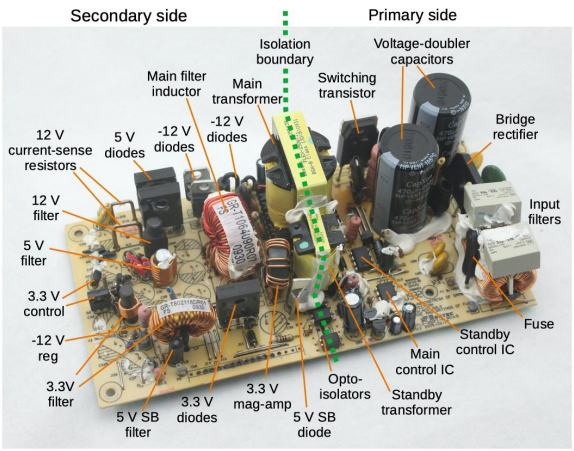

https://qiriro.com/epe2165/

Why study analog electronic?

Kizito NKURIKIYEYEZU, Ph.D.

Is analog electronics dead?

- Most electronic devices are digital nature.
- Traditional applications of analog electronics (e.g., filters) have been replaced by digital electronics
- Analog electronics is hard —as experience shows —why would anyone bother with it instead of using simpler digital electronics?
- Are the glory days of analog engineering over? How necessary Is analog electronics in an increasingly digital world?[1]
- Short answer: analog electronics is here to stay [2].
- “Analog circuits are needed to interface with reality. reality is analog” —Greg Taylor[3]

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[1] Belive it or not, this is an old argument going back to the 1960s. see for example Bill Schweber’s 1969 Bill Schweber’s 1969 article on the on the future of analog circuitry

[2] Read the article “The Perennial role of Analog Electronics” to understand the relevance of analog electronics in the modern world

[3] see Greg Taylor’s presentation on future of analog design and the challenges in nanometer CMOS

Why analog electronics

- Digital electronics is an abstraction of analog electronics —e.g.,building a NAND gate requires transistors
- The real world is analog[4] —thus, digital electronics need an analogy interface to the outside world
- Analog electronics is needed for signal acquisition, amplification, isolation, gain, and A/D and D/A functions
- Some tasks are still better handled through analog electronics
  - Switched-mode power supply[5]
  - Musical applications[6]
  - Radio frequencies (RF) and very high frequency signals
  - To transmit information over long distances, analog circuitry is needed to drive the communication channel [7]

[4] see prof. Peter Kinget on why/how thworld is analog and why that matters
[5] https://en.wikipedia.org/wiki/Switched-mode_power_supply
[6] https://blogs.scientificamerican.com/observations/which-sounds-better-analog-or-digital-music/
[7] https://www.ee.columbia.edu/~kinget/WhyAnalog/circuitcellar_The_World_Is_Analog_201410.pdf

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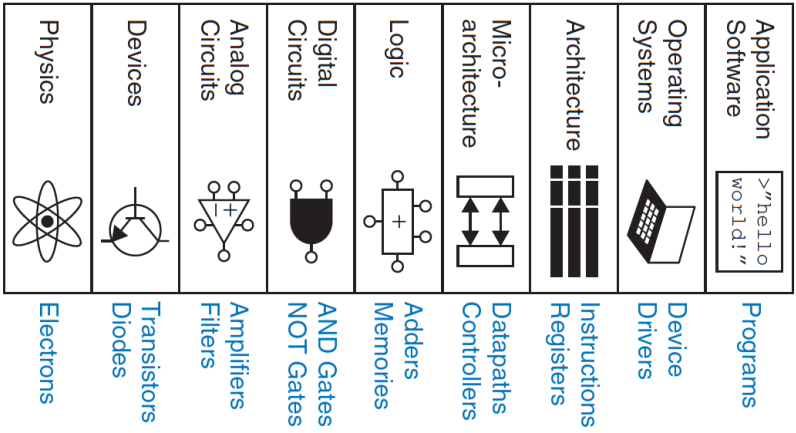

FIG 1. Levels of abstraction for an electronic computing system[8]

[8] Harris, S. L., & Harris, D. (2021). Digital Design and Computer Architecture

The end