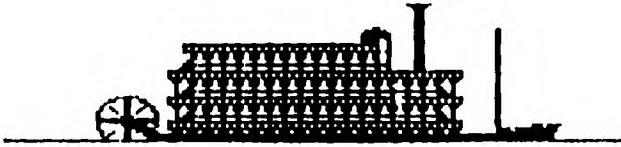


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# Tidbits

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USERS GROUP 89

## AUGUST 1990 ISSUE



# T I D B I T S

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# PRESIDENT'S BIT

By Gary W. Cox

This month I am using a new device connected to my computer called Mr. Lie Detector. How it works is when I tell a lie in my article Mr. Lie Detector interjects the word >BUZZ< in the article to alert you to a lie whereas I can't erase the >BUZZ< so I am stuck with it. For example, if I said that I was President of Federal Express >BUZZ< that would be a lie but if I said that I was extremely good looking >BUZZ< well just good looking >BUZZ<, if I just looked that would be the truth. Get the idea?

Often I am flooded with calls and letters of people in our group volunteering to help in any way that they can >BUZZ<, well often people volunteer >BUZZ<, occasionally >BUZZ<, sometimes >BUZZ<, ok well almost never does anyone volunteer but we are really in need of some ideas, assistance and in particular articles for the newsletter! An article can be either from typing it in from another newsletter, writing it yourself or downloading it from somewhere like Genie, Compuserve or a BBS. It can be on any subject, we're not picky! At one time I myself was able to fill an entire newsletter but nowadays I find it difficult just to write one or two articles. Won't you please help?

Many people have already expressed interest in going to the Chicago II Faire again this year. Among them so far is Richard Hillier, Michael Dorman, Jim Saemenes, James Bennington, Beery Miller and myself. Please speak up if you are thinking of going...

I would like to welcome several new members, Wesley Paeglow and David Helms from Memphis!

C ya at this months meeting...

# PROGRAM BIT

MEETING: August 16, 1990 - Red Cross, 1400 Central Ave.

- 6:30pm - Doors Open
- 7:00pm - General discussion
- 7:30pm - Demonstration by Jim Saemenes of Reminders.
- 8:15pm - Demonstration by Jim Saemenes of Artist Printshop including Banner maker, Sign maker and Stationary Maker.
- 9:30pm - Clean up period
- 9:45pm - Late Dinner at Shoneys on Union Ave.

NOTE: FREE popcorn and cokes at this months meeting!

# IN THE NEWS

By Gary W. Cox

Looking for a good place to purchase Video Modulators? All Electronics of P.O. Box 567, Van Nuys, CA 91408 has them for \$5 a piece plus \$3.50 shipping (\$10 minimum order). Order CAT# AVMOD, their number is 1-800- 826-5432. Our group tries to keep on hand extra video modulators which we sell to members at \$5 each since the modulators are the most common piece of equipment to fail.

9640 News now has a new address, the new address is: P.O. Box 752465, Memphis, TN 38175-2465.

The following from the July 1990 Micropendium:

The Eighth Annual Chicago TI International World Faire is scheduled for November 3rd at the Holiday Inn, 3505 Algonquin Rd., Rolling Meadows, Illinois, sponsored by the Chicago Area TI99/a Users Group. Fair hours will be 9am - 6pm with a \$4 admission fee.

A social mixer will be held from 8pm to midnight November 3rd at a \$5 fee and a dinner will be held from 6 to 9 after the Faire, with a cost of \$15 each. Exhibit space is available at \$75 per eight foot table. Hotel rooms are \$54 each, for single, double or tower rooms and van service to the hotel is free to and from the O'Hare Airport.

For further information contact Hal Shanafield, Faire Manager, c/o Chicago TI99/4a User Group, P.O. Box 578341, Chicago, IL 60657 or call (708) 864-8644 (2-10pm), hot line answering machine (708) 869-4304 or BBS (708) 862-0182 (leave message to #162).

