

Vol. 25 No. 2

www.mvus.org

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Upcoming Meeting Fri 25th of Feb. (6:30PM)

New Meeting Place, Earlier Time

MCL Cafeteria on 4485 Far Hills Av (Rt. 48) in Kettering.

Going South from Dayton drive past the Town and Country Shopping Center on your left.
At the next light turn right, then left into a small shopping center. MCL is at the end on the right.

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Southeastern VHF Society Conference April 28-30, 2011
Holiday Inn Civic Center, Huntsville, Alabama www.svhfs.org

Dayton **Hamvention** 20,21,22 May

Silent Key. John Champa , K8OCL, became a silent key, Nov 12, 2010 at age 66.
He was a member of MVUS for many years. A detailed description of his life and many accomplishments can be found at the ARRL website.

<http://www.arrl.org/news/john-champa-k8ocl-sk>

Correction. In the January AP the last entry on page 10 has the last letter (l) from the Internet address missing. It should be ...html

Please Read! Check your label! Memberships might be due. Also let me know about changes: tel. E-mail etc A new roster will be in the next newsletter!

DE N8ZM:

It has been said that an army travels on its stomach. I think that holds true for MVUS as well. Our last meeting was held at the MCL Cafeteria, and the opinion of those present was that we should continue to meet there. The food was at least as good as what we have been getting elsewhere, and there is flexibility to manage how much you spend. If you aren't interested in eating, there is no charge to just come for the meeting. Gee, that kind of rhymes; maybe I can sell it to them as an advertising slogan.

On another topic, the linear translator has been suffering from a problem with the slot antenna, but by the time you read this, Steve and Gerd expect to have it repaired and back on the air.

Progress has been slow, but now that it is on the air, the pace should pick up and I expect a number of the locals will start trying it out. If there is enough activity, we will happily be forced to find higher ground for it!

The balloon launch is confirmed for Hamvention. Although I don't have the final schedule yet, Bill, WB8ELK, will likely try to do it immediately following his forum. I do have confirmation that we will launch from the same location at the rear of HARA. And this time I have the show security people already tuned in so that we won't have the last minute questions about safety concerns. If any of you would like to help out, I have a need for a couple of folks to be extra hands, eyes, and ears right before the launch. Please let me know if you are willing.

Propagation for the January VHF contest was not very exciting, and it did not help that the snow was too deep at our contest site to allow us to get there. So we operated from my QTH, which as W8PLZ readily will tell you, is **substantially** below the minimum viable Height Above Sea Level. But we had a good time and recruited a pair of new operators. Our score was nothing to brag about; I think W8ULC and K8TQK both beat us as single op's! Hey, there's always June!

Speaking of June, we plan to back on the hill for the VHF contest. In addition, we have been invited to play Field Day from Beaver Island! More on that in coming months.

So I'll be looking for you at the MCL on the 25th! de Tom, N8ZM.



This picture from the annual TechFest just held (Feb 19/20) at Sinclair college in downtown Dayton. Exhibitors from schools, industry and other organizations demonstrate their business to young children up into the teens, often with hands on experiments. DARA, the Dayton Amateur Radio Ass. was also represented. We had three tables in the main hall with the model of a Phase 3 satellite, A "hands-on" Morse code demo and a small toy with a orbiting space shuttle. But what really stole the show was a classroom with six to ten kids putting together FM radio kits. In two days 288 kits were built. There was also DARA's communications van parked outside conducting demo QSOs.

Steve, K8UD & Gerd, WB8IFM

The critical eye of a future Scientist

This and That 2-11

Machining To-day. ...it is often difficult to measure clearances today expressed in microns (10^{-6} m). Measuring these clearances usually requires air gauges that measure the amount of air passing through the gap between the parts.
[James D Haldemann]

The Sun from all Sides. The STEREO mission's coverage of the entire Sun is nearly complete, with continuous images showing more than 99.2% of our nearest star. The black band of unseen area (seen at <http://stereo.gsfc.nasa.gov/>) is now just a tiny sliver, and magnetically active areas over the entire Sun may now be observed live from any place with an internet connection at any time of the day or night.
[Tad Cook, K7RA, 1-14, 2011]

