



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 January 2008 Edition

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At the **3 January 2008 SBMS** meeting will be a talk by Doug, K6JEY on frequency stability. 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- Larry, K6HLH gave a good talk on his Flex radio SDR-5000 software defined radio for the HF bands. He is getting some 4-5 software changes a day now. He had to get a new computer with dual processors to keep up with the program it uses. At first he was dealing with no manual but then it came out. The only software it uses is Windows XP. Lots of parameter selections to set up the radio. It puts out 100 watts of RF. Welcome to new members Ed Cannon W7GLF of Kirkland WA, Walter Clark of LA, Bill McNalley N6MN of Seal Beach. Nancy, N4NCY of the LA Area council of clubs visited our meeting. Pat N6RMJ sent the winners of the 2 GHz and up contest a certificate. The Northern Lights group were #1, followed by the Front Range group, SBMS, the San Diego Microwave Group, the Michigan group. Dennis, N6DQ was having the Christmas party at his house. The new membership form was to be put on the SBMS web site by Dick, K6HIJ. The membership voted to allow Treasurer Dick, K6HIJ to pay insurance bills as they come in.

Scheduling

Feb 7 TBD

Mar 6 TBD

“Wants and Gots for sale”.

For Sale- Programming sub-board for the Verticom and Stellex synthesizer. Assembled PCB, chip programmed for 11.880 GHz available from Chris N9RIN at: cshoaff@yahoo.com. SBMS member cost \$6.00 not counting shipping.

Want- Qualcomm rectangular PLL board Chris N9RIN cshoaff@yahoo.com. 949-388-3121

Want 9.000000 GHz brick Dick WB6DNX 714-529-2800

Want service manual for Motorola R2000A comm. Analyzer Dan W6DFW 714-776-7718

Want Xband omni antenna. Mel WA6JBD 951-212-8245

Want schematic of HP 5087A Distribution Amplifier Tom WB6UZZ 714-402-1280

For Sale 10w 10 GHz TWTA with working power supply \$60 Joonho KG6MQS

Need test cable for HP141/8555a spectrum analyzer Dick K6HIJ 760-253-2477

Want---A friend of mine in Europe has been experimenting with various mixer diodes on 122 GHz. To date the MA 46H146 Flip Chip Diode appears to be the most successful of all types tried. However, this is based on experiments with just one sample. He has asked me to obtain a small quantity of additional units (10-12) for further tests. In checking around, I find them available only in very large quantities. Does anyone have any of these around or can someone suggest a source for small quantity purchase? Thanks, Henry, KT1J kt1j (at) madriver.com

Want: filament transformer 6V, 30A John KJ6HZ 951-288-1207 cell

Phil, W6HCC Trip to DM75, 85, 96, EM06 11-13,14-07

I left home at 0555 hrs. and traveled down I-25. I planned to contact Bill, K0RZ in Lousiville CO. (DM79jx) from new grids in New Mexico, Texas (new state) and Oklahoma. The freeway was fairly busy for that early in the morning. As I approached 120th st. in Denver everything stopped! I was in stop-go traffic until I cleared the tech center. That took about an extra 45 minutes. I arrived at Raton NM at about 1130 and stopped for a snack. I continued on to Wagon Mound NM. There I refueled and continued on NM-120 to the site. NM-120 is north of the grid boundary (DM75). The road goes east from Wagon Mound and then dips south into the grid as it crosses some low hills. When I reached the grid, I found two problems. I had no shot back to the north without a local hill in the way and I had no cell-phone service. Bummer!! I decided to go on east on NM-120 to Roy NM. The web site for Verizon showed service in Roy and on NM-39, which runs north south along the eastern boundary of DM75.

NM-120 is a good 2-lane road. It crosses the canyon of the Canadian River. The canyon is deep with huge jutting boulders on each side. The scenery is very pretty. The road is a steep 6-7% grade down and up the other side -- easy in tow-haul mode for the excursion.

I arrived in Roy and much to my dismay, I had no cell-phone service. I tried several times to call Bill, but to no avail. I decided to head north on NM-39 and see if there was any better service as I went higher in elevation. I drove north until I ran out of the grid, but nothing improved. I was getting worried. No phone -- no contact!!