The Chicago TI Faire is held in conjunction with the Milwaukee TI Faire which is scheduled 9am to 5pm at the Quality Inn, 5311 South Howell Ave, Milwaukee, Wisconsin (across from Mitchell Field Airport). For more information on the Milwaukee Faire, contact the Milwaukee Area 99/4a Users Group, Gene Hitz, 4122 North Glenway, Wauwatosa, WI 53222 or (414) 535 0133.

The VAST TI Users Group of Phoenix Arizona is now operating a BBS at 300/1200/2400 at (602) 433-2767.

The Fest West 91 has been scheduled for Feb 16 and 17th at the Ramada Main Gate in Anaheim, California, across the street from Disneyland. Host for the fair is the users group of Orange County, in association with the Pomona Valley Users Group. Toll free number for the Ramada Main Gate is 1-800-447-4048. The hotel has 50 rooms for fest goers at \$55 per night. Travel arrangements may be made through Ruth Dickey at Travel Concepts, (714) 778-5459. For further information write Fest West 91 Committee, c/o Bill Nelson, 11692 Puryear Lane, 92640.

That's the news for this month...

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# THE MYSTERY OF 32767

By Andy Frueh

Reprinted from June 1990 - Lima 99/4A User Group Newsletter

Almost every programmer has used the RESequence command once. And almost invariably, a "BAD LINE NUMBER" error is generated. List the line that holds the error, and you'll most likely find that for some reason, the program branches out to line 32767. The maximum line number for the TI is 32766. Why, then, does the computer make us go to line 32767? Well, that's where I found a rather interesting "coincidence."

In a fairly recent MICROpendium article, the author discusses a program he wrote to resequence line numbers without error, and with greater power. Mainly, he wanted to correct the problem I mention. Anyway, for those unfamiliar with RES, here is a description of when this bug (or programmers nightmare) occurs. Suppose you have a line 10, in this line, it says GOTO 5, but there is no line 5. Run the program normally, and you'll get a BAD LINE NUMBER IN xx, where xx is the line number that holds the error (in my example, it would be line 10). Now, RES the program (it is not the scope of this article to review all of the possibilities that RES gives. Look it up in the manuals or the quick reference cards). You'll see that the line 5 we wanted to go to became 32767. AARRGGHH!!

Now, the question was asked, "Why does TI send us here? Why line 32767 in particular?" Really, I didn't think too much about it, until I was reading a beginners guide to Assembly Language. I found another instance using this number. People who program Assembly routines into Extended BASIC programs already know. But for the rest of you (or those who forgot), here is my coincidence (Yes, I'm finally getting to the point of this article!) Did you ever type in or list a program with CALL LOADS? Ever wonder why some of the numbers were positive, as in CALL LOAD (2314,5), and others were negative, as in CALL LOAD (-31931,0)? Well, to represent numbers that are too large, "two's complement notation" is used. Basically, 65536 is subtracted from the large number. You see, if the address (first number) in a CALL LOAD is greater than our own 32767, this notation is used. It may be just a stupid coincidence, but it is interesting. If anyone can tell me another instance where 32767 forces an "odd" outcome, please drop me a line!

AUTHOR'S NOTE: As soon as I finished writing this article, I discovered in the User's Reference Guide (of all places!) that there IS INDEED another "odd" occurrence of the number 32767. It seems that, at least in TI BASIC, you can't have a dimension for an array greater than 32767. This ALSO occurs whenever the number of records opened in a file in SEQUENTIAL mode is greater than 32767, or the record length of FIXED mode is greater than 32767. The numeric expression required by the POS (POSITION) statement also cannot be greater than 32767. Next I discovered that if either

expression 1 or 2 of the SEG\$ function (string SEGment) if greater than 32767, you'll get an error, and the last one I found is that the value of a TAB can't be greater than, you guessed it, 32767. O.K. Now I think I've found most of the actual occurrences, but can anyone tell me WHY? The answers I get I'll try to get printed. And I thought that the mystery of 32767 was more or less limited to line numbers!

