

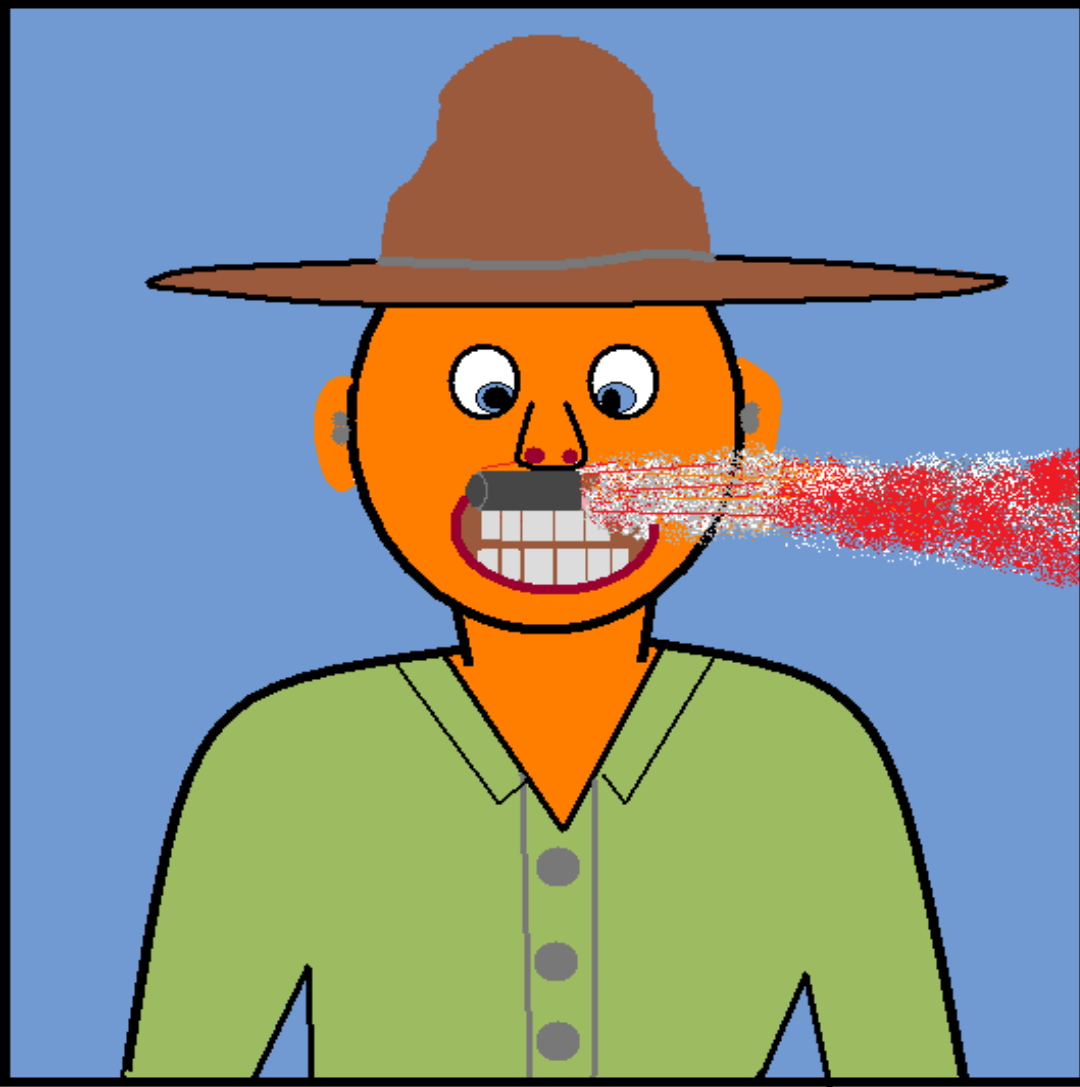
SURVIVING A LIGHTNING STRIKE

By Tom W9NBG

OR
DODGING
THE
BULLET

By Tom W9NBG

Surviving a Lightning Strike



Whats Better, a near miss or Boot Hill?

Surviving a Lightning Strike

- **##Three ways to handle LIGHTNING.##**
- 1. Build in Lightning Protection as part of your Ham Station.
- 2. Do nothing and pay for the recovery after the strike.
- 3. Prevent the LIGHTNING from striking or, a strike causing little to no damage to the station.

