Block diagram example

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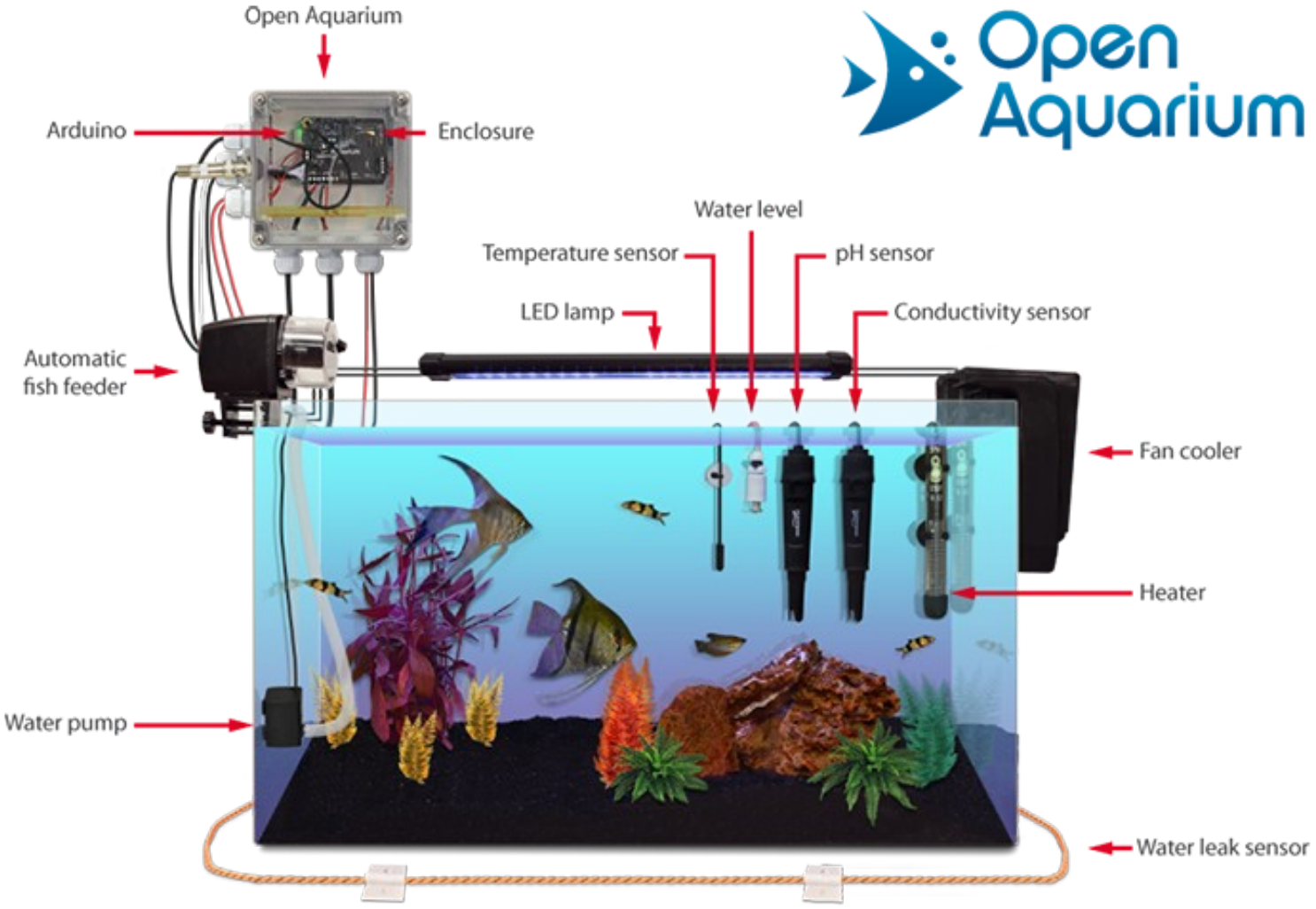
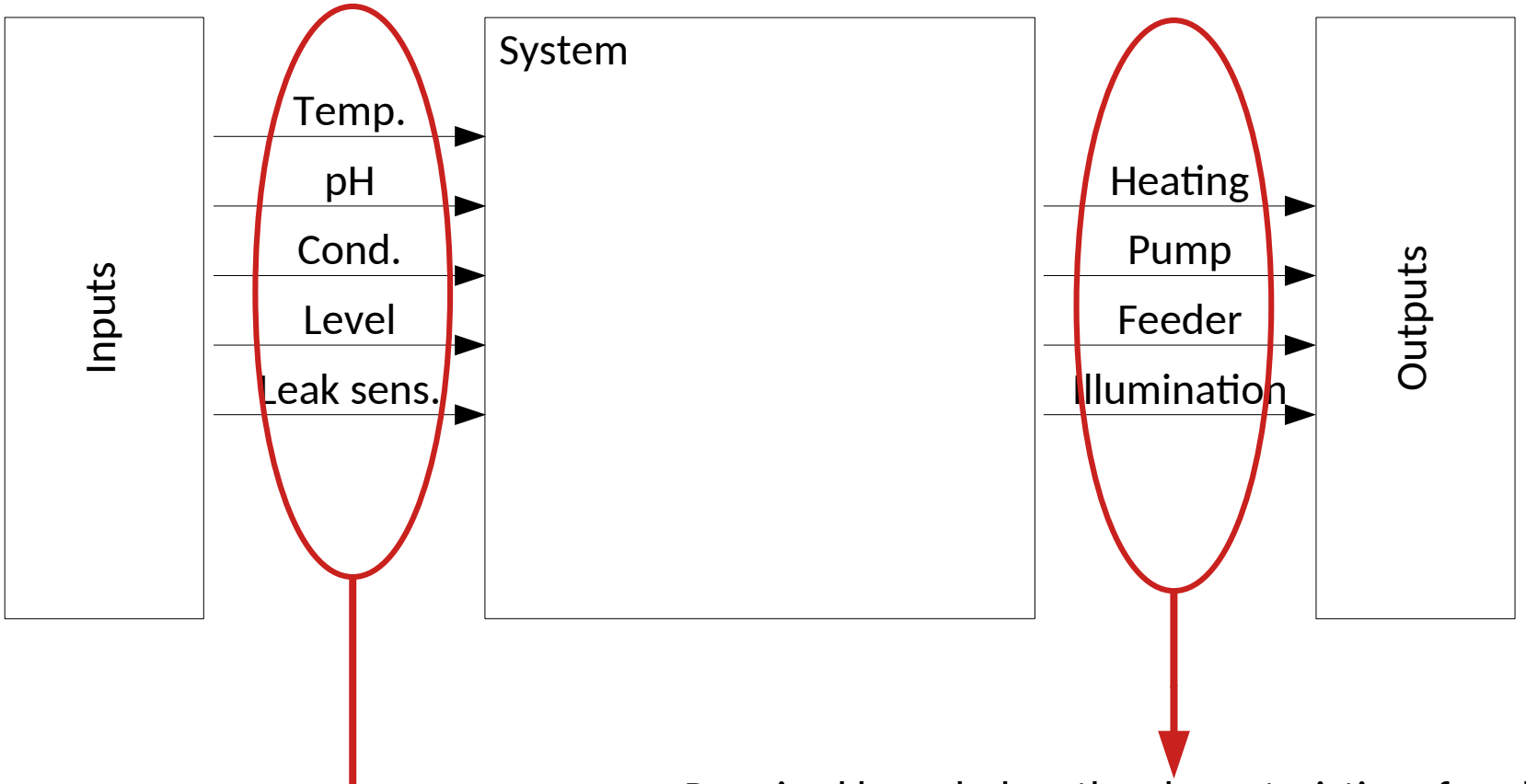
Aquarium control