# SURGE PROTECTORS

By Andy Baird

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Surge suppressors: worse than useless?

Andy Baird

ZZZZZAAAAPPP! Jolted out of my early-morning sleep by the deafening buzz of an electrical arc, I knew at once something was badly wrong. I lunged toward the sound, which came from beneath my computer desk, taking in at a glance the ominous blue-white glare from my surge suppressor, and the cloud of black soot staining the wall behind it. I ripped the Mac's plug from the outlet as the arc died and an evil smell filled the room. After my heart had stopped pounding, I examined the remains of my surge suppressor. Looking at the charred interior of the case, I shuddered. If it had been made of plastic instead of steel, there probably would have been a fire. The MOVs (Metal Oxide Varistors) had been literally blown apart by the force of the surge; then, like a welder's rod, had arced across the bare wire leads.

I thanked my lucky stars that the MOVs had done their job and saved my Mac, while wondering whether there wasn't a better way to protect equipment—a way that didn't involve an explosive failure of the components that did the protecting.

I thought about the time, a couple of years back, when my Hayes Smartmodem had died during a thunderstorm, along with a couple of chips on my computer's motherboard. I had surge protection on the computer, but none on the telephone line. When lightning struck nearby, a spike came up the phone line, fried the modem, then continued up the serial cable to kill the line-driver chips in my computer. After that experience, I added a surge suppressor on my phone line, so I was completely protected.

Or so I thought at the time.

Now I know I was wrong. In fact, I now realize that the modem was

probably killed by my surge suppressor. The MOVs which were supposed to protect my computer had done their job by shunting an incoming power-line surge onto the ground conductor--the same ground used by the modem as a signal ground reference. The result was a few thousand volts across the modem's inputs--and a dead modem.

Everything you know is wrong - I want to make three main points in this article.

First, the surge suppressor you own, if it's more than a year old, is probably not protecting your equipment, because its MOVs have degraded to the point of uselessness--and there's no practical way you can test this. Second, even if it's brand new, or uses expensive TransZorb devices instead of MOVs, it is designed to dump surge energy onto the ground conductor used as a reference by your modem, network connection or other serial device, thus endangering your peripherals or other networked computers even if it protects your own computer. Third, there is a new device which will protect your equipment over the long term--ten to twenty years--without endangering it. Before I tackle those three points--and try to convince you that the conventional wisdom about surge suppressors is wrong--let me tell you where this information comes from.

#### Lightning strikes in the capitol

The National Institute of Standards and Technology, in Washington, DC, has a section devoted to the study of power-line surges. The head of the group, Francois Martzloff, has been studying surges and other transient electrical phenomena for many years, resulting in ANSI/IEEE standards (C632.41-1980, if you're interested) defining commonly-encountered spikes and surges. A recent experiment, in which surges were artificially induced in the power wiring of an industrial building, yielded an unexpected result: suppressor-protected computers were undamaged, but serial printers connected to them were damaged by surges on the data input lines--not the power line. Where had these surges come from? Martzloff and his colleagues finally concluded that the data-line spikes which had damaged the printers had been created when the computers' surge suppressors shunted the excess electrical energy to the common ground conductor. The printers had been killed by the surge suppressors!

Interestingly, the NIST team was not the first to arrive at this conclusion. A small New Jersey company, Zero Surge Inc., had been founded not long before by two engineers who set out to build a power conditioning device which would not dump excess energy to ground. We'll talk more about the Zero Surge device later...but now let's consider my three major points.

#### The mortality of MOVs

A look at GE's "MOV Design Manual" reveals several interesting facts. First, MOVs don't begin to respond to a voltage spike until 10-40 nanoseconds. That may sound fast, but the typical spike described in the IEEE standard has a rise time of just 5 nanoseconds. That means an MOV can't react fast enough to stop

the most common electrical spikes--spikes the IEEE standard says can be expected many times a week in an average building!

