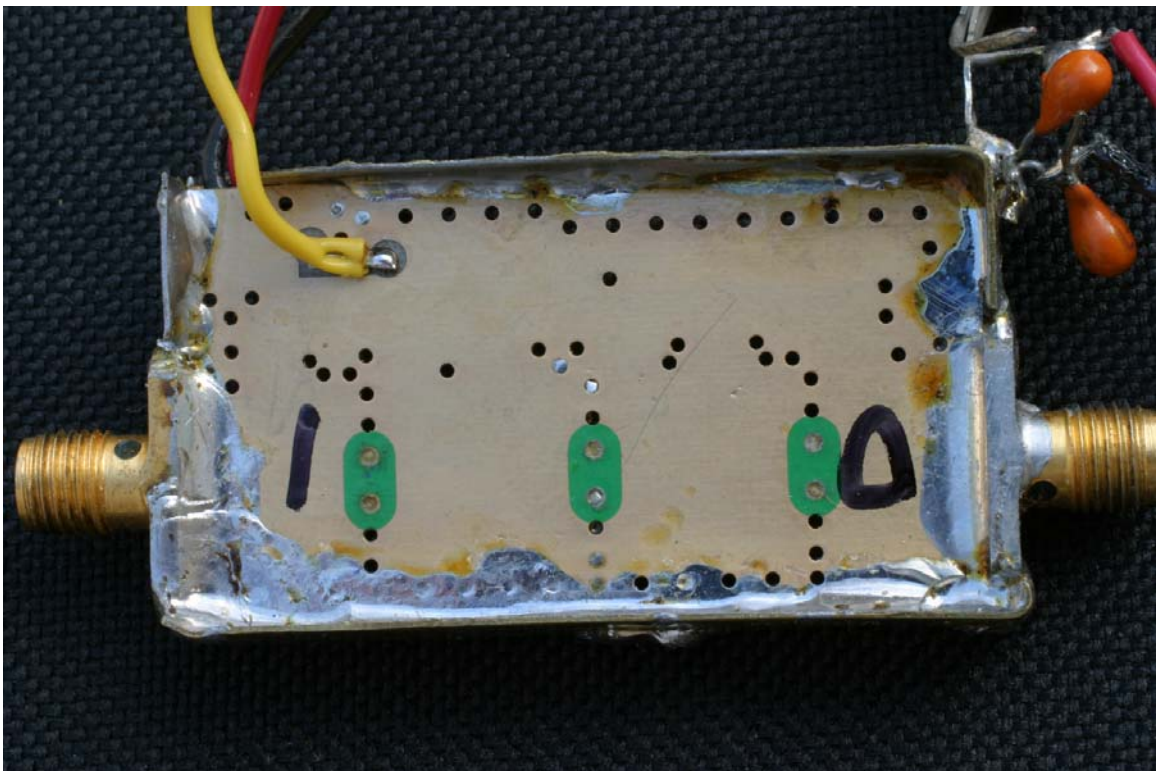
Rear view of the front panel.



The front panel includes a battery charge meter, fuse block, IF interconnections and status indicators. Labels will be added later.



This is a receiver pre-amp, cut out of a Qualcomm "Gold Board."



RF input on the left, and output on the right. Yellow wire is minus 5V input.

Some observations made while working with (or cursing at) the Pcom high side LO 24 GHz ODU.

With out further modifications to the transmitter board filters, one can generate a lot of 23.7 GHz output signal as detected by my HP 432a power meter with a WR-62 transition. About a milliwatt comes from the LOx2 plus 2 GHz IF mixing in the Transmit module before any 432 MHz SSB is added. When the 432 MHz SSB signal is added, more power comes out at 24.192 GHz (about 10 MW plus) while the 23.7 GHz is still present. I hope no one is listening there. Old waveguide wavemeters are useful for something. General power indications with just a waveguide detector mount and milliamp meter are helpful when you don't have any test gear in the frequency band. An old waveguide wavemeter helps narrow what frequencies you have coming out of the device.

Ed, W6OYJ loaned me a copy of Paul, WA6PY's notes from the Pcom he had modified. There are still questions on the modifications needed to the 2 GHz converter boards that the Society produced. The donated surface mount mixers have a different pin out than the one intended for the project. The amount of bias to the ERA3 devices is a question. Data book to schematic differences noted.

Just jumping in a checking the FET biases, found a dead FET in the receiver module LO chain. Replacing that from a "Hanger Queen" Board didn't fix my receive problems.

Using one of the Qualcomm 1152 MHz boards to generate +5 or so dBm is useful on the Pcom receiver. Using a 96 MHz crystal based signal source on 1152 MHz is useless since it also puts out signals in the 432 MHz Pcom IF region.

Using the original Pcom power supply (assuming you have a field source of 36 to 48 VDC) is a cause for discussion since it has 1 v noise on the power leads. I don't know where the source of my 5-vdc power problem is. After transmitting for 30 seconds the 5v power falls off to zero. Pcoms that have used other power sources don't seem to have that problem.

Oh well. I will keep fussing with it until I can get it on the air for the 24 GHz VUCC operation.



Pcom 24 GHz rig on the back of its 2 ft dish. The original feed is 3/8-inch hobby brass tube leading to a splash plate.

Bill, WA6QYR



Bill, WA6QYR had his 10 and 2 GHz rigs up on one of the Government Peaks, DM15di above Randsburg, CA for the 2 GHz and Up contest.

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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