



An Extended Guide · No. 1742

What Is a Power Surge?

What causes surges, what they
harm, and how to fight back

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! Read this first — two kinds of protection, one safety rule

There are two kinds of surge protection in this guide, and they are not the same job. A whole-home surge protector wires into your electrical panel, where the power is always live and a mistake can be deadly — that is strictly a licensed electrician's work, almost always with a permit, and never a do-it-yourself project. (It isn't something I do myself, either; I help you understand it, choose wisely, and line up a trustworthy local pro.) The other kind — the surge-protector strips and plug-in units you use at the wall — are perfectly safe for you to set up on your own. One honest note either way: no surge protector is a lightning rod or an iron-clad guarantee, so in a violent electrical storm, unplugging a treasured device is still the surest protection of all. This first guide is simply about understanding surges themselves — what they are and where they come from — so every choice in the other guides makes easy, common sense.

Let's start with what a surge really is

You've probably been told to use a 'surge protector,' but nobody ever explained what a surge actually is or why it matters. Let's fix that together, in plain English, with no fear and no jargon.

I'm Bill, and I run Bill's Home Tech here in Portage County, Ohio. I've spent 30-plus years helping folks feel at home with the electronics in their houses, patiently and without a lot of technical talk. Think of this guide as me sitting at your kitchen table, walking you through it one plain step at a time.

Here's the good news up front: once you understand what a surge is, protecting against it turns out to be simple and, for the most part, inexpensive. This guide gives you the understanding. The rest of the guides in this set help you act on it.

★ There's no silly question here

If any of this ever feels over your head, it isn't — it's just new. Call or text me at (330) 200-8042 and I'll explain it as many times as it takes, free and with nothing to sell you.

The whole guide, on one page

If you remember only these few things, you already understand surges better than most people.

- ❑ A power surge is a brief spike of electricity — more voltage than your wiring and gadgets expect — often over in a tiny fraction of a second.
- ❑ There are two flavors: rare big ones that can destroy on the spot, and small everyday ones that quietly wear your electronics down over time.
- ❑ Lightning gets the blame, but most surges actually start inside your own home, from big appliances switching on and off.
- ❑ The grid also causes them — power company switching, repairs, and the jolt when the power comes back on after an outage.
- ❑ There are two ways to fight back: a whole-home protector at your electrical panel, and plug-in protectors at the wall.
- ❑ The panel unit is an electrician's job; the plug-in ones you can set up yourself. Best of all is having both.

✓ One idea to hold onto

Think of surge protection like locks on a house. One good lock helps; locks on the door and the windows help more. 'Layered' protection — panel plus plug-in — is simply locking more than one way in.

What a surge actually is

You don't need any electrical background for this. A simple picture does the job.

The electricity coming into your home is meant to stay at a steady level — picture a calm, even flow of water through a pipe. Your televisions, computers, and appliances are all built to expect that steady flow.

A surge is a sudden jump in that flow — as if someone briefly cranked the water pressure way up. It can last only a tiny fraction of a second, but in that instant the extra 'pressure' pushes into your electronics harder than they were designed to handle.

Sometimes that extra push is enormous and does damage right away. Other times it's small — barely a blip — but those little blips happen over and over, and they add up. Both kinds are worth guarding against, and we'll look at each in turn.

✓ The word 'transient'

You may see surges called 'transients' on a package. It's a fancy word for 'here and gone in a flash.' Same thing — a brief, unwanted spike.

The two flavors of surge

Understanding these two kinds explains why good protection guards against both, not just the dramatic one.

The big, sudden surge

This is the one people picture — a large spike from lightning or a problem out on the power lines. It can be strong enough to kill a television, a computer, or an appliance's control board in an instant. It's the rarer of the two, but it does the most obvious damage.

The small, everyday surges

These are the quiet ones. Small spikes happen many times a day, mostly from things inside your own home. No single one hurts much, but like a drip wearing on a stone, they slowly shorten the life of your electronics. You rarely notice them — until a gadget dies 'for no reason.'

! The sneaky one is the everyday kind

Because the small surges cause no drama, folks assume that if lightning hasn't struck, all is well. In truth the everyday spikes may be doing more cumulative harm than the once-in-a-blue-moon big one.

