Revolutions towards Embedded Systems

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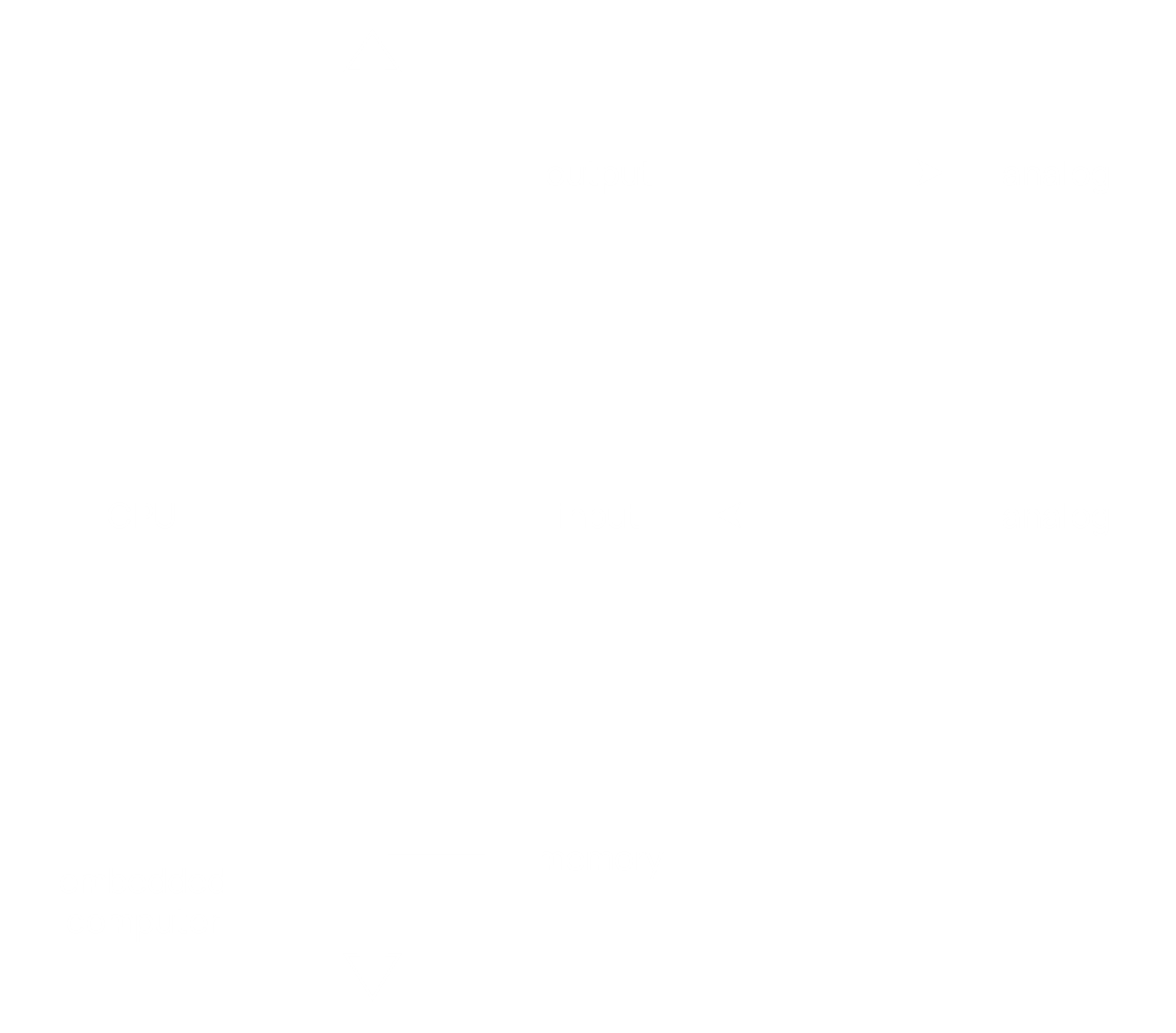
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As discussed before, an **embedded system** is a system which has multiple hardware and software components in the same device. Embedded systems can be of three types, **small scale**, such as mobile phones, **medium scale**, such as ATMs, and **large scale**, such as aeroplanes.

While we still use computers, those exist as a general-purpose tool. Embedded systems exist with some specific purposes. They also thus have specific requirements:

* Low-cost hardware
* Aggressive optimization techniques due to the limited storage space
* Simulation based development environment, which is different from the application environment
* Run continuously for extremely long times (e.g. pace maker)
* Work without human intervention
* Work exactly on time

## Embedding a Computer



An embedded system consists of a **microprocessor**, some **memory** and **I/O interfaces**. The number of each of these components varies depending on whether we are dealing with a small scale embedded system, a medium scale one or a large scale one.

Each of these components is a **separate IC**, and all of them need to be **directly connected** to each other. Thus, for ICs, we need connections. For even a handful of ICs, this will result in an unmanageable number of connections.

To avoid this, we can use a **common bus**. This removes the need for multiple connections and also provides the benefit of being able to easily add more ICs.

## Bus Technologies

We will now be examining two **bus technologies**, Controlled Area Network (CAN) Bus and Inter-Integrated Circuit (I2C) Bus.