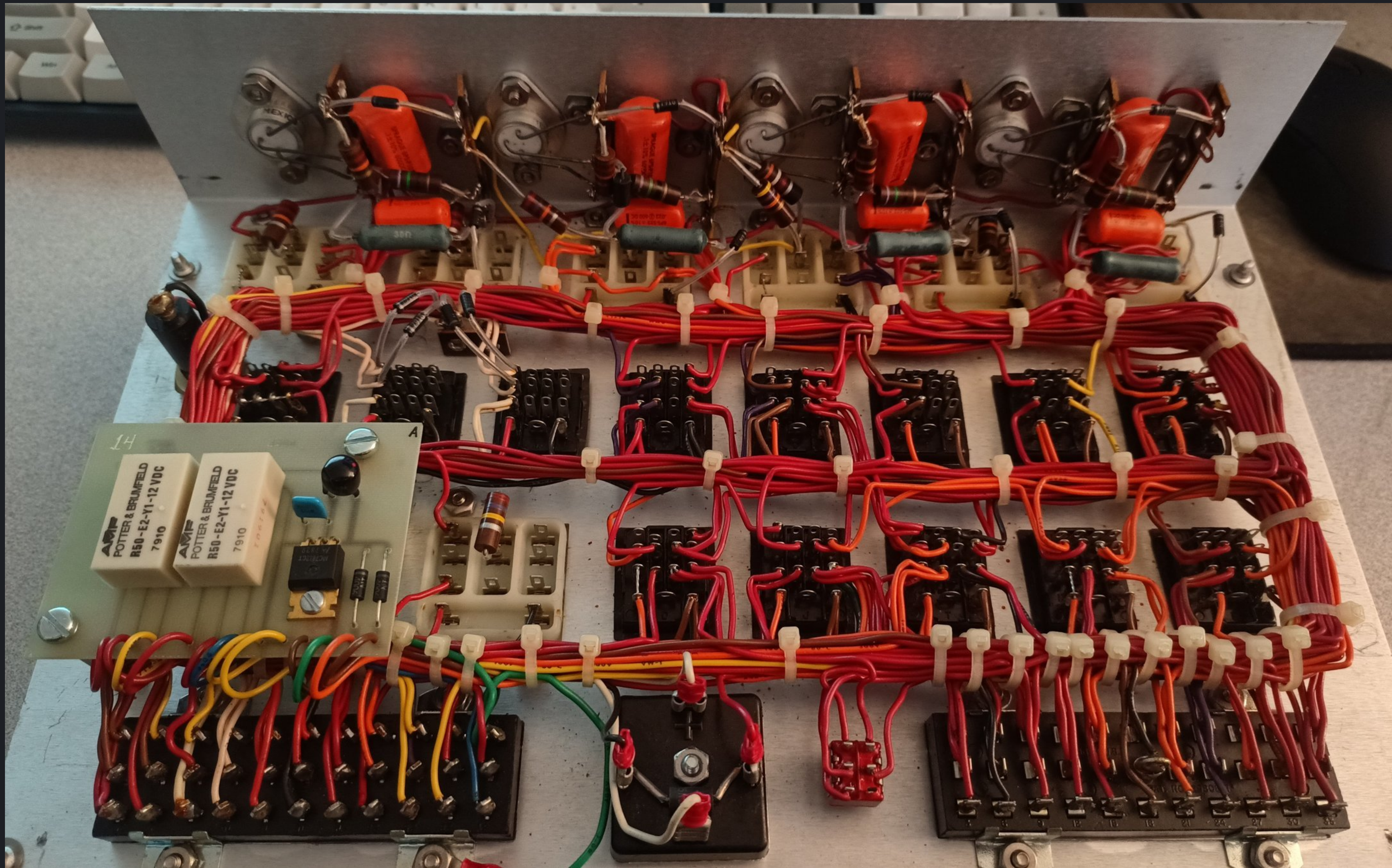


Transform  
function



credit: Foone, <https://twitter.com/Foone>



# The great things about analogic

credit: Foone, <https://twitter.com/Foone>



# The great things about analogic

credit: Foone, <https://twitter.com/Foone>



# The great things about analogic

- Modules with well known input/output relationship

credit: Foone, <https://twitter.com/Foone>



# The great things about analogic

- Modules with well known input/output relationship
- Well known composition functions

credit: Foone, <https://twitter.com/Foone>





# The great things about analogic

- Modules with well known input/output relationship
- Well known composition functions
- "just plumbing signals between these"

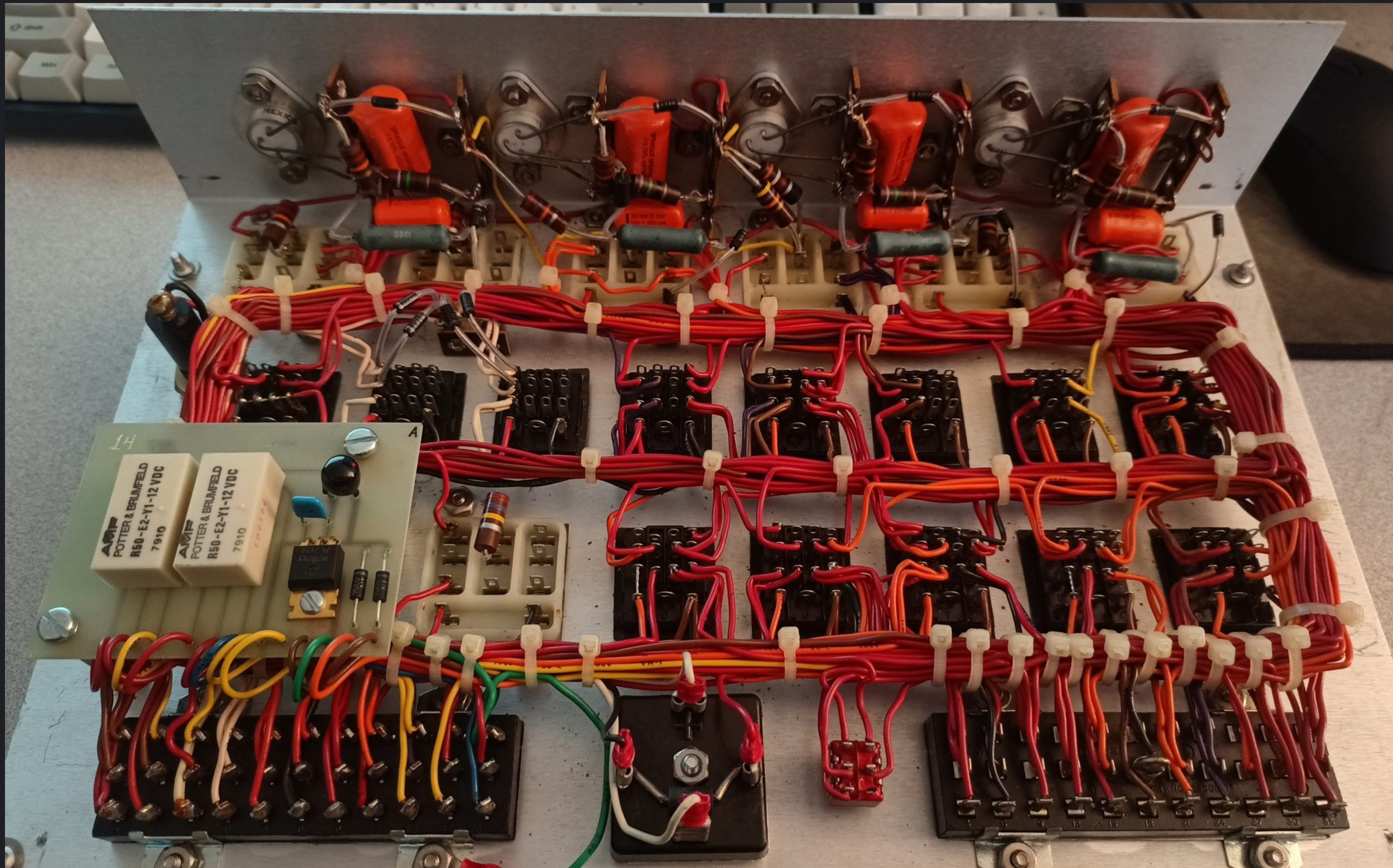
credit: Foone, <https://twitter.com/Foone>

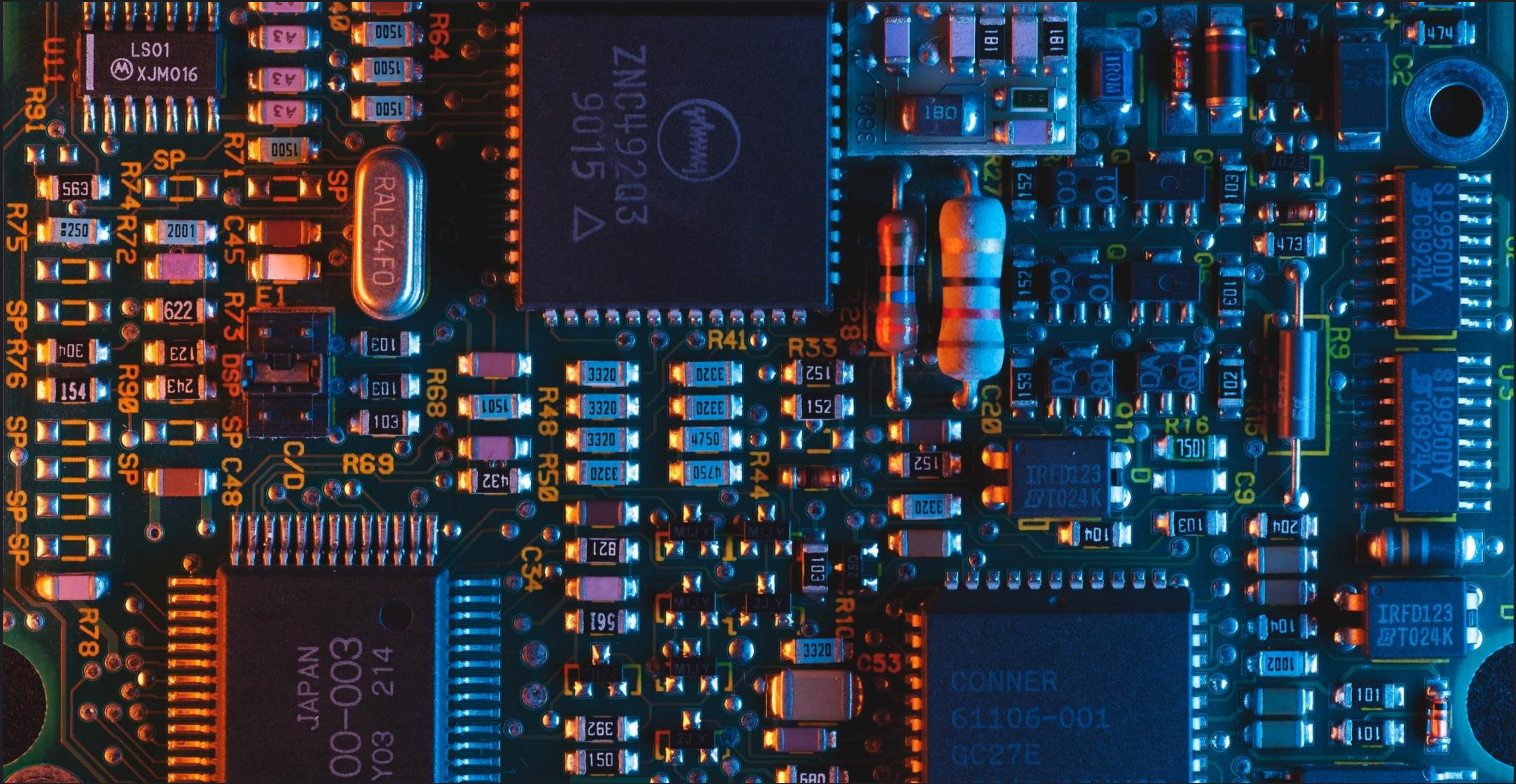


# The great things about analogic

- Modules with well known input/output relationship
- Well known composition functions
- "just plumbing signals between these"
- Easy to debug, the "real" signal can always be probed

credit: Foone, <https://twitter.com/Foone>





Why not do everything like  
that ?