Second, MOVs wear out. Every little jolt shortens the lifetime of an MOV, until finally it fails to provide any protection. Those little jolts include the several-times-a-week spikes described in the IEEE standard. A recent article in the industry journal LAN Times (May 1990) says: "If your surge protectors have been in use for a while (six months is a reasonable time), the MOVs may be incapable of proper performance. Moreover, as the [MOV] ages, its clamping voltage decreases and it may begin a process called thermal runaway, which has resulted in fire." (Remember, I spent a long time scrubbing the soot off my walls after my surge suppressors burned up!) A dead MOV--more precisely, one which has deteriorated to the point where it offers no protection--can only be detected with expensive, sophisticated test gear. That ten-cent LED which glows so reassuringly on your present surge suppressor may make a good night light, but it tells little or nothing about whether your MOVs are really doing their job, or have gotten tired and given up. I've been shown several commercial surge suppressors (a Kensington MasterPlace, among others) which appeared fully functional, but provided no surge protection whatsoever!

In short, MOVs provide inadequate protection; they wear out in the course of normal use, and they fail without warning, possibly posing a fire hazard.

What about TransZorbs?

I've always figured I was extra safe, because my Mac was plugged into an expensive power strip using TransZorbs instead of MOVs. TransZorbs (avalanche diodes) are semiconductor devices which respond faster than MOVs, and don't degrade with time. However, I've recently discovered that they have another problem: when a really big surge hits, they fail "open", so they can't divert the surge voltage, just when they're needed most!

But that's minor. The real problem is this: just about all presently available surge suppressors, whether they use MOVs or TransZorbs, are wired to divert, or shunt, energy to ground. As the NIST researchers found, this almost guarantees contamination of data lines, resulting in garbled data at best, and fried equipment at worst. The same design flaw which cooked my Hayes modem and those printers in Washington is built into almost every surge suppressor made, from the cheapest to the most expensive. The LAN Times sums it up this way: "Networks should only employ surge protectors that do not shunt surges to ground. If [existing] power conditioning devices contaminate the reference ground by introducing surges, it may be wise to remove such devices from a network or to replace them with something better."

Some people may think they're protected by the use of UPS (uninterruptible power supply) equipment, which by definition is a 100% battery-fed system. But not only are UPSs quite expensive, their inputs are protected by the same fifteen-cent MOVs the average surge suppressor. (The single exception, Abacus Controls, licenses its technology from Zero Surge, the small company I



mentioned earlier.)

## A singular solution

So how can you protect your expensive computer equipment? The LAN Times has this to say: "The ideal surge protector would be a circuit that presents a high impedance to the the surge and a low impedance to the [normal] power wave, while protecting the integrity of the ground circuit. It should also contain no degrading components like MOVs." Such devices exist; they are made by Zero Surge, Inc.

If I tell you that the Zero Surge units appear to be the only surge suppressors on the market which work properly, you'll have a right to be skeptical. After all, the power conditioning business is full of snake oil salesmen, each claiming that only his product is worth buying. Well, I don't blame you. I was certainly skeptical at first. But after reading articles in LAN Times, PC Week and Power Quality magazines and talking with electrical engineers as well as the president of Zero Surge, I believe the Zero Surge protectors are the only ones which 1) will adequately protect equipment and 2) won't contaminate data lines by dumping surges onto the ground circuit.