Time for plan B. I crossed back into the grid, and parked along the road on the broad shoulder on the east side of the NM-39. I set up the yagi for 433.1 MHz with the mast mounted receive preamp. The wind was very strong from the north. It was about 30 mph gusting 40 mph. I normally use 2, 5-foot mast sections on top of the excursion. Here, I used only one!! I pointed the yagi to the proper heading and called Bill. At first nothing was heard, then he came back to me loud and clear. No liaison problems!!

I set up the 4' dish. (I wore my hard-hat to be safe) The gusty wind was a problem, so I put extra clamps on the swing arm to be sure that nothing blew away. I asked Bill to send a carrier. At first I saw nothing on Spectran. I sent Bill's call and he got a good aircraft scatter burst and copied. A few minutes later he got both calls and the grid. Now we needed and 'R'. It took almost an hour to get enough signal to complete Bill's side of the contact. We then had several good bursts and I was able to copy Bill's call, my call, his grid and an R. The distance for the contact was 281 miles. After the contact was completed, Bill sent a signal and I saw a weak but steady baseline signal. Not loud enough to hear, but a broad line with no Doppler. There were several good aircraft Doppler signals as well.

I carefully packed up the system. The wind was still blowing, but not as hard as before. I decided to drive to Dumas Tx. for the night. I traveled up NM-39 to US-56. Along the road I saw a large flock of wild turkeys. I went east to Clayton NM. It was getting dark and I lost an hour when I went into central time zone. I got to Dalhart TX and decided to stop for the night. I stayed at a Comfort Inn. I had a good buffet supper at the local Pizza Hut and retired for the night.

The next morning I arose at 0530 MST, had a nice breakfast at the Inn, and went on my way toward Dumas Tx. I traveled down US-87 and across to Dumas. I arrived at about 0730. On the way, I saw an armadillo in the road. I had never seen one before. I checked the cell-phone and it had service. I traveled north on US-287 to CR-E. This is nearly on the border between DM85 and DM95. I planned to set up near the border and then move into the adjacent grid after completing the contact in the first. I drove west on CR-E and was surprised to find the grid border only a few hundred yards west of US-287. I stopped and took a compass sighting and found that it was clear with a good horizon to the northwest. The road was adjacent to a cotton field which had been plowed and there was an easy access from the road through a shallow ditch. The field was solid and I pulled off into the field. I set up the system. The wind was still blowing hard and it was cold. My fingers were about numb when I finally got the small SMA connectors between the PA and dish head in place. It was really nice to retire to the excursion and attempt the contact.

As often happens, when Bill put up a carrier, I heard nothing. I adjusted elevation and azimuth on the dish and heard a few aircraft bursts. I sent my grid and Bill copied. Bill sent his data and I got a good burst and copied both calls, grid and R's. I sent my data to Bill and at 1520Z he had a full copy. The contact was at a range of 327 miles.

To move to a new grid, I usually had to take down the dish, pack up the system and drive up to 120 miles. Here, I was on the border between DM85 and DM95. I was able to move slowly along the plowed field with the dish and system in place. Then all I had to do was park the excursion at about the same angle as during the previous contact and make slight azimuth corrections to the dish. It was the easiest move between grids that I have ever made.

DM85xx was a re-run of DM95ax. It took about 19 minutes to complete the contact. There were several good aircraft bursts. I copied calls, grid and R's from Bill. He copied the data from me. The contact ended at 1545Z and was again at a range of 327 miles.

I turned the excursion in to the wind. It was still strong, and I wanted the wind shadow of the vehicle to ease the wind pressure on the dish. I carefully packed up and headed for Oklahoma and EM06.

I traveled north on US-287 to Stratford TX where I turned northeast on US-54. I continued northeast until I arrived at Hooker OK. There I refueled, turned east on US-270 and continued to US-283. The road was good and signed at 65 mph. As I approached US-283 I passed through the small community of Gate OK. It was in a wide valley. I was concerned that I would still be in the valley when I reached EM06. Fortunately, I climbed out of the valley before I reached US-283. I drove a few miles north on US-283 and stopped to check for cell-phone service. I called Bill and the service was intermittent.. The site maps from Verizon showed the service to be better east of US-283. I turned east on CR-10 and drove toward higher ground. I passed CR-173 and continued east. I found 2 wheel tracks leading up to an oil well. I went to the well, only to find that I was behind a local hill to the northwest. I returned to CR-10 and went back to CR-173. The land rose to the north along CR-173. I went a mile or so and found an area with a plowed field with a good view to the northwest. The field was a little soft, but no problem for the excursion. I called Bill and found good cell-phone service. I pulled off into the field and set up. The wind was still blowing, but the temperature was now about 55 degrees and working outside was no problem.