# The problems with Analogic

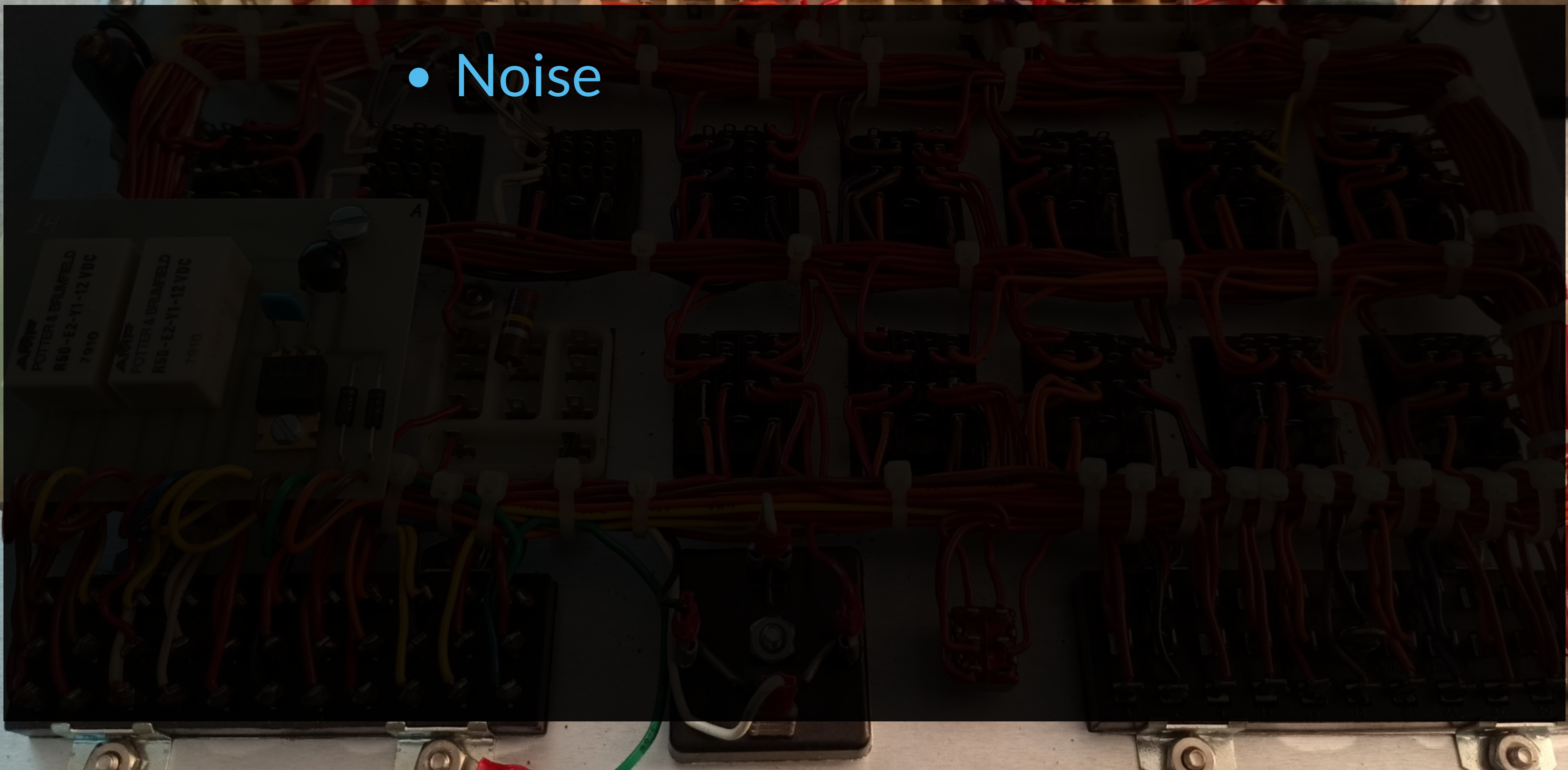


credit: Foone, <https://twitter.com/Foone>



# The problems with Analogic

- Noise



credit: Foone, <https://twitter.com/Foone>



# The problems with Analogic

- Noise
- Lot of specific components
  - Complex supply chain
  - Expensive (\$\$)

credit: Foone, <https://twitter.com/Foone>

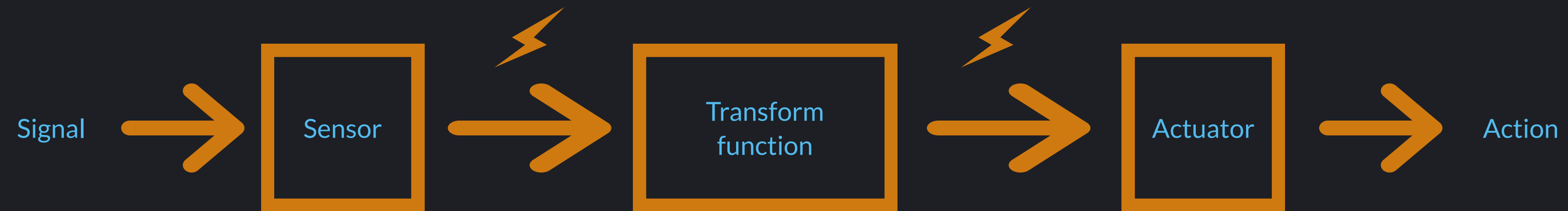


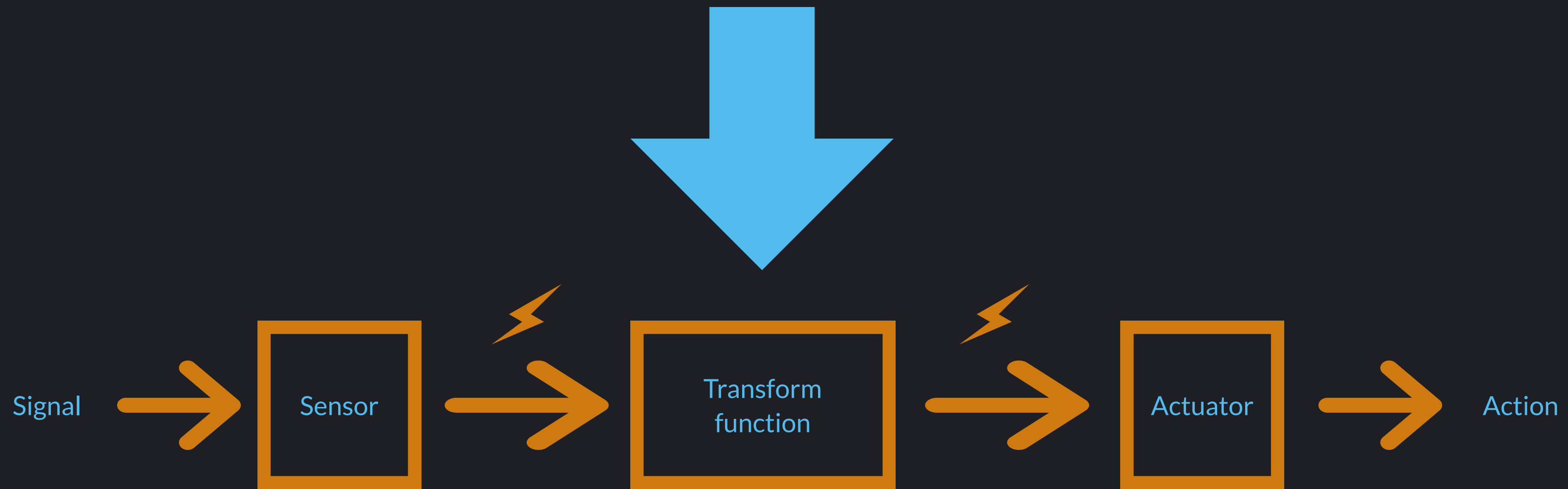


# The problems with Analogic

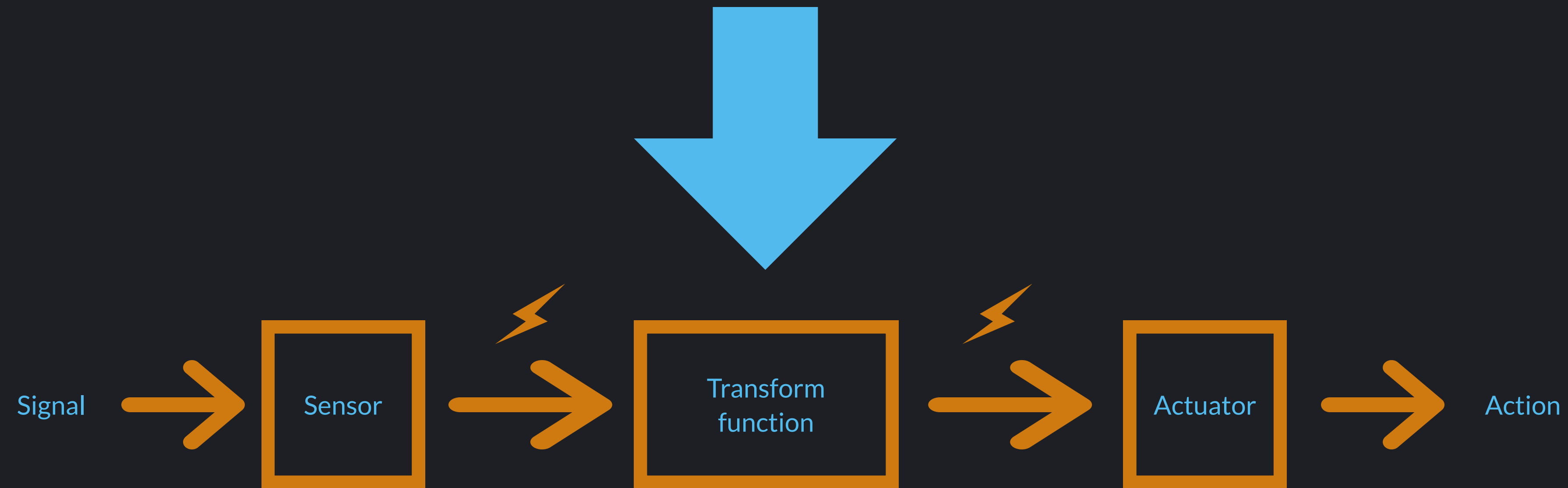
- Noise
- Lot of specific components
  - Complex supply chain
  - Expensive (\$\$)
- Really slow design cycles (\$\$)