Surviving a Lightning Strike

- **1. Build Lightning Protection as part of you Ham Station.**
- This is a good approach but is expensive and is not guaranteed to work completely.
- Each coax leading and rotor wire into the Ham Shack has to be protected. A very good ground has to be used. **Just grounding the Radio is a bad thing to do because that attracts the Lightning.**

Surviving a Lightning Strike

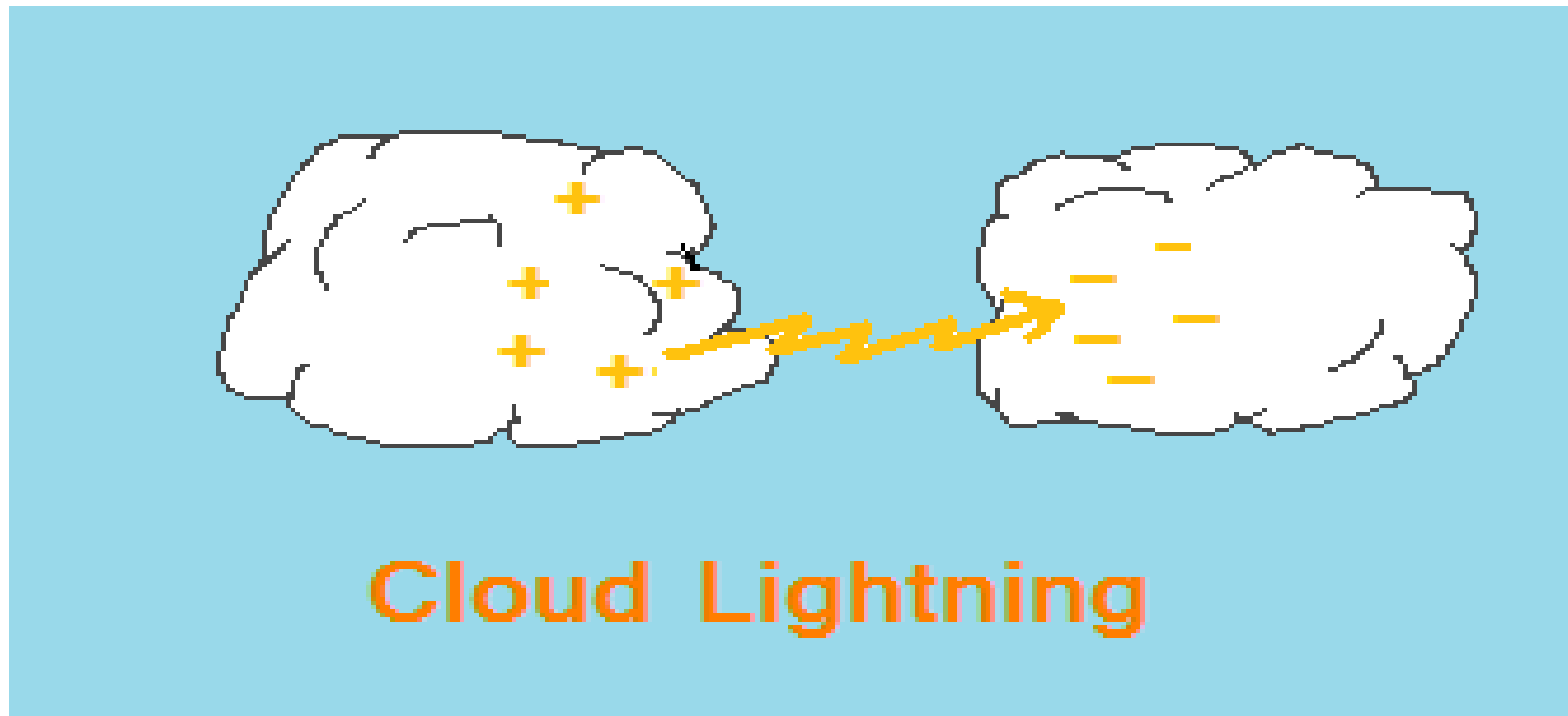
WHY IS GROUNDING EQUIPMENT IS A BAD IDEA.

The charge that builds up in a cloud looks for a place to get rid of the charge.

The charge can build up slowly then the electrons jump from the cloud to the grounded item. That is the Lightning flash that can be seen.

Surviving a Lightning Strike

- The charge that builds up in a cloud looks for a place to get rid of the charge. That can be to another cloud.