Cause one: lightning (and why 'nearby' matters most)

Lightning is the famous cause of surges. The surprising part is that it rarely needs to hit your house to hurt your electronics.

A **direct** strike on your home or its power line is rare, and frankly, little that plugs into a wall can fully survive one. But that's not the usual story.

Far more common is a **nearby** strike — lightning hitting the ground, a tree, or a power line somewhere down the road. That energy can jump onto the power lines and travel into your home from a surprising distance. It can also ride in on your cable-TV or telephone lines, which is why those deserve protection too.

So when we talk about lightning protection, we mostly mean guarding against these nearby strikes — the everyday reality of a good Ohio thunderstorm — not a Hollywood bolt hitting your chimney.

! In a severe storm, unplug the treasures

No plug-in protector reliably survives a direct hit. When a violent storm is right overhead, the surest protection for a prized computer or television is still to unplug it — including its cable or phone line. Our lightning-safety and storm-prep guides walk through this calmly.

Cause two: the power grid itself

Your electric utility does a remarkable job, but the grid is a living thing, and its normal workings can send surges your way.

When the power company switches equipment, reroutes power, or repairs a line, the electricity can briefly jump or dip. A downed line or a troubled transformer down the street can do the same. None of it means anyone did anything wrong — it's simply the nature of a big electrical network.

One moment catches people off guard: **the return of power after an outage.** When the lights come back on, they can come back with a jolt. That's why it's wise to unplug sensitive electronics during a long outage and plug them back in a few minutes after power is steady again.

✓ A habit worth keeping

When the power goes out for a while, walk around and unplug the computer, the television, and the like. When it returns, give it a few minutes to settle before plugging them back in. It costs nothing and sidesteps that power-restoration jolt.

Cause three: your own home (the big surprise)

Here's the fact that surprises almost everyone: many experts say the majority of the surges your electronics see start right inside your own house.

Anything with a large motor or a strong heating element gives a little electrical 'kick' when it switches on and off. Your furnace blower, the air conditioner, the refrigerator, a well pump or sump pump, the washer and dryer, even power tools and space heaters — each one sends a small spike down your home's wiring as it cycles.

These happen all day and all night, quietly. That refrigerator kicking on at 3 a.m. is nudging the electronics elsewhere in your home, just a little. It's a big reason the plug-in protector at your entertainment center earns its keep even when there isn't a cloud in the sky.

★ Why I mention this first

Once folks learn that their own fridge and furnace are part of the story, surge protection stops feeling like storm insurance and starts feeling like everyday sense. That's exactly the right way to think about it.

What a surge does to your things

Not everything in your home is equally at risk. Knowing what's vulnerable tells you where protection is worth the trouble.

The most sensitive victims are anything with a delicate 'brain' inside — a circuit board or computer chip. That means televisions, computers, modems and routers, gaming consoles, and, increasingly, ordinary appliances. Today's furnaces, washers, dishwashers, and even LED light fixtures have small circuit boards that a surge can ruin.

Simple, old-fashioned items — a lamp with a bulb, a plain heater, a basic coffee pot — shrug off small surges more easily. It's the electronics, and the modern appliances full of electronics, that need looking after.

How much risk	What's in this group
Most at risk	TVs, computers, modems, consoles
Now at risk too	Furnaces, AC, washers, LED lights
Least at risk	Plain lamps, basic heaters

✓ **A modern home has more to lose**

A house from decades ago had a few motors and some light bulbs. Yours is full of circuit boards, from the thermostat to the range. That's why surge protection matters more today, not less.

Why this matters more than it used to

If your parents got by without much thought to surges, there's a good reason — and a good reason that's changed.

Older homes ran on sturdy, simple devices. A power blip might flicker a lamp and do no harm. But over the years our homes have filled up with sensitive electronics, and manufacturers have put small computer boards into nearly everything to make it 'smart' or efficient.

Those boards are wonderful when they work and expensive when they don't. A surge that would have meant nothing in 1975 can now take out a control board and leave a perfectly good appliance dead. So the humble surge protector has quietly become one of the best-value protections in the whole house.

! The hidden cost

The sting of a surge often isn't a dramatic bang — it's a repair bill months later, or an appliance that dies years before it should have. Good protection is about avoiding those quiet, expensive surprises.

