

Vol. 14 No. 2

www.ceitron.com/mvus/mvus.html

February 2000

Club Memorial Call W8KSE

February Meeting. Friday, the 25th, at 7:30 PM at the Perkins Restaurant at SR 73 and I 75.
Meeting Topic: TBD

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Upcoming Events.

Great Lakes ARRL Convention / Cincinnati.....	25/26 March
Dayton Hamvention / ARRL Natl. Conv.....	19/20/21 May
Central States Conference.....	July 20/22 / Winnipeg
Microwave Update.....	Sep. 28/30 / Philadelphia

Correction: Change last month's Vol to 14 (upper left)

de N8ZM.

If you bring enough great minds together, such as MVUS members, and throw them a problem to solve, you will get an innovative solution. That's what happened at our last meeting as we tried to work out the details of when and where to have the radar detector disassembly party. Someone suggested, and I apologize for not remembering who it was, that it would be easier to give everyone who wanted to help a box full to take home to do on their own time. The notion caught on quickly, and soon we had disposed of all the boxes we'd brought along, and had commitments to do many more! Now, trust me, I don't have any misconception that this concept rivals rocket science, but it shows, more importantly, the willingness to look at a problem from a different angle to see a workable solution, and for the rest of the group to help run with the ball. And even rocket science benefits from that attitude. Thanks, Guys! And for every ten you disassemble, you may keep one for yourself.

By the way, here are the details on what we want from the dismantled radar detector boards: In the horn assembly there are two diodes (Gunn and mixer) which should be kept in separate anti-static containers. The horns are of sufficient mass that Bruce, KA8EDE, believes we will be able to get a few bucks out of the scrap metal value. There is a feedthrough capacitor in the casting which is valuable to us because we use a lot of them in the beacons. The LEDs, pot, Voltage regulator IC, beeper, and other devices probably wouldn't bring much in a flea market, so we would use those to provide a parts bin for the club. If you feel ambitious, you can try your hand at retrieving the various chip parts and transistors on the boards, as well. The board with the IC's is a good 10.7 MHz IF module, easily adaptable for other purposes, so it makes more sense to leave it mostly intact. If you have any questions, call me, but any judgement call you choose to make is fine with me.

Something which I didn't get to at the last meeting, but which needs some attention, relates to AMSAT and Phase 3D. Most of you know that we are very close to a launch opportunity on an Ariane 5 from Kourou. The expenses never stop for an activity like this. The shipping bill just to get from Florida to South America was over \$20,000. Because we have been fortunate recently to have our treasury boosted, thanks to radar detector sales, and some donations (which are earmarked for the beacon project), I feel we could comfortably make a donation to the cause on the order of \$500. As a 501(c)3 entity under the IRS rules, we are limited to making donations only to other 501(c)3 organizations, such as AMSAT. Of the members who attend the meetings, I believe that most support the amateur satellite activities as being worthwhile, and that many make personal contributions to AMSAT. This is our way to help out as a group.

I will bring this matter up for discussion at the February meeting, and you will have the opportunity to vote on the proposal. If passed, we plan to write a letter to accompany the check, and have it signed by as many MVUS members as possible. A blow-up of the letter would be displayed at our Hamvention booth, with a second blow-up available for the AMSAT booth to use. Mark Tessner, KB8ZR, conceived this idea, and has agreed to help with the logistics. I expect the letter will be available to sign at the March and April meetings.

Don't forget to mark your calendar for March 18th. That is the Saturday of our tune-up session. Starting time will be 10:00 a.m. at my house. At this time, I know we'll be able to check receiver dynamic range and intermod performance. I haven't been able to lock in equipment for noise figure or impedance measurements, as yet. If there is enough demand, we can schedule a second session in April or early May. That may be a good strategy because we tried to do too many things last year, and really weren't able to meet everyone's needs.

See you at the meeting, Tom.

Directions to Tom's house on the back page!