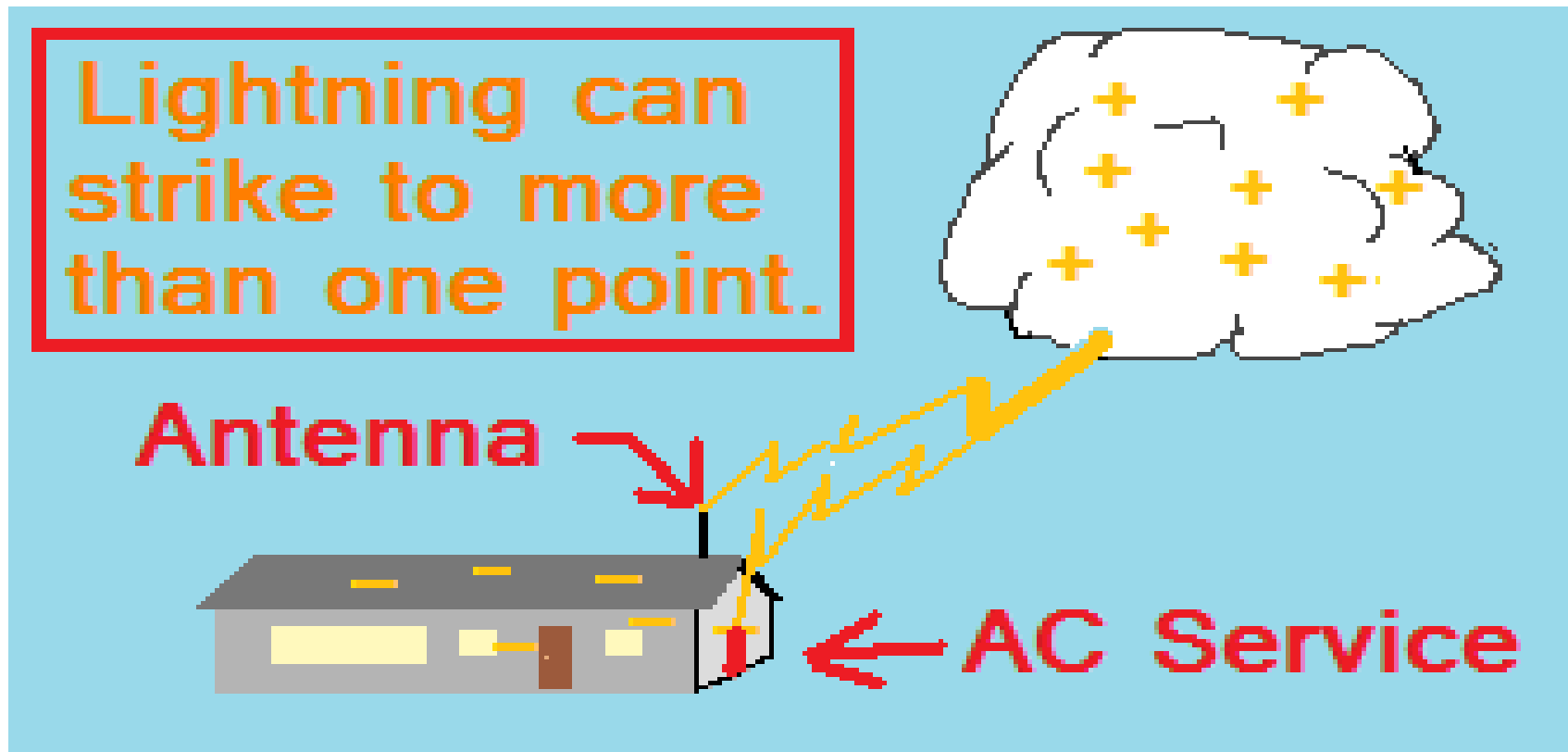
Surviving a Lightning Strike

The charge that builds up in a cloud looks for a place to get rid of the charge. That can be towards the ground.



Surviving a Lightning Strike

The points can be more than one.



