

## Re: Repairing Lightning Damaged Tv's

**Source:** <http://sci.tech-archive.net/Archive/sci.electronics.repair/2004-06/1648.html>

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Date: Mon, 21 Jun 2004 00:04:10 -0400

Your incredibly comprehensive and useful reply is very much appreciated!

Thanks,

Sunny

w\_tom wrote:

- > *Protection starts with the underlying geology. Best is a*
- > *monolithic soil of clay or loam that is damp. Worst is sand*
- > *or gravel. Also bad would be two different types of soil*
- > *where the more electrically conductive vein is far from the*
- > *single point ground. Example: they had a bathroom wall struck*
- > *twice by lightning. They installed lightning rods. The*
- > *bathroom wall was struck a third time. Lightning rods were*
- > *earthed in sand. Bathroom plumbing made a better connection*
- > *to deeper limestone. One poster in the Perennes once said he*
- > *had to sink a 150 foot ground rod to get through glacier*
- > *tailings and into more conductive soil. A rather extreme*
- > *example that demonstrates the point.*
- >
- > *Establish the single point earth ground. For most, two*
- > *ground rods driven well below the frost line and separated by*
- > *a distance equivalent to their length is sufficient (Rods*
- > *closer tend to act as if they were the same rod). Idea is to*
- > *make this the best electrical ground on the property.*
- >
- > *All incoming utilities first connect to this single point*
- > *ground either by direct wire connection or via a surge*
- > *protector. Unfortunately, your antenna violates the*
- > *principle. But there are alternative solutions. Three*
- > *examples – the bad, ugly, and good (left to right) – are*
- > *provided in figure 2. Concept demonstrated in figure 1. Halo*
- > *ground that connects your earth grounds together. This could*
- > *be a buried bare 4 AWG ground wire that interconnects AC*
- > *electric ground to TV antenna ground. That buried bare wire*
- > *makes all grounds equipotential as well as enhances the*
- > *connect*

- > <http://www.bass-home.com/gotoproduct.cfm?item=91598>
- >
- > *A 14 AWG wire connects from that box to the single point*
- > *ground. Again, it should meet these criteria rather than look*
- > *neat: be short, direct, and independent. Too many telco*
- > *installers want to square off the wire or neatly ty-wrap a*
- > *ground wire to other cables. Wrong. That 14 AWG (more often*
- > *is 12 AWG) wire must run independently and directly to the*
- > *same single point ground used by AC electric. Both grounds*
- > *meet at the earthing rod – the single point ground.*
- >
- > *Every incoming wire – all three AC electric, both telephone*
- > *wires, and shield of any incoming coax cable from satellite*
- > *dish – are earthed to same earth ground. As noted earlier,*
- > *that antenna will require special attention. Now lets discuss*
- > *induced transients.*
- >
- > *Lightning strikes the TV antenna seeking earth ground. Path*
- > *will be destructive via household wires. And not necessary*
- > *just through TV and AC electric to earth ground. That antenna*
- > *wire may be bundled with other wires. Therefore that antenna*
- > *wire induces transients on other wires or may even arc into*
- > *those other wires.*
- >
- > *Same problem is also created by plug-in protectors. Lets*
- > *say a plug-in protector is earthing the transient. IOW it is*
- > *shunting a transient into the AC electric safety ground wire.*
- > *But that safety ground wire is bundled with other wires. Now*
- > *a transient is induced onto those other wires. Just another*
- > *example of why plug-in protectors are not effective and can*
- > *even contribute to surge damage.*
- >
- > *Idea is to earth a transient before it can enter the*
- > *building. Not just earth anywhere, but earth less than 10*
- > *feet to a single point. Campers demonstrate the principle.*
- > *They were sleeping nearby a tree that was struck. Lightning*
- > *strikes tree to obtain earth borne charges some kilometers*
- > *beyond those boys. Some were sleeping perpendicular to that*
- > *tree and were not hurt. Any boy who was sleeping pointed*
- > *towards that tree had electricity rise up into his feet, pass*
- > *through his body, then exit via his head. Body is more*
- > *conductive than earth. Lightning will find every conductive*
- > *path to those earth borne charges some kilometers away. This*
- > *is also why multiple earth grounds on a building can cause*
- > *lightning to find the other earth ground, destructively, via*
- > *the house.*