At first, no signals were heard. We were now at a range of 353 miles and we needed an aircraft in just the right place for communication. At 2001Z I copied both calls from Bill. A few minutes later we got a very strong and long duration burst. It had no Doppler shift on it and we were able to complete the contact at 2013Z. This was grid #51. (My high school graduation year) We continued operating and made some signal recordings using Spectran. In the next 30 minutes, we never got a burst strong enough to hear; just small signals on Spectran.

At 1415 MST I headed for home. I traveled up US-283 to Dodge City KS and on north to WaKeeney KS. Here I took I-70 and returned home. I arrived home at 2207 MST. This probably is the last 'grid quest' for 2007. This summer Bill and I have worked 26 new grids and added 2 new states (New Mexico and Texas) to the list of contacts on 10368 MHz. The grid total is now 51. Next year, I think there are several more grids that are possible. We shall see!!! 73 for now, Phil, W6HCC

Activity reported at the December meeting—Dan, W6DFW did cactus radio work; Larry, K6HLH did presentation on his Flex radio 5000; Joonho, KG6MQS is making his endwave 24 GHz rig and power supplies; Dick, K6HIJ is making wr-22/19 flanges and his CNC mill computer died; Chris, N9RIN making

more PIC boards; Kurt, K6RRA cleaned his garage; Jeff, KN6VR worked on feeds for the "new" 1 meter dishes and did experiments on silver loaded epoxy; Walter Clark, no call, talked about his optics career and physics; Bill, WA6QYR worked on some Mitrek 450 radios; Chuck, WA6EXV continued work on 50w 10 and 24 GHz amplifiers and experiments on "new" 1 meter dish feed; Dick, WB6DNX worked on 24 GHz beacon; ATV inputs from N6IFU, K6BNN and W6KGE.

Email Threads

Noise figure Hi Guys! A great topic, a lot of knowledgeable players contributing here. I remember N4FS's article in Ham Radio on noise figure measurement. Also Joe Rieserts VHF column. Good learning when I was a kid. OK, now for my 2 cents worth! I have made my living in this area so may have a little to contribute. In fact a great many of the solid state noise sources are 35 dB ENR (hotter than the Sun, 1000000 K) (I actually look for and collect high ENR sources!) And were attenuated down to 25 dB (for Sanders Noise sets, used to inject at test coupler ports of ECM gear, a flight line quick test box), or 15.5 dB ENR (this value chosen as a direct replacement for the Gas Plasma Tube invented by Mumford in the 1950's and extensively studied because of the extremely flat noise vs. frequency response), or the 5 dB ENR sources, which have a 30 dB pad in them, to mimic the 5.2 dB ENR of the 5722 noise diode tube source in the HP 345 used with the HP340/342 Noise figure meters. Both AIL and HP exploited the waveguide noise tube (with its critical guide angle) that Mumford puzzled out. It was the switching video spikes from the HP 349 coaxial noise source (100-4000 MHz!) and its AIL equivalent which I think was the AIL7011 that gave gas tubes the bad name for "killing" transistor LNA's in the '70's.

BUT gas tubes are a very good source and we used them for GaAsFET measurements by putting a 10 dB pad on the 15.5 source, making it 5.5 dB ENR (allowing us to use the low range scale on the HP342) and also providing a shunt path for the transformer coupled high voltage video spike that was propagated to the coax connector by the wideband pickup Balun transformer used in the source. BTW waveguide gas tubes don't have the video spike, as waveguide is a HPF, won't propagate the video energy, so old waveguide noise sources are GREAT for the microwave bands, and cheap!