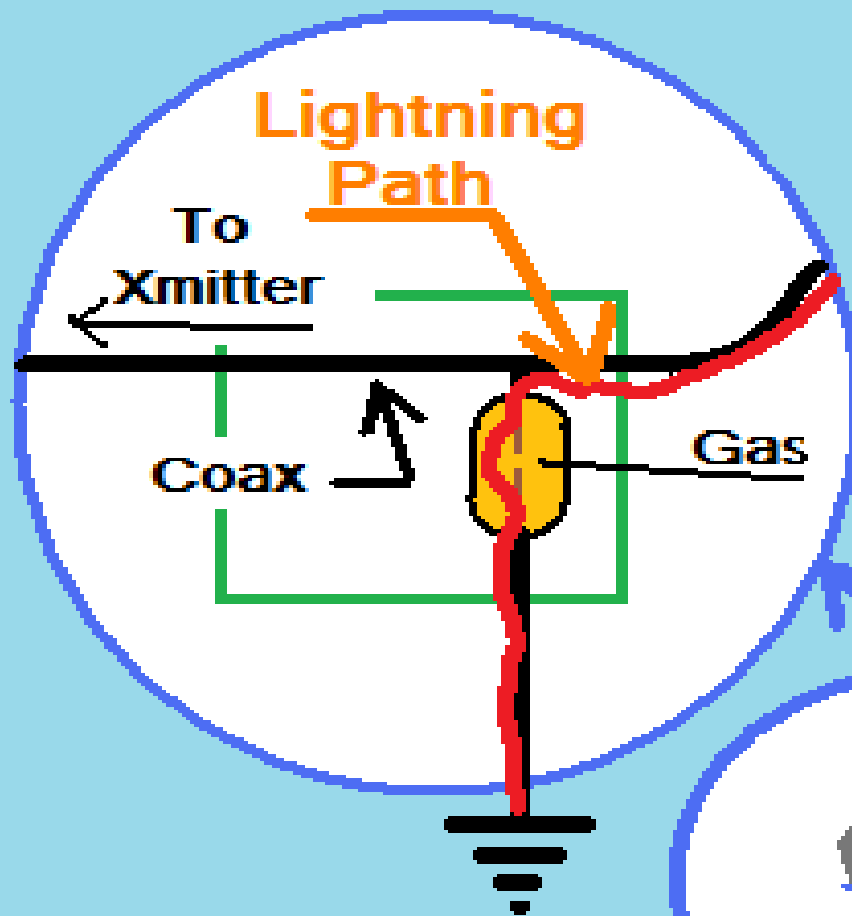
Surviving a Lightning Strike

- Grounding the Radio provides an **invitation to the Lightning to strike** the antenna and follow the coax into the house to the grounded Rig.
- If the Radios share a ground the Lightning may destroy all the Radios as it finds it's way to ground.

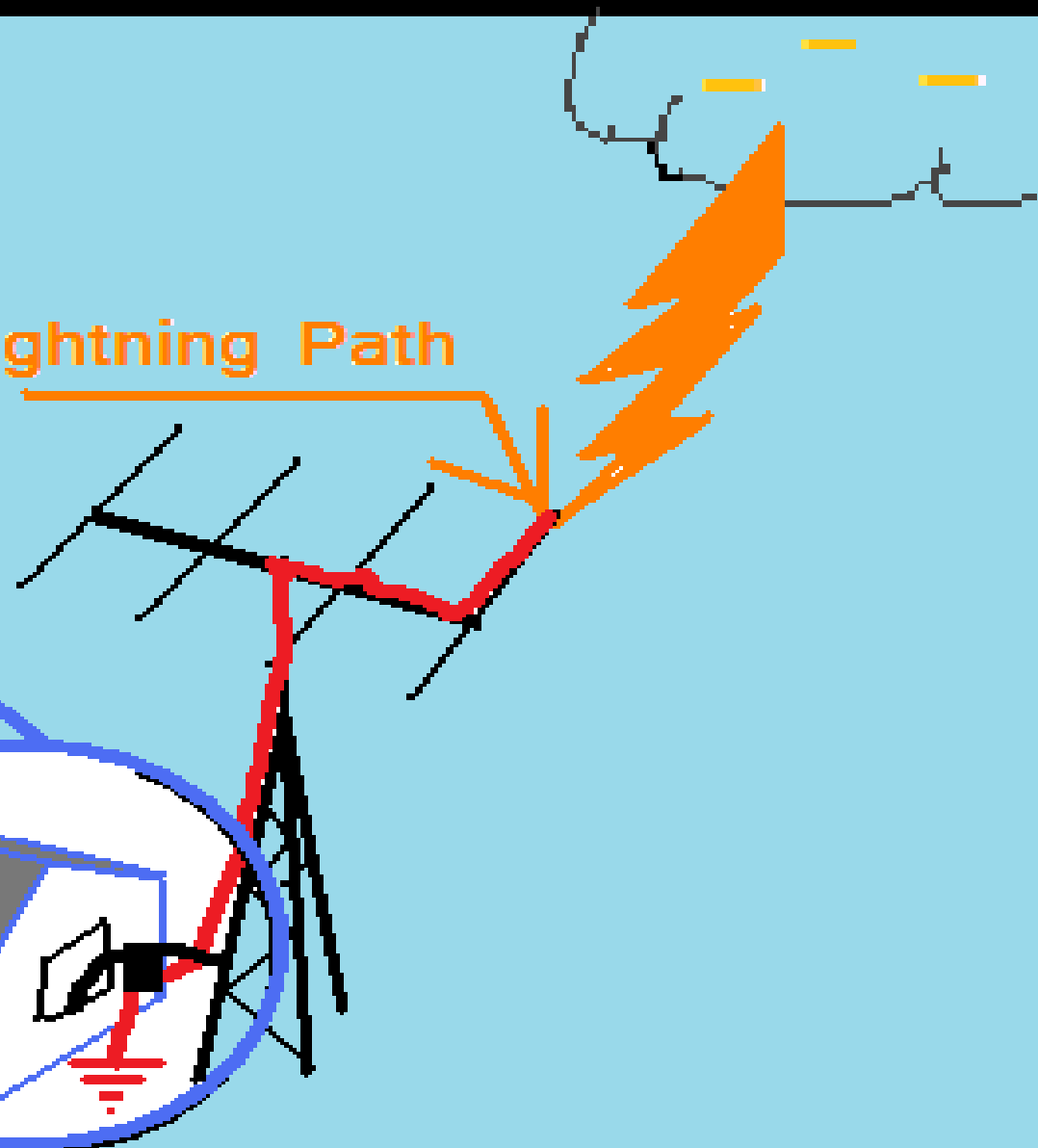
Surviving a Lightning Strike

- Lightning protection built into the Ham Station should keep the Lightning outside the house by using Surge Protectors on each coax and any other wires like Rotor Cables that go into the house.
- The Lightning arks in the Surge Protectors and is routed to ground. This keeps the Lightning outside the house and away from the Radio.

