Fundamentals of Electronics

Electronics Design, Drawing a Schematic, Layout Design, Trace Routing, Resistors, Transistors, Schematic Symbols, Footprints, Printed Circuits Boards – What is this all about? Let's take a look into the world of electronics.

Electronic Components

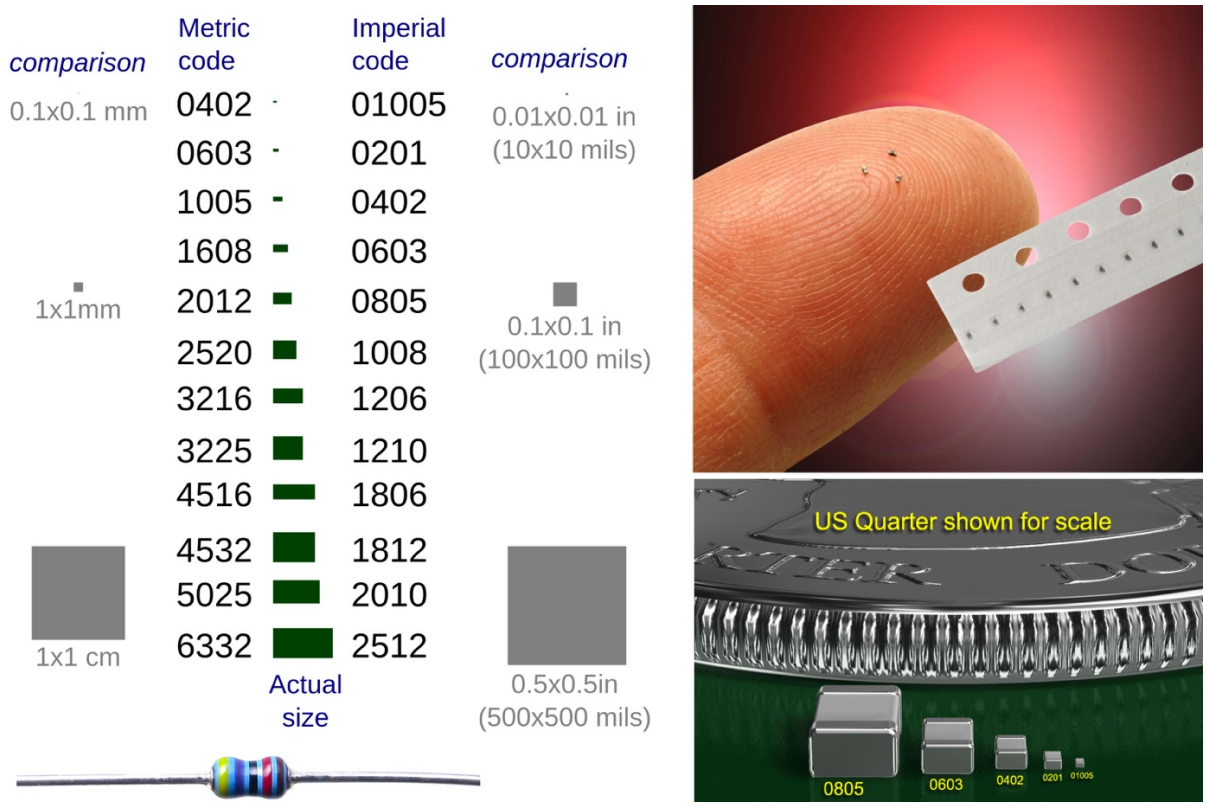
Resistors, Capacitors, Transistors, Inductors, LEDs, MOSFETs, Op-Amps, Diodes, Logic Gates and many more different components are available. As an electronic engineer you know all these expressions and what they describe. If you do not know, take a look into the web. There you will find all lot of information about them.
Further information is available in the Autodesk EAGLE blog via the following links:

How to Choose the Right Resistor?
→https://www.autodesk.com/products/eagle/blog/how-choose-right-resistor/
All about Capacitors
→https://www.autodesk.com/products/eagle/blog/everything-need-know-capacitors/
What Is an Inductor, In Plain English?
→https://www.autodesk.com/products/eagle/blog/inductor-plain-english/
How does a diode and LED work?
→https://www.autodesk.com/products/eagle/blog/diode-led-work/
What is a Transistor?
→https://www.autodesk.com/products/eagle/blog/transistors-world-modern-electrons/
How Transistors Changed Electronics Forever
→https://www.autodesk.com/products/eagle/blog/how-transistors-changed-electronics-forever/
Op-Amps – A beginners Guide
→https://www.autodesk.com/products/eagle/blog/op-amps-beginners-guide/
How the Integrated Circuit Works: Everything You Need to Know
→https://www.autodesk.com/products/eagle/blog/integrated-circuit-moores-law/
How do Microcontrollers work?
→https://www.autodesk.com/products/eagle/blog/how-microcontrollers-work/
How Logic Gates Work in Digital Electronics
→https://www.autodesk.com/products/eagle/blog/you-shall-not-pass-how-logic-gates-work-in-digital-electronics/

There is another amazing development in electronics. As you know all our electronic devices are getting smarter and smarter and at the same time smaller and smaller.