Almost all the early AIL and HP solid-state noise sources were made by MSC (Microwave Semiconductor Company) in N.J. (Steve Kostro used to work there!), supplied as modules (little gold blocks with an SMA connector on them). When MSC went tits-up, killed by the MIMIC program and Jim D., there were a few other noise source makers such as Micronetics, who continued to make noise diodes and supply to source makers. I don't know where HP (Agilent) and Maury Microwave (new owner of the AIL/Eaton product line) get their diodes from now. I doubt they make their own. I have had AIL 74's (vacuum tube version), 75's (solid state), and now have Eaton 2075; also had HP 340/342's have two 8970's now (kind of my favorite). Have as well as a hand full of the Sanders things. All of these rigs, by different makers, seem to work, but take a little skill and practice to get meaningful number. The older ones were not inferior, just generally harder to use (read, "more skill needed").

I attended both the AIL and HP noise figure measurement seminars, waaay back when in the 1980's, and remember that both companies claimed no better than plus and minus .5 dB absolute accuracy on noise figure measurement! This was due to mismatch, calibration inherent instrument accuracies, LSB's on ADAC's etc, all adding up! If you wanted better, they would teach use how to do manual Y factor measurements with hot/cold sources to get better accuracy on absolute measurements.

Relative measurements (like noise figure contests at the MUD etc.) are different. You want to see how good your amp is relative to all others. But you really can't come away claiming your amp is .25 dB noise figure from an 8970-measurement setup! All you can do is say; "My amp is better than yours, on the bench, in a 50 ohm system, that is well behaved, with no out of band impedance weirdnesses presented to my amp"!

I agree with the concept that using the antenna-preamp combo in situ is the best way to evaluate NF, but a little tough for the production line.... Also, hot/cold VSWR of source and noise source match of the first stage are very important, but mostly were considered second order effects, and didn't stand in the way of tweaking for optimum relative performance. We used to use a double stub tuner and a line stretcher to rotate an input mismatch around the Smith chart to evaluate effect of source impedance change on noise figure. Simple enough to do at home if you really care. AIL had some GREAT little app notes on this

stuff, and even a noise figure slide rule (I have one somewhere....). K2RIW probably has this stuff somewhere as well, he worked there!

My work now is measuring noise using astronomical radio star sources for T sys and G/T work. Even use a little liquid nitrogen in a cold load for really precise Y factor measurements. I use a 35 dB ENR diode injected through a 30 dB coupler and level set attenuator to calibrate the 21M R-A dish at L band here at Morehead State, for "on the fly" noise cal marks on radio astronomy observations.

So there are a variety of cheap instruments and sources out there, even venerable gas tubes which are useful for modern measurements if you know how to tame them. Why build a source, when you can have professional one pretty cheap! Can't make it as good as you can buy (25.00 for a gas source, what's your time worth?)(Unless it's a learning experience, answer in of itself, but I usually build something because I NEED it to do some other work).

BTW, I have a HP 342 Noise Figure Meter with cable and a book (340 book, but close) and even an ugly 5.5 dB VHF gas tube source to throw in looking for a home (currently boxed up, sitting in my den, used as a coffee table!). If anyone wants a noise figure meter CHEAP (shipping wont be cheap, as big, 19 inch rack unit, but real stuff and maintainable), contact me directly.

Also in the junk box are a few solid-state sources of different ENR/frequency ranges that I might be willing to part with.73 Jeff Kruth WA3ZKR

Just a few notes from having done a lot of NF measurements with lots of kinds of setups. Unless you want to play with a lot of variables and spend a lot of time building and not measuring, I suggest the following. I say the latter because the NF meter is one of the most important instruments in my lab and gets used the most next to the spectrum analyzer. Buy an AIL 75 or similar meter. If you have more money I strongly suggest the automatic type like the Eaton or HP 8970a as they also

measure gain and loss conveniently and accurately as well as Afford the AIL you will also need a 30mhz filtered IF amplifier on the input to keep out the LO signal from your converter and to boost the gain. For both meters you can start with on of Kerry Banke's Qualcomm noise source from the San Diego MWG. They work fine to start with. Once you have experience, graduate to an AIL or similar source. Often sources that are listed for a lower frequency range will work fine at higher frequencies just test them to find out what that ENR is. I have noticed that many Microwavers get very mired down in trying to make a noise figure set up work. It is difficult measurement to make unless everything works and is verified. It is a key piece of test gear, so spend some real money on what you need. At least you can save a considerable amount on the noise head. BTW I got my last AIL 75 for less than \$100. I got my 8970a for less than \$800 and it is easily ten times better than the 75. In my opinion, one should stay away from the older HP or AIL gas tube meters (although I have had and used one) and the Saunders meter with an MSC head. The latter doesn't give accurate enough results because they are meant for general system verification and not component NF. Just some ideas from a practical standpoint. Doug K6JEYSBMS

Hi Mike: Most of the Noise diodes put out about 25 dB Excess Noise, as measured against their normal Thermal Noise just because they are not at absolute zero.

