Pons' Guide To Tech

Literally everything I know

This is going to be structured as well as I can, similar to old Walkthroughs.
Every chapter will receive its own unique "Identifier", something like "(0000x0)"
While these have no meaning by themselves, these are simply used as a way to quickly navigate over to a certain chapter, there will only ever be 2 of one within this document.

The current date is December 2nd, 2025

Chapter 1

The Basics:

- **CPU/Processor** (0004x1)
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  - Data Connections ()
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- **Graphics** (0008x1)
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- **Displays** (0009x1)
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        - Refresh rate ()
    - Display Types ()
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        - LCD (Liquid Crystal Display) ()
        - TN (Twisted Nematic) ()
        - IPS (In-Plane Switching) ()
        - VA (Vertical Alignment) ()
        - OLED (Organic Light-emitting Diode) ()
            - What about AMOLED and POLED? ()
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        - Quantum Dot Displays ()
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- **Power Supplies** (0010x1)

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- Different Standards ()
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  - SFX ()
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- 80+ and why it isnt enough anymore ()
- The Cybenetics Rating System ()

- **<u>CABLES</u>** (0011x1)
- What actually is a cable? ()
  - USB (Universal Serial Bus) ()
    - USB1 ()
    - USB2 ()
    - USB3 ()
    - USB4 ()
    - USB-C ()
    - Micro-B USB > 3 ()
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  - Sound Only ()
  - Video Only* ()
  - Networking ()
  - Power Only ()
  - Why USB is so hard to classify and buy/sell ()
    - The USB “Standards” ()

– Phones
– Laptops
– Smart devices

- Servers
- Mini PCs
- Raspberry Pi / Micro PCs

Electricity & what runs on it (0000x1)

Just about everything I'm going to be talking about here runs on electricity! Power! It is in an almost literal sense the lifeblood of most of modern technology, and while I obviously wont throw everything at you at once, I **am** going to explain some basic concepts to you.

What actually is Electricity? (0000x2)

Electrons moving from one point to another. That is about it, really.

It only really gets more complicated once you want to actually do anything with it, but that is the exciting part, is it not? Harnessing something so tiny that its moving on the same size-level as actual photons?

For those who maybe were just never taught, heres a quick rundown of what an electron is.
Everything is made up of atoms. Look around, everything is made up of tiny, even smaller than microscopic parts called atoms. Atoms are also made of stuff, however, **Protons**, positively charged parts, **Neutrons**, which seperate the protons from eachother, and they have **Electrons**, the negatively charged parts, flying around.
Protons are already absolutely tiny, right? They absolutely dwarf electrons, that's how small these are and why its so hard to really do anything with them in a consistent manner.

That is what we will get into here.

Different properties of Electricity (0000x3)

This is where it *can* get a bit complicated, but stay with me here, trust me, this will matter down the line! We are going to go through the basics for now, the more complicated stuff only comes later on if you're interested!

Watts (0000x4)

How much electricity is needed to get the job done / is being consumed.
This can be anything from turning on a light bulb, or just ringing a door bell, or in the upcoming topics, your PC!
(You can calculate this with "Volts x Amps")
So for example, your lamp might need 65W of electricity/power to function properly, however, there is a lot more to electricity, such as...

Volts (0000x5)

You can essentially imagine Volts as the "Speed" or "Tension" of the electricity.
A more "official" way of saying it would be "The measure of how strongly a current is sent through an electrical system".
(You can calculate this with "Amps x Resistance")
But what exactly are...

Amps (0000x6)

How much Electricity is flowing through something.
This is also why it's so important for any of these other calculations, Watt just tells you a requirement, and Volt tells you the "pressure", but neither can do anything without anything actually moving in the first place.
(You can calculate this with "Watts / Voltage")
While with electronics you will USUALLY be talking about Watts and Volts, it is also important to keep the Ampere / Amp in mind, as this tells you how much electricity is actually flowing through right now.
There is still one missing puzzle piece however, and that would be resistance, otherwise known as...

Ohms (0000x7)

Ohms are the resistance that every electrical current meets to some degree.
Later on I will get into more detail about this, but this can be a good thing, too, which is why little components called “Resistors” exist, but that is a bit advanced for now.
(You can calculate this with “Volts / Amps”)
What I mean by resistance is quite literal in this case. (To my knowledge) No material has truly *no* resistance to having a current run through it simple because everything is made of atoms, there will be *something* in the way, all the time. Some things have more or less resistance than others, though, but explaining all that will also be for later, when I get into the chemistry/physics of it, if you are interested.
Within electronics, resistance is commonly used to lower the voltage for something in order to not fry a delicate electrical component, where “Resistors” are used to very precisely lower the pressure of the current.