Spider Work. A strand from a spider spanning the globe at the equator weighs not more than a pound. [PBS / Nova]

Firing Squad. ..."Do you know that the firing-squad stands only a yard and a half from the condemned man? Do you know that if the victim took two steps forward his chest would touch the rifles? Do you know that, at this short range, the soldiers concentrate their fire on the region of the heart and their bullets make a hole into which you could trust your fist? No, you don't know all that; those are things that are never spoken of."...
[Albert Camus in "the Plague"]

Yearly Averages. I have long trusted the "solar flux", measured solar radiation at 2.8 GHz, more than the convoluted counting of sunspots. Here are some numbers mentioned in the ARRL prop rept for some recent years: Yearly averages of daily noon 10.7 cm solar flux readings from Penticton for 2004-2010 were 106.6, 91.9, 79.9, 73.1, 69, 70.6 and 80.
[Gerd, WB8IFM]

Full Moon. You are a "Ham"----When you look at a full moon and wonder how much antenna gain you would need. And another criteria: When someone asks for directions, you pause, wondering if long or short path would be best.
[Provided by Lloyd. NE8i]

Transistor. Back in 1961 a single transistor cost \$ 10. Today Intel manufactures incredibly complex microprocessor chips containing more than two billion transistors that sell for around \$ 300. You could say that's a price of .000015 cents per transistor. But, of course, you can't actually buy a single transistor at this price. (But much less than \$10)
[Jeff Bairstow, Laser Focus World]

The First X-Ray Flare of the New Solar Cycle: Sunspot 1158 has unleashed the strongest solar flare in more than four years. The eruption, which peaked at 0156 UT on Feb. 15th, registered [X2](#) on the Richter scale of solar flares. NASA's Solar Dynamics Observatory recorded an intense flash of extreme ultraviolet radiation. X-flares are the strongest type of solar flare, and this is the first such eruption of new Solar Cycle 24. In addition to flashing Earth with UV radiation, the explosion also hurled a coronal mass ejection (CME) in our direction. Geomagnetic storms are possible when the CME arrives 36 to 48 hours hence.
[NASA]

Lady Gaga. In a "60 Minutes" interview that aired just before the Grammy Awards, Ms. Gaga disclosed what inspires her. "I smoke a lot of pot when I write music. I drink a lot of whiskey and I smoke weed when I write."
[D.L. Stewart]

Serving Size: (The "serving size" represents nothing but a loophole for deceptive advertising. Ed.) "With many fat-free/reduced-fat products, the serving size has simply been made smaller, making it appear as if the product itself has fewer actual calories when it does not."
[Marjie Gilliam]

Gripping, Complaining and Whining... is what I do. It is in fact, what a majority of columnists do. If we ever reach a time in this country when the economy is booming, there are no wars and our politicians turn into statesmen, a lot of us are going to have to find honest work.
[D.L. Stewart]

Near Miss: Space's natural debris usually goes undetected, but sky monitors did spot one small asteroid, called 2011 CQ1, less than a day before it buzzed Earth at the smallest distance ever recorded. On February 4, the meter-size rock flew over the Pacific at an altitude of about 5,500 kilometers.
[John Matson, Scientific American]