Two kinds of homes, two sets of needs

Where you live changes how much surge risk you face — and a farmhouse on a well sees a very different picture than a tidy lot in town.

If you live in town or the suburbs

In town and in the suburbs, the power lines feeding you are often shorter, and sometimes buried, which gives lightning fewer places to jump aboard. Your water keeps flowing from the city main during an outage, so the electronics you're protecting are mostly comforts and conveniences.

- You still get plenty of grid-switching surges and the everyday spikes from your own appliances.
- Plug-in protectors on the TV, computer, and network gear cover most of what matters.
- A whole-home protector at the panel is still a fine, affordable upgrade.
- Closer neighbors mean shorter outages, but the power-restoration jolt is just as real.

If you are out in the country on a well

Out in the country, long power lines run for miles across open land, giving lightning far more chances to jump on and reach you. Storms roll through with fewer things in the way, outages last longer, and when the power quits your well pump quits with it.

- Long overhead lines mean more exposure to nearby-lightning surges — rural homes often have the most to gain from good protection.
- A 240-volt well pump, plus a furnace and other hardwired gear, are costly to replace and can't be guarded by a plug-in strip.
- That makes a whole-home protector at the panel an especially smart first step — an electrician's job, with a permit.
- A protector at the well pump's controls, added by that same electrician, is worth asking about.

★ Not sure which picture is yours?

Plenty of homes sit somewhere in between. Tell me where you are and how your power behaves in a storm, and I'll help you sort out what's worth doing — no pressure, no sales pitch. Call (330) 200-8042.

The two ways to fight back

Now that you know what a surge is, here are your two tools against it. You'll meet both in depth in the other guides — this is the map.

A whole-home protector at the panel

This is your first line of defense. A licensed electrician installs a protector right at your electrical panel, where it can stop a big surge before it spreads through the house. It guards everything wired in — including the furnace, the well pump, and other things a plug-in strip can't reach. Because it means working inside a live panel, it is strictly an electrician's job, with a permit — never a do-it-yourself project.

Plug-in protectors at the wall

This is your second line of defense, and it's the part you can handle yourself. A good surge protector strip guards the sensitive electronics plugged into it, and catches the everyday spikes that start inside your home. Simple, safe, and inexpensive.

✓ Together they're strong

Neither tool is the whole answer alone. The panel unit stops the big stuff but can't finely protect a laptop; the plug-in strip protects your desk but can't guard the furnace. Used together — what we call 'layered' protection — they cover each other's blind spots.

What surge protection can and can't do

I'd rather you know the honest limits now than feel let down later. Good protection is powerful, but it isn't magic.

A surge protector reduces the risk of surge damage — often dramatically — but it is not a lightning rod and not an iron-clad guarantee. A large enough spike, or a direct lightning strike, can overwhelm any plug-in device. That's why unplugging in a severe storm is still the surest step of all.

And a surge protector is not the same as a battery backup. It stops spikes; it does **not** keep your devices running during an outage, and it does not smooth out a brownout or a dip. For that you want a UPS — a battery backup — which we cover in its own guide.

! A power strip is not a surge protector

The single most common mistake I see: trusting a plain power strip to protect electronics. A basic strip only adds outlets — it offers no surge protection at all. Telling the two apart is so important it has its own guide in this set.

Signs you may have had a surge

Surges are usually invisible, but they leave clues. Here's what to watch for, especially after a storm or an outage.

- A device that suddenly won't turn on, or acts strangely, right after a storm or a flicker.
- The clocks on the microwave and oven blinking — a hint the power dipped or blipped.
- A surge protector whose 'protected' light has gone out, even though things plugged into it still work.
- A faint burnt or electrical smell near an outlet, a protector, or a device — treat this seriously.
- A breaker that tripped, or a ground-fault (GFCI) outlet that needs resetting.

! A burnt smell means stop

If you ever smell burning or something electrical from an outlet, a protector, or a device, unplug it if you can do so safely, don't use it, and call a licensed electrician. That's not a wait-and-see moment.

A gentle walk through your home

You don't need to protect every outlet. A slow lap around the house tells you where it's actually worth doing.

