

Meeting: Fri 26th at the MCL Cafeteria in Kettering

October, 2012

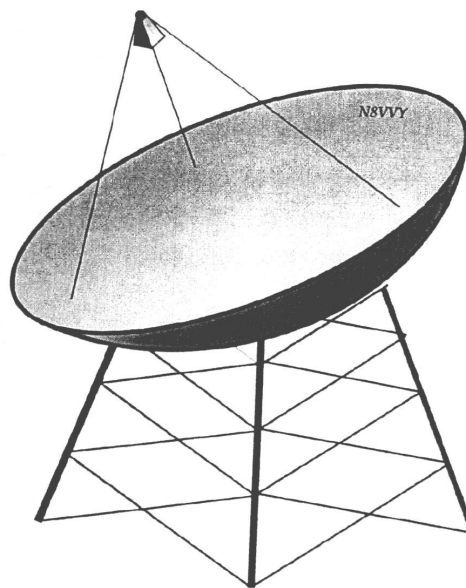
ANOMALOUS PROPAGATION

Newsletter: *The Midwest VHF/UHF Society*

Editors:

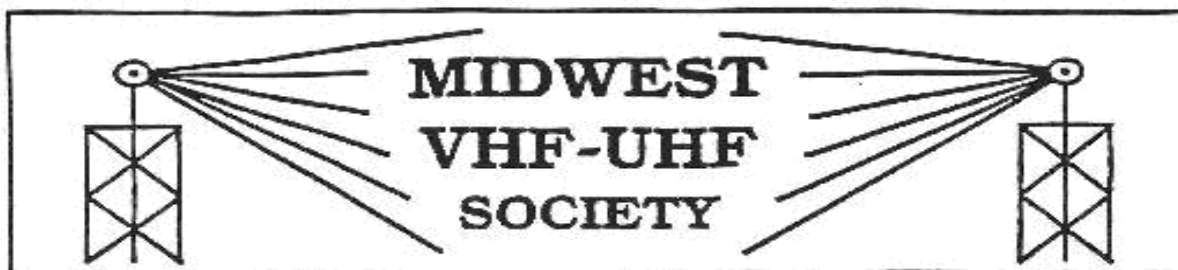
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Annual Society membership is \$ 12.00. Please
make checks payable to Gerd Schrick



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Beacon: 1296.079 W8KSE EM79ur Dayton, OH---- 2W to Big Wheel 800' AGL.

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Upcoming Events

Microwave Update 2012

October 18 to 21 in Santa Clara, CA, (near San Jose and San Francisco).

AMSAT Space Symposium Oct 26-28, 2012 Orlando, FL.

HF-Frequency Measurement Contest: See Nov QST. Date Wed, Nov14. Times are EST. 80 and 40m for us. Connie, xxx, adds 160 meters. Roundtable format as in the past. Our call W8KSE. [Mike, W8RK0]

The Midwest VHF/UHF Society has noise sources available in two frequency ranges: 50 MHz to 3 GHz, and 3 GHz to 11 GHz. Both versions are fully assembled and tested with ENR data provided. The lower frequency version is currently in stock at \$50 including shipping in the USA. The 11 GHz version is \$90, but delivery is about 8 weeks ARO. Contact N8ZM at n8zm@mvus.org for more details.

MVUS Officers

Pres. Tom Holmes, N8ZM

Vice Pres. Bob Mathews, W8

Secretary, Steve Coy, K8UD

Treasurer, Gerd Schrick, WB8IFM

DE N8ZM Sorry I had to miss the last meeting, but it appears from the reports that there was a good discussion about putting more beacons on the air. Beacons are a good thing, as they provide test signals to evaluate how your system is receiving, and even allows for checking for performance variations over time, as well as propagation conditions.

Getting back to the meeting, I want to thank Bob, K8TQK, for stepping into the role of vice-president at the meeting and for leading the discussion. I understand that there was an affirmative vote regarding putting more beacons on the air, which is terrific!

Part of the discussion was an offer from Craig, whose call I don't have handy but he is the guy who operates C.A.T. S., the rotor repair service up near Bowling Green, to provide a nice high site in an area which is quite flat. This would be a good location for a 2304 beacon as it is centrally located with respect to many of the microwave operators in the upper Midwest.