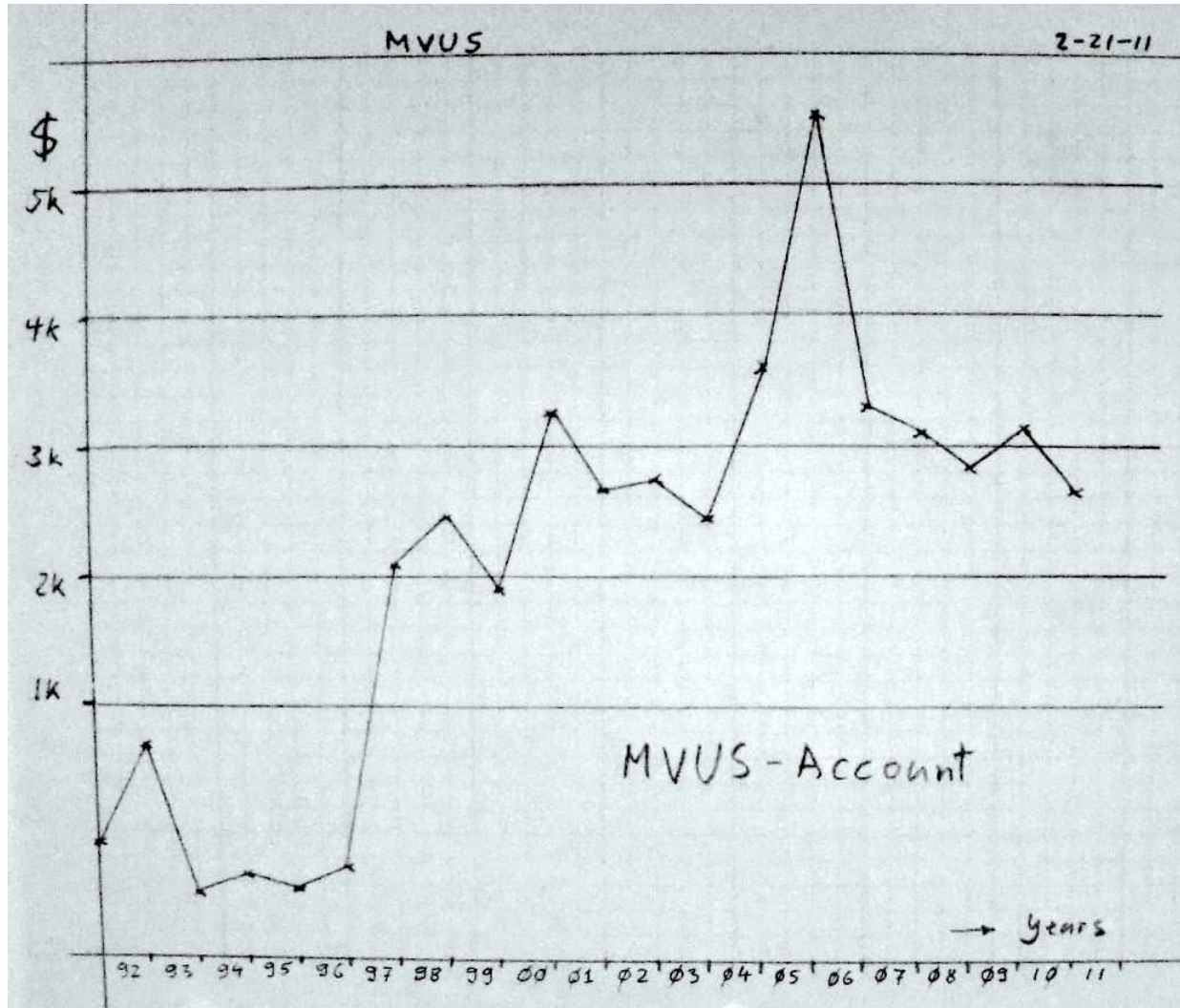
Tender Loving Care required. Solar panels are supposed to be a set-and-forget technology. Mine so far have performed just as advertised. All the installer said I need to do is look them over a couple of times a year and rinse off any dirt buildup. The approval and installation process had its [delays](#) and [gaffes](#), but all's well that ends well, I figure. But lately I've been feeling less sanguine. Solar experts have regaled me with tales of poor workmanship they find when they do spot checks of installed systems. Terminals, switches, etc are not labeled; non-standard components are used that do not last under the exposed conditions they are under. There is a great need of properly trained installers and openings for after market service.
[Georg Musser, Scientific American]

Wireless Internet. Pres. Obama gave a speech in Michigan noting that only 65 percent of U.S. households have a high-speed Internet connection. (A few studies from last year put that number at 75 percent or greater.) Talking about the Egyptian revolution he commented on the impact that broadband Internet connections and wireless technology are having on society, saying, "As we watch we are reminded that we live in an interconnected world." The president wants to deliver that interconnected world to a larger portion of this country.