credit: Foone, <https://twitter.com/Foone>





What if this was a reusable component  
we could adapt on the fly



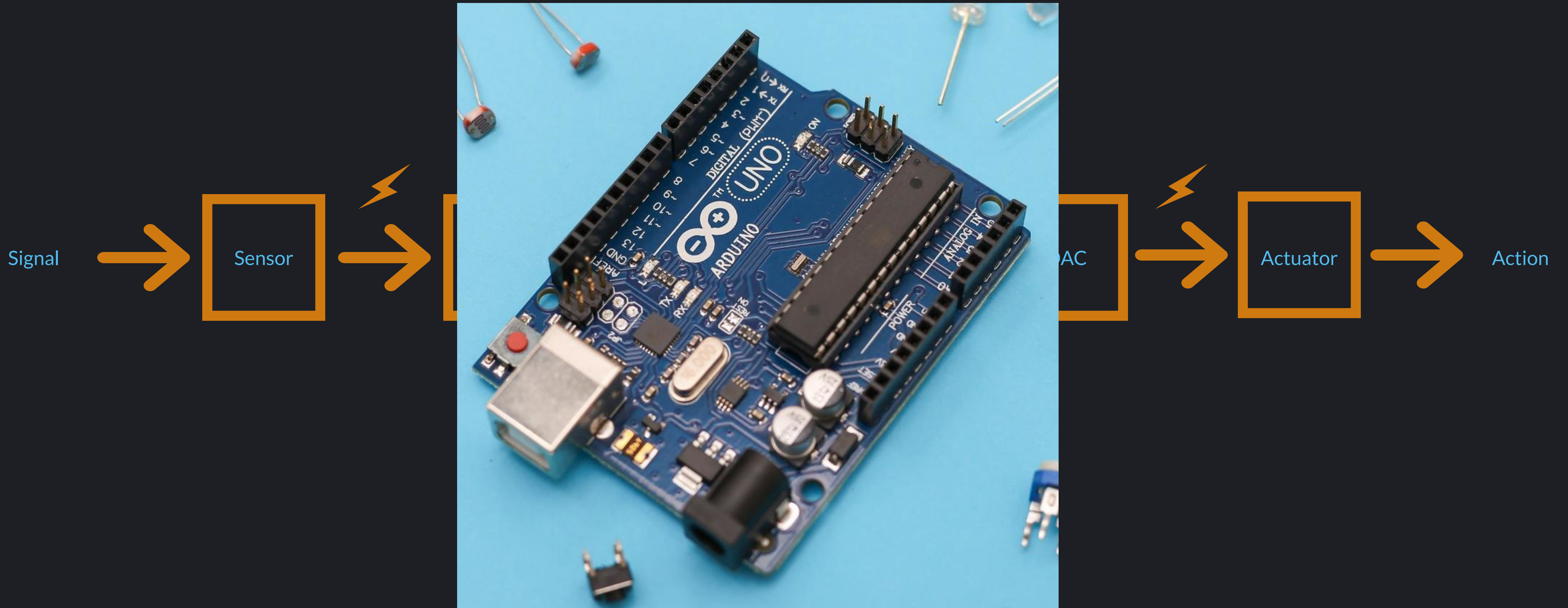
# Digital Programmable Electronics

AKA Microcontrollers  
and FPGA

# Digital Programmable Electronics



# Digital Programmable Electronics



# The advantages of Digital

- Fixed noise (only ADC and DAC)
- Infinite transformation complexity
- Fast and cheap design cycles, just recompile
- Reusable components with near infinite reuse
  - We still use 30 years old design today in new products





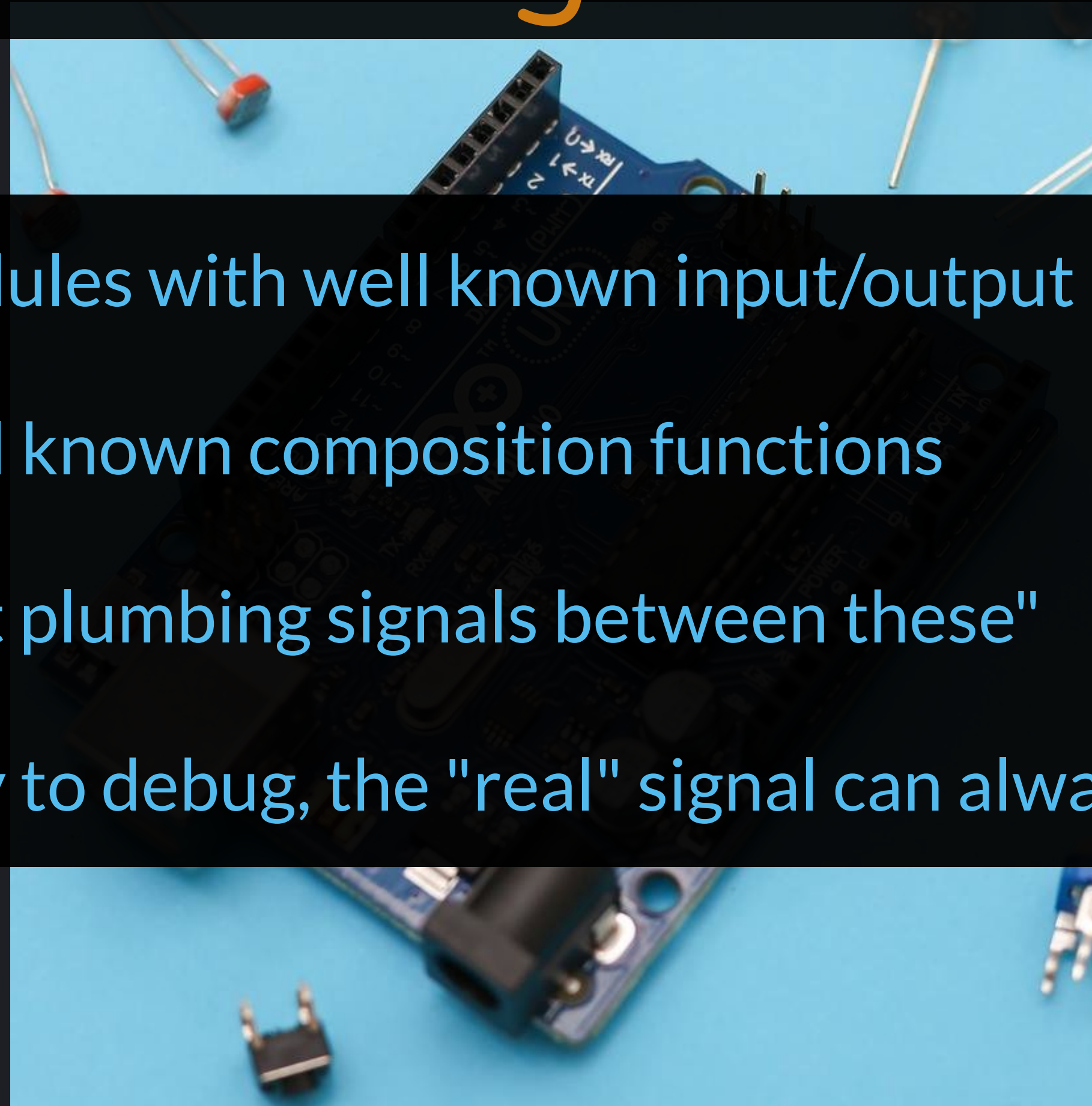
# The great things about analogic

- Modules with well known input/output relationship
- Well known composition functions
- "just plumbing signals between these"
- Easy to debug, the "real" signal can always be probed

credit: Foone, <https://twitter.com/Foone>

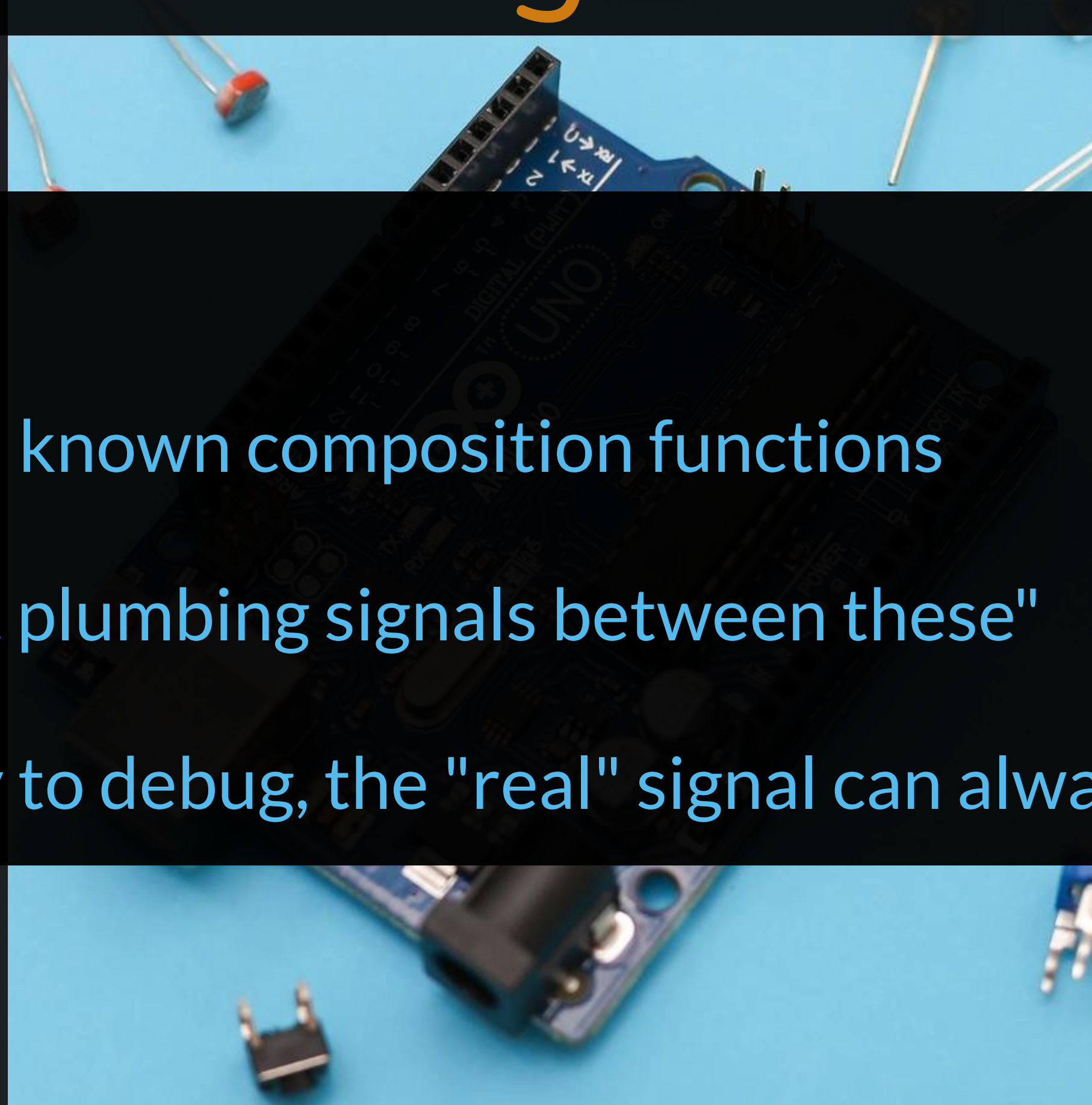
# The great things about digital ...