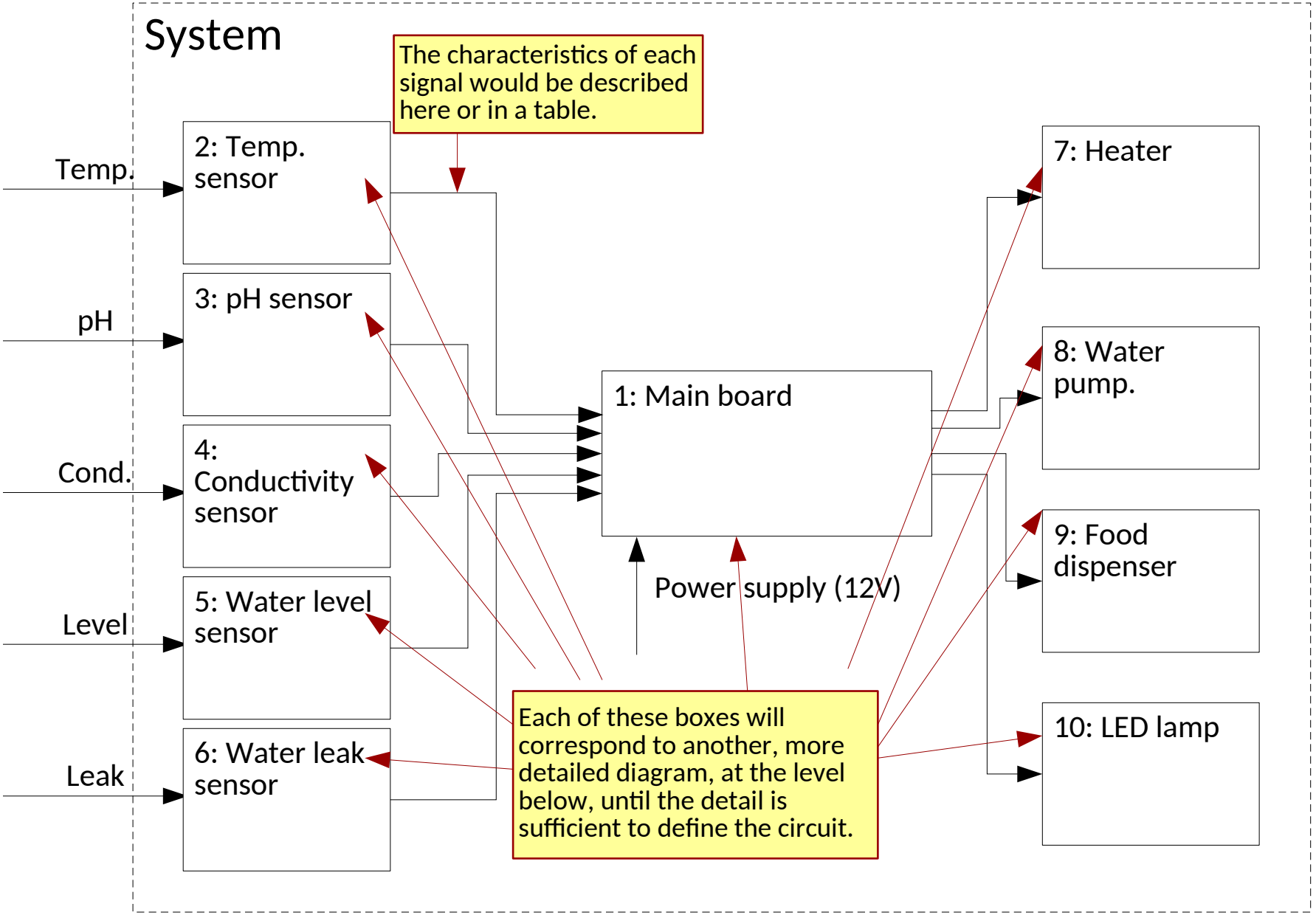
Block diagram: level 0: System

User requirements are usually defined at this level.