So now it's just up to us to put together the parts and get it on the air. In that regard, I have been looking into two key areas: a stable frequency source for a 2304 signal suitable to drive an amplifier, and a horizontally polarized omni directional

antenna. For the former, the leading contender is a DEMI WSS(Weak Signal Source) which can generate about +10 dBm and uses a 10 MHz reference. The antenna appears to be a little more of a challenge, as the common approach is some sort of Alford Slot type. These are not terribly complex but do require some machining of the slots to a reasonable degree of precision. As the proposed beacon site would be much more accessible than our site on the TV tower, we can be a little more daring with our design.

Any thoughts?

Next topic is to decide on meeting dates for the remaining months of 2012. For October, the 26th is it. For November, the 4th Friday is again the day after Thanksgiving, and my family has scheduled our dinner for that evening. Thus I would like to propose moving the meeting back a week to the 30th? Any objections?

For December, the 4th Friday is the 28th, about half-way between Christmas and New Years, so I am thinking that this year we could actually have our meeting on its traditional night. Does that work for you guys?

See you all on the 26th!

de Tom, N8ZM.

50 ways to use a noise source*

By Tom, N8ZM (*with apologies to Paul Simon)

OK, I don't actually know of 50 ways, but maybe you can add a few new ones that I haven't thought of.

The one that most frequently comes to mind is as the reference noise source for an Automatic Noise Figure Meter such as the well-known HP 8970 A/B. These boxes are becoming quite available lately as they are being phased out for newer models, and also because the latest spectrum analyzers have very quiet front ends with built-in preamps as well as noise figure measurement modes, so a separate instrument is often not needed.

But besides that, what else can you do with one?

Well, consider that the noise source is a broad band device, meaning its output is noise power which is fairly flat over a substantial frequency range. If you want to test a receiver to see if it is working, the noise source is handy because you don't need to have a signal generator for the specific frequency of your receiver. Simply hook up the NS to your receiver input and turn it on and off. You should hear a noticeable difference on the noise level. For those who like to take data, document your setup and record the noise level across the speaker terminals with an AC voltmeter. A true-RMS type is desirable but not mandatory if you always make your measurements with the same meter. Now you can compare results to see if those last mods you made actually improved your system's performance, or see if something has gone wrong. Some hams actually mount a noise source out by their antenna and couple it into the

system either via a small antenna or a directional coupler to put a repeatable signal level into the system. Obviously, you'd want the darn thing turned off when you are trying to work someone.

On the bench, you can use a similar technique to tweak your latest preamp design for the best noise figure even though you may not know what the actual value is. You can get the actual value at one of the many VHF and microwave conferences where NF measurements are offered.

Actually, calculating NF from a couple of measurements isn't too difficult, although some care is needed to avoid fooling yourself. I strongly recommend that you read Agilent's App Notes AN-52-1 and -2 for a description of what noise figure means and how it is measured. These are available online at:

http://www.home.agilent.com/agilent/redirector.jsp?action=ref&cname=AGILENT_EDITORIAL&ckey=916266&lc=eng&cc=US&nfr=-11143.0.00

and:

http://www.home.agilent.com/agilent/redirector.jsp?action=ref&cname=AGILENT_EDITORIAL&ckey=923487&lc=eng&cc=US&nfr=-11143.0.00

Sorry these are so long, but you can also search www.agilent.com for "noise figure app notes" and get to a list which includes these.

Have fun and let me know if you can help me find the remaining 47 ways.

This and That 10-12

Explaining. If you can't explain it to a 6-year-old, you don't understand it yourself. [Albert Einstein]

Bragging. People never lie so much as after a hunt, during a war, or before an election. [Otto von Bismarck]

Making extra money. The iPhone 5 has a new connector on the phone's base that instantly renders all (previous) accessories and chargers obsolete. An adapter that will work with many, but not all current accessories starts at \$30. [News item]

Leadfoot. A 20-year-old grandson had ruined her car's engine...If you can still afford it (after the car is fixed), buy Junior a \$50 bicycle and tell him that's his new ride until he turns 30. Good luck, Evelyn. [Tom and Ray, CarTalk]

While the Newsletter was copied... I usually walk to the Walmart store 1/3 of mile away and I always run into interesting things. This time there was a lady on a bike putting on lipstick. And you thought we had a problem with texting... At the store they offered pink bike tires, that I hadn't seen before. [Gerd, WB8IFM]