The Zero Surge unit differs in four fundamental ways from ordinary surge protectors:

1. It's a series circuit with zero response time. It intercepts all surges, including the common 5 nanosecond surges which are too fast for MOVs to divert.
2. It contains no MOVs or other sacrificial or degrading parts, and no components are overstressed by surges of unlimited current up to 6000 volts (the IEEE standard). Its service life is equal to the shelf life of its components, which is why Zero Surge warrants its products for 10 years, and thereafter offers to upgrade any unit to new condition at any time for 20% of whatever the unit then sells for.
3. Critical for networks and modems (BBS and LAN users take note), Zero Surge does not use ground as a surge sink, but instead stores the surge energy temporarily, then slowly releases it to the neutral line. This preserves the integrity of the ground for its role as voltage reference by all dataline interconnections.
4. Zero Surge takes the sharp leading edges off surges and noise, eliminating their ability to couple into computer circuitry. Zero Surge makes 2 sizes of surge interceptors, a 7.5 Amp model (list \$149), which is right for those of us who don't have laser printers, and a 15 Amp model (list \$199) for those who do. The 15 Amp unit is offered at a special price of \$169 to user group members. (You won't be surprised to hear that I bought one!)

Zero Surge president Wendell Laidley is a straightforward, soft-spoken man who emphasizes his desire to answer any and all questions about his product. His phone number is 201-766-4220 (fax number: 201-766-4144). Don't hesitate to call him.

[My special thanks to Chris Bannister of the Princeton Apple User Group for bringing this to my attention, and for allowing me to excerpt from his article on the subject. -Ed.]

APPENDUM: How does it work?

Briefly, Zero Surge employs a 100 microHenry current limiting inductor, followed by a voltage limiting bridge. The bridge contains several triggered energy absorbing stages that respond according to the slew rate and energy of the incoming surge, and keep maximum let-through voltage under 250 volts (in UL 1449 tests at 6000 volts and 500 amps, let-through was 223 volts, or 42 volts above AC power line peak, the best ever tested by UL).

The unit contains three large electrolytic capacitors. One capacitor is charged to track the sine wave peak at all times; the other two are uncharged except during a surge. The rated life of these capacitors, under 24-hour-a-day full load, is 11.5 years. Regarding the claim of "zero response time," Laidley says, "The first component is an inductor, in series with the line, that responds instantly to the surge current. The output rise time of this inductor is far slower than the low nanosecond range response time of the bridge diodes. Zero Surge reduces surge rise time by approximately 40 times, thus reducing the disturbance below the threshold, to a point where no significant coupling can occur."

By the way, all the Zero Surge components are in full view when the box is opened; there are no "hidden parts" and none of the epoxy encapsulation so often found in other units. I'll give the LAN Times the final say: "If it doesn't have UL or CSA certification as a transient voltage surge suppression device, don't buy it. Look for the UL 1449 clamping voltage in the product literature. If the device has UL certification as a temporary power tap, it means that UL has a high opinion of it as an extension cord, not as a surge protector!"

Comments by Ray Dyer from the TI Echo:

As we can see, this is more like a commercial, trying to get you to buy their product. This is fine for some things, but there are a few good concerns outlined in the article. Like the MOVs breaking down, and doing nothing at all to protect. Well, this is true for everything out there. Ever had to replace your Diode in your PBox? I did. That blew most likely when you turned on your system, which sends a large surge into the PBox. MOVs are always exposed to electricity, so it is no wonder that they can break down.

The big point I disagree with is that NOTHING can prevent your system from being fried when lightning hits right beside or on your house. There is not yet any way of preventing flashover, being that lightning likes to find ground no matter where, and is willing to jump 6 feet to ground when it can, and that could be your computer.

Above all, it is always safer to unplug both phone line and power where ever possible during a thunderstorm.

# SURGE PROTECTORS CONTINUED

By Gary W. Cox

Now that you read Andy Baird's article on surge protectors here is mine.

For many years I have been trying to look into the phenomena of the quality of surge protectors and I have yet to find anything completely convincing. Depending on whom you ask the information that you receive varies. Although ANSI standards exist for surge protectors as well as a UL listing for them the specifications are vague at best.

In order to try to understand this mystery lets first take a look at what surges are and what causes them.