Start where the expensive electronics live: the living-room entertainment center, the home office, and wherever the internet equipment sits. These are the spots where a good plug-in protector pays for itself many times over.

Then think about the things you can't put a strip on — the furnace, the central air, the well pump, the range. Those are wired in, and they're the case for a whole-home protector at the panel. You don't have to decide today; you're just noticing what's where.

★ I'll happily do this lap with you

On a visit I'll walk your home with you, point out what's worth protecting and what isn't, and set up the plug-in protectors right there. For the panel unit, I'll line you up with a trustworthy electrician. Call (330) 200-8042.

Simple habits that help

A few easy habits stretch the value of whatever protection you have. None of them cost a thing.

- ❑ In a severe storm, unplug the electronics you'd hate to lose — data lines too, like the cable or phone cord.
- ❑ During a long outage, unplug sensitive gear and plug it back in a few minutes after power returns.
- ❑ Never plug one power strip into another (that's called daisy-chaining) — it's a fire risk and undoes the protection.
- ❑ Glance at your surge protectors' indicator lights now and then, especially after big storms.
- ❑ Plug protectors straight into a proper grounded wall outlet, not into an extension cord.

✓ Post a little list

Keep a short 'what to unplug' note by the door for storm season. When the sky turns green, you won't have to think — you'll just glance at the list.

A few myths, cleared up

Surges attract some tall tales. Here are the ones I hear most, set straight.

- **'Only lightning causes surges.'** No — most start inside your own home, from ordinary appliances cycling on and off.
- **'A power strip protects my electronics.'** No — a plain strip only adds outlets. You need a real surge protector.
- **'Surge protectors last forever.'** No — they wear out over time and use. Their indicator light tells you when.
- **'A new house doesn't need protection.'** Backwards, actually — newer homes have more sensitive electronics, so they need it more.
- **'One protector covers the whole house.'** A whole-home unit is wonderful, but you still want plug-in protectors on sensitive gear.

✓ Each myth has its own guide

If any of these surprised you, good — that's the point. The 'common myths' guide in this set digs into each one, and the 'protector vs power strip' guide settles the biggest confusion for good.

Common mistakes people make

Knowing the usual slip-ups in advance is half the battle. Here are the ones worth sidestepping.

- **Trusting a plain power strip** to protect a television or computer — it doesn't.
- **Forgetting the data lines.** Surges ride in on cable, phone, and ethernet cords too, not just the power cord.
- **Using a protector until it dies** and never checking the light — so the protection is long gone while the outlets still work.
- **Protecting the TV but not the furnace or well pump** — the pricey hardwired gear needs the panel unit.
- **Daisy-chaining strips** or forcing a three-prong protector into an ungrounded two-prong outlet with a 'cheater' adapter.

! The grounding trap

A surge protector needs a real ground connection to do its job. Never use a 3-to-2-prong adapter to make one fit an old two-prong outlet — it defeats the protection. Our grounding guide explains this simply.

Surge causes at a glance

Here's the whole cast of characters on one page, so you can see how much starts closer to home than you'd think.

Where it comes from	Inside or out?	How it behaves
Nearby lightning	Outside	Sudden and severe
Grid switching / repairs	Outside	A brief jolt
Power returning after outage	Outside	A jolt on restart
Furnace, AC, fridge cycling	Inside	Small, adds up
Well pump, sump pump	Inside	Small, adds up
Washer, dryer, power tools	Inside	Small, adds up

✓ **Notice the pattern**

Look how much of that list lives inside your own home. That's the whole reason plug-in protection is worth it every day, not just in storm season.

Where to begin, without overthinking it

You don't need to do everything at once. Here's a calm order that makes sense for most homes.

First, protect the sensitive electronics you already own with good plug-in surge protectors — the TV and home theater, the computer, and the internet equipment. That's the part you can do yourself this week, and it covers a great deal.

Then, when you're ready, ask a licensed electrician about a whole-home protector at the panel. It's an affordable addition that guards the hardwired things — and quietly backs up all your plug-in protectors too. There's no rush; even one layer is far better than none.

★ A plan that fits your budget

There's no need to spend it all at once. Tell me your home and what you'd hate to lose, and I'll help you put things in a sensible order — starting with the cheap, easy wins. Call or text (330) 200-8042.

