



Texas Instruments Electronics Online Challenge 2020

Computer Analysis

Early 2008 Dell XPS Desktop

Team: 1715S

Name: Strikeforce

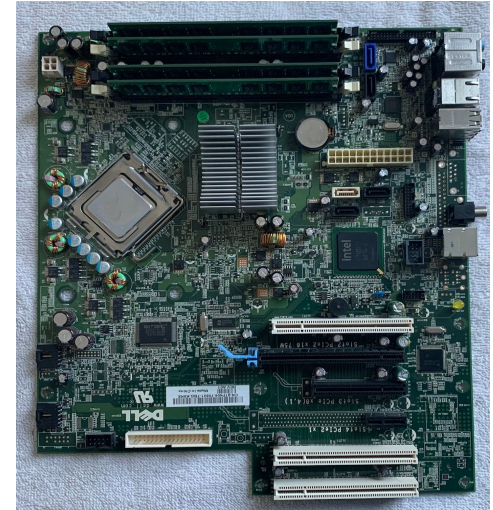
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Summary

This summary is a breakdown of the components of a motherboard taken from an early 2008 Dell XPS desktop computer. We've chosen this device because of the wealth of information that can be found by learning about the components on the device, and the likelihood of encountering TI-manufactured or designed parts.



After disassembling the tower, we decided to focus on the motherboard and components you can find located on it. You will also find basic information about the other main components of a desktop computer in this document, including the storage media, graphics card, power supply, and various other I/O devices.

Beginning at the top of the motherboard, you'll see a socket for the CPU, or Central Processing Unit. This socket allows different models and versions of a socketable CPU to be used in this computer, allowing you to modify the computer to suit your needs. The Central Processing Unit is commonly known as the “brains” of the computer. On the atomic scale, the CPU is made up of logic gates that control the flow of electricity. One example of these is an AND gate, which will only output a 1 if both inputs are 1, or on. When you put dozens of millions of these together, you can run complex instructions.

Looking elsewhere, you will see sockets for RAM, or Randomly Accessed Memory. These sockets allow for extremely high-speed volatile memory to be utilized for the CPU.

Moving down, you'll find PCI-E expansion slots. These are high-speed direct connections to the CPU that allow you to attach additional devices to your computer. Some examples of these devices include a wireless card, a video capture device, a sound card, and a graphics card. CPUs have not been the best at running 3D applications, because these programs require parallel processing. This is why graphics cards, with thousands of low-power cores, exist.

Some other components include:

The chipset - This device controls various external inputs and outputs of the computer, including USB and Ethernet. The chipset also controls hard drives and other internal components such as the PSU.

The power supply - This device converts and closely manages and monitors the power that the computer receives.

There's also a Texas Instruments microcontroller on this motherboard. This component manages IEEE 1394(FireWire) connections. This typically is used to connect to external hard drives or cameras and behaves similarly to USB.

Resistors - these limit the amount of current that flows through. The resistance varies.

Capacitors - these help smooth the flow of electricity by storing a charge and discharging it when the input voltage drops.

Diodes - these permit electricity to flow in only one direction.

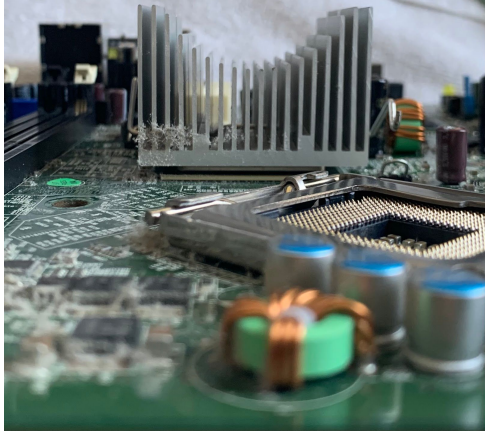
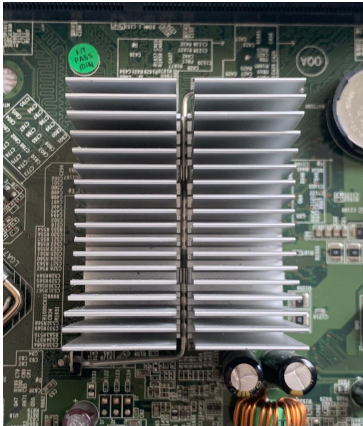
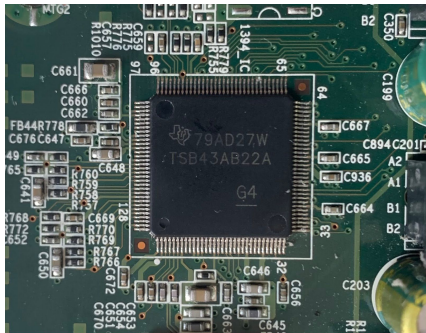
Transformers - which have the ability to change the voltage of an electrical current with coil windings.

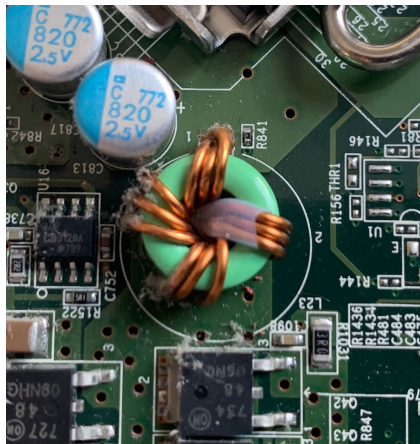
Transistors - which amplify or change electrical signals.