- Modules with well known input/output relationship
- Well known composition functions
- "just plumbing signals between these"
- Easy to debug, the "real" signal can always be probed



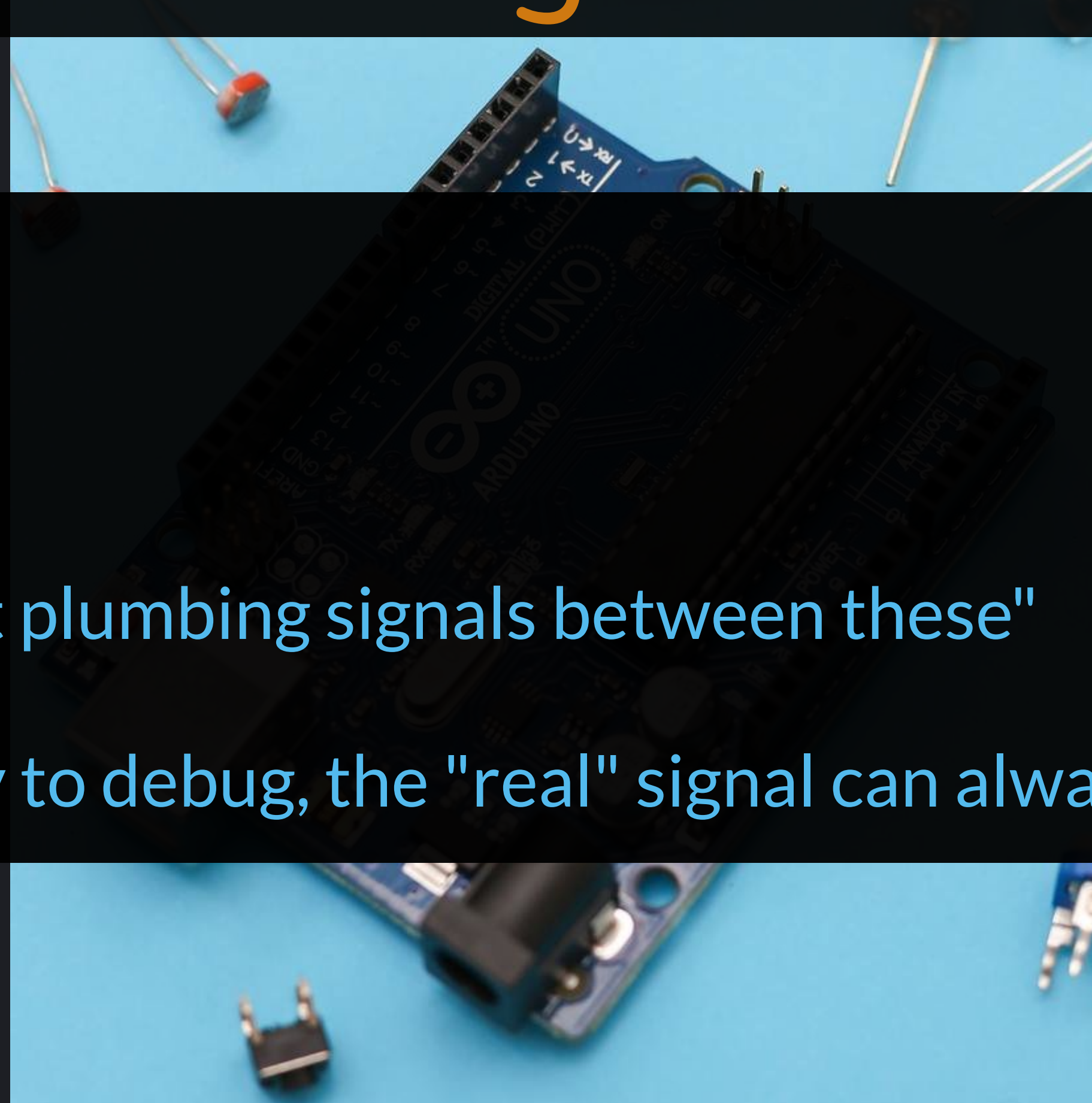
# The great things about digital ...

- Well known composition functions
- "just plumbing signals between these"
- Easy to debug, the "real" signal can always be probed



# The great things about digital ...

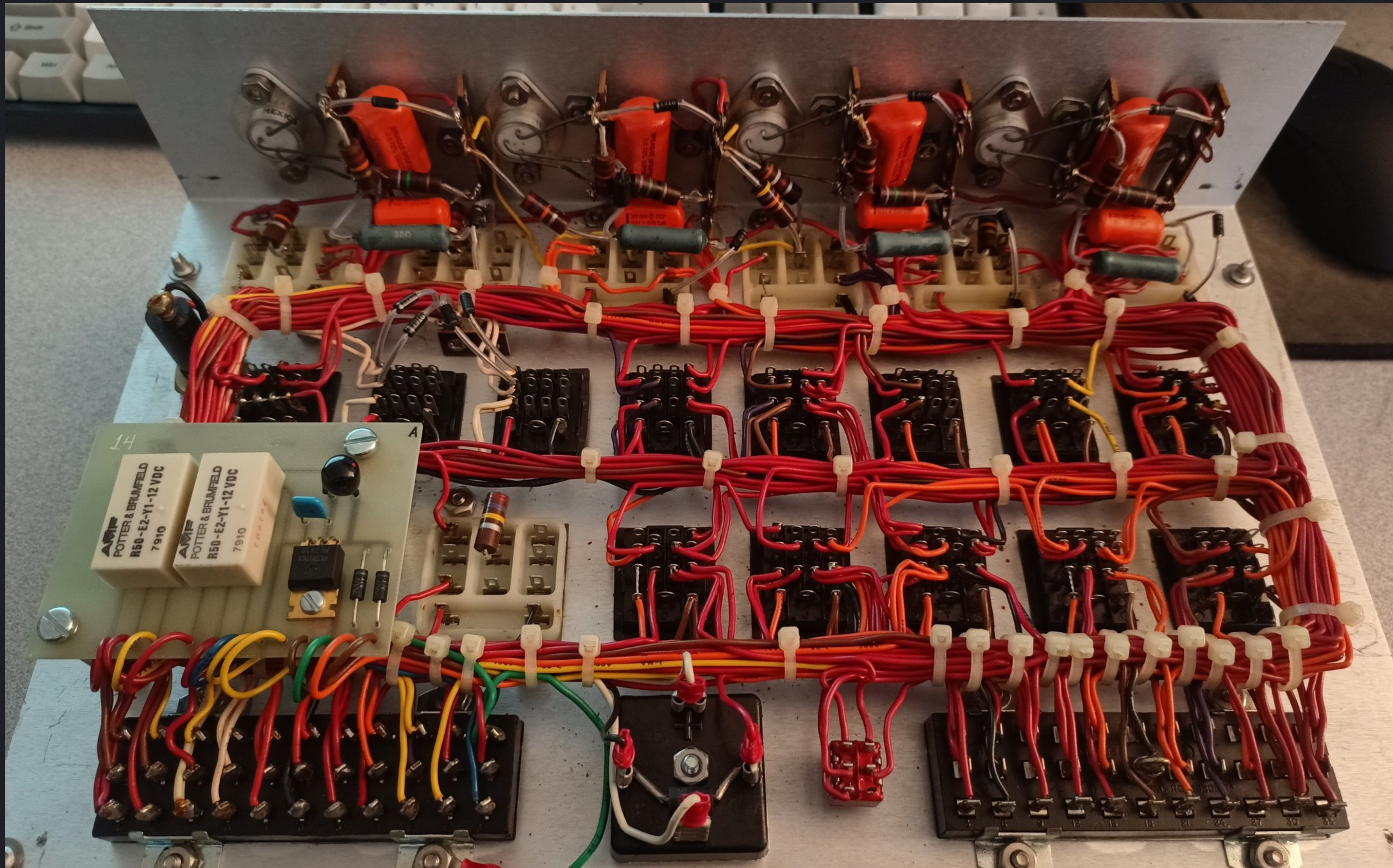
- "just plumbing signals between these"
- Easy to debug, the "real" signal can always be probed



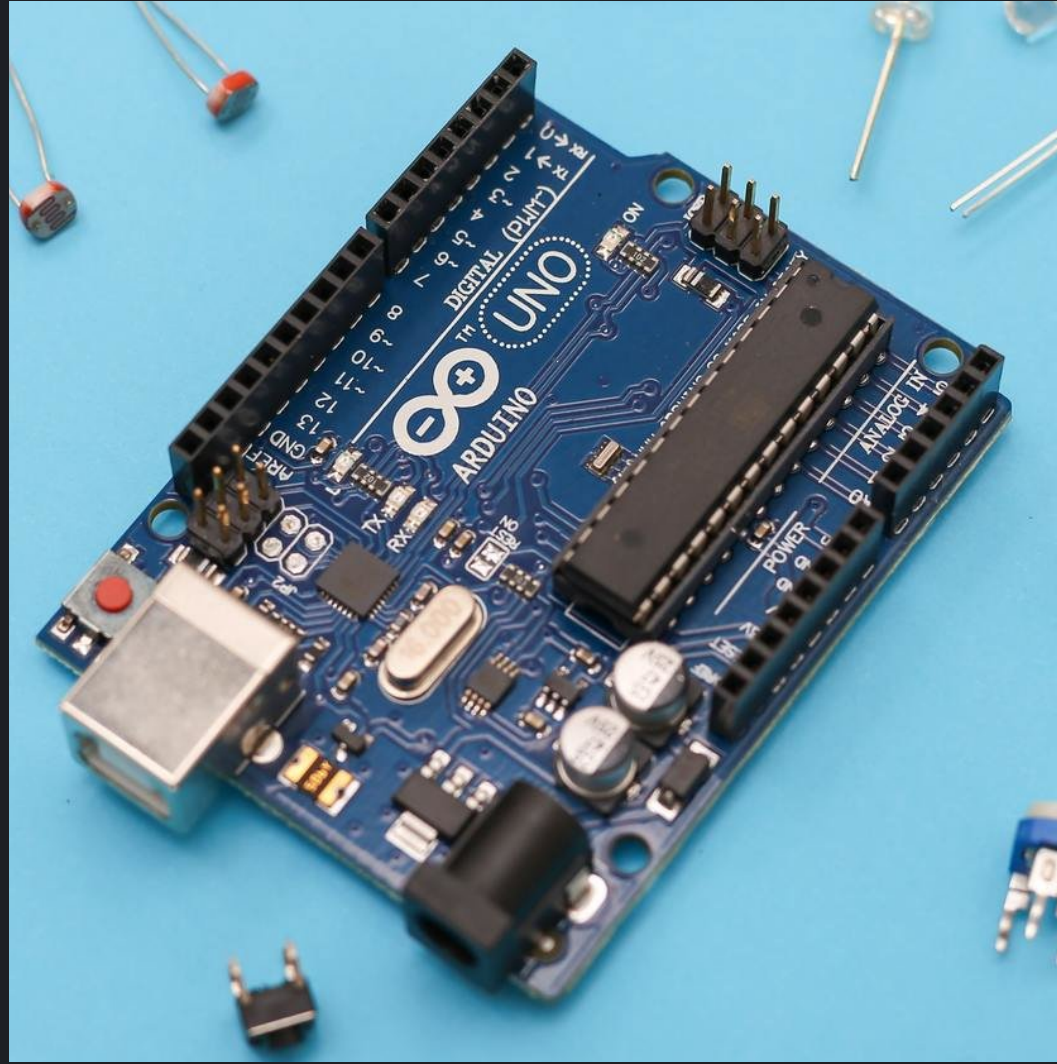
# The great things about digital ...