Miniaturization of Electronics
→https://www.autodesk.com/products/eagle/blog/the-miniaturization-of-electronics/

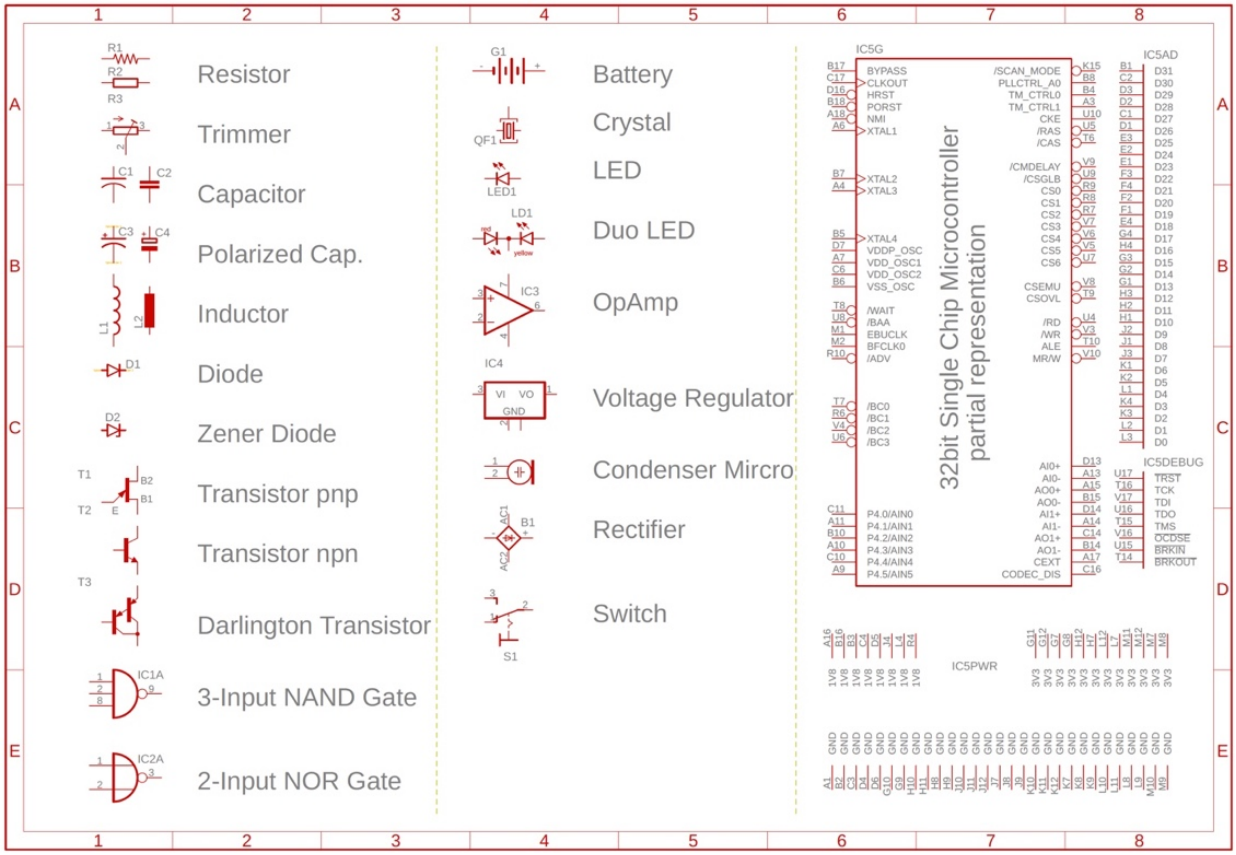
The following image shows an impressive change of size for electronic devices.



