# How computers store data

Computers work using **electricity**.

This powers the hard drive, processor, screen etc….

It’s also the only way that computers have to store data in memory.

When they process data this must also happen using electricity.

# How computers store data

The circuit boards and chips that make up the inside of a computer are basically made up of lots of really thin wires.

To connect these wires together we use switches.

Switches are the only way that a computer can process data. When a switch is turned on electric current can flow; when it’s off it can’t.

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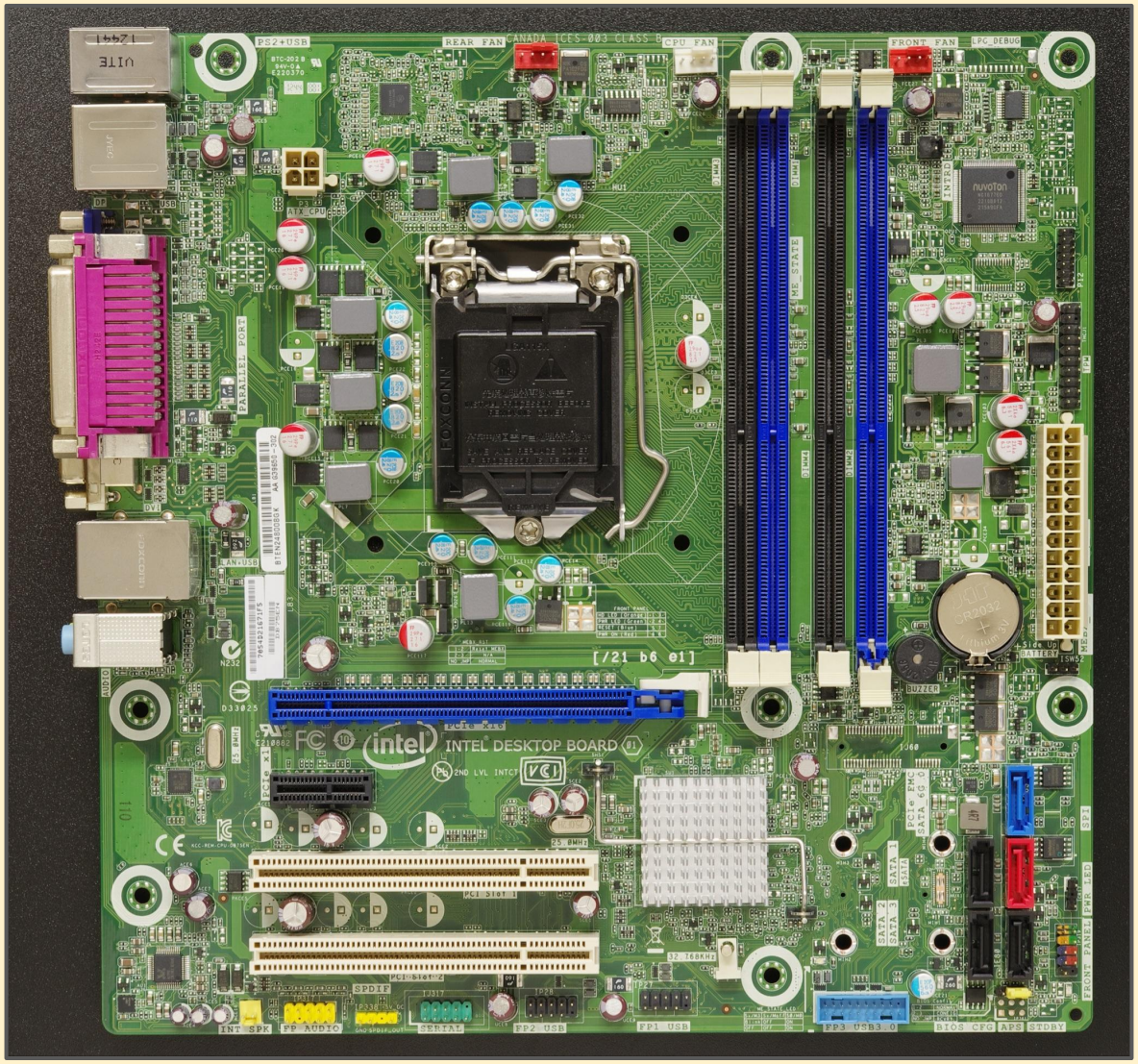