- Easy to debug, the "real" signal can always be probed





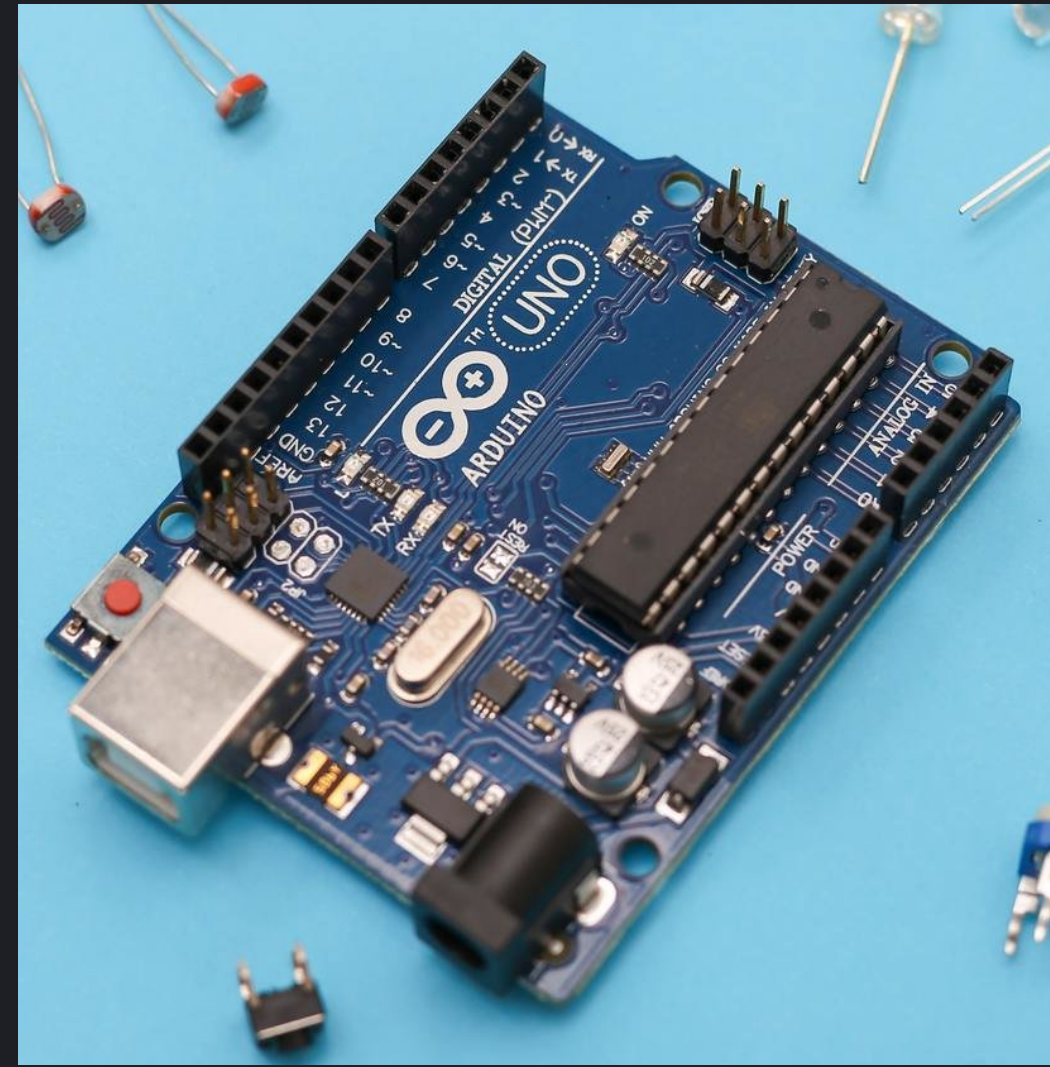
Code



Code



Memory





Code



Memory



Debug  
Circuit



Code



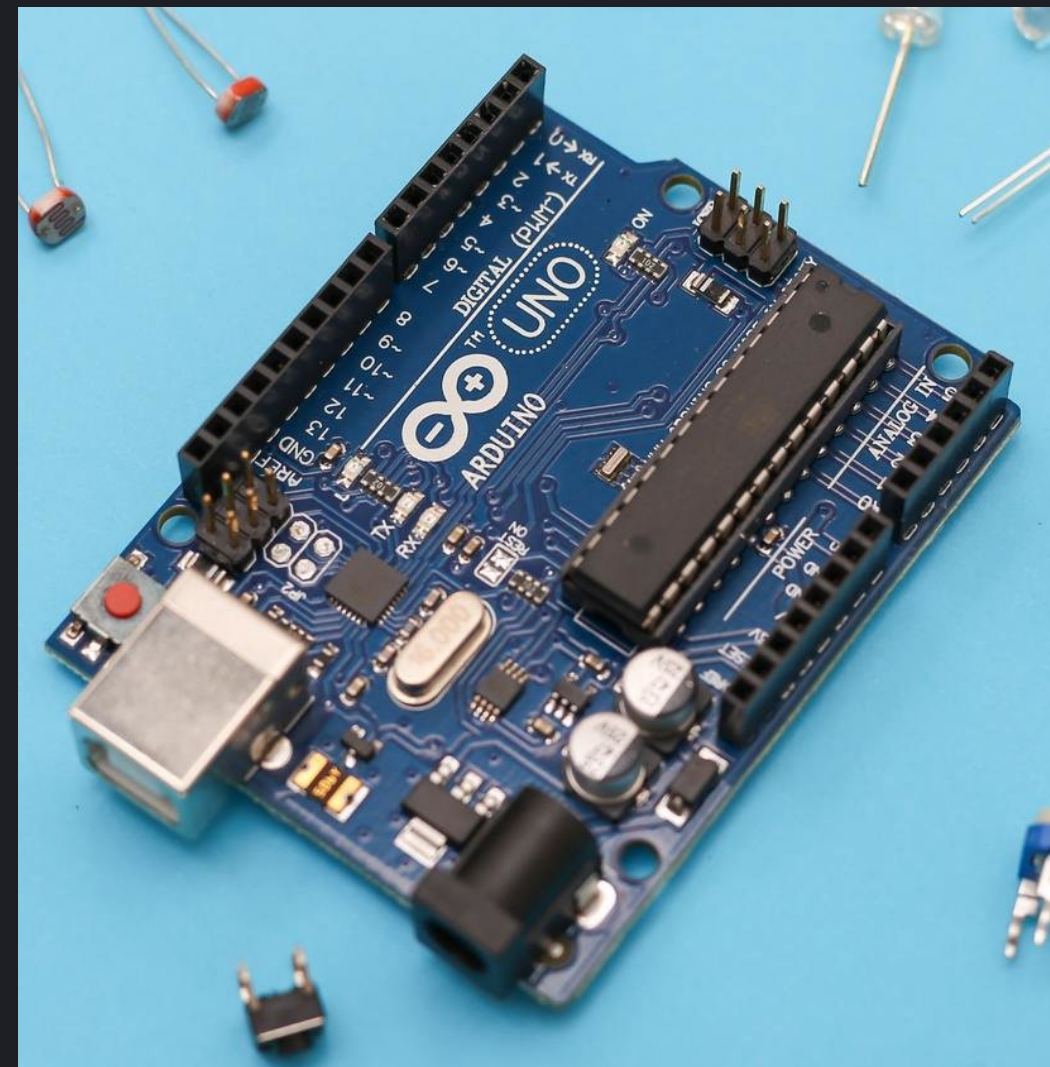
Memory



Debug  
Circuit



JTAG



Code



Memory



Debug  
Circuit



JTAG



Debugger  
UI



Code



Memory



Debug  
Circuit



