

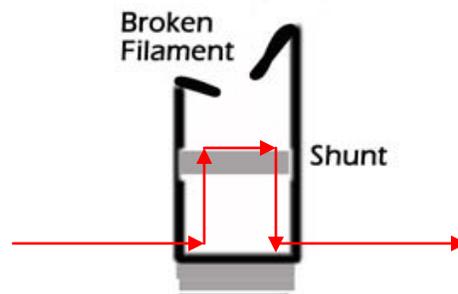
# An Easy Way to Troubleshoot Lights

## What Causes a Light Set to Fail?

A light set can fail for any of these reasons:

- Internal bulb or shunt failure
- Loose, broken, or missing bulb
- Bad connection between the bulb and bulb socket
- Broken wire or plug
- Poor connection at the power source
- Not replacing burnt out bulbs prior to storing
- Blown fuse (**very rare**)

**-But the most common cause by far is internal bulb failure. Modern light sets are designed to work even if one or more individual lights fail as illustrated below.**



**Path of electrical flow**

**-In this drawing, the filament in the bulb has burned out, interrupting the flow of electricity required for the light bulb to operate**

**Miniature light sets are designed with a feature that allows current to bypass the burnt out filament. It's called a shunt – an aluminum wire wrapped around the two metal posts supporting the filament. If the filament is burned out, current will normally burn through an oxide coating, completing the circuit and illuminating the rest of the light set. Light sets must be plugged in and have current present within the set for the shunt system to initially work.**

If the oxide fails to burn off, the shunt fails, the circuit cannot be completed, and the remaining lights go out. **Please note, failed or stuck shunts can be repaired with the use of a LightKeeper Pro light tester** (see page 3). **The best way to prevent shunt failure from season to season is to replace burnt out bulbs prior to taking down and storing your tree. This will prevent shunts from becoming disconnected through the set up and take down processes, when electricity is not present within the sets.**

Just as a water pipe needs a clear path to have water flow it; a light set also requires a clear path to have electricity flow it. The shunt acts as a back up system to keep a light set's electrical circuit completed. The first thing you should do when lights are out is to inspect the light set to see if all the bulbs are present, are unbroken, are in tight, and plugged into an outlet that's working.

If this doesn't solve the problem, it may be due to a loose contact between one of the light bulbs and its husk (the plastic receptacle into which the light bulb fits). Next, you will need to check your light set for a loose bulb or contact.

## The quickest way to check for a loose contact is to:

1. Run your hand over the needles of the sections where the lights are out.
2. Start at the base of the branch near the tree trunk, and brush your hand out toward the tip. By doing this you will be gently jostling the bulbs, and usually the bulb with a loose contact will cause the lights to flicker on.
3. If this is the case, locate the bulb that's creating the flicker and replace it with one of the spares provided. (You can find these in clear plastic packages attached to the base cords of each light set)
4. Start with one branch, and go from branch to branch (working left to right) using this method. Proceeding left to right is a good way to keep track of what you have checked, so you don't become frustrated looking randomly for bulbs. **In some cases this method can help the electricity present with in an unlighted set to get a stuck shunt to properly connect and illuminate the set.**

If this technique of brushing and replacing doesn't solve the problem, it's probably due to one or more failed shunts. Resolving this problem can best be accomplished either by obtaining a **LightKeeper Pro** or by contacting NeumanTree through our web site [www.neumantree.com](http://www.neumantree.com) for help.

**The LightKeeper Pro is an inexpensive investment that will repair shunts and locate problems. This tool (and replacement bulbs) will enable you to keep your tree lit for as long as you choose to maintain it.**

You can check out the Light Keeper Pro and find a retailer near you at:

[www.lightkeeperpro.com](http://www.lightkeeperpro.com)



- **As a reminder**, many spare lights have been included with your tree. They may be found in small plastic bags attached to each light set where it plugs into the extension cord at the trunk. We recommend leaving them attached so that they will not get lost and remain easily available for replacement.

- **If you have utilized all of replacement bulbs provided with your tree, NeumanTree, Inc. is delighted to provide replacement bulbs for a period of 10 years from your original date of purchase.** Please visit our customer service page at [www.neumantree.com](http://www.neumantree.com) to download our replacement bulb order form, or to contact us via e-mail to find the nearest NeumanTree dealer.