How I can help

This is exactly the sort of everyday, practical thing I love to take off your plate.

I can walk your home with you, spot what's worth protecting, and set up the right plug-in protectors on the spot — neatly, with the cords managed so nothing's a trip hazard. I'll show you where the indicator lights are and what they mean, so you'll know at a glance if one ever needs replacing.

For the whole-home protector at the panel, I don't do the electrical work myself — that's a licensed electrician's job. But I'll help you understand it, decide if it's right for you, and line up a trustworthy local pro, so you're never navigating that alone.

★ Real help, close to home

A first in-home visit is a flat \$99, and for the simple things I can often help right over the phone or a screen-share for \$49. Every visit comes with a 30-day, come-back-free guarantee. Call or text (330) 200-8042.

Common Questions

The questions I hear most when folks first start thinking about surges, answered plainly.

Q: Do I really need surge protection, or is that just for storms?

You really do, and not just for storms. Most surges are small everyday ones from your own appliances, chipping away at your electronics all year. Storm protection is a bonus on top of that.

Q: If I've never noticed a problem, am I fine?

Not necessarily. The everyday surges are invisible — you don't feel them shortening a device's life. The first sign is often a gadget dying sooner than it should have, with no obvious cause.

Q: Is one big whole-home protector all I need?

It's a wonderful first layer, but no. It can't finely protect delicate electronics, so you still want plug-in protectors on the TV, computer, and network gear. Together they're strong — that's 'layered' protection.

Q: Will a surge protector stop a power outage?

No — that's a different tool. A surge protector stops spikes; a battery backup, or UPS, keeps a device running through an outage. Many UPS units include surge protection too. We cover those in their own guide.

★ Still have a question?

That's what I'm here for. Call or text me at (330) 200-8042 and ask away — there's truly no such thing as a silly question about this.

You don't have to do this alone

You just have to remember that a friendly, patient person is one call away.

I hope this guide made understanding power surges feel a little less daunting and a lot more doable. Keep it in a drawer with your other home papers, come back to a page whenever you need it, and don't worry about memorizing anything.

When you'd rather have a hand, that's exactly what I do. I come to your home, work at your pace, and never make you feel rushed or silly for asking. A first visit is a flat \$99, and for the parts that don't need me on-site I can often help right on your screen for \$49. Every visit comes with a 30-day, come-back-free guarantee. I don't do the licensed electrical work myself — for that I'll help you line up a trustworthy local pro.

★ Bill's Home Tech — real help, close to home

Call or text me at (330) 200-8042, or visit BillsHomeTech.com. Serving Atwater and all of Portage County. 30+ years of patient, plain-English tech help — and if you're ever not 100% happy with a visit, I'll make it right or refund it. That's a promise. — Bill

Where Power Surges Come From

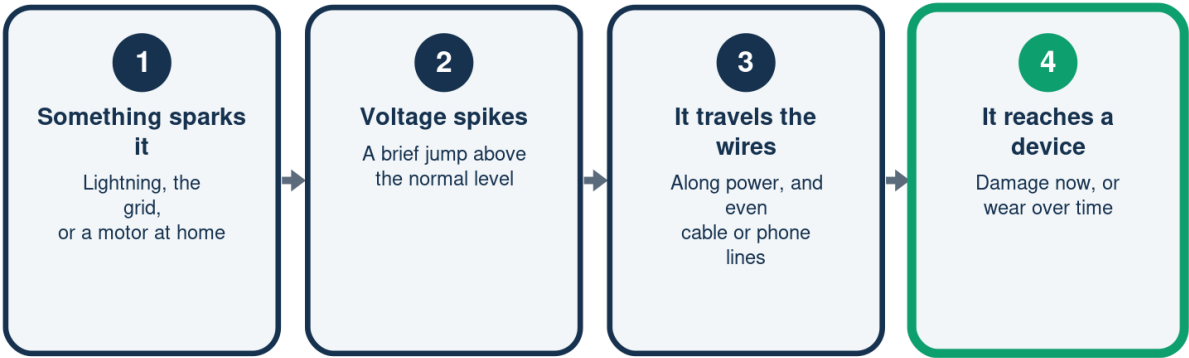
Most start closer to home than you'd think

	Inside or out?	How it behaves
Nearby lightning	Outside	Sudden, severe
Grid switching	Outside	A brief jolt
Power returning	Outside	Jolt on restart
Furnace / AC / fridge	Inside	Small, adds up
Well or sump pump	Inside	Small, adds up

Many of the surges your gear sees start inside your own home.

