

2.2.2 Contacts

✚ **Contacts**, meaning **mechanical contacts** here, are a major part of most electronic products. Even if there is no mechanical switch anymore, you still have the contact between the plug and the outlet, and/or the contact springs for the batteries.

✚ **Contacts** include the following items:

- Switches, **plugs**, relays, connections to removable parts (batteries, light bulbs, ...), **pantographs** (the thing on top of a locomotive), "brushes" (for motors), and so on.
- Contacts are also the components or materials that often cause **trouble**. Contacts or switches are often the first components to break, and thus a nuisance to consumers like you and me.

✚ There are many specific requirements for **contact materials**:

- Small contact resistance (it is never zero).
- No sticking or welding under load.
- No **abrasion** under load.
- No intermixing of materials.
- No wearing and tearing.
- Suitable mechanical properties, e.g. good elasticity (forever) for switches.

✚ There are specific materials and group of materials generally favored for contacts:

- **C** (graphite in many forms) for pantographs and whenever you want to draw a big current.
- **Cu, Ag, Au.**
- **Ru, Rh, Pd, Os, Ir, Pt.**
- **Mo, W.**
-

- An example of [Ag-based contact materials](#) can be found in the link.
- For contact applications we find **expensive** materials, because in many applications only small quantities are needed and the inertness of noble metals is what counts.