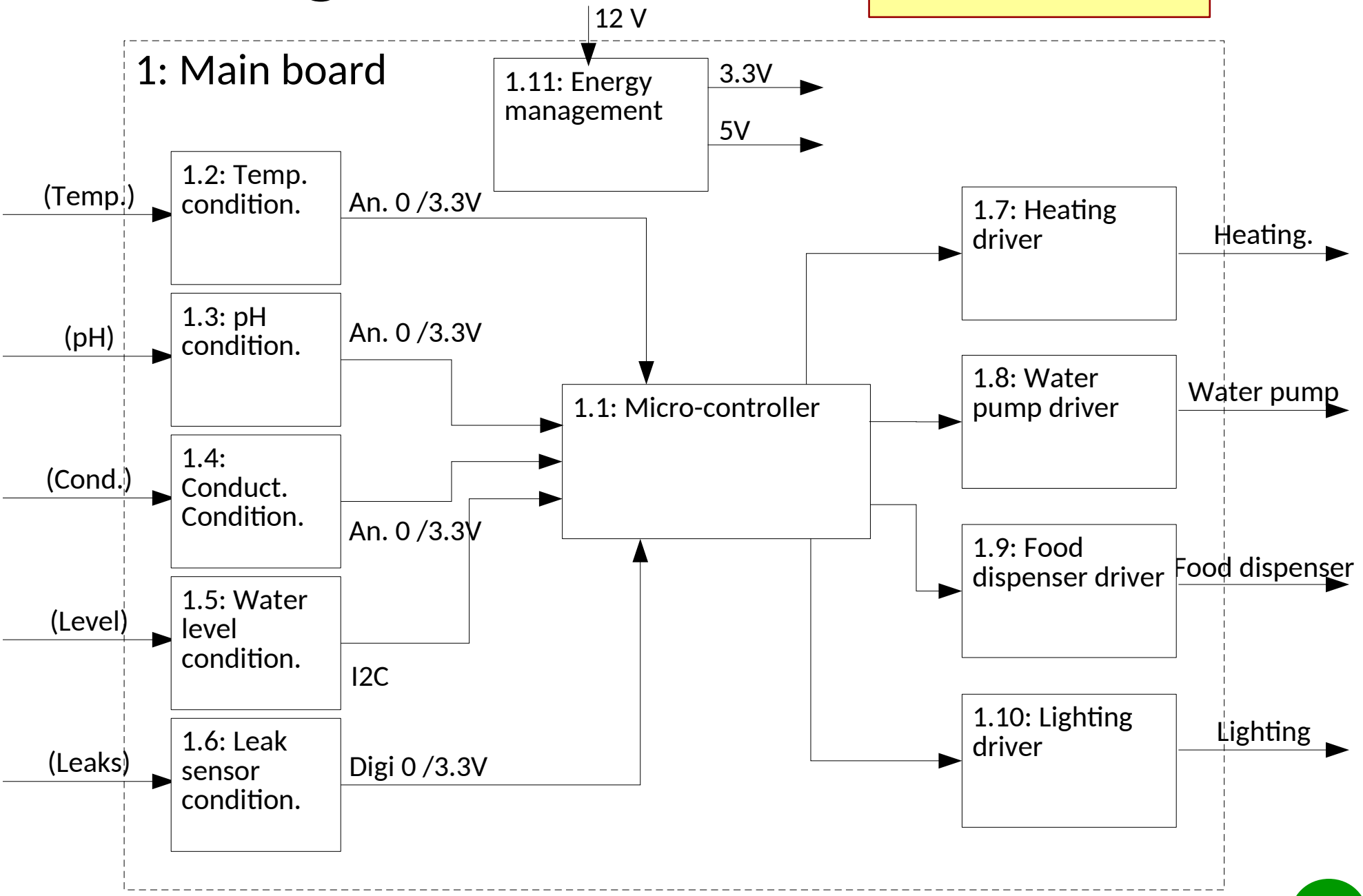
Required knowledge: the characteristics of each signal to be handled by the system (incl. value range, frequency spectrum, ...)