Surviving a Lightning Strike



Lightning Path



Station Wiring

Surviving a Lightning Strike

- What is the next thing to try?
- **2. Do nothing and pay for the recovery after the strike.**
- This is what happened to me two times and I will now show what it takes to recover.

Surviving a Lightning Strike

- If you have never had to recover from a Lightning strike it is good to learn what it takes to recover in work and expense, before you can decide which method to use to protect your Radio Shack.

Surviving a Lightning Strike

- **Let us cover method #2, below.**
- **2. Do nothing and pay for the recovery after the strike.**
- This is the easiest before the Lightning strike but the most costly after the strike.
- Ham Radios and other electronic equipment are generally a total loss for they can not be repaired because the equipment keeps going bad months to years after being repaired.
- More later on this.

Surviving a Lightning Strike

- **My actual experience with TWO strikes has been a great teacher.**
- 1st strike happened about 2002.
 - 1. I was in the Ham Shack in my basement, in Des Plaines.
 - 2. I had only a MFJ CW rig powered up by a small Power Supply and connected to an antenna.
 - 3. Had a 6 Meter Transceiver connected to a beam but not on.
 - 4. Had Gun Powder open because I was reloading Ammo.

Surviving a Lightning Strike

- The strike sounded like a lowed Snap coming from my Furnace. The guy next door thinks the Lightning hit his tree about 10 feet from my HF VERTICAL that the MFJ was connected to. The MFJ was damaged and so was the power supply it was connected to.
- The 6 Meter rig was OK and its antenna was about 50 ft from the strike.
- The Gun Powder did not exploded.

Surviving a Lightning Strike

- MFJ repaired the radio that was covered by my house insurance. It worked OK for the time I owned it. I hope they replaced the board. I did not know how serious a Lightning strike was to electronic equipment, then.
- I had a very low deductible.
- I got parts for the power supply.
- My Stereo did not work. But after I unplugged the power and it sat for about 10 min, and then applied power, it was OK.

Surviving a Lightning Strike

- **2nd Lightning strike happened in**
- **July 2020.**
- This Lightning strike was much more work and costly. Sunday night when the strike happened:
- 1.Lights went out in two bedrooms of my house.
- I spent over a week trying to fix the house electrical problem. Tested and replaced breakers. Removed wall plugs and tested for shorts. I could not find the short. I thought it was in the walls.
- Had to call a Electrician who found where
- Strike occurred, outside at GFI wall plug.
- Electrician cost about \$300, covered by insurance.

Surviving a Lightning Strike

- **2nd Lightning strike.**
- I did not find where the Lightning stuck because it was near night fall when I looked outside at the GFI box that was covered with a semi-transparent cover. It looked OK to me then.

Surviving a Lightning Strike

Outside GFI hit by Lightning.



Front



Back

Surviving a Lighting Strike

- 2. Lift Chair Charger/Power-Supply destroyed. Cost covered by house insurance, \$450.
- 3. TV RF amplifier damaged, covered by house insurance, about \$45.
- 4. Yaesu FTDX-3000 6Meter receive sensitivity very poor.
- 5. Transmitter Power setting changes on its own to half its setting.

Surviving a Lighting Strike

- Cost to ship and insure FTDX-3000, Yaesu California, \$130. Covered by insurance.

Surviving a Lighting Strike

- Cost to repair, \$0. Yaesu considers the
- **FTDX-3000.....**

Surviving a Lighting Strike

UNREPARABLE.

FT DX 3000



Surviving a Lighting Strike

- Cost to repair, \$0. Yaesu considers the
- FTDX-3000
- **UNREPAIRABLE.**



Surviving a Lightning Strike

- **UNREPARABLE.**
- Ham Radios and other electronic equipment are generally a total loss because they can not be repaired because the equipment keeps going bad months to years after being repaired.
- I talked on the air to a ham that had FTDX-3000 damaged by lightning.

Surviving a Lighting Strike

- He had the FTDX-3000 repaired for \$450. He said it was a waste to money because the radio keeps going bad even a year and a half later.
- **When I got my 3000 back the Scanning part of the screen was dead.**
- **The Decoder for CW, RTTY and PSK-31 no longer worked.**
- It has not change power settings.

Surviving a Lighting Strike

- Got a quote for a new Yaesu FTDX-3000,
- Over \$1,800. I paid more than that originally.
- Total cost of the claim: \$2,770.66
- My insurance company paid the claim right a way.
- But I have \$1,000 Deductible, so my loss is **\$1,000.**

Surviving a Lightning Strike

- So I got \$800 for the Rig. I replaced it with the Yaesu FTDX-991A. Cost about \$1,200.
- Since the FTDX-3000 was considered a total loss, I had it returned to me and Yaesu paid for the return shipping. I can not sell the Rig. 6 Meters and all the other bands are OK for Receiving and transmitting. It is now a backup Rig.