Empty Head. An empty head is not really empty; it is stuffed with rubbish. Hence the difficulty of forcing anything into an empty head. [Eric Hoffer]

Universe. The most terrifying fact about the universe is not that it is hostile, but that it is indifferent. [Stanley Kubrick]

Medical Knowledge. Many medical schools tell their students that half of what they'd been taught will be wrong within five years – the teachers just don't know which half. [Samuel Arbesman]

All Those Digits. "Not everything that can be counted counts, and not everything that counts can be counted." [Albert Einstein]

NASA. A country that can't get its roads and bridges fixed at home actually has infrastructure on Mars. Two NASA orbiters helped relay Curiosity's transmissions to Earth and wave their new coming sister in for a landing. [Time Magazine, 8-20-2012]

Computer Terminology: ISDN - It Still Does Nothing *** APPLE - Arrogance Produces Profit-Losing Entity *** BASIC - Bill's Attempt to Seize Industry Control *** IBM - I Blame Microsoft *** CD-ROM - Consumer Device, Rendered Obsolete in Months *** OS/2 - Obsolete Soon, too *** WWW - World Wide Wait *** AMIGA - A Merely Insignificant Game Addiction *** WINDOWS - Will Install Needless Data On Whole System *** [from the "www" via John Mullan, KD2L]

Grunting. Maria Sharapovah's screeches and grunts on the tennis court have been measured at 101 decibels, or roughly the loudness of a chain saw... [CSmonitor]

Long Live the 555 Timer IC

By Lou Frenzel

Editor Electronic Design Magazine

Aug 16, 2012

Hans Camenzind, the designer of the popular 555 timer IC died this week in Silicon Valley. He was 78.

Mycondolences to his family and friends. Hans came to the U.S. from Switzerland in 1960. He worked for a number of the early semiconductor startup companies before joining Signetics. He designed the 555 while there in 1970. The 555 was introduced in 1971 and was widely second sourced. It is not likely he actually knew he was designing what has to be the world's most widely used IC. What EE has not used the 555 at one time or another?

Hans went on to found several companies like InterDesign and Array Design where he continued to design circuits. In the mean time, the 555 became the base IC for many designs in the 1970s and 1980s. Too bad he was not able to collect a royalty on each of the billions of chips sold.

Amazingly, the 555 timer is still around. Millions are still sold each year, not only of the original bipolar design but also newer CMOS versions. Its flexibility is incredible and many articles and books have been written about it. And every now and then a new or rejuvenated design shows up. Besides its use as a basic one shot timer, it is used as a free-running clock, VCO, phase-locked loop, comparator, PWM modulator, frequency divider and DC-DC converter. And the 555 is still widely taught in colleges and universities because of the many principles it teaches like RC time constants and basic pulse generation circuitry.

There are not too many other legacy ICs that have survived over the years. I believe the 555 is king of longevity. Another long time favorite is the 741 op amp and its many derivatives. Then there is the 8051 microcontroller which is still used in many forms in new designs. I am probably leaving some out but I need to be reminded. I have used all of those parts myself in past designs.

It is hard to say how many new designs use the 555. I suspect adoption may be dwindling but the continuing massive sales of this device may say otherwise. The basic timing and clock functions can easily be duplicated with a cheap embedded controller and I suspect that is what most new engineers would use today in a new design. However, for other analog/linear uses the 555 still rules.

Anyway, let's give Hans a silent respectful good bye and thank you with applause for his endlessly useful creation.

Scopes Double As Spectrum Analyzers

Jack Browne Technical Contributor

Oscilloscopes are perhaps the most useful of high-frequency measurement tools, closely followed by spectrum analyzers. But when both are rolled into the same package, the result is the MDO4000 series of mixed-domain oscilloscopes (MDOs) from Tektronix.

A pair of low-cost additions to the product family includes models with analog scope bandwidths of 100 and 350 MHz and spectrum-analyzer ranges that extend to 3 GHz, covering a large part of the cellular/wireless-communications spectrum.

Each of these new combination instruments offers 4 analog channels, 16 digital channels, and 1 RF channel for spectrum analysis. They integrate the functionality of a digital sampling oscilloscope, RF spectrum analyzer, protocol analyzer, and logic analyzer for prices starting at a little over \$12,000. more...