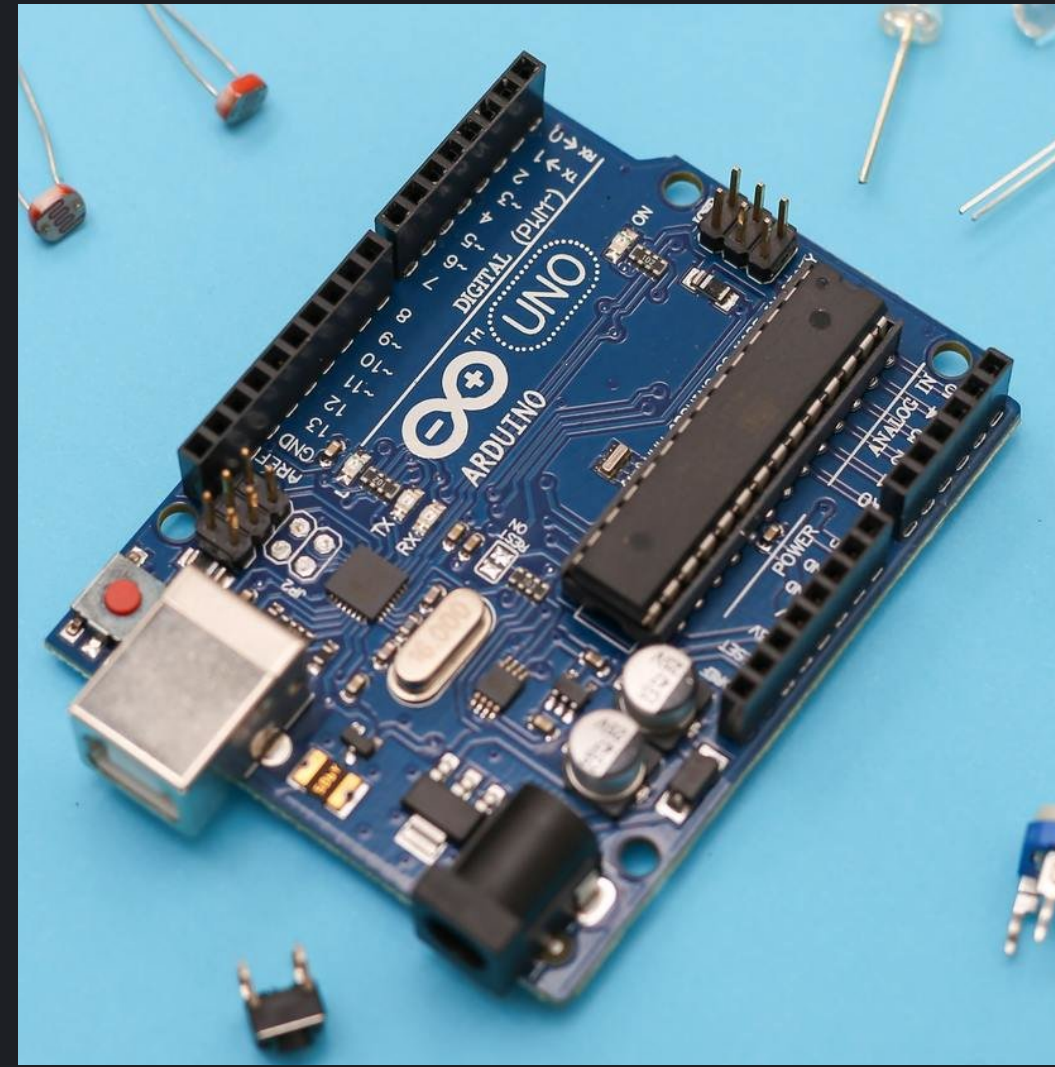
JTAG



Debugger  
UI



Me



Code



Memory



Debug  
Circuit



JTAG



Debugger  
UI



Me



Revert model of the  
Debug circuit



Code



Memory



Debug Circuit



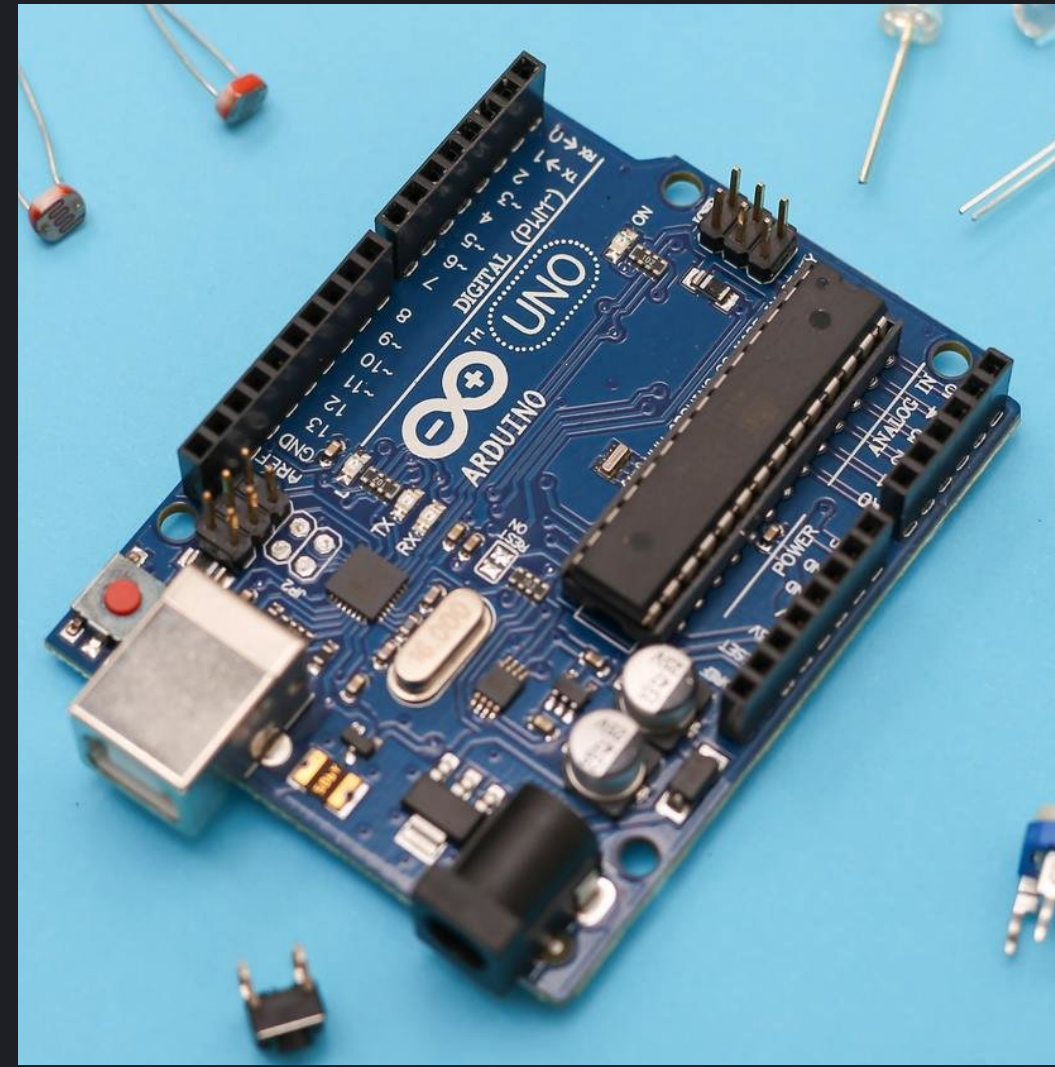
JTAG



Debugger UI



Me

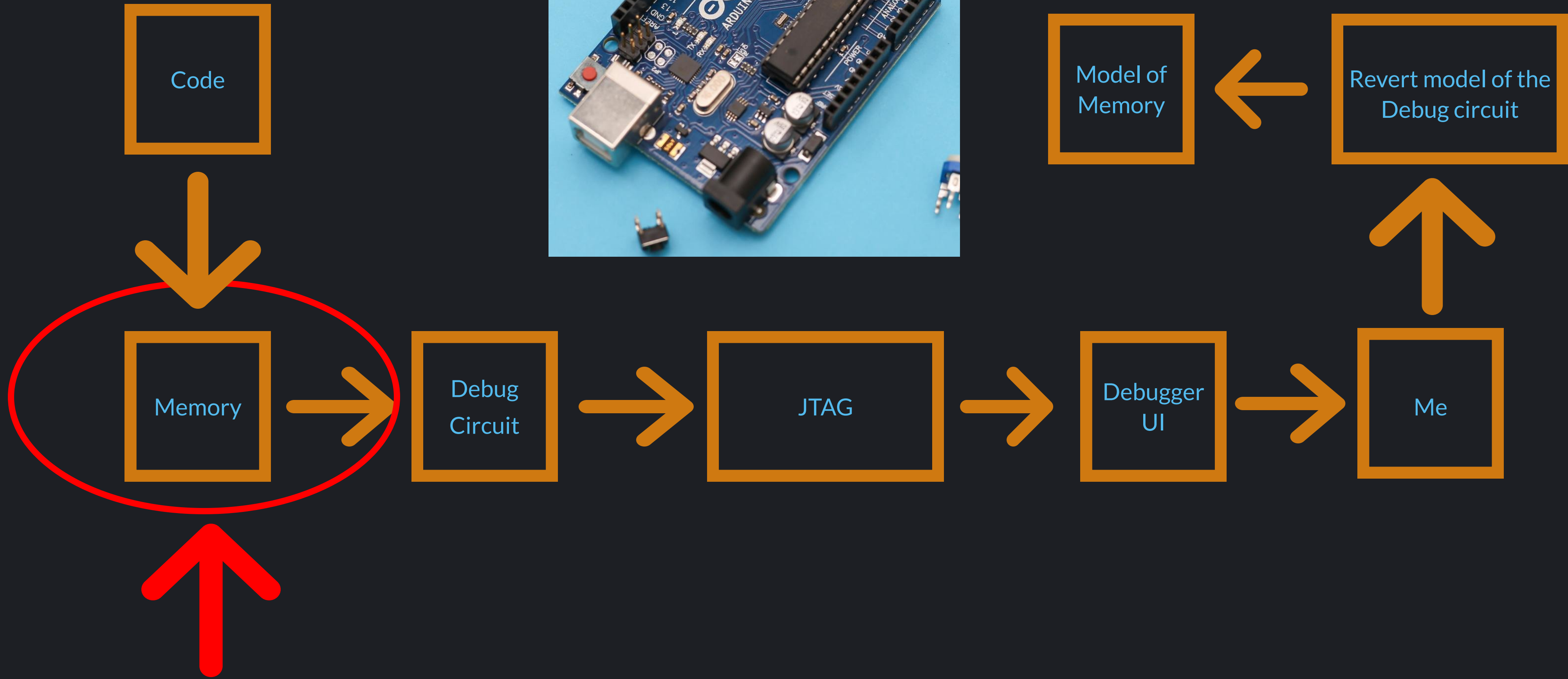
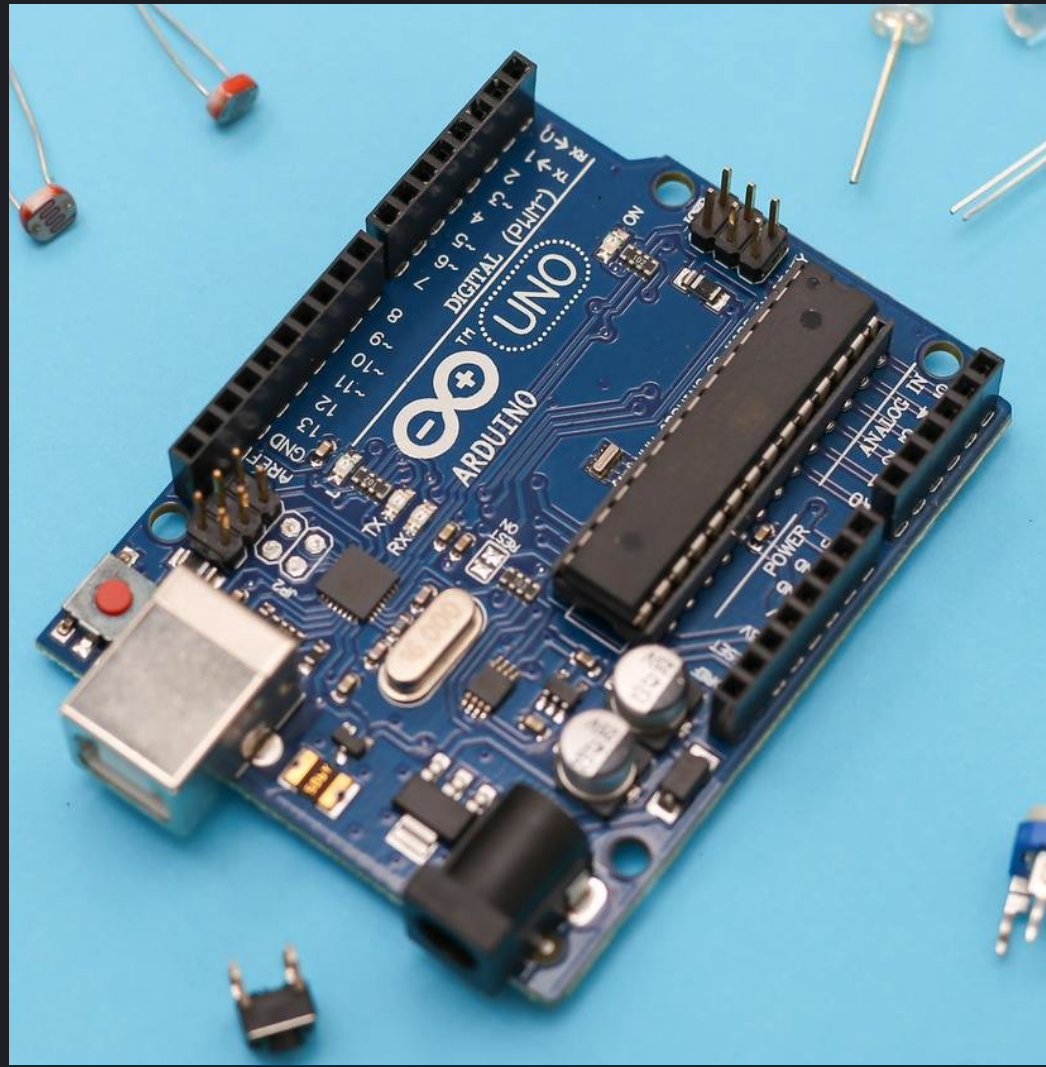