Treasurer's Report 1-24-2011

My records, the money the club takes in and spends, go back to 1989 and useful numbers are available since 1992 (the first few years do not have the same format as the rest). It's a very simple accounting and has the following entries in a single line: date, item, paid to, amount in, amount out, and balance.

At the beginning of the year I went through the numbers, jotted down the balances for all the beginnings of the years and found some interesting ups and downs. As the table gives you the data the graph I drew gives you the ups and downs in the blink of the eye.



Leafing through the account book I found the following details: The club was founded around 1989 and after initial gyrations of the account and a focused accounting the budget fluctuates now around \$3,000. Periods that brought increases were when the club had money making projects. We bought and sold books, radar detectors, detector diodes, white boxes and parts for these. The outstanding event here was the Microwave-Update in 2006 where we were very successful and had our account temporarily shoot up to \$5.6k. After our bills were paid and the seed money had been forwarded to the 2007 Conference, there was a nice amount left at our own disposal.

Here are some items we spent "money" on: ca \$900 in 1993 on a trailer to haul equipment. The main purpose to transport a voluminous pattern measurement equipment we had obtained as a donation. A few years later we needed new tires at \$ 177. In 2000 we donated \$500 to AMSAT and \$ 100 to NAAPO (The North American Astro Physical Observatory/ Big Ear). The latter got another \$100 in 2007. The FMT (Frequency Measurement Test) got \$ 615 for 3ea TS 520s with sets of new tubes, and in 2010 we bought \$200 worth of helium for a balloon launch at the Hamvention.

The newsletter, the project that keeps me particularly busy, costs approximately \$600 presently for printing and ca \$300 for mailing. This covers 10 issues. We have roughly 100 members and we mail about 75 copies. The others get e-mail copies. After a month or two we post the copies on our website, at least that is the idea (There is presently a delay).

Kindle

By Gerd, WB8IFM

The ChristKindl (the German for Christ Child) brought the xyl a "Kindle" last x-mas. Actually it did arrive late and when it did, it didn't get much attention. I had ordered it from Amazon knowing what this thing did, but not exactly knowing how you went about it. The Wifi feature was so thoroughly promoted, that every other solution to connect with Amazon was unclear to say the least. Obviously the younger generation wants to get everything out of thin air. I am sure when you ask them where their WiFi antenna is you get some empty stare.

Well two days ago I brought up the subject of the Kindle, that's when the xyl gave me a piece of paper with the titles of two books she was interested in reading. The Kindle is a very nice book reader tablet (black and white) about the size of a readers digest, only thinner, also quite lightweight. We knew how to turn it on and off and admired a nice feature that when you turned it off, instead of going blank, a picture

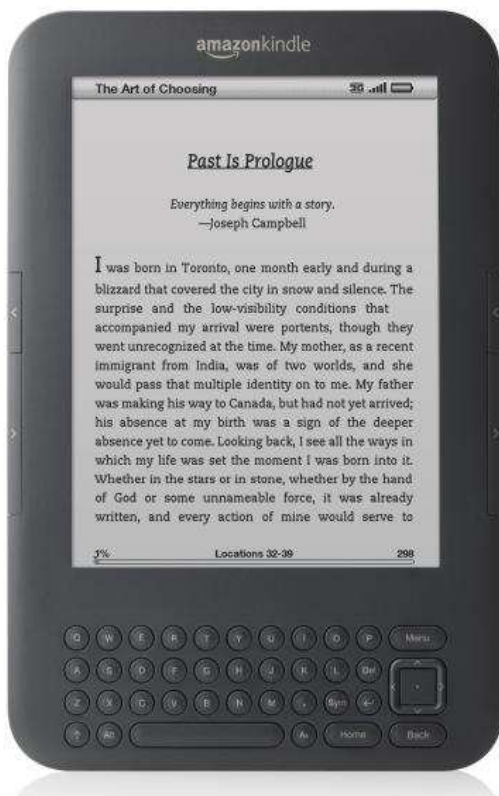
appeared showing either some famous writers or some birds fishes or plants. The display shows these pictures without using any electricity.