This and That 2-00

- **New 13CM Record.** Recently K5VH (Dripping Springs, TX) and KB4DFO (Ocala, FL) set a new 2.3 GHz North American distance record of 965 miles. Contacts were completed on both CW and SSB. [NLRB-BB]
- **Exposure to Radiation.** I have compared the US limits with ours ... especially at lower frequencies the Americans are ten times harder than the Germans. (hi) The problem is furthermore approached much more professionally in the US. The FCC appreciates and consults with the ham operators while in Germany the agency is going it alone, not looking right or left. [Klaus, DL7DU]
- **Live Longer.** If you move very fast your clock slows down...So, if you wanted to live longer, you could keep flying to the east so the speed of the plane adds to the rotation of the earth. However, the tiny fraction of a second you gained would be more than offset by eating airline meals. [Stephen Hawkins]
- **Communication or What?** Are we talking too much? The average American made 40 phone calls a year in 1915. That number went up to 2300 by the end of the century. Factoring in the number of e-mails, which is of comparable size, phone calls probably peaked between 3000 and 4000 a few years ago. [Time]
- **Ohm's Law.** Alessandro Volta was quite impressed by the twitching froglegs in Galvani's experiment and the "animal electricity". He also knew, that different metals touching the tongue would give the sensation of taste. He claimed he could tell the difference between negative and positive. He eventually build up a stack of elements, which provided enough "voltage", pardon "electrical force" to compete with a charged Leyden jar, except the electricity was (almost) inexhaustible. However, George Ohm found Volta's battery to unreliable to perform his intricate measurements in an electrical circuit. He then used thermo couples as a power source. And we all know he then came up with a simple equation: $I=E/R$ which made him world famous.
- **Free Internet in the UK.** And there is no advertising either. So, what is the catch? The user pays for the local phone call, which costs a penny per minute. The Internet provider gets a cut of that amount. So that's how this works. As Internet users will tell you, charges add up quickly. "That's why most Brits log on, suck up the mail, run like the citizen of Pompeii around their precious (and short) bookmark list, then get the heck out before the bailiffs arrive." [Danny O'Brian]
- **Dot-Com.** " In journalism, as in business and education, if you are not dot-com you are dying." Says CBS' Dan Rather (68), who has three home computers. "If you don't keep up with change, you may become obsolete."
- **Sign of Global Warming.** A study in England showed that one third of the 65 local species of birds laid their eggs 9 days sooner in the spring of 1995 compared to 1971.
- **Flip Flop.** Remember the old days when your family or neighbor told you the radio or TV wasn't working. The first thing you did was check whether the power cord was plugged in. That would solve a large percentage of the problems. Now we have digital technology and even with the cord plugged in it sometimes refuses to work. Here is what you do: turn the gadget off completely. Take a deep breath and count to ten to give the capacitors time to discharge and the memories time to loose their settings. Then turn it on again and in a large percentage of cases the gadget will now work.
- **Contest Report.** W8ULC worked the contest on 2m only, he managed 219 contacts with 67 grid squares for a total of 14,673 points. His setup includes 2x17 el at 80' and 500 W of power!

Analog Devices AD8361 RMS Power Detector

Analog Devices Announces RMS-Responding Power Detector (Dec 99)

The manufacturer says . . .

The AD8361 is a True Power Detection RFIC, offering RMS-responding power detection for the first time in integrated form. The device is capable of converting a complex modulated RF signal, from 0.1 to 2.5 GHz, into a DC voltage representing the RMS level of the signal. The device is highly linear and temperature stable. It is useful for detection of CDMA, QAM and other complex modulation schemes.

The dynamic range is 24 dB, with ± 1 dB accuracy. Response time is less than 10 μ sec. The AD8361 is offered in a small 8-pin micro-SO package and requires only 5 mA from a 2.7 to 5.5 V power supply.

Chipcenter's Paul McGoldrick says . . .

An RF engineer's dream! Slap a single supply on the IC, connect your RF single-ended through scaling (an attenuator, usually) and a series capacitor, and pick off your dc level from the top of a pull-down resistor. It doesn't matter what the modulation scheme is, you will get a dc level corresponding to the true rms value of the input RF. With an input bandwidth of 2.5 GHz just about every power-measuring problem today can be performed with a single IC. Hopefully the lower frequency restriction above (and in the ac specifications of the data sheet) of 0.1 GHz (i.e. 100 MHz) is a typo. I do not understand why the lower end should be restricted in a non-switched device.

This is an extremely important, breakthrough, product. The AD8361 is sampling in an 8-pin micro-SO and was unpriced at publication. I feel it should optimally be a \$3 part (1000 pieces) for maximum market penetration. An evaluation board is

****NOTE:** About one month after publication of this review Analog Devices released the full text of their press release on the AD8361, including pricing. The related data sheet for the part shows in the numerical specifications the same 0.1 to 2.5 GHz frequency range, the text says "Linear Response from DC (sic) to 2.5 GHz." I hope that the latter is correct.