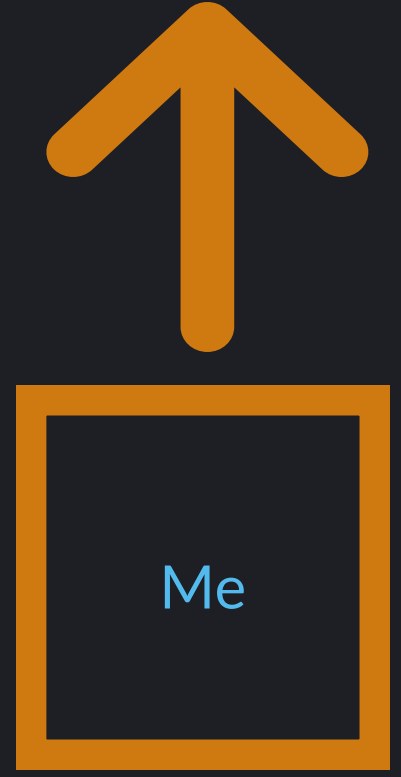
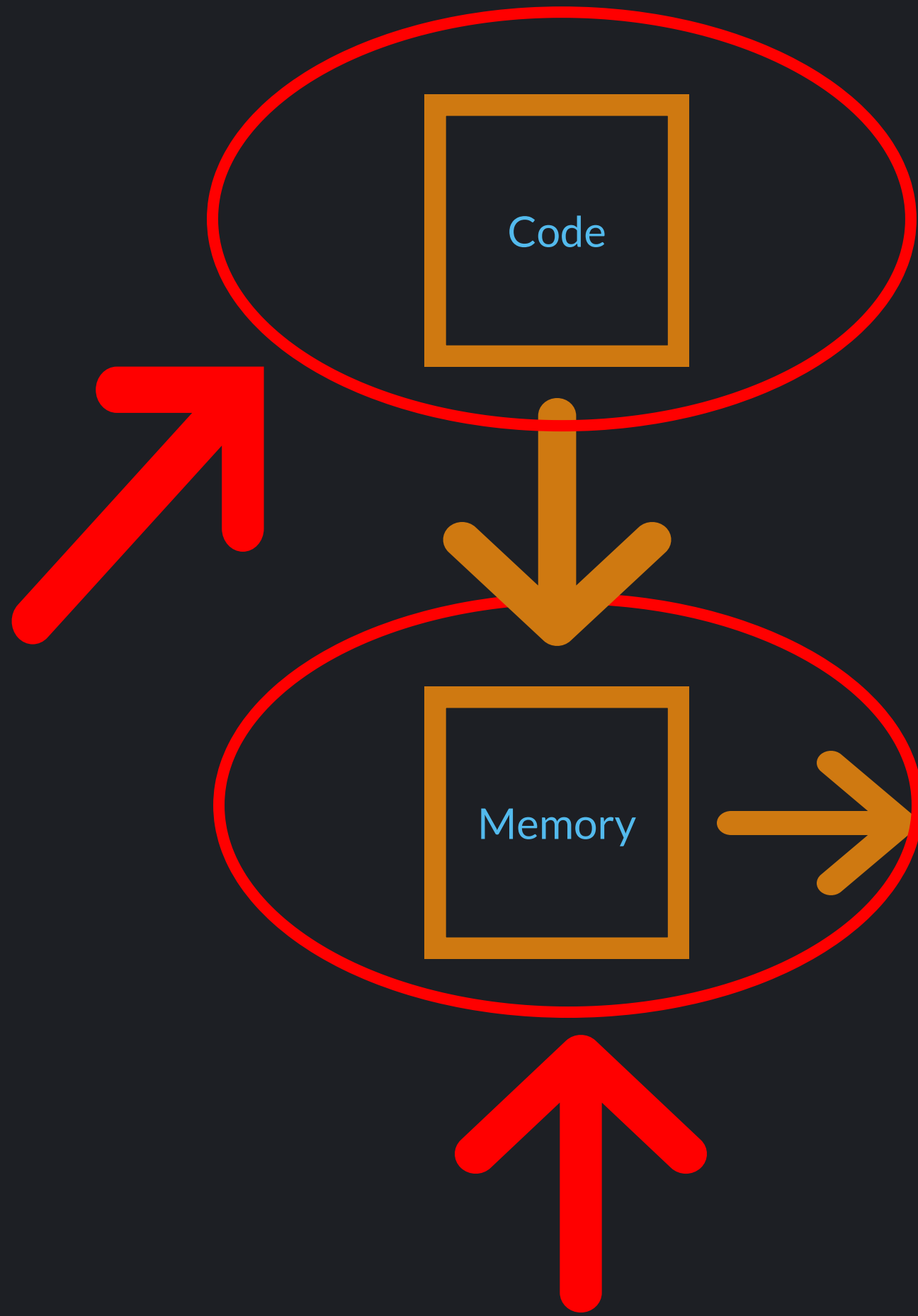
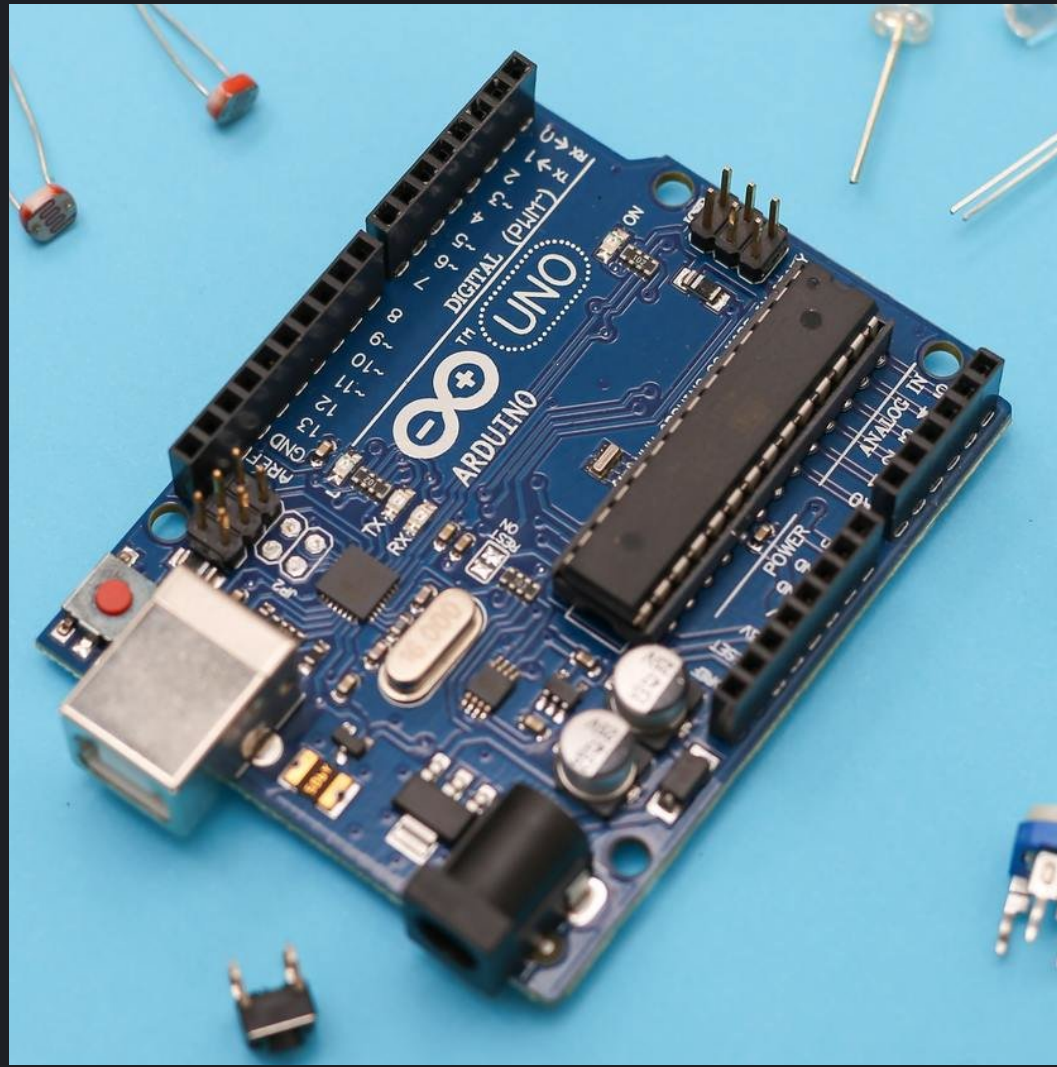
Model of Memory