Surges, transients and spikes are all somewhat the same, they are all an overvoltage sent across the power line or phone line which can cause damage to equipment. Surges are usually less than a second in duration and are in fact in the nanosecond time frame. While we may not notice that a surge has occurred a power surge can damage or shorten the life of equipment. Generally speaking power supplies can filter out surges of several hundred volts above the 110 volts that they operate on with little or no damage. However, a surge of about 600 volts can destroy your equipment. So what is needed is a device to clamp off any damaging voltage thus shorting it to ground and causing no harm to equipment. (Note that circuit breakers and fuses provide little or no protection against power surges.)

When people talk of power surges most people think of lightning as the major cause. Lightning is a big cause of power surges and is potentially the most damaging however, during the day any number of things can cause surges from your air conditioner kicking on to untraceable surges which come through the power line.

No computer system should ever be operated without a surge protector but the question is what surge protector to buy? It seems like everyone makes a surge protector now days. Some have really impressive statistics on the package and the price ranges from \$3 to \$900. However, I think we can rule out the surge protectors that cost several hundred dollars as they are too expensive for home use. But, in industrial usage the high cost surge protectors may be worth it to protect a variety of expensive equipment.

Differences in the effectiveness of surge protectors exist, many are of low quality, have a large let through voltage (this is voltage that actually reaches your equipment after the surge protector has worked), do not last long (usually not indicating that they are no longer working) and just plain old do not work. I have heard that some have even melted or caught on fire after a power surge!

When looking for a surge protector be sure that it is listed by UL standard 1449 as "Transient Voltage Surge Suppressor" or "Surge Protector" on the surge protector itself. Many surge protectors simply say on them "temporary power tap" or "the effectiveness of this product has not been evaluated by underwriters laboratories" thus indicating they have not been tested to pass the minimum standard for a surge protector. This does not mean that they are not any good it just means that they have not been evaluated by UL. However, the problem with this UL 1449 standard though is that the standard is vague and thus does not really indicate the true effectiveness of the device nor the longevity of it.

Basically two categories of surge protectors exist and they are "Envelope Clamping" and "Sine Wave Tracking". Envelope Clamping is the most common and the easiest to construct. This type of protector just provides an envelope of protection above and below the AC sine wave and makes no allowance for the position or polarity of the sinewave. For example, if a surge protector of this type clamps the voltage at 480 volts (thus not letting through any voltage above 480 volts) and a surge occurred while the sinewave was at a phase angle of 270 (sine wave at it's lowest negative voltage) the surge protector would still clamp the voltage at 480 volts. However, the actual amplitude of the surge would be 480 plus 170 which is a greater damaging voltage than if the surge had occurred at a phase angle of 90 degrees (no extra 170 volt amplitude). To make this long technical story short an envelope clamping type surge protector is not as effective as a sine wave tracking.

The sine wave tracking surge protector, on the other hand, tracks the sine wave itself keeping the sinewave within certain limits no matter what phase angle it is at. However, this type surge protector is usually more expensive than an envelope clamping surge protector but does provide better protection of equipment.

Looking at another aspect of surge protectors is their longevity, in other words how many surges will they take before they fail? Some surge protectors fail on the first surge, many are weakened over time by surges but worst of all many surge protectors do not indicate that they are no longer working even though they may have one of those lights or windows which suppost to indicate surge protection is active. Many surge protectors use MOV's (Metal Oxide Varistors) which absorb surges but after each surge they become less and less effective as time goes on yet there is not always an indication that they are no longer effective. Some surge protectors do have more sophisticated circuitry which does monitor the status of the surge protector plus indicate proper grounding of your wiring.

