



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

Hardware Plus

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In 10—15 years...

Hardware design, fabrication, and shipment will have as low a barrier to entry as shipping software does today.

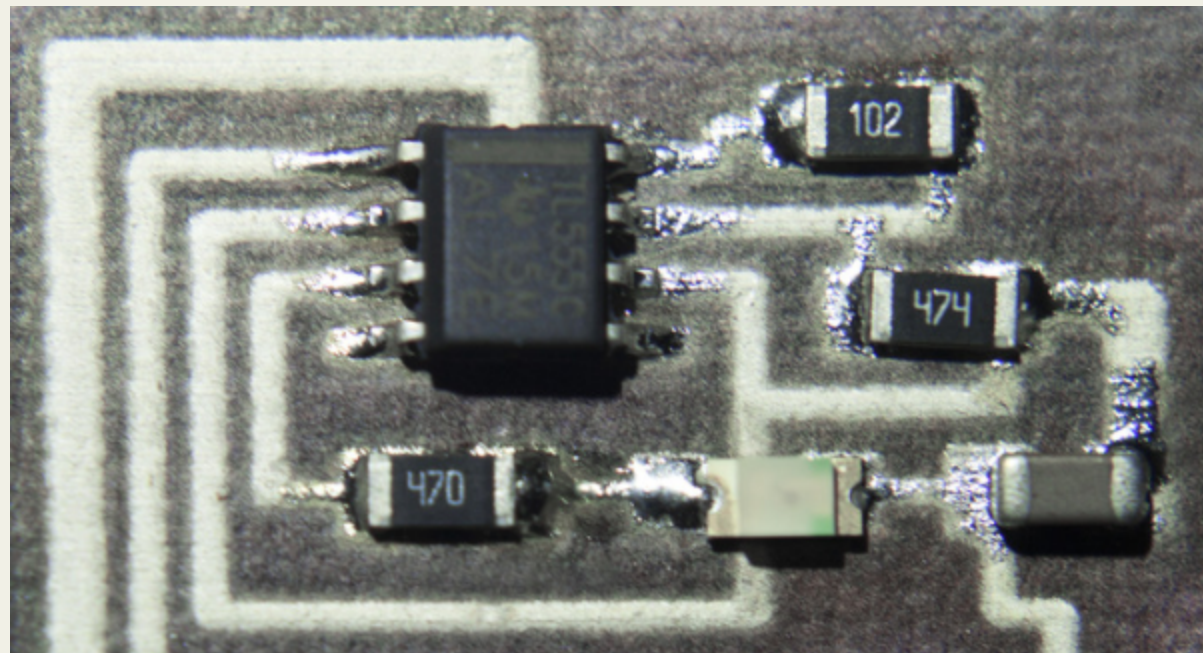
- Smaller, more portable computers brings more companies into HW design



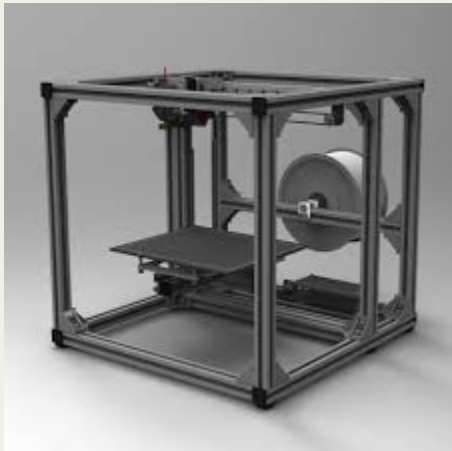
- Modular devices
 - Google's Project Ara
 - One company provides the frame
 - 3rd party HW components can be swapped in
 - \$50-\$500



- 3D printing of circuit boards
 - Cartesian Co's EX¹
 - Easy and affordable electronic prototyping
 - \$2000



Users download a new hardware component's design and print their own at home



Opportunities for Better Security

- Swap in security according to need
 - Eg cameras with on-module encryption circuit so photos are never stored or transmitted in the clear

Opportunities for Research

- Secure design, fabrication, supply chain
 - When 1000's of companies are in the game
 - When individuals are in the game
- Secure interaction between disparate components
 - Poorly understood interfaces
 - Emergent vulnerabilities
- User education
 - Hardware is not trustworthy