Full Article in **MicroWaves & RF**, Oct 18 2012

Deus Ex Machina

The Forgotten Vice President

By Gerd, WB8IFM

Tom, N8ZM, our president, was out of town and somebody else had to conduct the meeting. That's what clubs do: they conduct meetings, and sometimes good things happen.

Well there was Steve, our secretary and myself, the treasurer. We usually come together but this time Steve canceled out so I was stuck with getting up and doing the honors.

The meeting was off to a slow start. There were only 4 of us initially and I was thinking, this will be short, so we kind of started. Then more showed up so we went into a standby mode. Since The new arrivals had to eat we waited a little longer and when I finally got up to get the ball rolling, Bob who had come last with xyl Caroll got up also announcing he was going to conduct the meeting as he was the vice president.

That came as an surprise to me and probably most others. Just at the picnic we had reelected the president, secretary and treasurer, and I had so stated it in the newsletter just sent out days before. When I was typing out the names of our officers I was thinking it looked "incomplete" and was thinking we could use some more help in the club and a vice pres, of course, is particularly useful.

Bob did a super job, quickly relating an offer for a repeater/ beacon site near Bryan* Ohio. Once we clarified roughly where this site was, the discussion shifted to beacons in general and considering the usefulness of beacons for operators and especially newcomers. The lack of beacons in Ohio would provide the club with a useful task to build and maintain beacons, give the club some "visibility" and help to recruit new members. We already have a 1296 MHz beacon installed which so far has gotten good reviews. So we decided (by vote) to make it a club project to build and install more beacons in the future.

Red, W8ULC, recommended beacons for 220 and 144 MHz, stating both could be driven by a single oscillator, thus simplifying design and reducing cost at the same time.

I learned something new also. Dayton, located in the Miami Vally, the confluence of the Great Miami, the Stillwater and the Mad Rivers is like a large Basin and not very good for VHF/UHF dx. And the hams, living just outside and beyond refer to it as the Great Dayton Hole. My primary interest since I moved to Dayton in 1964 has been in shortwave dx, later, with the launch of semi stationary satellites, working through those was added to my favorite ham activities.

I hope, one of these days, AMSAT finds a way of launching a phase 3 or 4 or 5 satellite, just one of the many things US hams should fight for. Instead many are happy to throw little cubes into close-by space which ultimately only contribute to multiply space debris!

* Bryan is located in the extreme NW corner of Ohio, 13 miles from the Indiana border to the west and 15 miles to the Michigan border to the north. Bowling green the closest mayor city is 50Miles to the East.

3D-TV

By Joe, N8Q0D

While driving down to Atlanta for the DCC last month, N8ZM and I discussed a number of technical topics; with 3D TVs coming onto the market Tom suggested I share my 3D experiences and insights with the club, despite it not involving RF. Note that the FCC has not authorized 3D broadcasting, so the manufacturers are mostly attempting to create 3D imagery from 2D signals.

3D display methods can be segregated into four categories: Holographic, Geometric, Active glasses and Passive glasses.

In a private 1979 showing, I saw a Holographic CRT being developed by the Environmental Research Institute of Michigan that projected real three-dimensional images you could view from all sides. Its drawback was a 30 second cycle time - it could only show 2 frames per minute, where TVs display 30 frames per second. Apparently they were unable to overcome that hurdle and abandoned the project. A practical holographic TV display is still a dream.

At the 1992 conference of SPIE (the international society for optics and photonics) I sat before a laptop with a Geometric 3D Liquid Crystal Display (LCD); when I moved my head into the right location I suddenly was watching a video in 3D - if I moved my head the 3D effect was lost. It was explained that a filter with vertical stripes was inserted between the LCD and its backlight, to block light from the even pixel columns reaching my right eye, and from the odd columns reaching my left eye when my head was properly positioned. The obvious drawbacks were that it only worked with a single viewer and a single head location, but recent reports indicate a lenticular front panel allows a wider range of viewing locations. I anticipate seeing 3D TVs with geometric displays sold soon.

A decade ago Tektronix was selling a lot of (expensive) Active glasses visualization systems to scientific laboratories. With this approach, images for the left & right eyes alternate on the display. The glasses have Liquid Crystal lenses that are alternately switched between transparent and opaque, synchronized with the displayed frames; each lens is clear for its corresponding frame and opaque for the other. An advantage is that the 3D effect does not depend on the orientation of your head; cost of the glasses, and their batteries are its drawbacks.