Surviving a Lightning Strike

- The insurance paper work took a few days to complete.

Surviving a Lightning Strike

- So what now???
- How do I protect the Ham Shack.

Surviving a Lightning Strike

- **3. Prevent the LIGHTNING from striking or a strike causing no damage to the station.**
- It is the cheapest way but you will see that it takes some personal effort. I have adopted this method at my Ham Shack.
- This is the preferred way for me in the long run.

Surviving a Lightning Strike

- The answer is simple!
- .

Surviving a Lighting Strike

- The answer is simple!
- Unplug the antenna from the Radio when I leave the Shack.

Surviving a Lightning Strike

- Unplugging the Radio from the antenna is so simple!
- But should be effective.
- Grounding the antenna can be helpful.
- Why?

Surviving a Lightning Strike

- This Lightning strike only damaged the circuits **inside the Radio.**

Surviving a Lightning Strike

- This Lightning strike only damaged the circuits **inside the Radio**. The external Power Supply was not damaged **like in the 1st strike**.
- The Lightning must have come in the antenna connector.

Surviving a Lightning Strike

- This Lightning strike only damaged the circuits **inside the Radio**. The external Power Supply was not damaged **like in the 1st strike**.
- The Lightning must have come in the antenna connector.
- The FTDX-3000 has 3 antenna connectors.
- The 6 Meter antenna was connected to the 2nd antenna connector.
- Another antenna was connected to the 1st antenna connector.

Surviving a Lightning Strike

- But do you want to reach to the back of the Radio and unscrew the antenna every time you leave the Ham Shack for the day?

Surviving a Lightning Strike

- But do you want to reach to the back of the Radio and unscrew the antenna every time you leave the Ham Shack for the day?
- Most Ham Shacks have equipment stacked and reaching the connector to remove and replace it IS DIFFICULT.
- That will become quickly a pain, and eventually not be done.

Surviving a Lighting Strike

- One approach that has been helpful to me and makes removing the antenna coax a reasonable task is moving the antenna connector to a convenient location.
- I use a Coax Switch mounted near the front of the Transceiver.

Antenna connector easy to connect to or remove from the switch.

Surviving a Lightning Strike



Surviving a Lighting Strike

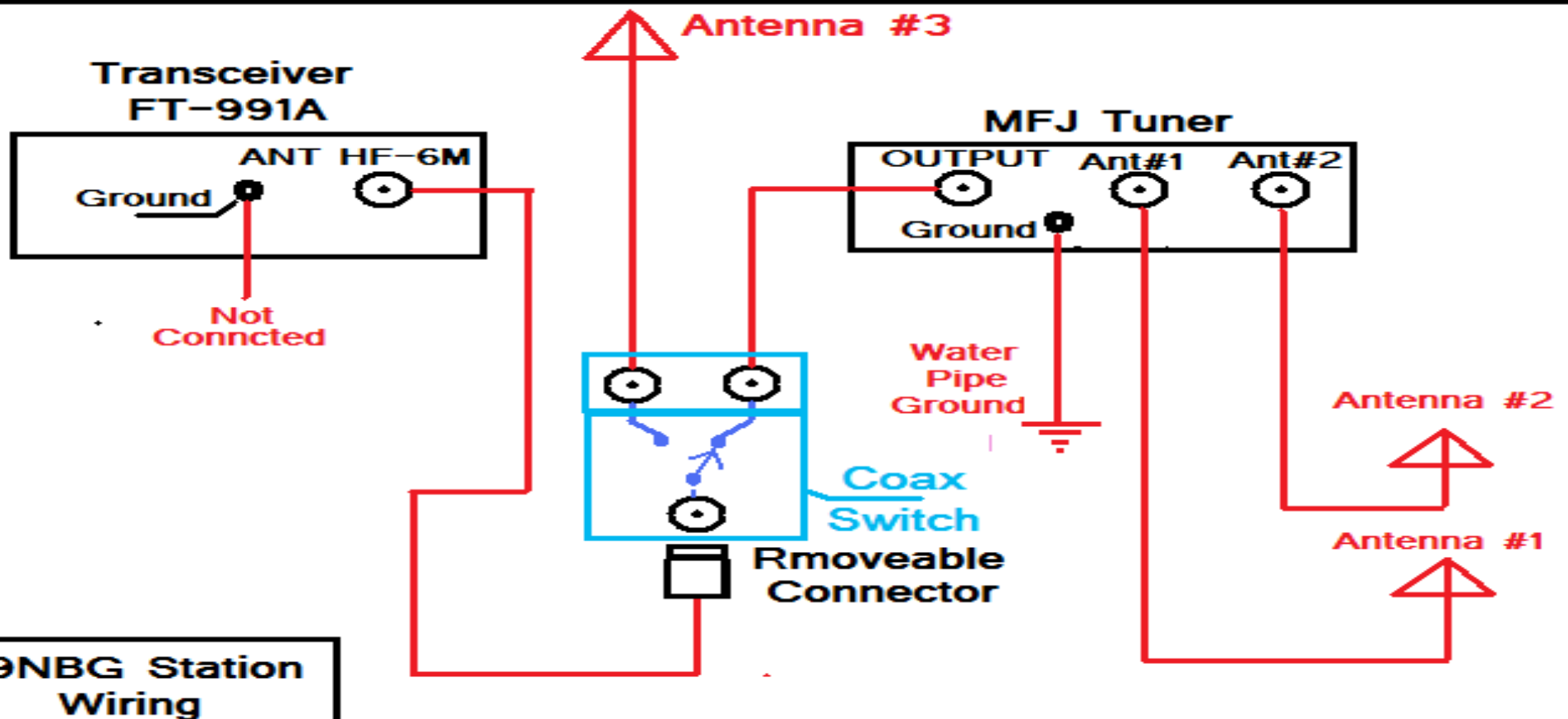
- A BNC connector can be use, its Bayonet locking arrangement is fast to remove and relock. But they can become unreliable.