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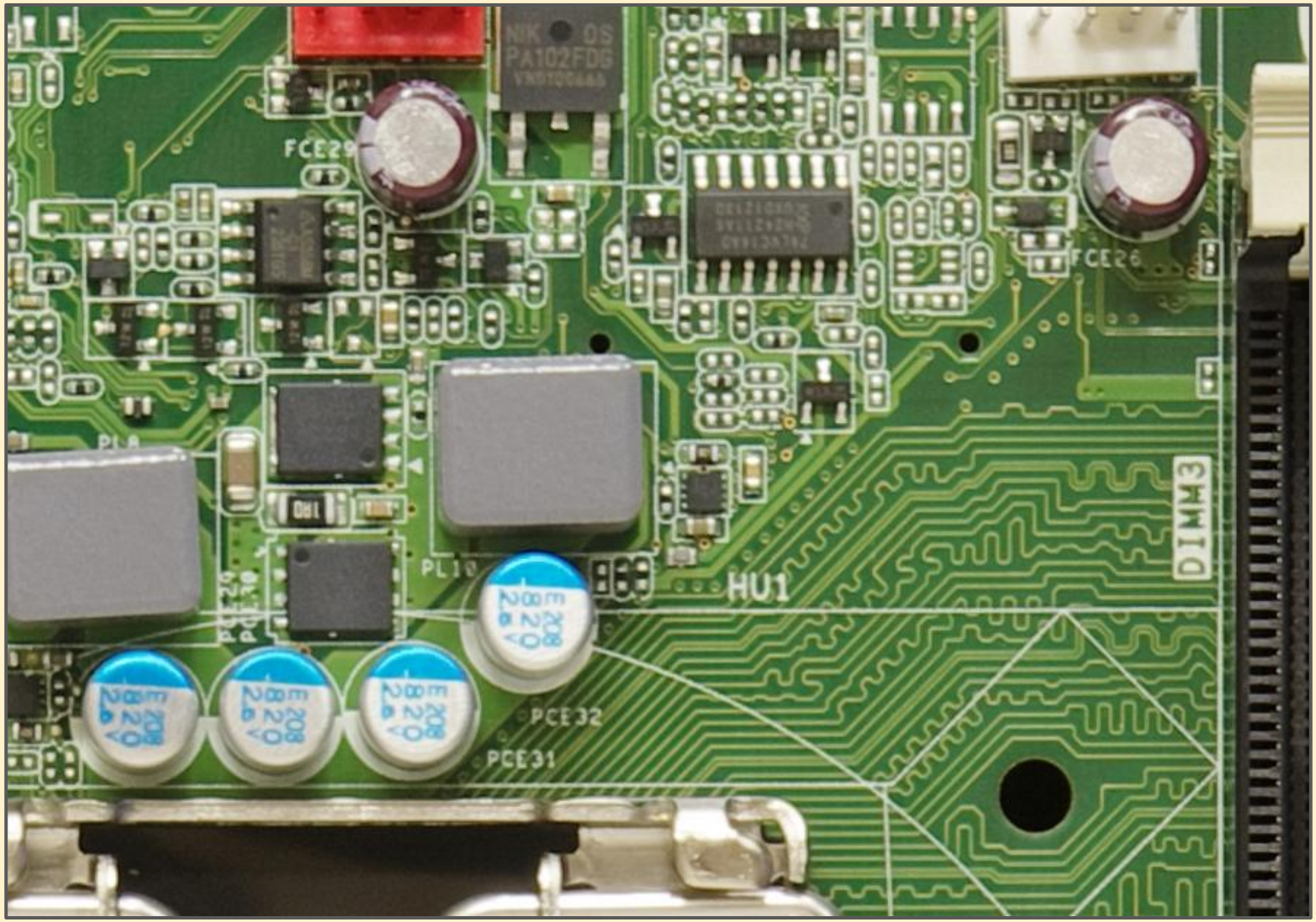

# How computers store data

Each switch can either be turned on or off.



This gives us two possible values for each switch – on or off

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So, switches are the only way computers can store data.

But each switch has only 2 possible settings.



So, what values can each switch represent?

# How computers store data

Each switch has only 2 possible settings.


On = 1


Off = 0

The only thing we can do, is have two values - 0 and 1

So, an on switch is 1; an off switch is 0

That means that everything in a computer has to become a number

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## Summary 1:

- Computers work by using **electricity**
- Computers store and process data using **switches**
- Switches can be **on** or **off** - two possible values
- This gives us **two possible values** of 0 and 1 for each switch
- **Everything** in a computer gets stored this way
- So, everything that is stored by a computer must end up as a number using 0s and 1s

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## Summary 1:

- Computers work by using **electricity**
- Computers store and process data using **switches**
- Switches can be **on** or **off** - two possible values
- This gives us **two possible values** of 0 and 1 for each switch
- **Everything** in a computer gets stored this way
- **So, everything that is stored by a computer must end up as a number using 0s and 1s**

# How computers store data

So, how can we store bigger numbers?

# How computers store data

If you have 2 switches, how many different combinations of on and off are there?

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If you have 2 switches, how many different combinations of on and off are there?


2 switches = 4 combinations = 4 numbers

What numbers shall we call them?

# How computers store data

What if you have 4 switches in a bank?

# How computers store data

How many different combinations are there?

# How computers store data

What if you have 4 switches in a bank?

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# How computers store data

## How many different values can you store using 4 switches?

# How computers store data

What if you have 8 switches in a bank?

# How computers store data

## Summary 2:

- Everything that is stored by a computer must end up as a number using 0s and 1s
- The 0s and 1s can be combined to make larger numbers - the more switches you have, the bigger the number you can store or process
- This way of counting is called **binary code**
- This is why computers use **binary** (and why you need to know it!)