Many of the HP heads were 15 dB ENR so they had about a 10 dB attenuator in there.

As the Noise Diode turned on and off, it's impedance changed.

If you over coupled your preamp to the noise head, the preamp would change gain when the noise source turned on and off.

The Noise Figure Meter is doing it's calculations based on the DUT gain staying constant.

Gain change showed up as NF Improvement. The 15 dB ENR heads had a .7 dB uncertainty due to this problem. So with a .5 dB NF preamp, less than zero NF was quite possible. The preamp performed poorly in the field because it was not tuned anywhere near 50 Ohms. In the last 25 years there have been many improvements in the noise head circuits and in the Noise Diodes themselves to lower this on-off variation. Today's 15 dB ENR heads are not as bad as the ones from the early 80's. And even the HP NF notes recommend that the Noise head have only 2 dB more ENR than the NF of the device being tested. So the 5 dB ENR heads are preferred. Yea, a well calibrated 2 dB attenuator can be added, but this is rarely done. You still need a 15 dB ENR head to allow the IF section of the 8970's to self calibrate, but per WW2R's suggestion, a 5 dB head and a 10 dB MMIC amp works well. The self-calibration just needs lots of noise and doesn't depend on the exact ENR of the head.

This issue can be completely eliminated by using a calibrated isolator between the noise head and the

preamp.

You can easily build your own noise heads up to 10 GHz. The Base-Emitter junction of a NEC64535 (Or most any 6 GHz ft transistor) makes about a17 dB ENR noise source at 5 and 10 GHz. At UHF the Base-Emitter junctions of the NE021 and the MRF901 transistor can be used as 20-25 dB ENR sources up to 2.3 GHz. Just attenuate as necessary. Good luck with your work, Kent WA5VJB

See page 74 of January 2008 QST, which indicates Noise Com is offering noise diodes at special price for amateur use (not given) and that a special price for calibration is offered (\$100). A source for PCB kit also mentioned. Elecraft has a noise source kit that is a zener diode with the noise output capacitively coupled to an MAR1. I wrote an eham review on it available at <http://www.eham.net/reviews/detail/3883> I mentioned in the review at the time that a companion adjustable attenuator kit would be very helpful. Apparently someone was listening as Elecraft started offering an adjustable attenuator kit a few months afterwards. This kit has limit utility above 1 GHz, given its design and use of FR4 board, BNC connector, and whatever reflection coefficient issues there are with the MAR1. Someone might comment if this Elecraft noise generator concept could be useful using .015 Duriod, a 10GHZ MMIC, suitable noise diode, and SMA connector & attenuator of known quality. Mike WA3TTS Several Hams including W1GHZ and I have written articles on making your own noise source using ordinary microwave diodes for use to 10 GHz and beyond.. The project I put together can be found at <http://www.ham-radio.com/sbms/sd/nfsource.htm>. Contact Chuck Houghton, WB6IGP (choughton@cox.net) for the project materials he has available. I can supply typical ENR data from the ones I have built as a rough calibration table.

- Kerry N6IZW -

Fellow DXers,

Al Ward posted this summer's 10GHz DX record activity on the ARRL website today.

Below is a clipping from the post.

Also, I was told there is a mention of our contacts in the *World Above 50MHz* column in the January QST.

Merry Christmas to all, and to all a good night.

Frank

Tropo (C)	1,460	AD6FP (CM96wa) - 4C2WH (DL34wt)	19-Aug-2007
Tropo (C)	1,448	KH6WZ (DM05ax) - 4C2WH (DL34wt)	19-Aug-2007
Tropo (C)	1,448	N6CA (DM05ax) - 4C2WH (DL34wt)	19-Aug-2007
Tropo (C)	1,315	W6QIW (DM04am) - 4C2WH (DL34wt)	18-Aug-2007
Tropo (C)	1,303	WA6QYR (DM04bk) - 4C2WH (DL34wt)	18-Aug-2007
Tropo (C)	1,290	AA6IW (DM04ek) - 4C2WH (DL34wt)	18-Aug-2007
Tropo (C)	1,290	KE6HPZ (DM04ek) - 4C2WH (DL34wt)	18-Aug-2007
Tropo (C)	1,286	KB8VAO (DM04ms) - 4C2WH (DL34wt)	18-Aug-2007
Tropo (C)	1,286	N6DN (DM04ms) - 4C2WH (DL34wt)	18-Aug-2007
Tropo (C)	1,286	WT6K (DM04ms) - 4C2WH (DL34wt)	18-Aug-2007