Surviving a Lightning Strike

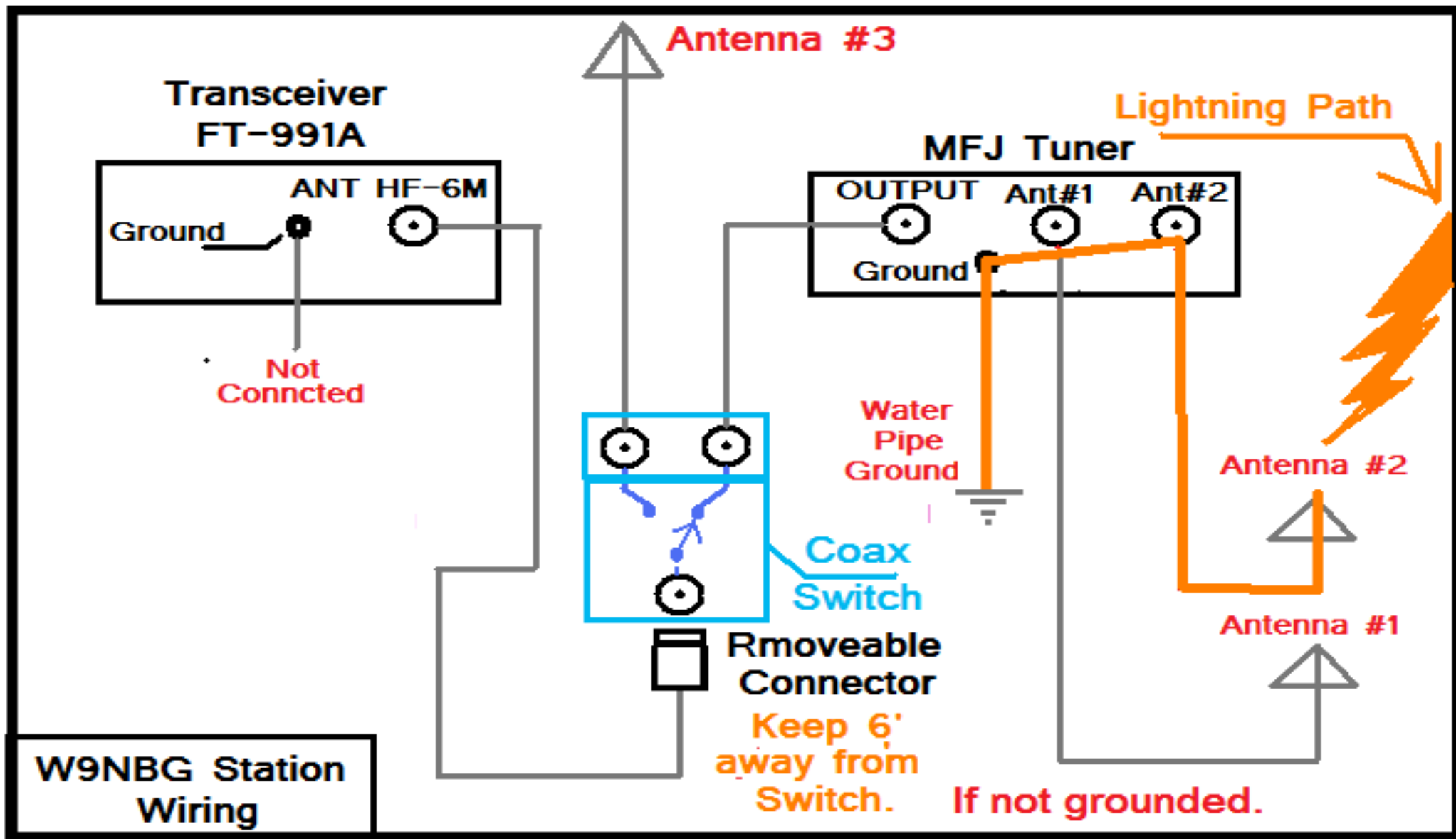
- I do not ground the Radio unless it improves the performance. My ground is connected to the Manual MFJ antenna tuner. The antennas remain connected to the tuner. Two antennas can be selected that are connected to the tuner.
- The only damage to the tuner in the 1st Lightning strike was a diode that burned out.
- I would not let an Auto Tuner left connected to an antenna, unattended.