AC vs DC (0000x8)

First of all, what do these stand for?
AC stands for “Alternating Current”
DC stands for “Direct Current”
I will be referring to these as both AC and DC for both ease of reading and writing

AC essentially means that the current, the electricity, constantly changes in a predictable manner, which it does by cycling its voltage/tension from highs to lows1 until something changes. Now, this sounds chaotic, but there are some advantages for this:
1. It is quite easy to change the voltage of this kinda current because of how “liberally” its handled
2. It is a lot easier to transmit this over long distances, since you can always just add more, unlike with...

DC, which is one constant, non-alternating current.
What this means for you is that this only moves in one direction, at one speed.
This is what AC is turned into (in most cases) once electricity comes from your outlet to your electronic device, since the electricity from your outlet is quite high voltage / has a ton of tension, making it quite dangerous. DC is incredibly stable but hard to alter after the fact, unless you use tiny components like resistors that I mentioned!

Why should I care? (0000x9)

This is honestly a pretty good question, can't exactly blame you for it.
The reason why all of this matters is REALISTICALLY only once we get into what a power supply is and into the smaller, electrical components.
This will turn into quite a big topic later on, what with power efficiency and such, but if you truly only want a more basic understanding, I suppose this wouldn't matter that much to you.
Yes, unless you want to make this into a degree, you won't really need to fully understand everything about this and keep it all in mind, but I'd argue that it is important context for a decent amount of the future topics in this document, at least when it comes to hardware.

What is a "Chip" anyway (0000x10)

Essentially a small wafer, made out of semiconductors, with circuitry carved/embedded into it.
What EXACTLY a semiconductor is, is something I will explain in more detail later on, for now you can just think of it as, yknow, the main material responsible for actually having electricity go to where it needs to go, in the *exact* state it has to be, since it is a *conducting* material.
For the most part, chips look just about as you probably imagine them to look like right now, lil black boxes with some pins on the outside, or on the bottom.

The basic setup of an “electronic board” (0000x11)

Like with most things, this is incredibly simple in nature, but has almost infinite potential. Essentially what an electrical board does is two things, it holds the components in place and it offers routes, or “traces” for the electricity to follow as it travels through it.
You (usually) have a beginning and an end, one point where electricity enters, and one where the wattage (how much it needs) is ideally the exact same as how much actually reaches that point, essentially leaving you with 0 leftovers.
What a ton of people do as their first project is something real simple, they get a little battery they can hook up to their board, usually just through lil wires, plan out a route for the electricity, place a resistor or two so theres more resistance along the route, leaving them with JUST enough wattage to power the little LED light at the end.
This same principle of “add/substract from this load” can be heavily expanded upon in many ways, but for this example, this is already enough.
You would need the resistors because odds are, the little LED isnt made with the same voltage/tension as your battery is, so you have to lower the voltage a little before you can safely power your LED, else it might burst or just burn outright.

Some basic electrical components (0000x12)

So, I’ve mentioned some already, but never *quite* went into what they actually do, these are at least some basic ones to get you a solid baseline to work with:

Trace: Essentially a “road” for the actual electricity to travel
Resistor: A bit of material that has a certain amount of Ohms (Resistance), usually used in order to hit a certain target voltage. These are bi-directional.

Diode: While not a resistor, these CAN be used as one. These are not bi-directional, but one-directional, with ideally NO resistance from one side and ideally infinite resistance from the other.
The most common use for these would probably be LEDs, which are “Light Emitting Diodes”

Transistor: Both an amplifier and a switch
Transistors are weird, because depending on how you route electricity through them, you can either use them as a switch to turn a signal on or off (cutting power changing it from 1 to 0, for example), or you can use them as an amplifier, in order to... yknow... amplify the electricity's current running through it.
Its ability to act as a switch allows it to even run basic logic! If you have a chain of them, you can set it up so that "if these are 0 1 0 0 1 then do X", which is the basis for every single electronic we have and have essentially ever had.
This is why the Transistor is often called the most important invetion of the 20th century.

Capacitor: Essentially a mini-battery
A capacitor does exactly what the name would imply that it does, it saves up a charge of whatever current is running through it, usually in order to add some wiggle room, in case the current has a short hiccup. If these didn't exist, any minor sway or error in power supplying would cause your device to shut down!

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