Many surge protectors have EFI/RFI filters for noise suppression. Noise might be described as the popping and cracking that you might hear on AM radio or the noise that you see on TV when you run your vacuum cleaner. Supposedly this noise can effect the operation of your computer causing errors to occur, however, the power supply of your computer usually filters out most of this noise but if the surge protector has these filters it certainly doesn't hurt. If there is a high amount of noise I can see where this could possible cause a problem plus many of these filters

filter noise in the opposite direction as in electrical noise coming from your PC which could effect other nearby equipment...

How about my personal experience with surge protectors? Several years ago lightning hit in the neighborhood where I live causing a powersurge to my house. The computer was on, the TV in the other room was on plus the VCR was plugged into the same outlet at the TV. The computer and VCR had a surge protector (a \$8 one) but the TV didn't. The computer and VCR was ok but the TV smelt like burnt electronics! At work we have had several computers destroyed by power surges which were not on a surge protector. Since I have been working there of all the systems which have a surge protector none of the problems which have occurred could I relate to power problems. The type surge protectors that we are using are just \$15 ones which apparently just have MOV's in them. However, what I do not know is that many of them may now be worn out or causing slow damage to the system by no longer protecting against surges...

Only in recent years have many companies come to realize the value of surge protection on electronic equipment. I have numerous examples where when companies started using surge protection on their equipment and equipment problems associated with power problems have been virtually eliminated. The fact is the cleaner the power to your equipment the longer it will last and the less problems that you will have. It is a trade off in economics, will you spend a little money now for protection or will you pay high repair costs and face down time in the future? You have heard the saying you are what you eat, your computer is no different.

Now that we know what power surges are, how they work and why we need them, which ones do we buy?

Recently I attended a seminar on surge protection where a device which simulated surges was used to test various surge protectors. An O'Scope was connected on the input and output of the surge protector to view the outcome. Many surge protectors had a large "let through voltage" and were destroyed on the first surge. Not to be picking on Radio Shack but each Radio Shack surge protector blew on the first surge!

The problem in purchasing a good surge protector is that you can not depend on the specifications listed on the package. It may sound impressive but usually you are given information in a form that it sounds good (information twisted) but in reality it is not so good. You must actually be an expert to know what to look for and how to decipher the specifications. Few people will fit into that category including myself. After attending the seminar I am still confused on how to tell which surge protectors are the best. I can only go on what I have read from testimonies from companies using certain surge protectors and from testing that I have seen as well as personal experience. At the end of this article I will list a few surge protectors that I feel are of good quality.

Don't forget that your phone line needs surge protection as well as a surge can not only destroy your modem but the surge can continue into your computer damaging it as well! Also remember your data lines! For example, I have seen lightning induce voltage

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across data cables underground traveling from one building to another. Be sure you have a surge protector on them! Be sure that the surge protection that you use on data lines, such as those for RS232's, clamp the voltage at a low level as it takes only a very small amount of voltage above the specifications to damage a RS232 port.

Keep your power system and data lines protected against surges, the better the protection the better it is for your equipment, the less down time and the fewer repairs that would be needed. Spend a little money now or spend a lot later. However, be aware that no surge protector can protect against a direct lightning strike. The best thing to do during a lightning storm (if possible) is to disconnect your equipment. Also disconnect your equipment if you are going to be on a trip...

Surge protectors come in many different forms. The most common forms are in the form of outlet strips or small cubes which can be plugged into the end of an existing outlet strip. Surge protectors can be purchased in the form of outlets replacing the outlet in the wall as well as in a form to go in your power distribution panel protecting outlets that the panel supplies. For home use outlet strips or cube surge protectors are quite sufficient.

Not to be promoting these companies my personal experience and feelings on surge protectors that would be of good quality are those produced by EFI corporation of 2415 So. 2300 West, Salt Lake City, UTah 84119, phone 1-800-221-1174 or (801) 977-9009 and Inovative Technology Inc. of 7228 Grove Road, Brooksville, FL 34613, phone (904) 799-0713 and Trippe Lite Manufacturing Co (Isobar), 500 N. Orleans, Chicago, IL 60610 phone (312) 329-1777. These surge protectors should be available through local distributors...