Amazing, I was looking at this a few minutes ago. Also, we appear here:

RF Cafe:

http://www.rfcafe.com/miscellany/press_releases/2007/San_Bernardino_Microwave_Society_10-29-2007.htm

And World Radio:

<http://www.wr6wr.com/newSite/news/index.html>

KH6WZ

Trip To Raton NM (DM76 and DM86)

By Phil Lee, W6HCC SBMS member in northern Colorado

On 6-25-07 I traveled to Raton NM. For a microwave shot from Capulin Volcano (DM86) and Raton pass (DM76) to Louisville CO. (DM79) on 10.368 GHz and 2.304 GHz. I planned to communicate with Bill, K0RZ and Don, N0YE. The distance from Louisville to Capulin Volcano is 231 miles. It is 210 miles to Raton Pass.

I left home at 0800 hrs. And traveled south on I25. I stopped for some food in Pueblo CO., then continued south and reached Trinidad CO. about noon. I started up Raton pass only to find the road had been closed due to a serious accident further up the pass. I spent about an hour waiting for the road to open. I had planned to arrive in Raton at about 1300, after checking out a site at Raton pass on the way. I would get lodging for the night and then go over and try a shot from Capulin volcano. It is about 30 miles from Raton to Capulin.

All this went on hold and I arrived at Capulin mid afternoon. The weather was getting steadily worse. There was a large T storm to the south and it was raining in the little town of Capulin, about 3 miles south of the volcano. When I got to the visitor's center at the base of the mountain, I found that the road would be closed at 1830 and not open until 0730 the next morning. So much for an early shot!!

My golden age passport spared me the \$5.00 admission fee to the national monument. I mentioned that I wanted to make a microwave shot back to the Denver area. I was told that the only place to stop was a small turnout on the north east side of the mountain and the parking lot at the top.

Armed with this information, I headed for the top. The road is paved and is a good, but narrow, mountain highway. It is an easy grade, but be sure to stay on your side of the road in some of the sharp turns.

I arrived at the top to find a large parking lot with a good view from SSW to North. My boresight was about 25 degrees west of north. By parking along the west side of the lot (perpendicular to the marked parking spaces), I was able to line up the dish in the clear.

By this time, the weather had worsened. The rain which was in the town of Capulin had moved to the mountain. There was also some thunder. I decided not to erect the 433.1 MHz com antenna. That was too much like a lightning rod!! I set up the 4-foot dish for 10ghz. I called Bill on the cell phone (at a very few places in the lot I was able to get cell service from some unknown analog site) and told him I was ready to go.

Bill runs 15 watts to a 30-inch dish on his tower. My system is 3 watts to a 4-foot dish in my ford excursion.

Bill sent a cw carrier and I immediately found his signal. It was about S6 and had the 'watery' signature of a rain scattered signal. We made an easy exchange of calls and grids in CW.

We next went to 2304. On this band Bill runs 15 watts to a loop yagi and I run 1.5 watts to the 4-foot dish. Signals again were very 'watery' and only S2. We made the exchange of calls and grids in CW.

By this time the rain was coming down in earnest. I quickly took down the dish and secured. After about 15 minutes, the rain quit and I called Bill on the cell phone. He said that Don was ready on 10ghz. Don runs 3 watts to a 3-foot dish in the back of his Land Cruiser.

I set up the system again and this time Bill and I used narrow band FM. Signals were better and we had good voice communication with signal levels from S8 to S9+20db. Don's signal was much weaker, about S1-S2. I asked Don to go to NBFM. I was able to copy calls and grid with a few repeats.

We decided to experiment with SSB. We found that the signals were very distorted, like someone with a sever cold. However, they were intelligible and 100% copy was possible. (Usually SSB is too distorted for copy at all on rain scatter.) Even on Don's signal, SSB would have been an easier copy than NBFM, even though the voice was much more distorted.