RESISTORS IN DIFFERENT PACKAGE SIZES

Logical Representation of a Component in a Schematic Drawing

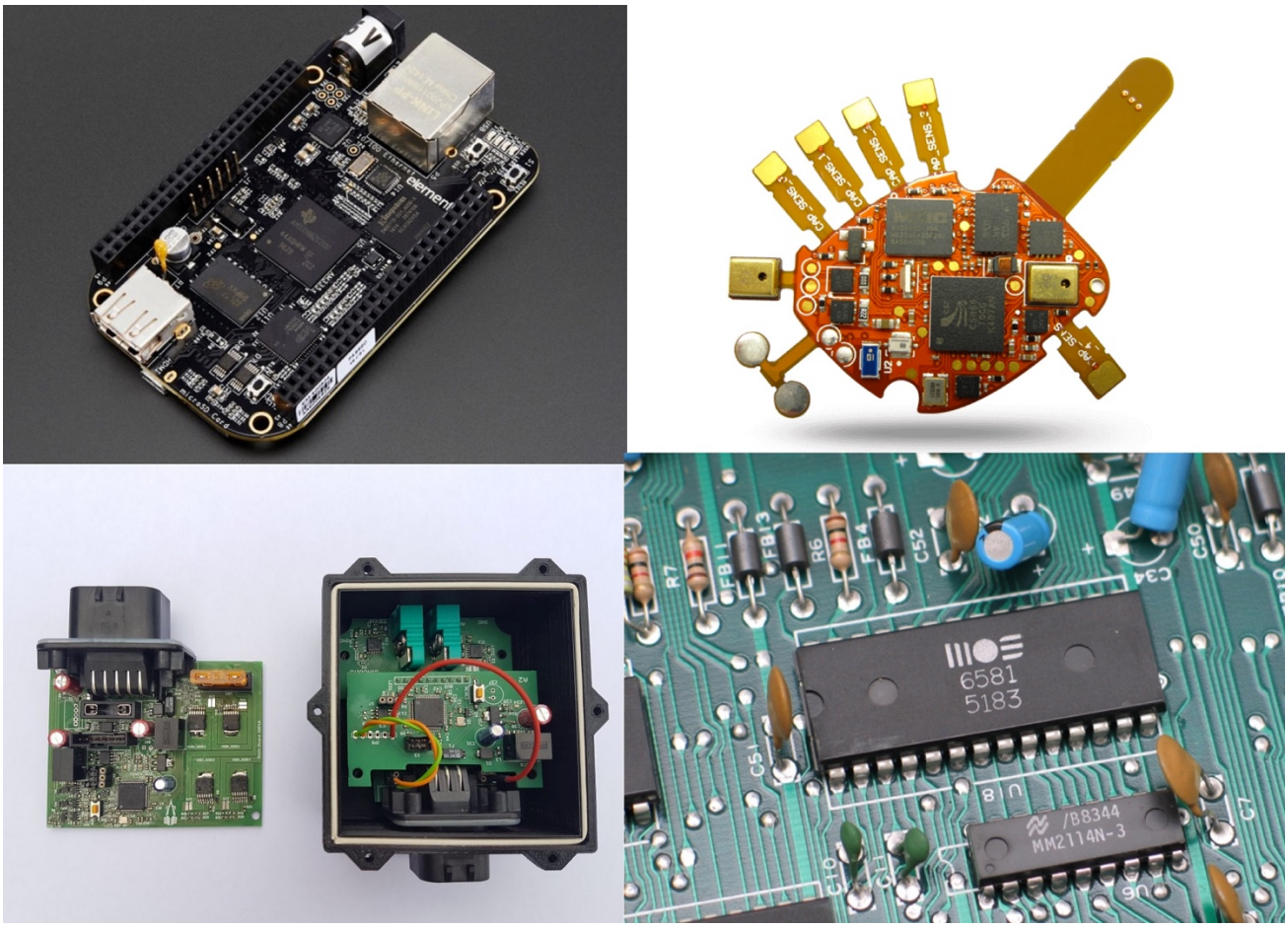
The Schematic is a drawing that contains symbols, the logical representation of components. Some examples:



SYMBOLS USED IN THE SCHEMATIC DRAWING

How Do Printed Circuits Boards Look Like?

PCBs are available in all kind of shapes. They can be rigid or flexible or a combination of both. Some boards have components on side or even on both sides (top and bottom side). The vast majority is two layers. This means copper traces on top and bottom. Depending on complexity the can also have more copper layers, so-called inner layers. EAGLE supports up to 16 signal layers.



PRINTED CIRCUIT BOARDS

Further information is available via the following link:

Printed Circuit Boards
→ https://www.autodesk.com/products/eagle/blog/printed-circuit-boards-10000-feet-introduction-electronics-beginners/

How is a PCB manufactured?

The basic data format for industrial manufacturing of a Printed Circuits Board is Gerber data and Excellon data for drilling. Please follow these links to get further information:

Gerber and Drill data
→ https://www.autodesk.com/products/eagle/blog/gerber-nc-drill-pcb-manufacturing-basics-1/
PCB manufacturing.
→ https://www.autodesk.com/products/eagle/blog/pcb-manufacturing/
Alternative options for PCB manufacturing:
→ https://www.autodesk.com/products/eagle/blog/additive-pcb-manufacturing-desktop/