Now I looked at the menu and clicked on the "order books" option. Well Kindle immediately scanned the WiFi range and didn't let go. We do have "personnel WiFi" but somehow forgot the password and we need a wizard to help with that.

I studied the setup guide again and found as a last resort to a: consult the Kindle Web page, b: send an e-mail or c: call per telephone. With Amazon in my book the telephone is the preferred method. I tried that once before and it worked like a charm. For starters there is practically no waiting. So it was this time. Immediately I had a live person to speak to.

I estimate it took about 10 minutes, it was easy as one two three: connect the Kindle with the USB cable to your PC, on the Internet go

to the AMAZON website, order the Kindle version of your selected book (usually they run \$10 or less) and pay for it (by credit card). This electronic version, of course, requires no postage. I was told to check my "download folder" and there was the book. First I was waiting patiently for the download to proceed, but after a minute or so I realized, it must already be complete. We have a very slow DSL connection. Our download speed is only 600 kb/s. The book had a file of 699kB, so that would take $699 \times 8 / 600 = 9.3 \text{sec}$. Although this, by to-days standards, is not a big file, I think Amazon pays the provider, in my case ATT, a small sum to send me the book ASAP. Last I cut and pasted the file into the Kindle! That was it. I am sure with the next book it would take less than 5 minutes. Can't beat that. Compare it with going to the library to check out a book or to a bookstore to buy it, or ordering it through the Internet.



The Kindle has the capacity to store ca 200 books, after that you can "return" books and if you later on want to read them again, you can download these books again without pay. Amazon in essence works as a huge depository and you could acquire thousands of books from them that would be rather impossible to store in a normal house. Look around, how many books you have on your shelves now, you could drastically reduce that number and have room for other things. If you use your WiFi, sitting in your easy chair you could grab your Kindle, and look for a book to read. If it is one of those residing at Kindle, or a new book you could request and download it in a few minutes. Probably faster than looking around the house at the various places you store your books. And you don't have to get up, although I think that exercise might be beneficial.

How does the display work? It is called electronic paper. Here in a few words from the web: The Gyricon e-ink developed in the 70s by Nick Sheridan at Xerox is based on a thin sheet of flexible plastic containing a layer of tiny plastic beads, each encapsulated in a little pocket of oil and thus able to freely rotate within the plastic sheet. Each hemisphere of a bead has a different color and a different electrical charge. When an electric field is applied by the back plane, the beads rotate, creating a two-colored pattern (black and white). When the display is turned off the last image is retained without applying any more electricity.

Re 10 GHz Cumulative Contest

How the computer spoils the fun!

I enjoyed the 10 GHz and up cumulative this last year. Lots of rain scatter with some interesting propagation. Many stations to work. Wonderful efforts. Worked across Lake Michigan with Gary K3SIW on 24 GHz. We most likely will do it again during the year. Always improving the equipment. Bob, K2YAZ, is a great there. What is seldom mentioned, all his efforts coordinating activity on 144.260 USB. He is always ready on 10/24 GHz for trials.

I would like to see a 3rd weekend in the Cumulative contest. Like the second or third weekend in October. Then the wx is usually still nice, and you do not have the big summer crowds. Also it would be possible to relax between the September VHF and the September Cumulative weekend. One weekend right after the other, is hard. We need to talk to the VUAC. If you agree, please, send them a note.

I did not make the January VHF. Bad weather and roads. Sunday PM, by the time things cleared a little, I was too tired from hours of shoveling snow, and like everyone says, there was nobody on. Too many watching the game. So, I too could have driven 300 miles, only to work a couple of stations.

I was hoping by now, the League would have fixed their problem with their new website. Windows 7 does not support older computer programs, such as this windows XP, or ME. Those operating systems are too old. Microsoft marketing people want to sell more new products. Old programs are not supported and become obsolete. So, I cannot download or open any of the contest files from their new, revamped web site. I cannot read the rules, results, or get any of the forms. One good hearted ham, spent hours yesterday, trying to convert some of the newer 7 version files to older pdf files so I could see them and print them out. After hours of trying without success we gave up. Next time I am in town at the cyber cafe, I will have to see if I can

open them, and see them. No printer is available there.