I first ran into Passive glasses watching 3D movies in the nineteen-fifties, and they were revived for the recent 'Avatar' movie; this seem to be the approach used with current displays. At one time glasses with Red and Blue filters was popular for comic books where inks could be selected to give a 3D effect, but movies (and new TVs) use polarized light to separate the Left and Right imagery. One image is polarized 45 degrees left of vertical, the other 45 degrees right of vertical; the glasses have 'lenses' that are actually polarizing filters oriented to keep the images separate.

A few years ago I observed an experimental 3D Plasma display that interweaved the left and right images on the even and odd lines of pixels, behind a plastic filter aligned to those pixel lines to provide the correct left/right polarization. More recently, NTT demonstrated LCD screens that alternated full left/right frames and created the correct polarizations within the crystal by cleverly modulating its video signal. This innovation seems to have great promise.

DCC 2012 Report

By John Ackermann N8UR

The annual ARRL/TAPR **Digital Communications Conference** made its way to my new neck of the woods this year, and was held Sep. 21 – 23 at the Sheraton Gateway hotel near the Atlanta airport. As always, it was a great show with lots of new ideas and technology on display.

It was a special treat to see some of the MVUS folks who came for the event. Tom N8ZM and Joe N8QOD drove from Dayton and spent the Wednesday evening before the show at my house. We had a nice chance to ragchew and then drove down to the conference site Thursday morning so that Tom and I could attend the TAPR board meeting that day. The Other Bruce (Raymond, ND8I) flew in from his new QTH in Alabama so we had a chance to catch up with him as well.

As always, there were lots of great presentations. My favorites this year included:

- Heikki Hannikainen, OH7LZB, who gave a presentation and demonstration about the APRS internet server at aprs.fi. This is a site where you can display all the APRS stations whose signals reach an internet gateway, and do some remarkable searching, sorting, and mapping.
- David Bern, W2LNX who talked about a high speed, 430 MHz data radio system he designed and which his local club is deploying for emergency communication use.
- Aleksandra Rohde, W3JAG, who described using digital radio systems, including David's, as a part of emergency communication planning (Aleks is a professional emergency management consultant who had some great insights into how amateur radio can assist in that space).
- Chris Testa, KD2BMH, won the prize as far as I'm concerned for new technology. Chris is a young ham who is developing a handheld radio that is entirely based on SDR. He has prototype breadboarded hardware working and is now miniaturizing the pieces to if not quite HT size, something no bigger than a small mobile rig. It will be capable of multiple modes and multiple bands in the VHF/UHF spectrum, and is just a really, really, cool project.

On Saturday evening, Bdale Garbee, KB0G, was the banquet speaker. Bdale has a wide range of interests both within and outside amateur radio, and recently retired as the Linux Chief Technical Officer at Hewlett-Packard. His talk was about the joy of making stuff, and he focused on his latest hobby, which is **really** big model rockets. He's managed to engage his son in technology through this hobby, and has also created a radio connection: he and a friend now manufacture ham-band telemetry systems for rocketeers.

One tradition of the DCC is the "Sunday Morning Seminar" where we do an in-depth technical presentation on a single topic. This year, Tom Rondeau, KB3UKZ, who is the leader of the Gnuradio SDR software project, did a hands-on demonstration of Gnuradio. We provided a bootable DVD to every attendee, so we could all follow along on our laptops while Tom showed how to use Gnuradio to build various SDR and digital signal processing systems. (We were able to create a nice synergy this year: we talked Tom into having the annual Gnuradio Conference at the same hotel as the DCC, starting right after we finished. That helped us get a cross-over crowd that improved the attendance at both events.)

Attendance this year was about average, with around 100 people. We had quite a few Atlanta locals, but frankly I was disappointed that we didn't have more; there are certainly enough hams here to fill the hall! Plans for next year are still underway, but we will probably hold the DCC somewhere in the western part of the US.

Operating Systems

By Gerd, WB8IFM

The word operating system feels like an oxymoron. A better description would be "operating headache", because this is what I get often when working with the Microsoft "windows" system, presently the system used by most. It starts with the fact that every few years you have to buy a new version that initially was "backward compatible"; but that now is a lost art. Furthermore it is the abject failure of providing adequate "customer care" that makes the Microsoft approach so frustrating.