Block diagram: level 1



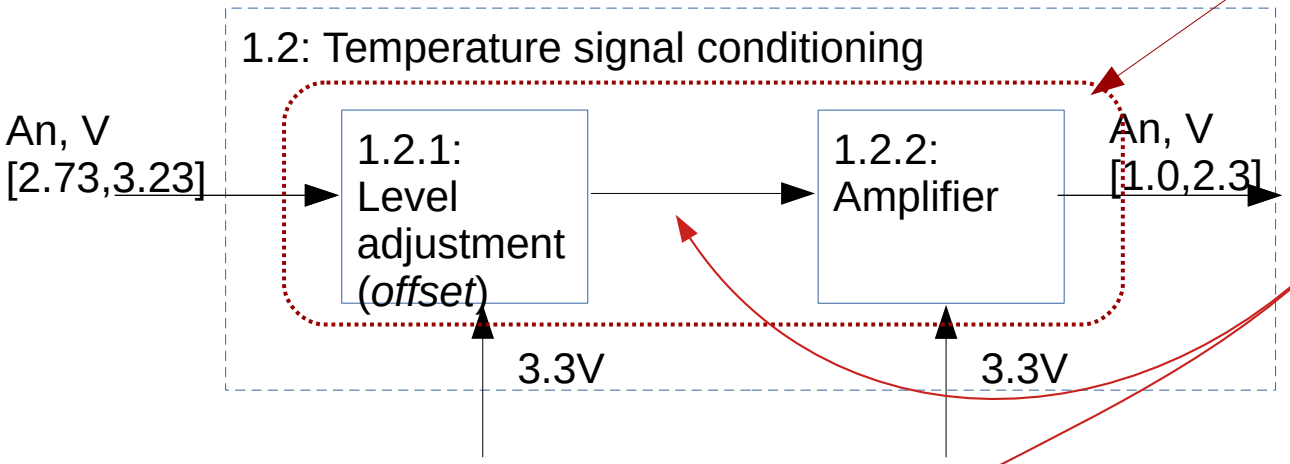
Block diagram: level 2

Each level provides additional detail from the levels above.

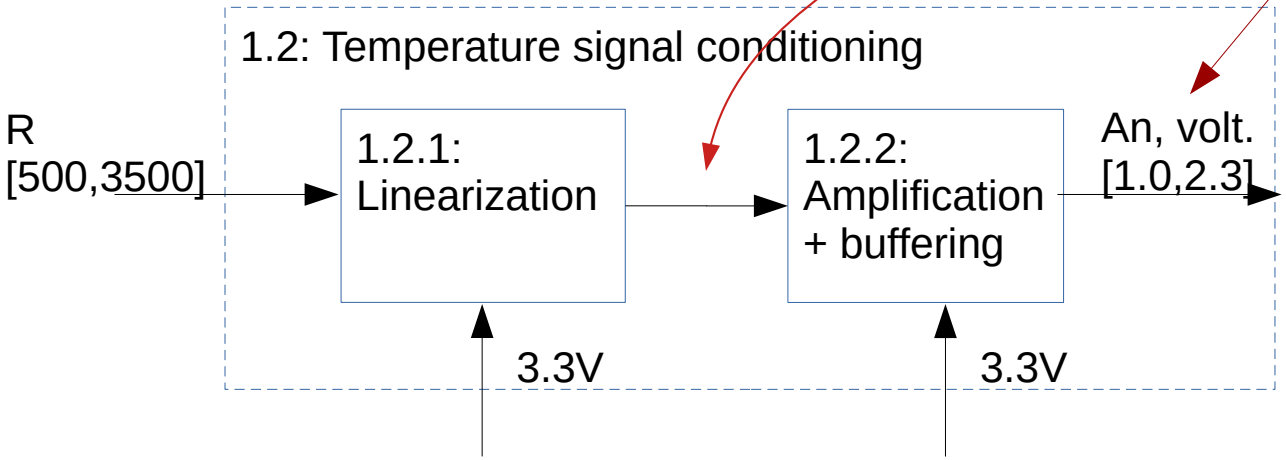


Temperature conditioning

Example with LM335 (linear integrated sensor)



Example with a NTC sensor



Notes:

Although 2 blocks appear, the function could be performed with a single op-amp. But there are two distinct actions to execute.