That is why, I did not send in contest results last year for most contests. No rules, no forms. Can't send in a log. For 10 GHz I found and used some really old forms. Mailed them in. I am still hopeful, that the League will find the fixes and implement them. Not leave out a pile of hams hanging, who would like to participate,

Cabrillo does not work on this computer. So, I cannot send in contest results. The 20 times I have tried, it has failed every time. So, when I see published numbers of participants each year, I wonder what the error factor is. Talking with other VHF+ hams, many have had the same experience. Active in the contest. Sent in results. Then nothing.

At my previous job, with the resources to find and fix such computer problems. I learned that each brand of pc has differences in the compiler programs. So some programs, will just not run right on them. An expert spends 3 weeks, to find the trouble, a single character in the code, which causes an error. Colon instead of a semi colon or something. After fixing, it runs as advertised.

Went to a meeting a few years back, which featured Bob Cabrillo, talking about all his fine efforts to produce the ham contest program. He got it right and left from the audience. Common complaints for lack of performance. All I did, was raise my hand, when he asked the audience, if they had ever experienced any problems.

That might make a good project for one of the VHF conferences. Ask how many ops participate, but gave up trying to send in things. How many have had problems. Look into the problems. Survey them. Detail them.

Another point. My tight fixed budget, looks like it will not allow the purchase of a newer computer, or software upgrades for the next year or two. So I have a choice: gasoline to rover for 2,000 miles or computer upgrades. Which shall it be?

So if it's not fixed by the ARRL this year, I will let you know here what I managed to do. Some of the fun contacts and

stories. And there will be no official contest entry.

If you look back at the reason we lost WW8M to our contest activity. Simply a sad story. For several years running, Don took first single op place in the UHF contest. No computer, just paper log and dupe sheet. Done all by paper and pencil. Some years back, Don ran the UHF contest. QST listed him as multi operator. When he in fact entered as single op, high power. QST made a mistake. SNAFU. Well QST later printed a correction. Everyone has forgotten that correction. He has the contest winner award on the wall to prove it. Single op, high score. But, in the last few years, everyone looking at the contest results, has referred to him as not the single op winner, but as another multi op entry. He has taken this personally. Rubbing salt into an open wound. Finally, had enough. I doubt if we will ever see him back. All he will do now, is get on, work a few stations. Pass out some points, go back to watching the NASCAR race and never ever send in a log for anything.

Don has offered a couple of times, if someone else, a group, cares to come out and operate, he would have to arrange things. But, they would need to contact him a couple months in advance of the contest, and come out a few times prior to the contest, to learn how to run the station.

Well, from descriptions of things, reads like many did not send in logs for the 10 GHz and up cumulative for one reason or another.

I am planning ahead to work harder and put more into Microwave Activity Days. This year, starting in May or June. I am planning to drive much further South, to get within range of Zack, Jim, Mark and Garry and all. And make some other rover changes.

This 2011 VHF+ contest season, things so far, have not been looking up. So, we will see what the rest of this year brings. Microwave snow scatter, has been a bit thin so far this winter.

73, Lloyd NE8I/r EN74 etc
Life Member ARRL

Glanced from Trade Mags.

Tube-vs.-Transistor Debate Continues | ED Online | January 19, 2011

By Jack Browne Editorial

Many military and commercial applications require generous amounts of RF power, including satellite communications (satcom) uplinks and radar systems. Typically, satcom system designers automatically reach for a travelling-wave-tube-amplifier (TWTA) catalog for power levels in excess of 100 W at Ku-band (14 GHz), and there are many fine suppliers of this venerable technology....

Solid-state technology was at one time automatically dismissed as inadequate for large amounts of output power at higher microwave frequencies. But transistor-amplifier designers are a feisty bunch, driven to displace TWTAs with their solid-state circuits. They may not be there just yet, but as the lead news item below illustrates, they're getting closer. And in the process, they bring along those simpler power supplies for transistors, often with improved operating efficiency compared to tubes. Inevitably, it appears that transistors will catch tubes in terms of power at a given frequency, but that challenge is firmly in the hands of the process and device developers, rather than the SSPA designers. In the meantime, let's enjoy the competition.