## HELP NEEDED

I've decided that I need to cut back on some of my activities. Because of this, December 1990 will be the last issue of Tidbits that I will edit.

If you have an interest in editing this newsletter (or helping in any way - e.g. printing), please contact Gary Cox or myself.

Michael Dorman

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Information contained in TidBits is accurate and true to the best of our knowledge. Viewpoints and opinions expressed in TidBits are not necessarily that of the Mid-South 99'ers. We welcome any opinions/corrections from our readers. Articles may be reprinted elsewhere as long as credit is given to the author and newsletter.

## GROUP INFO

Visitors and potential members may receive 3 free issues of TidBits while they decide if they wish to join (no obligation). On the top of your label is a code. A Y means you are a member, N means 3 free list, UG means user group and S means a business. Beside the Y is a date, one year from that date your dues are due. A dollar sign (\$) on the label will indicate that your dues are due. The library is open only to members. Library list is \$1. Mail order disk library access is \$2 for the first disk and \$1 for each additional disk - max of 5 disks per month. Order by disk number only. At meetings, library access is FREE if you exchange your disk for ours or \$1 per disk for our disks. Send all mail order library requests to librarian's address! Send dues and correspondence to group address.

## CALENDAR

MEETINGS: August 16 (3rd Thursday!)  
WORKSHOPS: August 25 (4th Saturday!)

## 24HR TI BULLETIN BOARD

The Midnight Hour BBS 300/1200/2400/9600 Hayes 501-735-9980  
Dial 735-9980 from Memphis area for toll free call.

## GROUP MAILING ADDRESS

Mid-South 99 Users Group  
P.O. Box 38522  
Germantown, Tn. 38183-0522

## LIBRARY ADDRESS

David Ferguson  
3377 Creighton Ave.  
Memphis, TN 38118

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## MEMBERSHIP APPLICATION

NAME \_\_\_\_\_ : : \$15.00 FAMILY  
ADDRESS \_\_\_\_\_ : : \$10.00 JUNIOR (under 15)  
CITY \_\_\_\_\_ ST ZIP \_\_\_\_\_  
PHONE( ) - \_\_\_\_\_ : INTERESTS \_\_\_\_\_  
EQUIPMENT, ETC. \_\_\_\_\_

Detach and mail with check payable to: Mid-South 99 Users Group,  
P.O. Box 38522, Germantown, Tn, 38183-0522.

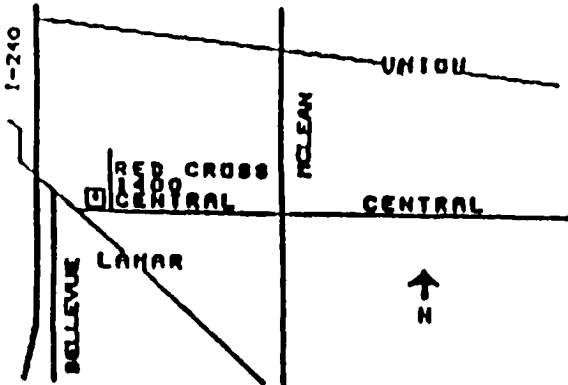
NOTICES

MEETING

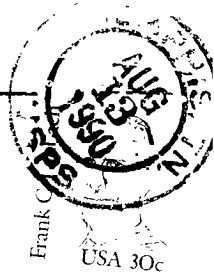
7:00 P.M.  
Thursday, August 16th  
Red Cross Building  
1400 Central Ave.

WORKSHOP

9:00 am - 12 noon  
Saturday, August 25th  
To Be Announced



Mid-South 99 Users Group  
P. O. Box 38522  
Germantown, TN 38183-0522



UG  
EDMONTON 99'ERS USER SOCIETY  
P.O. BOX 11983  
ALBERTA T5J-3L1  
CANADA

FIRST CLASS MAIL