Revert model of the Debug circuit

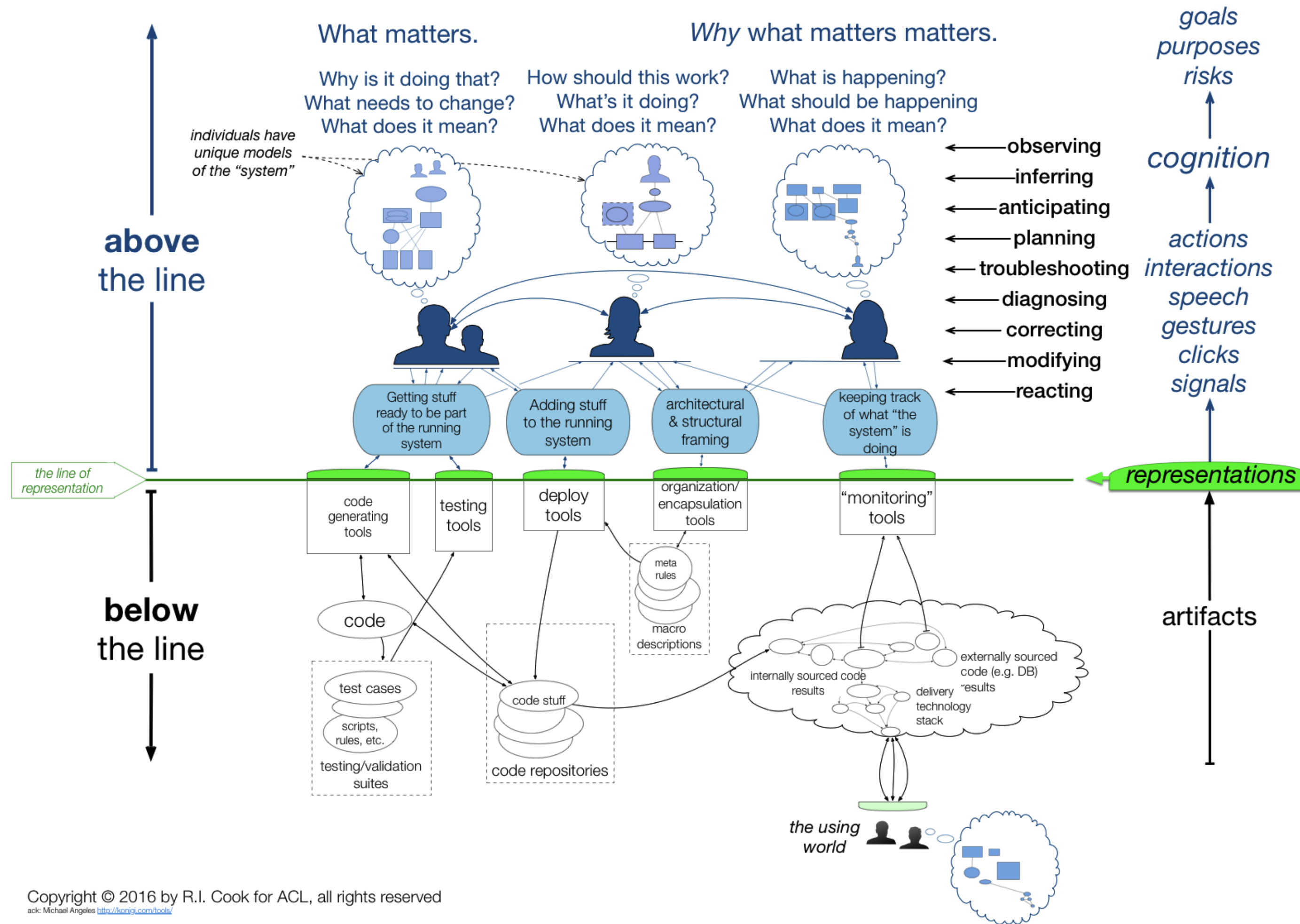




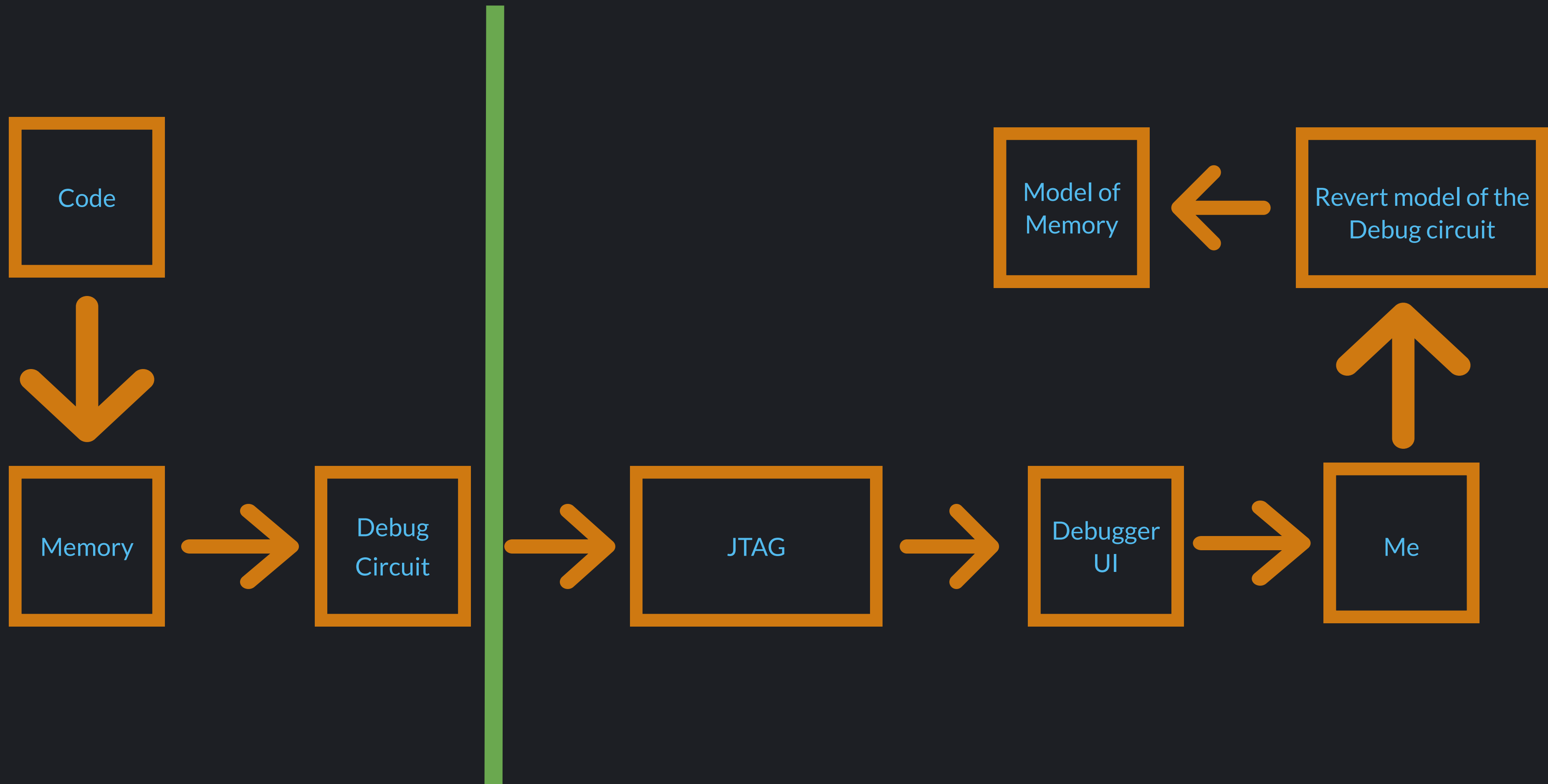


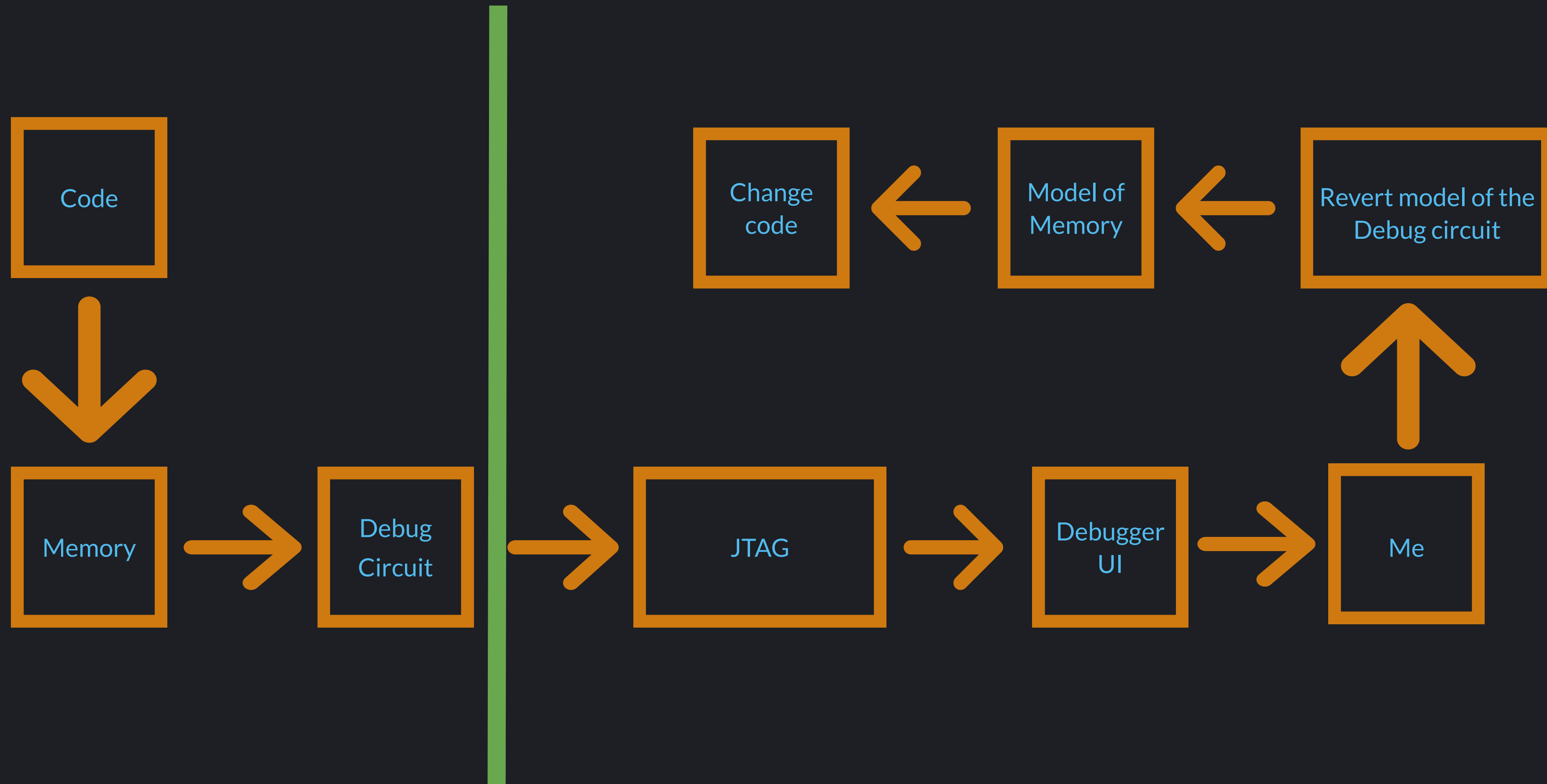


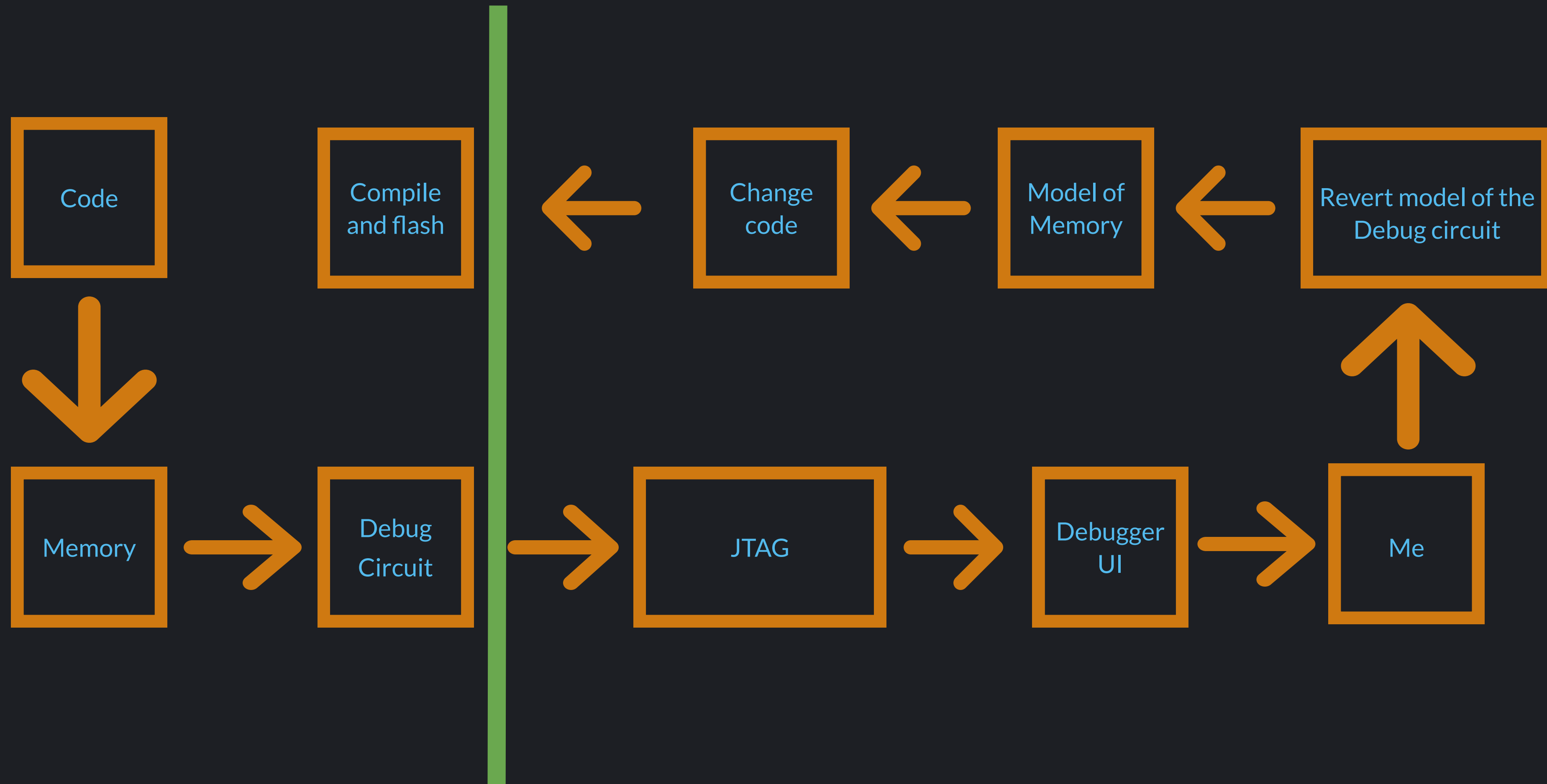
# Line of Representation



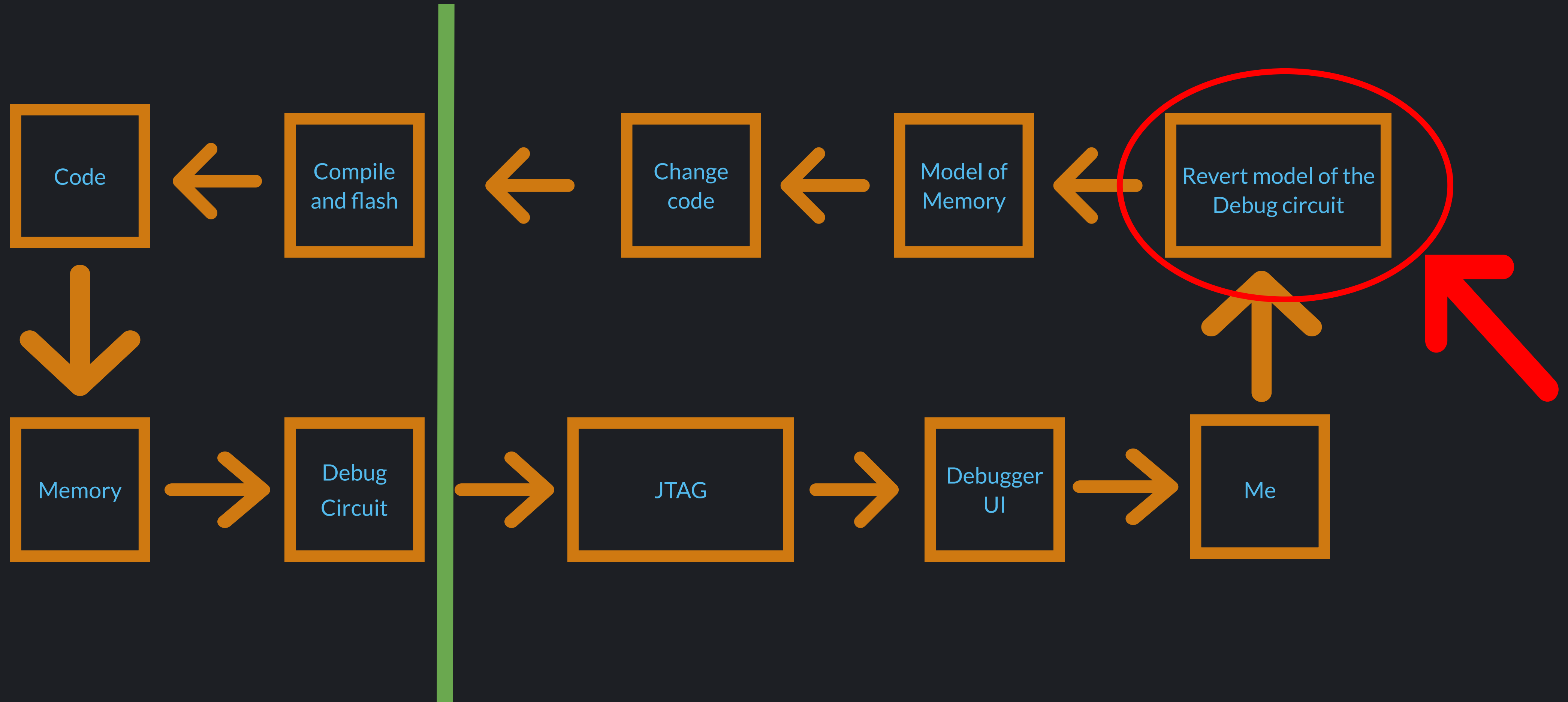
Copyright © 2016 by R.I. Cook for ACL, all rights reserved  
 ack: Michael Angeles <http://www.ricook.com>











Ceci N'Est Pas Un CPU Load

Thomas Depierre

haruspex.dev

@Di4naO