How a Surge Reaches Your Gear

And where protection steps in



Good protection sits between the wiring and your device.

The Two Flavors of Surge

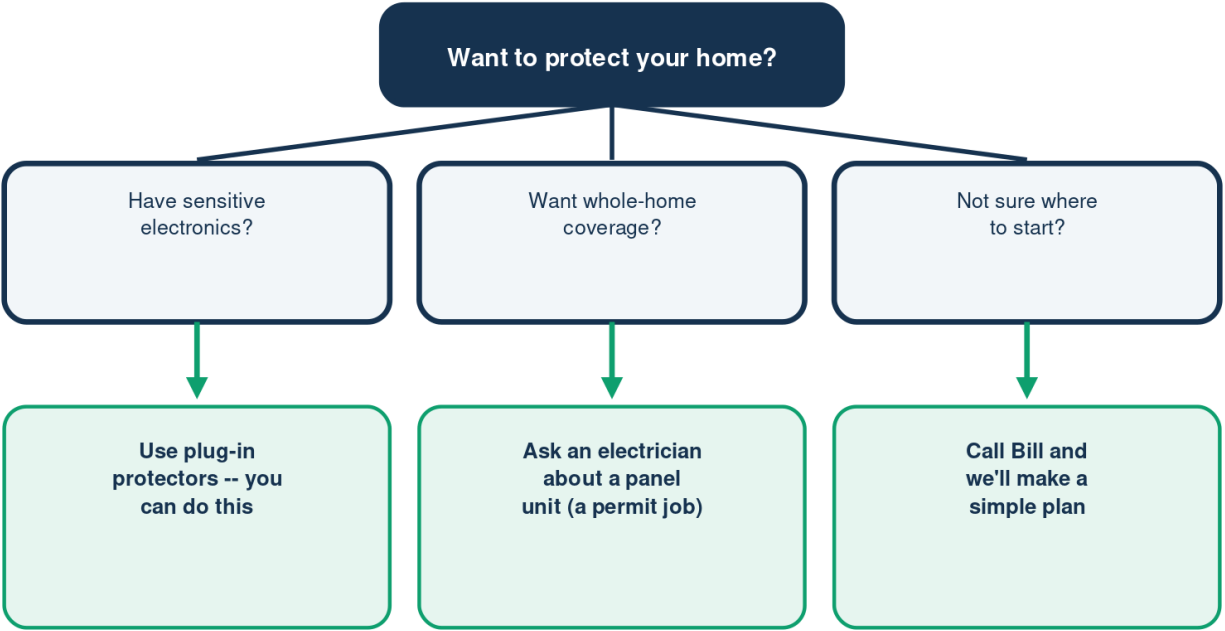
Why good protection guards against both

	The big one	The small ones
How often	Now and then	Every day
Where from	Lightning, grid	Motors at home
What it does	Destroys fast	Wears gear down
You notice?	Often yes	Usually not

One is dramatic; the other is sneaky. Both are worth stopping.

So What Should I Do?

Let your situation point the way



Best of all is both layers -- a panel unit plus plug-in protectors.

Illustration - a schematic, not to scale. Your setup may differ.



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A Note From Bill

A quick note from Bill.

I write these guides to make home tech a little less frustrating, and I do my best to keep every step accurate and up to date. Still, every home, device, and setup is a bit different, so I can't promise a guide will match yours exactly or fix your particular problem. These guides are for general information only — they're not professional, legal, or financial advice, and they don't replace your device's own manual or the manufacturer's instructions. Please go slow, use your own good judgment, and use everything here at your own risk. If a step involves electrical wiring, a gas appliance, a water heater, plumbing, or climbing a ladder — or if anything just doesn't feel safe — please stop and call a licensed professional (or give me a call at 330-200-8042). Bill's Home Tech and Bill Davis can't be responsible for any damage, data loss, or injury that comes from using these guides. Thanks for reading, and stay safe out there.

— *Bill*



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