

## Your data . . . your equipment . . . gone in a flash!

**A surge, spike, brownout, or lightning strike can wipe out your data, destroy your equipment.**

If you're like most people, you worry about power protection when the thunderstorm season begins, and forget about it when the season ends.

But lightning's not the only power threat your equipment faces. Power fluctuations occur hundreds of times every day. If you've lost data or had files corrupted and can't find a cause, you could be getting surges over your data lines. If your computers reboot or even shut down without reason, they could be suffering from an unsteady power supply. To protect your equipment and data, you need to know about power fluctuations and their sources.

### Lightning—The ultimate power spike.

Lightning is pure electrical energy following a path until it finds a ground. If it strikes your building, that path could lead through every device that's plugged into an outlet. If you've ever seen a tree split and burned to the ground by a stray bolt, you can imagine what 6000 volts will do when it runs through your equipment.

Our BLACK BOX® AC Surge Protectors (page 229) ground those power surges before they reach your equipment. Six-Line Protectors give you solid protection for up to six devices; Models I, II, and III offer different levels of protection. The AC Wall Protectors give you the same protection as the Model III, but for only two devices; the AC/Modem Protector also lets you plug in your RJ-11 cords to keep your phone lines safe. The Single-Line AC Surge Protector (page 228) handles the power loads of your heaviest office equipment.

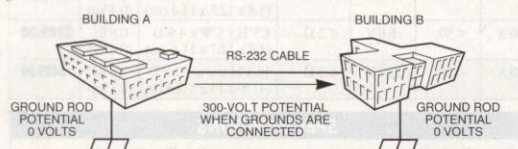
### Induced power—a threat to your data.

Induced power surges come from electrical motors that are too close to data or power lines. They can cause power surges, distort your data, and damage your modems, fax machines, and serial ports. If you're in a manufacturing environment, any heavy equipment—like arc welders or truck engines—may emit a magnetic field that causes electronic "noise" and corrupts your data. Another source, more common in business locations, is a power line located close to your data lines.

Our data surge protectors (page 224) are made to stop electrical surges while letting your RS-232 or RS-422 signal go through uncorrupted. The 50-Line Surge Protector is built for your large-scale communications: analog, leased-line, or RS-232. We also have protectors for your network lines—see page 225.

### Running cables between buildings—the Ground Loop problem.

If you've got cable lines running more than a few hundred feet or between buildings, you could be experiencing problems caused by ground-loop potential. That's the potential difference (energy waiting to be used) between two connected grounds.



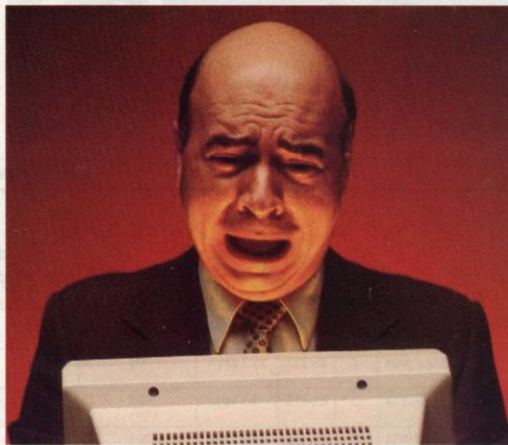
In our diagram, both Buildings A and B have rods that ground the electrical energy running through them, so each building *individually* has a zero-volt potential.

Because there are differences in each building's electrical system and the way each system is grounded, a voltage potential may exist. In this case, Building B's grounding can handle 300 volts more than Building A's. In other words, the two buildings have a *potential difference* of 300 volts. That's not a problem as long as they're not connected.

But then a data line is set up to connect their systems. It also connects their grounds. *Now* there's a problem. Building A now has a potential difference of 300 volts *relative to* Building B. That means that up to 300 volts of excess energy from Building A may see the grounding rod of Building B as another place to ground. To reach it, the energy has to follow the established path of the power flow—a path that leads across your RS-232 connection and through the sensitive circuitry of your modems and computers.

And that potential is always there, as long as the grounds are connected. So your surge protectors can't prevent it, as they can temporary surges or spikes.

The solution? Our Opto-Isolator (page 225). It eliminates potential differences by enclosing two circuits within its shell. Between the circuits is a physical gap of air



**Don't let this happen to you! Get complete power protection from Black Box.**

that electrical energy cannot cross. Your RS-232 signals are converted to light pulses, sent across the gap, and converted back to surge-free data signals on the other side.

### Fluctuations from your power company.

If you're near a power substation, power surges are just a fact of life. Power companies periodically balance their power lines by an essentially mechanical switching method—and send damaging volt spikes through their lines.

*Brownouts* are the dips in your power supply any time there's a drain in power from somewhere up the line. In a city, it could be too many air conditioners going on at the same time. In a more rural environment, you might be too far away from the source to receive reliable power.

What you need then is power conditioning. Power conditioners flatten out the spikes, surges, and dips to give your equipment constant, steady power. Our Line Conditioners 1200 and 1800 on pages 210 and 228 will steady your power to 120 VAC within  $\pm 7\%$ . The Line Conditioner 1400VA (page N-14) uses a new sophisticated, efficient tap switch for greater regulation, to  $\pm 5\%$ .

If your equipment is extra-sensitive to power fluctuations, you'll want our Power Conditioners 250 and 500 (page 226). They give the kind of protection hospitals demand for their most sensitive equipment—to  $\pm 3\%$ . They use ferroresonant transformers, which regulate power at a finer level than conditioners controlled by electromechanical components.

### Blackouts—when the power goes out.

If an unexpected outage has ever shut you down in the middle of a project, crashing your network system and destroying hours or days of work in a split-second, you already know about blackouts. If the head of your hard drive drops down on the disk, you can lose expensive equipment as well.

You can rely on our Back-up Power Supplies (BPS 650VA, 800VA, and 1200VA)—listed on page 226—to monitor your power supply. If the power level drops below 109 volts or surges above 138 volts, the BPS units will kick on within two milliseconds and power your equipment for 4 to 35 minutes, depending on the BPS model and the requirements of your equipment. You'll have ample time to shut your system down.

If you have crucial network servers or hard drives that can't afford to suddenly shut down, even for two milliseconds, our Personal UPS units (page 227) virtually isolate your devices from the power company. They continuously condition the power line, keeping the supply well within acceptable variations. Since they're always working, you won't even have a millisecond's loss of power. Then you'll have 7-23 minutes (depending on the UPS model and power load) to shut your system down, or continue working normally while power is restored.

### Need more information? Call the experts.

If you're still not sure what you need to protect all your equipment, call us at (412) 746-5565. Our Technical Support Engineers will be glad to help you find the perfect solution.

**FREE, EXPERT TECHNICAL SUPPORT:** Call (412) 746-5565  
We'll help you select the right product!



**Black Box Corporation**  
The Source for Connectivity™

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