

# 2952D- Reverse Engineering Sponsored by Texas Instruments



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*Smoke Detector*



Our team decided to participate in the Reverse Engineering Challenge sponsored by Texas Instruments. In this challenge, we broke down a smoke detector, and figured out what is inside the device. Along the way, we documented all of the things that we have learned.

Smoke detectors are used in everyday life to inform people if something is burning. We thought that understanding an object that is in our house is a very important thing. So that is exactly what we're doing. Another reason we did the smoke detector is because of how useful it is, It can save lives.



When we finally broke open the smoke detector we saw the motherboard. There were a lot of components but some of them we could already recognize. Some that we knew were the heat sync, the battery, and the sensors. Some of these looked like they were duplicated all around the motherboard. Some of the parts that were duplicated all over the motherboard were the resistors.



The resistors pass the electrical current from one place to another. This is useful because without it the smoke detector would just sense the smoke and nothing else would happen.

Other parts on the smoke detector only appear once in it, like the air horn. This piece is very important because of what it does. It is the reason you hear anything coming from the smoke detector. Another reason this piece is important is because that is the reason you know that



there is a fire, it's the only reason you know to evacuate. Other pieces are the heat sync, which is located right above the horn because it will keep it cool, so it doesn't go off in a false alarm.



Another reason why the smoke detector is very complicated is because of the lighting, which can show you if your smoke detector is working or not. It is very useful because if it doesn't work you won't know if there is a fire or not.



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Finally there is the capacitor, which senses the smoke. It contributes to the smoke detector because it is the reason the whole process starts

with the smoke detector. Without it, the air horn wouldn't blow. the battery which powers the whole smoke detector.



Last of all is

What my team and I learned from breaking apart the smoke detector is that it isn't just metal pieces with some electricity flowing between them. No, it is a whole machine that has the power to save lives. It has so much to it with all of the wiring and the components which can sound an alarm with just smoke. My team and I have learned all of the parts in the smoke detector and what they do to help the process.