SRI 46-Meter Antenna at Stanford Sets Another UHF Distance Record

The SRI 46-Meter Antenna at Stanford University in Palo Alto, California continues to set new distance records at UHF. On 2000-02-08 at 1930 UTC, the 46-Meter Antenna detected the 1-watt 437.1 MHz CW signal from the Mars Relay on board the Mars Global Surveyor (MGS) spacecraft in orbit around Mars. At the time of the detection Mars was over 307 million kilometers away. This represents the first time an UHF signal has been transmitted and received beyond a distance of 2 astronomical units (AU). This new record was accomplished by Dr. Ivan Linscott of Stanford University, Dr. John Callas of the Jet Propulsion Laboratory, and Dr. Michael Cousins of SRI International.

[Thanks Mike, WB8GXB, for passing this along!]

Air Force Minuteman to Launch Satellites

Calif., Nov 99

For the first time ever, the Air Force will use a refurbished Minuteman II to launch satellites into orbit. The famed Minuteman rocket, deactivated as an offensive weapons system by Strategic Arms Reduction Treaty in 1991, was initially designed as an Inter-Continental Ballistic Missiles delivery system. Liftoff from Vandenberg Air Force Base, Calif., is set for 6:20 p.m. Dec 7. The Orbital Suborbital Program Space Launch Vehicle, a combination of rocket motors from the Minuteman II and Pegasus XL launch vehicles, is part of an Air Force effort to use surplus Minuteman II components for sub-orbital and orbital spacelift in support of U.S. Government requirements. This program is managed by the Space and Missile Systems Center Test and Evaluation Directorate located at Kirtland AFB, N.M.

The goal of this launch is to validate the OSP Space Launch Vehicle's spacelift capability. To determine the mission's success, SMC personnel will evaluate data measuring the successful separation of the payloads and detailing whether the payloads were deployed in the correct orbit.

Currently having *more than 350 Minuteman II ICBMs* in storage, SMC/TE is working with the vehicle contractor, Orbital Sciences Corporation, to demonstrate a reliable, economical and efficient way to put these missiles to good use. The OSP Space Launch Vehicle can operate with two fairings allowing for the launch of oversized payloads. Using a multi-payload adapter, the vehicle is capable of launching several payloads of up to 750 lbs. to a 400-nautical mile, sun-synchronous orbit. This is roughly 1.5 times the Pegasus XL capability alone.

The payloads for the upcoming launch are integrated to the Joint Air Force Academy Weber State University, or JAWSAT, multi-payload adapter. The four payloads are the U.S. Air Force Academy's FalconSat, Arizona State University's ASUSAT, Stanford University's OPAL satellite and the Air Force Research Laboratory's Optical Calibration Sphere Experiment. Also attached to the multi-payload adapter are two experiments: NASA Marshall Space Flight Center's Plasma Experiment Satellite and Weber State University's Attitude Controlled Platform.

The second OSP Space Launch Vehicle launch is scheduled for the spring carrying the Air Force Research Laboratory's MightSat II.1 payload. Spaceport Systems International is under contract to provide Range operations for both launches. The launch set for next week will be SSI's first launch. Media interested in attending the launch should contact Lt. Tom Knowles at Vandenberg AFB Public Affairs at (805) 606-3595.

The Space and Missile Systems Center, located at Los Angeles Air Force Base, Calif., is the center of technical excellence for developing and purchasing military space systems and manages more than \$56 billion in contracts. The center has an annual operating budget of more than \$5.5 billion and employs about 3,400 people worldwide. For more information, see SMC's web page at <http://www.laafb.af.mil.30> -

SPACE & MISSILE SYSTEMS CENTER (AFMC)

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After several postponements the successful launch took place on 26 January 2000. {Ed.}