RF Detectors and more by "Analog Devices"

Analog Devices is recognized as a leader in RF detectors and offers a broad product portfolio that includes logarithmic amplifiers for both RF and IF applications and TruPwr™ RMS detectors. ADI's logarithmic amplifiers measure signals up to 100 dB dynamic range, from dc to 10 GHz, at accuracies of +/-0.2dB and are well-suited for use in wireless infrastructure, for both receive and transmit power level detection. There are also devices optimized for optical power measurement, radar / military applications, low power ASK demodulation and instrumentation. ADI's TruPwr(TM) detectors address the challenge of measuring complex waveforms found in spread spectrum CDMA / W-CDMA and higher order QAM modulation systems. The TruPwr™ detectors provide the user with an accurately scaled DC voltage, that is RMS equivalent of the input waveform. With TruPwr™ products Analog Devices offers power detectors applicable to both wireless and wired communications infrastructure applications, instrumentation and military equipment, and devices packaged in small footprints for portable applications. [a lot of words, but you get the idea!]

And You Thought the 555 Timer was Dead. By Louis E. Frenzel Dec. 10, 2010

ADL7555, ALD7556 and The 555 timer IC has been reinvented—again. Signetics introduced the enormously popular chip back in 1971, and it quickly became a big hit. Myriad application circuits have used it throughout the decades, proving its unparalleled versatility (see "[The 555: Best IC Ever Or Obsolete Anachronism?](#)"). Recently, both Advanced Linear Devices and Semtech have redesigned the chip, improving it in many ways and extending its usefulness—most likely—for years to come.

Re Light Pillars.

Fellow Microwave Enthusiast

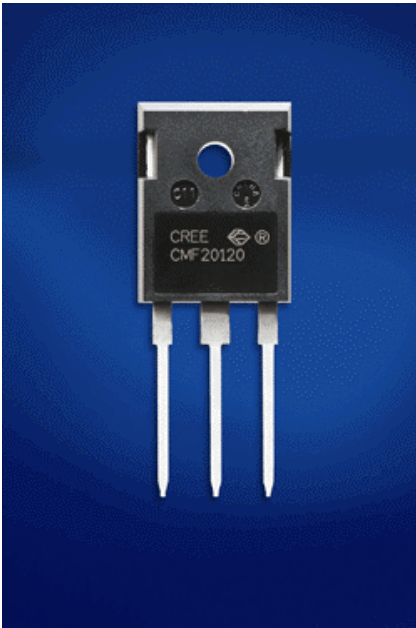
Looking today 1/28/11, at the Space Weather web site is covering the topic of light pillars. Searchlights, aimed up, under the correct atmospheric conditions, form, what looks like a support pillar. At first narrow, then broadening out near the clouds. Like a roof support pillar.

This reminds me of: Don, WW8M and I, running our 24 GHz and 47 GHz contacts, and experiments. Turn the beam to the horizon we saw this effect many times. Close in contacts, we moved the dish back and forth, up and down. Tight focus. Narrow beam. On our most distant contacts, the aim, the "target", widened. It spread out in a similar fashion. At times, it seemed to form a distant barrier. Then you just cannot make a longer contact. Yopu hit a wall. We did not do enough experiments to come to sme conclusion about weather conditions. We need many more experiments and try to learn.

Just passing along some observations. For thought, comment.

73, Lloyd NE8I/r EN74 etc

First SiC power MOSFET targets Si devices in HV apps 1/19/2011



The CMF20120D is the industry's first fully qualified commercial SiC power MOSFET. It enables high-voltage circuits with fast switching speeds and low switching losses. The device can be used for solar inverters, high-voltage power supplies, and power conditioning in many industrial power applications. The SiC power switches and diodes may also expand into motor drive control, electric vehicles, and wind energy applications.