Surviving a Lightning Strike

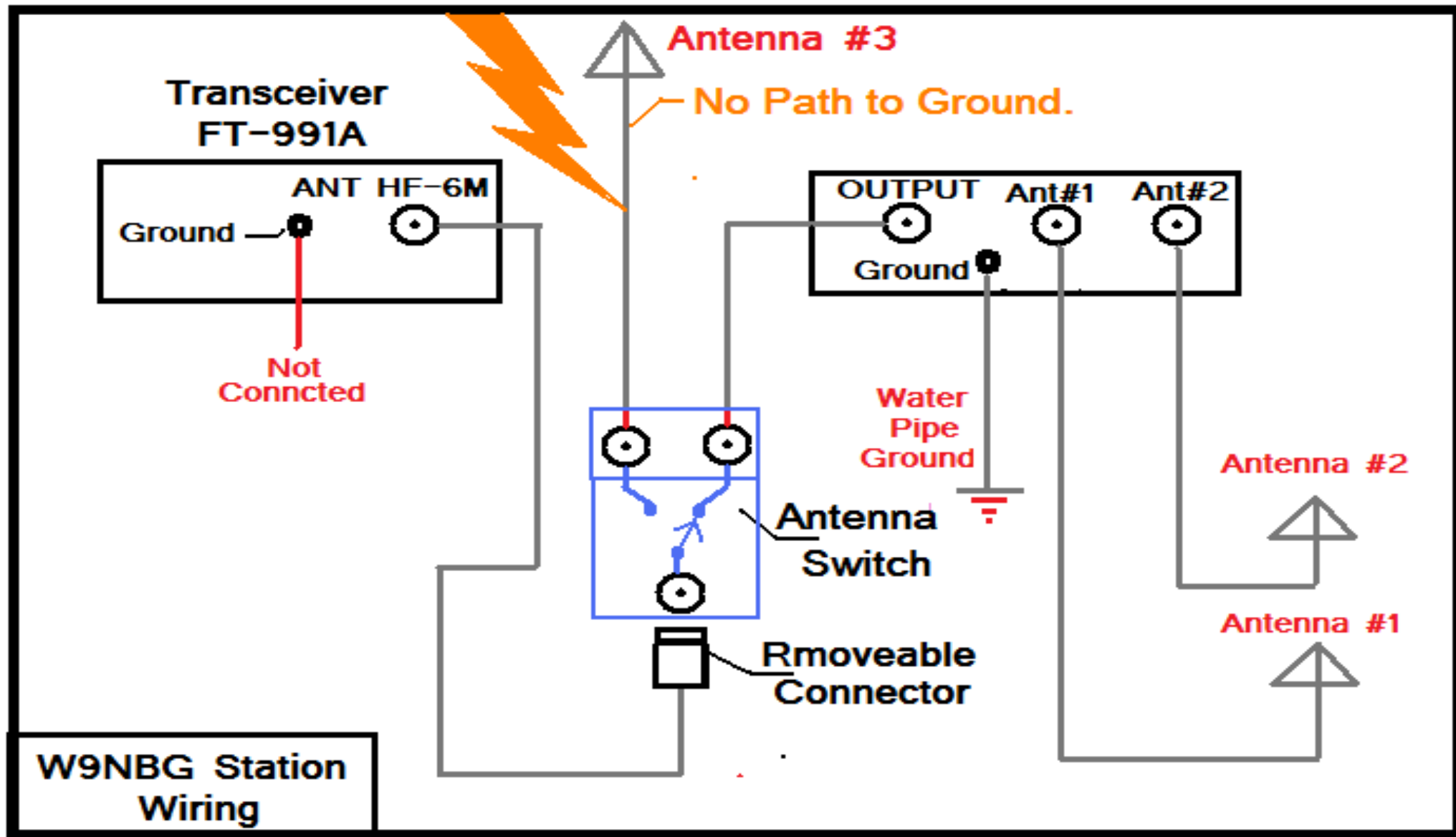
- One way for me to wire my station is shown below.



Surviving a Lightning Strike



Surviving a Lightning Strike



Surviving a Lightning Strike

- **Unplugging the Radio from the antenna is simple but so effective!**

■ **THE END**

■ **W9NBG**