VHF Radio Clubs with Web Pages

From Cheese Bits, Mt. Airy VHF RC

Mt. Airy VHF Radio Club	http://www.ij.net/packrats
Central States VHF Society	http://www.csvhfs.org
Delmarva VHF and Microwave Society	http://www.qsl.net/dvms_k8gp
East Coast VHF Society	http://www.ecvhfs.org
Mt. Greylock Expeditionary Force	http://www.mgef.org
Midwest VHF-UHF Society	http://www.ceitron.com/mvus/mvus.html/
North East Weak Signal Group	http://uhavax.hartford.edu/~newsvhf/
North Texas Microwave Society	http://www.ntms.org
Rochester VHF Group	http://vhfgroup.rochesterny.org
Northern Lights Radio Society	http://www.tc.umn.edu/nlhome/m374/husby002/nlrs.htm/
Rocky Mountain VHF+	http://www.qsl.net/rmvhf
Six Meter International Radio Club	http://www.smirk.org
San Bernardino Microwave society	http://www.ham-radio.com/sbms
Southeastern VHF Society	http://www.svhfs.org/svhfs
Western States VHF Society	http://www.wswss.org

De Steve, KB8UHY

We just got a kick in the seat of our pants and now there is no one else to point the finger to. Yes, I'm talking about the future of Ham Radio. The FCC has already approved the new license structure and the new requirements go into effect on April 15, 2000. This gives the amateur community a breath of new fresh air. New hams are already flocking to exam sessions all over the country. There has never been this much excitement about a rule change since low power FM or when they gave up 11M to the CB'ers. This time it is very positive. We are now attracting those technical individuals that would have never before thought about us "Hams". I am one of those individuals that went to get my upgrade this past month.

While UD had 15 individuals, Huber Heights had 31. This was for one day only. The VE's welcomed these new individuals with enthusiasm. Next to me was a gentleman that went for his General, across the table was an elderly gentleman going for his Extra and on the other side of me was a new "Tech". One young lad that was attending the no code tech class out at Greene County Memorial Hospital couldn't wait and took the test. It looks like this pace will continue up through April. Some of the VE teams will have a "special" session just to validate the SASE's on April 15, 2000.

So let us all take advantage and go get that upgrade that you have been thinking about and encourage at least one individual to go get their ticket. If every ham operator does this throughout the country, we should be able to double our size easy. Hopefully in the next 6 months you will hear more activity on the birds, 2M SSB, 440, 902, etc. We have needed this type of stimulation so now it is up to us to promote amateur radio.

Good luck and 73 de KB8UHY

MVUS E-Mail List as of 18 Feb 2000

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Passive Current Limiting for Triode Power Amplifiers

By John Berker, WA9OUU

Performance testing was done with a single 7289 tube at 23cm. High power air cooling operation was used because drift is very high. Still, at 1250 V and 200 mA a good preset tuning point for power up and long key down could not be set. With a current limiting bias circuit, however, a preset tuning point can be found that powers the amplifier up quickly, makes a drift into tune, but not past. Output over 100 W and stable operation is possible. The current limiting bias also controls the gain increase of the amplifier that otherwise tends to be regenerative. Even the lower drift water-cooled version is improved, so higher initial turn on power can be used. Furthermore tuning errors are less likely to cause an arc-over.

Q1 is a Darlington TIP120 and acts as an adjustable Zener with little voltage change as current increases. This sets the idle current.

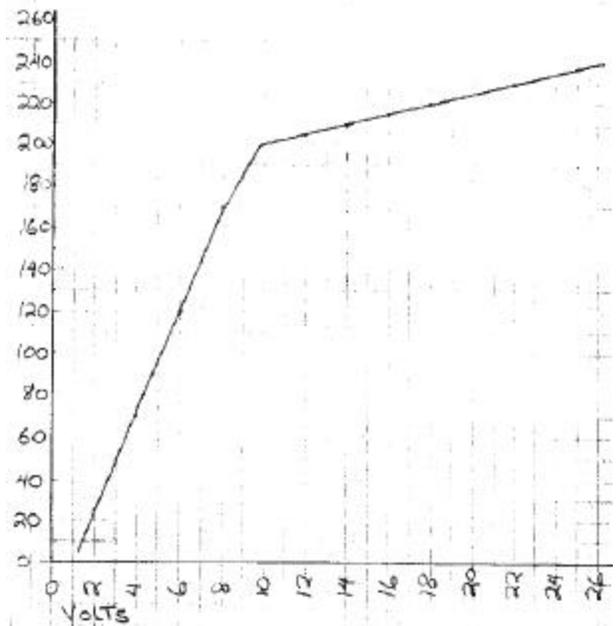
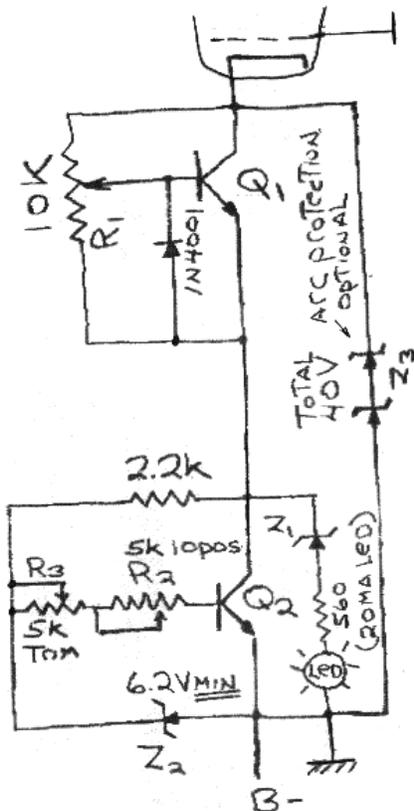
Q2 is a MJE3055T variable pass transistor. R2 sets the current limit knee point and using a 10 position pot gives presetability. R3 sets the midrange position to 5 and makes tracking easy in a multitube circuit. Likewise for good tracking the Q2 transistors should be matched.