The SiC MOSFET provides blocking voltages up to 1,200 V with an on-state resistance of 80 m Ω at 25C, and remains below 100 m Ω across its entire operating temperature range. This normally off device is suitable for power electronics switching circuits and has a gate drive energy of <100 nC across the input voltage range, <1- μ A leakage current. Conduction losses are minimized with forward drop of <2 V at 20 A. It can reduce switching losses in many applications by up to 50%. (Samples are available now from Digi-Key at www.digi-key.com).

By Paul O'Shea



The new Code: Thumbs up and down

RF and microwave power meter basics

There are a number of ways in which RF power (including microwave power) can be measured. There are two main types of RF power meter that are used:

Through-line RF power meters:

These RF power meters take a sample of the power flowing along a feed-line and use this to indicate the power level. These through-line RF power meters are used on live systems, such as radio transmitters as a check of the outgoing power. They are normally directional and can be used to check the power travelling in either direction.

Measurements made by these RF power meters are frequency insensitive - they measure the total power entering them regardless of frequency (within the overall frequency limitations of the instrument).

Absorptive RF power meters: As their name implies, these RF power meters absorb the power they measure. Typically they utilise a power sensor that may be one of a variety of types. This generates a signal proportional to the power level entering the sensor. The sensor signal is coupled to the main instrument within the overall RF power meter to process the results and display the reading. Measurements made by these RF power meters are frequency insensitive - they measure the total power entering them regardless of frequency (within the overall frequency limitations of the instrument).

The absorptive RF power meters generally have digital readouts these days. An analogue voltage is generated within the power sensor or power head and this is fed into the main RF power meter unit. With high levels of digital

signal processing available these days, many RF power meters contain significant levels of processing and this can enable a variety of signal types to be measured.

When selecting an RF power meter or a microwave power meter, it is important to select the correct type of power sensor. There are a number of different types of power sensor, and these are suited to different types of RF power measurement. Some types of RF power sensor are suited to make measurements of average power, whereas others can make measurements of pulse power or peak envelope power. Further pages of this tutorial address the power measurements - average, pulse power (often termed peak power), and peak envelope power, as well as the different types of sensor that can be used with RF power meters.

Spectrum analysers and other instruments:

Instruments such as spectrum analysers have power measurement capabilities within them. These instruments are able to measure the RF power level on a particular frequency, but cannot measure the total power entering on all frequencies. Spectrum analyser RF power measurements used not to be accurate, but with the improvements in their technology, the RF power measurements have far greater levels of accuracy.

Each type of RF power meter is used under different circumstances. However the absorptive RF power meter is the most widely used for accurate laboratory measurements. The through-line power meters tend to be used more for field applications.

From Radio-Electronics.com (Digi-Key)

Units for RF and microwave power measurements

Power is a measure of energy per unit time and it is typically measured in watts - this is a energy transfer at the rate of one Joule per second.

Although the watt is the base measure, often this is preceded by a multiplier as power levels can extend over a vast range. Levels of kilowatts (10^3 watts), or even megawatts (10^6 watts) are used in some large power installations, whereas other applications have much lower levels - milliwatts (10^{-3} watts), or microwatts (10^{-6} watts) may be found.

In some instances power may be specified in terms of dBW or dBm. These use a the logarithmic decibel scale but related to a given power level.

In itself a decibel is not an absolute level. It is purely a comparison between two levels, and on its own it cannot be used to measure an absolute level. The quantities of dBm and dBW are the most commonly used.

dBm - This is a power expressed in decibels relative to one milliwatt.

dBW - This is a power expressed in decibels relative to one watt.

From this it can be seen that a level of 10 dBm is ten dB above one milliwatt, i.e. 10 mW. Similarly a power level of 20 dBW is 100 times that of one watt, i.e. 100 watts.

A more extensive table of dBm, dBW and power is given below:

dBm	dBW	Watts	Terminology
+60	+30	1 000	1 kilowatt
+50	+20	100	100 watts
+40	+10	10	10 watts
+30	0	1	1 watt
+20	-10	0.1	100 milliwatts
+10	-20	0.01	10 milliwatts
0	-30	0.001	1 milliwatt
-10	-40	0.0001	100 microwatts
-20	-50	0.00001	10 microwatts
-30	-60	0.000001	1 microwatt