The rain was returning again, so we decided to secure. I planned to go to Raton Pass and we would try that path at 1800. On the way back to Raton, I came through a very heavy rain/sleet storm. I was slowed to 30 mph and even then it was difficult to see the road. When I got back to Raton, the rain had stopped.

I went up to the pass. It is 8 miles from Raton. When I got there, guess what was waiting for me?? Another thunderstorm!! I waited for about 30 minutes and then gave up and returned to Raton for the night.

Next day we planned a 0600 shot from the pass. I arrived there at about 0530. I set up 10ghz and erected the long yagi with mast-mounted preamp, for 433.1 MHz. I run 50 watts using a Yaesu 847. Comm. on 433.1 SSB was good. Signals were S2 to S6.

Signals on 10ghz were not too good. This time, no scatter signature, just weak and clear. Signal levels were S1 to S2. The path is obscured in the middle. It passes nearly over Pikes Pk. We made the exchange in CW. Don was on the air, but I could not hear him, nor could he hear me. We decided to switch to 2304.

If signals on 10ghz were weak, signals on 2304 were horrible!! Nothing heard at times, then just a few short bursts of aircraft scatter. I sent to Bill and he got both calls and a partial grid. He sent to me and I got a good burst in which I copied my call. This went on for about an hour, during which we pieced and patched in high speed CW to get full calls and grids. We finally made it!! Without good liaison on 433.1 we could not have done it.

I left the pass at about 0800 and arrived in Louisville at about 1130. The roads were good and I made good time. My excursion averaged 21 miles/gal of diesel fuel. Good for a 6000-pound truck! My travel distance for the trip was 724 miles. Bill, Don and I had lunch together and recounted the days adventure. Two new grids and a new state on 2 bands. Not bad for 2 days work!!



LOG TIMES:		Time (UTC)	Contact elapse
		Time (MDT)	
6-26-07	DM86AS:		
	K0RZ 10 CW	2142-2152	1543-
		10 NBFM/SSB	2222-2252
		2.3 CW	2155-2200
	N0YE 10 NBFM/SSB	2202-2255	1655
6-27-07	DM76SX:		
	K0RZ 433.1 SSB	1159-1327	0559-
	10 CW	1201-1210	
	2.3 CW	1226-1355	0755

A notice for your DXpeditions setup to explain to people who ask what you are doing.

What Are We Doing?

Thank you for your interest in our operation. We are radio communications experimenters participating in a nationwide competition on the microwave Amateur Radio (ham) frequencies.

Who are we?

We are licensed Amateur radio operators ("hams") and members of the San Bernardino Microwave Society (SBMS). The goal of this contest is to talk to as many other ham radio stations with similar equipment as far away as possible.

Is this legal?

Yes. The Amateur Radio service was created to encourage development of radio communication technology and establish a public service communications force at no charge to citizens or the government.

Is this like CB?

No, this is not Citizens' Band radio (CB). Ham radio requires a license issued by the Federal Communications Commission (FCC) and licensees are required to successfully pass a written test involving electronics theory, radio regulations and operating procedures.

How far can you talk?

The frequencies we are using generally follow line-of-sight paths. However, through experimentation, we find that signals can be reflected against objects such as buildings, trees, islands and mountains, to extend the range. Using these techniques, we are able to contact other stations hundreds of miles away.

What kind of radios are you using?

We are builders and experimenters in microwave radio communications. No commercially built, "off-the-shelf" equipment for these frequencies exists, so we must build our own equipment, or modify commercially-made equipment meant for other communications services, such as cell phone and long-distance telephone.

How much does this equipment cost?

Like any other hobby, people spend as much or as little as they can afford. Most people involved in ham radio spend as much as any serious stereo enthusiast, amateur photographer or woodworker.

Where can I get more information?

More information on ham radio is available from the American Radio Relay League (ARRL): <http://www.arrl.org>

If you are a licensed ham operator already, and want to try a new challenge, visit the San Bernardino Microwave Society (SBMS). Meetings are held the first Thursday of each month in Corona, Calif. For more SBMS information, go to <http://www.ham-radio.com/sbms/>



Phil, W6HCC/0 on a field trip near Roy, NM.

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.

San Bernardino Microwave Society newsletter
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USA