Inductors - which have the ability to reduce, or block high-frequency electrical noise.

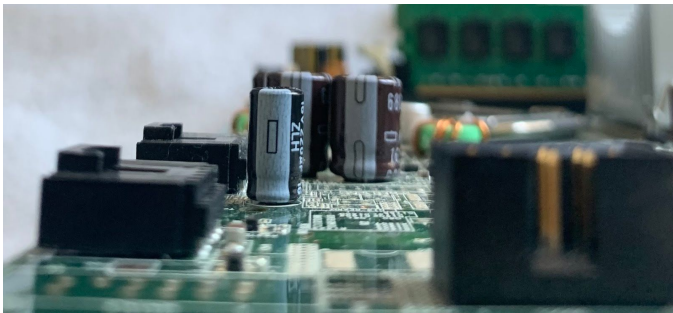
Throughout this process, we've learned that even as modern technology advances, the roots of basic technology are still seen to this day.

Images

Image	Description
	-Chipset + Heatsink-
	-Heatsink-
	-Texas Instruments- -FireWire controller-



-Inductor-



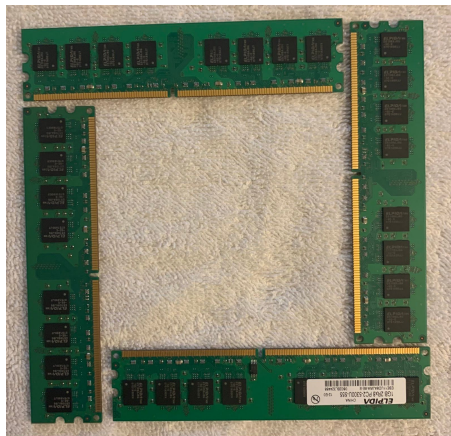
-Capacitors-



-Wireless Card-








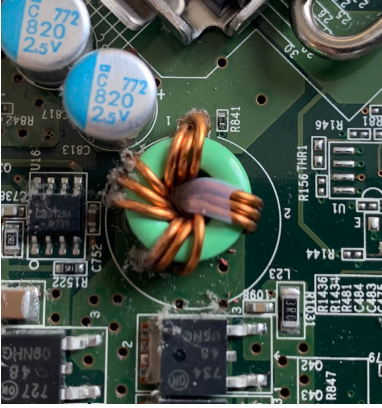

-Graphics Card-

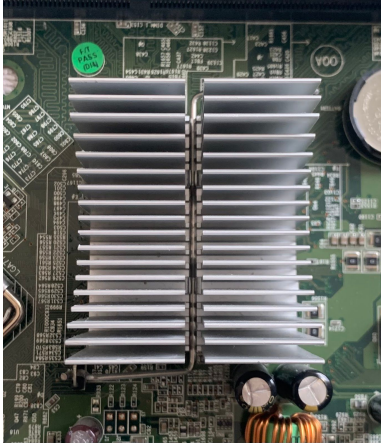
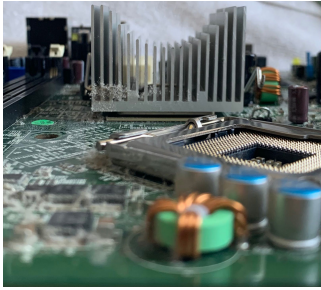
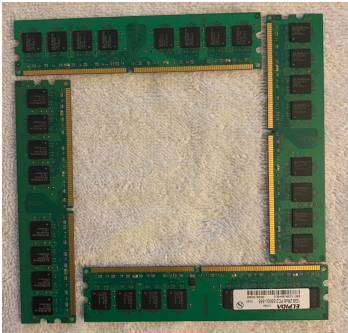


-RAM-

What Are They? What Is An Example?

Image	What Is It?	Examples
	CPU - The heart of the computer.	You can solve math problems with this
	The Motherboard - where most parts of the computer are located and connected	N/A
	Graphics Card - Renders and displays images on your screen.	Images such as this document are rendered here.

	<p>Wireless Card Communicates wirelessly with radio frequencies to other computers</p>	<p>Connects you to the Internet</p>
	<p>Capacitors Smooths voltage spikes by storing charge and using when needed</p>	<p>Without this, your computer would constantly shut off</p>
	<p>Inductor Filters out high frequency electrical noise</p>	<p>When parts are so close to each other on a board, some electricity can “leak” out and mess up other signals</p>
	<p>FireWire controller Manages FireWire connections</p>	<p>This was the fastest and best way you could upload videos from your camera back in the day</p>

	<p>Heatsink Absorbs and dissipates heat</p>	<p>Prevents computer components from overheating</p>
	<p>Chipset (under heatsink) Manages devices such as the hard drive, Ethernet, and USB</p>	<p>Tells the hard drive what to do and tells the CPU where your mouse is</p>
	<p>Randomly Accessed Memory A fast way to store data</p>	<p>Without this, it would take a lot longer to start Windows</p>

Resources

The text below are hyperlinks

- **Texas Instruments Parts Lookup (FireWire)**
- **Dell Technologies (Motherboard)**
- **Asus (Graphics Card)**
- **Intel (CPU)**
- **Elpida/Micron (RAM)**
- **Information about resistors, capacitors, diodes, transformers, transistors, and inductors**



We would like to thank you very much for viewing
our submission and we hope that you enjoyed
reading this as much as we did writing it!