

LIGHTNING PROTECTOR FOR A ROUTER

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ABSTRACT

Lightning travelling through phone lines can damage the modem, Phone. If the computers, TV are connected to the phone lines via a router, there should definitely use a lightning protector to have the phone line plugged into the router and telephone. Computer has multiple voltage-sensitive components that a power surge could damage easily. This damage will shorten the life of the computer, and it could very easily wipe out all saved data or destroy the system. Because when we connect internet through router. And also Peo TV connection is connected to the TV via router. Those are very expensive items, and the data they hold is often irreplaceable, so install in a lightning protector over telephone line. A lightning protector will generally extend the lifetime of these devices. Because there is always a chance that a big power surge will cause damage. Designing a lightning protector for routers is the objective.

Keywords : *Surge, lightning, common grounding, surge arresters, transient overvoltage, MOV(Metal Oxide Varistor)*

1.0 INTRODUCTION

Burning the telephone line equipments such as telephones, routers, STBs(Set Top Boxes) and etc due to lightning is a common issue. Protecting the devices by lightning is very much essential for the areas where heavy lightning occurs frequently.

The aim of a surge or an overvoltage protection system is to assure the continuity of electrical power supply and minimize to an acceptable level for people and equipment any possible damages due to incoming transient surges. The most important feature of surge arresters is its rapid response time. Transient overvoltage could easily reach several kilovolts in a few microseconds. During this raise time, while them protector has not reacted; this increasing voltage reaches the connected equipment. Generally, the response time of the arresters varies between 20 and 100 nanoseconds. Surge arresters can be

installed in series or parallel, but in all cases they must remain inactive under normal conditions. Once the overvoltage starts, the protector will start working, leading the lightning current to ground.¹

From the investigations, it was identified that the grounding is the major phenomena should be controlled to design the protector. A common ground was used to design the circuit. The device can be installed in between any telephone line connected devices which should be protected.

2.0 EXPERIMENTAL

The circuit implementation of lightning protector is fitted to phone line. The technical specifications and characteristics of the lightning protector were studied in detail. They provide an alternate low resistance path to ground during a lightning strike, and thereby protect the electronic equipment connected to them. That's why it's important to have an excellent site ground. If the site ground is inferior, the lightning protection cannot offer the low resistance ground path, so the lightning will discharge through the electronics, leading to damage. The connection to a ground plane is as important as the surge protection device itself. Following proper installation techniques and attaching to proper grounding planes is required for a workable electrical grounding system.

- Do not sharply bend the surge protection wires during termination. Offer a straight path to ground.
- Keep the surge protection wires as short as possible to improve effectiveness and response time.
- Keep the surge protection device a few feet away from the equipment protected to allow enough response time for the transient voltage to be suppressed.
- Ensure all systems connect to the same grounding point only once. Multi paths to a ground plan create different voltage potentials on the system that can result in transient surges. This simply means only pound one copper rod in the earth for grounding.

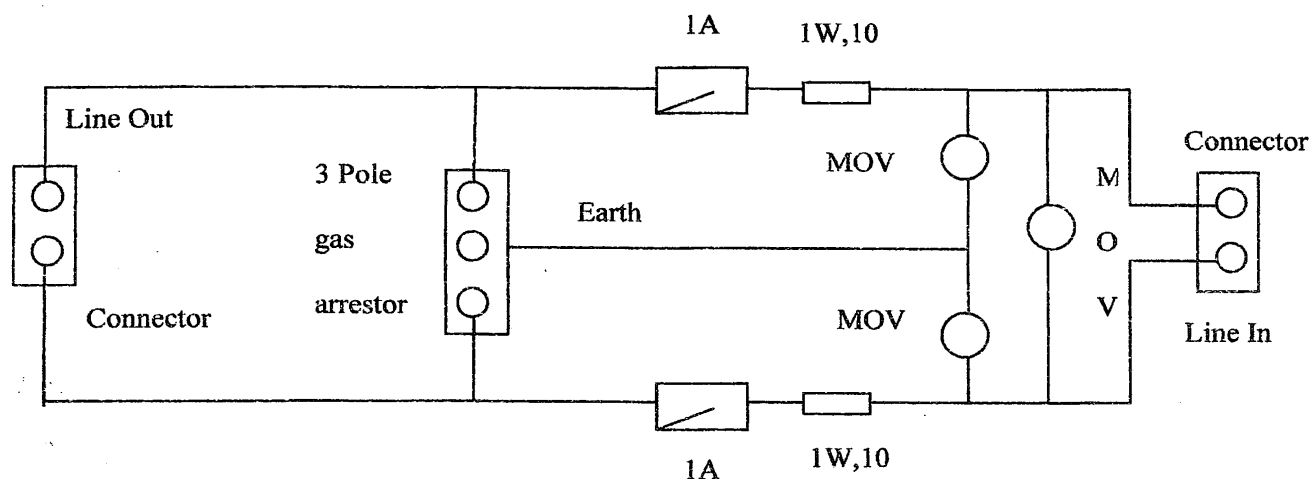


Figure 1: Circuit Design

3.0 RESULTS AND DISCUSSION

The device was tested with an area of heavy lightning occurs. The equipments which were connected to the telephone line, especially routers were safe after using the device series with the equipments. The specialty of this device is that it can be used in between drop wire and the rosette or in between rosette and the splitter or in between splitter and the router. So the advantage of the design is highly valued.

The protection provided by telecom operator and the devices connected to telephone lines is not always enough. Because most of time telephones, routers, arresters are replaced because of lightning. The protection usually is designed so that it minimizes the costs. It is not suitable to protect cheap telephones with expensive protectors, because strong lightning surge is quite rare and telephones are inexpensive to replace if such thing happens. The situation might be different when there is something more expensive than ordinary telephone connected to line. In the cases of having expensive computer systems, PeoTV^o are usually worth to protect because the damage caused by the lightning strike can cause very terrible damage. For example in computer, lightning strike can not only destroy the router but also something else inside of the PC or Peo TV. That can become very expensive if valuable information is lost and the PC is very important at our business. So sometimes extra protection is needed. If there is enough protection, the damage is avoided or at least minimized.

4.0 CONCLUSION

The major identified drawback is to have extra fuses to use in the case of burning existed fuses by a heavy lightning. But when comparing the price of a fuse with the price of a router and sometimes the consultant fee of the service provider it very much cheaper and negligible price. It is more cost effective than replacing expensive routers, computers, televisions, STBs and etc.

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