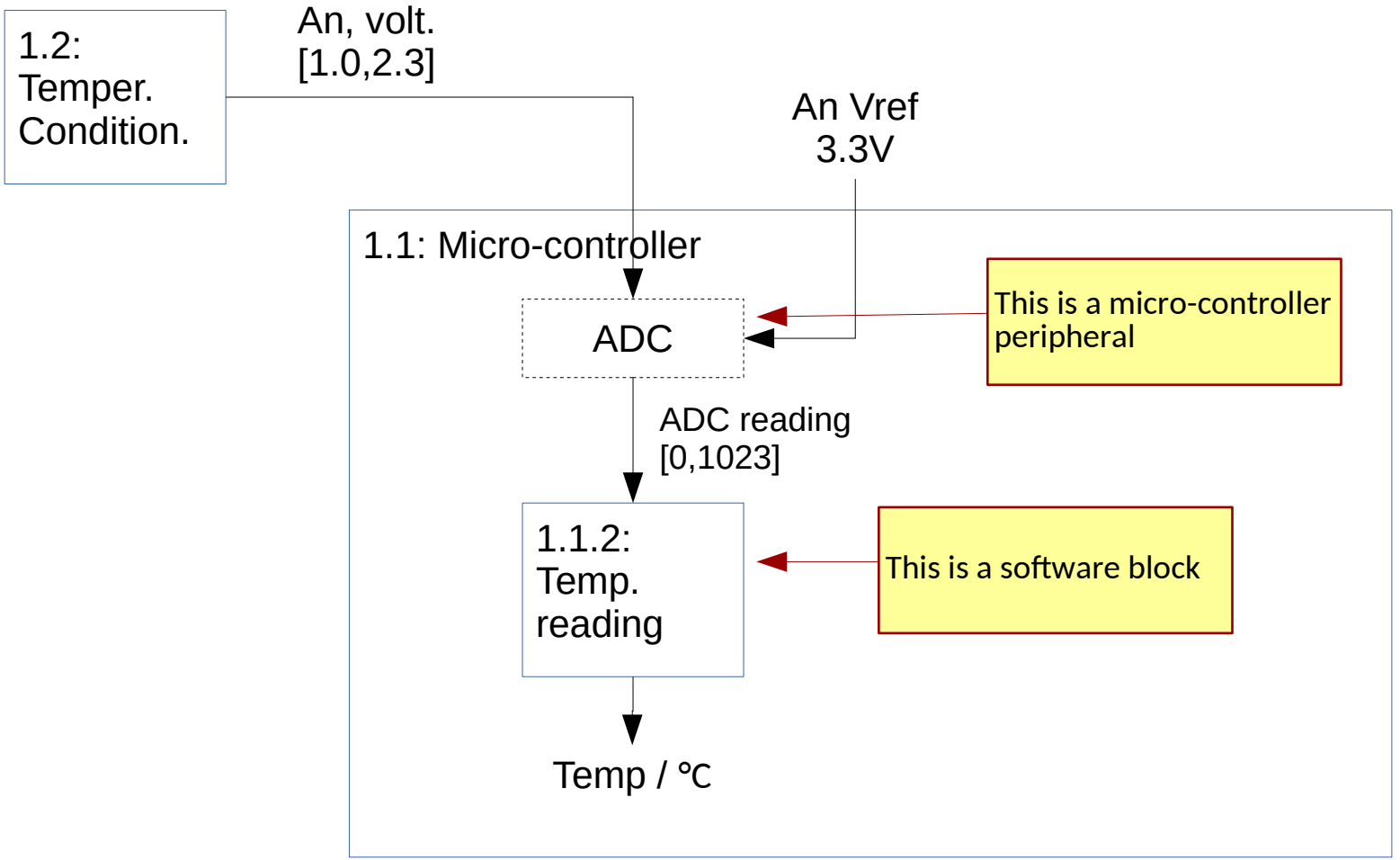
Intermediate signal levels do not have to be specified. They may depend on the particular solution adopted and are not relevant at this time.

It is intentional that the output signal does not use the full range available (0 to 3.3V). A value less than 1V could be used to detect "abnormal" situations.

Although the two output signals have the same range, their characteristics are very different! One (from LM335) has linear variations, the other is strongly non-linear (from NTC).

Blocks may exist also **inside the micro-controller** (in this case, they correspond to micro-controller peripherals, *device-drivers* or functions*)*

Example for temperature reading:



Summary

- **Block diagrams describe the system in terms of:**
  - Composing blocks
  - Connections (signals) between blocks
- **Hierarchical**
  - Organized in levels
  - Each level provides further details relative to the level above.
  - Define a tree-like structure, with a root node: the system

Bibliography

- Salt, J. Eric. Design for Electrical and Computer Engineers. New York: Wiley, 2002.
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