The LED / Zener combination can show indication of operation past the preset cathode current knee thus indicating drive power. This could be a peak indicator for future development and would show SSB peak flat topping.

Ed Krome, K9EK is having even better results in 13cm amplifiers using GS-9b tubes. Ed is very good at taking advantage of a tube's characteristics and developing an optimal circuit. His results have changed my EME amplifier plans. I now consider a multitube design with the GS-9b tube's large grid diameter and small anode diameter. This is the opposite of typical tubes, that I used in my past layout thinking and design.

73, John.

Pos	0	1	2	3	4	5	6	7	8	9	10
mA	135	140	150	165	180	200	225	255	295	345	355



Q and A.

A-1. (Jan 00) **Bringing the Solar Problem down to Earth.** Ed, WR8A, compared the sun with a 75 Watt lightbulb using a sheet of white paper with a spot in the center made by a dab of oil or butter. The spot will appear transparent and dark. Held between the light bulb and the sun the distance is varied until the spot melds best with the surrounding white of the paper. At that point Ed measured two inches to the bulb. This is a very old method used by physicists and you can find in sometimes in older physics books.

What does it mean? The lightbulb viewed from 2" away is as bright as the sun at this moment. (The measurement should be made on a clear day and around noon). Assuming we can safely eyeball the lightbulb from 10 feet (=120") away, the square of the ratio: $120"/2"$ or $60^2 = 3600$ would be the attenuation necessary to view the sun safely. In dB this is 35.6 dB.

Subtracting this from the previously established range from the faintest visible star to the sun of 132 dB, we arrive at the *safe* dynamic range for the eye of **96.4 dB**.

Ed comments further: Measurements should be made on a blue sky day in June at noon (that's when the sun is highest in the sky in the northern hemisphere). My measurements were not. My second set of readings six weeks later needed a 135 W bulb at 2 inches. This was in February and the sky was not clear blue either.

A-3. (Jan-00) Many photo sensors are also good temperature sensors. My guess is someone didn't incorporate adequate if any temperature compensation in the design. Wouldn't be the first time. I speak from experience. Ed, WR8A.

Your Question here!?

Mar 18 Measurement Session

The fun starts at 10:00AM at my house, and runs through the day until I've had enough fun! Bring a few cans of your favorite beverage, I'll get the club treasury to spring for some pizzas sometime in the afternoon.

Directions: Very important info! Take I-75 north through Dayton, past I-70 to the 2nd exit, Northwoods Boulevard. Turn left at the end of the ramp, and go west until the road dead-ends into North Dixie Drive (old US-25). The airport will be directly in front of you. Turn right (north). Go about three miles until you get to the village of Ginghamburg (speed limit drops to 40). In about a 1/4 mile, turn right (east) on Ginghamburg road. Go about 8/10 mile to Winding Way, and turn right (note big sign with a deer on it). Go to 2nd right, which is Wilderness Bluff. It is a short dogleg cul-de-sac, and my house is a gray cedar and stone contemporary at the end of it (number 1055). If you get lost, the phone number is 667-5990. Talk-in will be on 443.275, and 146.52, both simplex. To park, nose into the curb to the right of the driveway (saves space) , or park in the driveway.