This situation with the personal computer, PC, is aptly described in a comparison that was passed along on the Internet years ago where Microsoft was compared to the automobile industry. I am sure you can still look it up.

There are, however, other operating systems presently available. You have Apple/McIntosh with their OSX(ten) operating system. Their system is more stable than Windows, but it is more expensive and therefore not so popular. It is not so much plagued with viruses as the Windows system. Apple's PCs are used by professionals, by universities and more demanding individuals. You can look at it this way: it is the "Cadillac" or "Mercedes" of the computer world. In the 90s, at the AMSAT integration lab in Orlando, we used PCs with the Windows operating system and Apple computers side by side. The programs are quite similar and switching between them is not so hard. It is comparable to two closely related languages like Spanish and Portuguese.

Then there is a third operating system: Linux. This was born by computer enthusiasts, unhappy with the performance (or lack of it) of the Windows Empire and its paternalistic customer relations exemplified by the word: "thrust Bill!". Linux runs on a regular PC, has a few flavors to select from and is available free.

Steve, K8UD, who has run Linux on one of his PCs is full of praise and, most important, assures me that in so many years he has not had a single virus. So that made me decide to give it a try as well.

Right off the bat I noticed some common sense approach to reducing susceptibility to outsiders (speak Internet). With the Windows problems come more than just viruses; there are also "pests" like unsolicited advertising drivel cramming your email and flooding the webscreens. The feel you get with Linux is that a big door to the outside has been shut and there is peace and quiet in the house!

Though many programs and file types used are similar, it still takes some getting used to. Also you might have to use a new program like for photographs which takes longer to learn and getting used to. It might still pay to run windows on the side without Internet connection. I used to do that, but that PC gave up, so I have to think about reviving it. I might do pictures and the databases on that.

Frozen Mouse

By Gerd, WB8IFM

As an example of the fun that expects you when you dabble with computers I'd like to relate the story of the frozen mouse.

The new PC was up and running, e-mail, a high priority item was coming in again and so we could think about all the files and pictures still residing in the old PC on it's hard drive and how to get some important ones transferred.

Steve had already mounted the old hard drive and checked it out briefly. But it was not connected now.

In the meantime I had bought 1 Gig new RAM (Random Access Memory) and a huge (for my feeling 0 500 G bytes, 7200RPM hard drive.

Now it was time to reconnect the old hard drive and transfer the needed files. One side of the large (7.5?16.5? 19cabinet had been temporarily removed to make access and exchange of the individual components easier. But even with easier access it is still no picnic to route the connecting cables, line up the connectors with the right sockets and insert them. A small flashlight is very helpful!

But all was fine as the PC booted up properly, I located the old drive worked my way through the menu to the desktop and started transferring some files when suddenly the mouse stopped moving. Without the mouse nothing happens, you cannot even properly turn the computer off. From similar calamity with Microsoft windows I knew I had to turn the thing off, take a deep breath, count to ten, then turn it on again, here often comes the Microsoft ?illegal operation notice everybody fears, because, what it means: there is no help, you are on your own!

Well another mouse led to the same symptoms and after a while I realized I was repeating the same maneuvers and was hoping for a marvel. Much better to call it a day, think about it, maybe talk it over with my PC guru.

I had noticed that the freeze effect seemed to appear sooner with each new try cycle and suddenly it occurred to me that we might have a heat build-up problem. The main fan sure was running but what about the little fan that cools the main processor? A look inside, this time with the help of a flashlight, showed this fan running just fine. Moving my hand around inside the cabinet to get a feel for the air movement I did not find much distinction. Now I started thinking aerodynamics and you wouldn't fly an airplane with an open door, even in a car when you open a window, especially at high speed, strange things can happen.

Ergo, I put the side panel back on the PC and it woke up the mouse and it hasn't frozen up since! Problem solved!

Lightning Advice

Best and briefest explanation on how to protect your equipment from lightning damage. All you need to do, apply Ohm's law assuming the average lightning stroke runs at 40 to 50 kV.

“Ensure that during a lightning strike, when everything is raised above ground potential, everything in the shack rises to the same potential. This is your goal: to ensure when a strike occurs, that there are no significant differences in potential that can cause components in your shack to 'talk to each other.' “

From: Lightning, Grounding, and RFI / Noise SOLUTIONS And PRACTICES For Communication Sites. By Scott Bidstrup.