

Ripple: Communicating through Physical Vibrations

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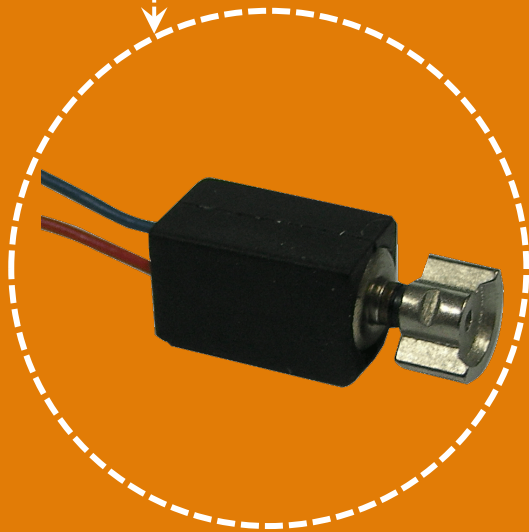
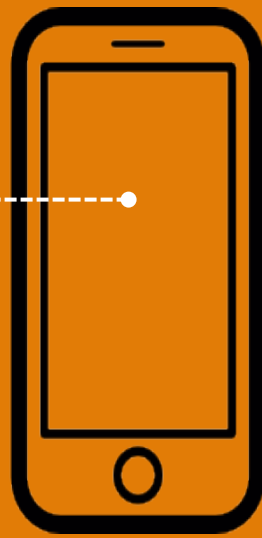
Radio-Frequency

Optical

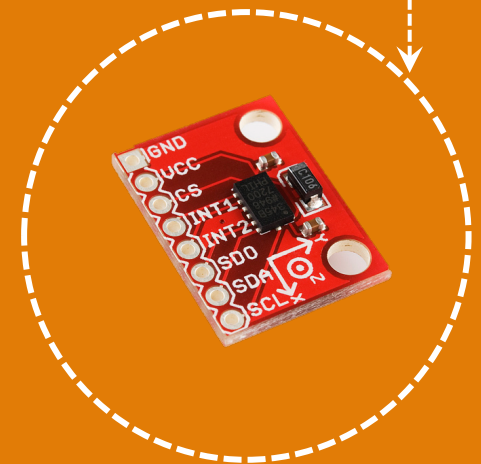
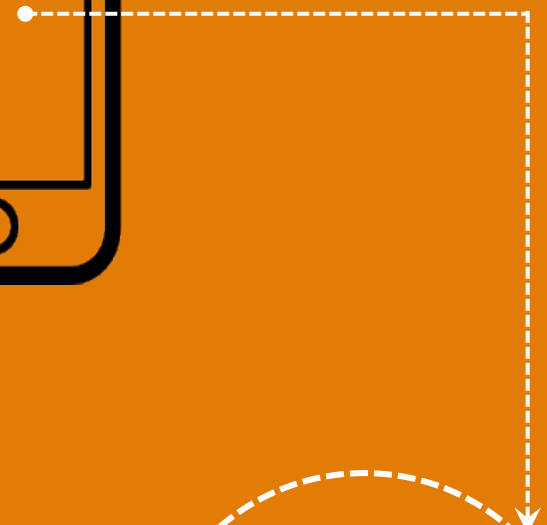
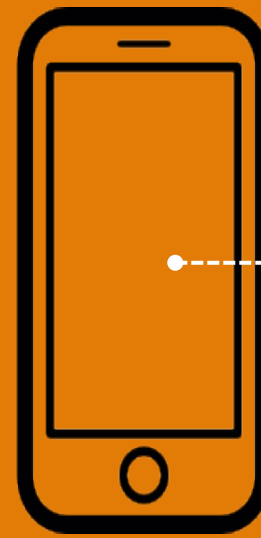
Vibratory
Communication
through Solids

Acoustic

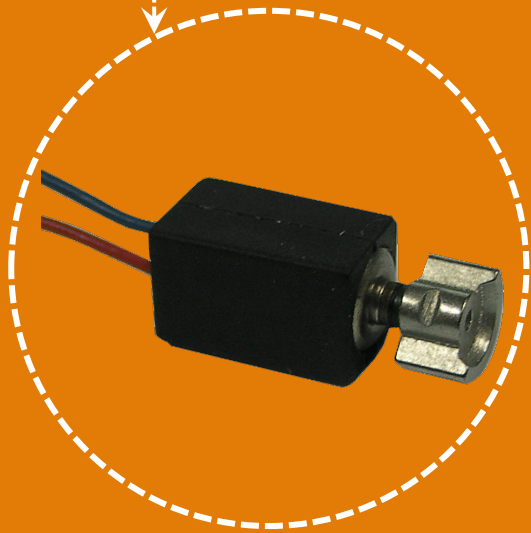
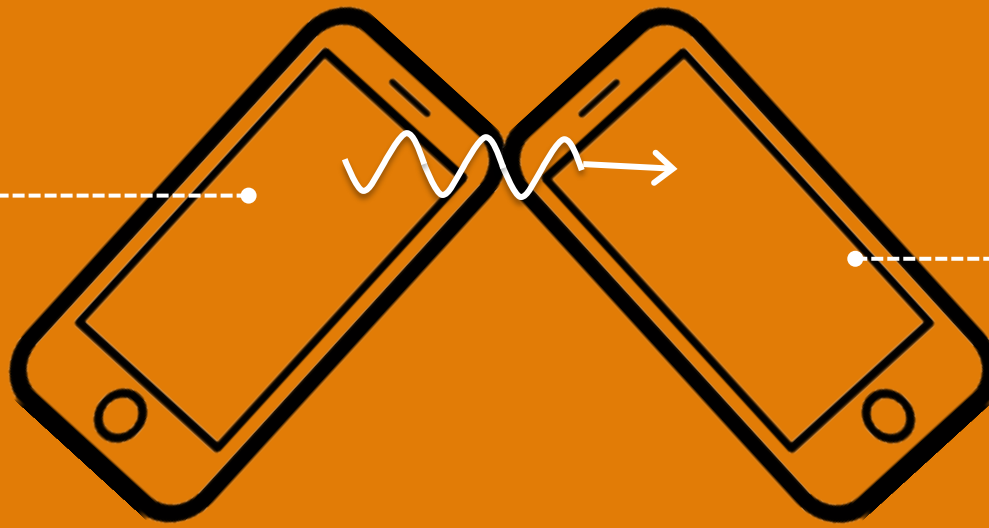
Magnetic



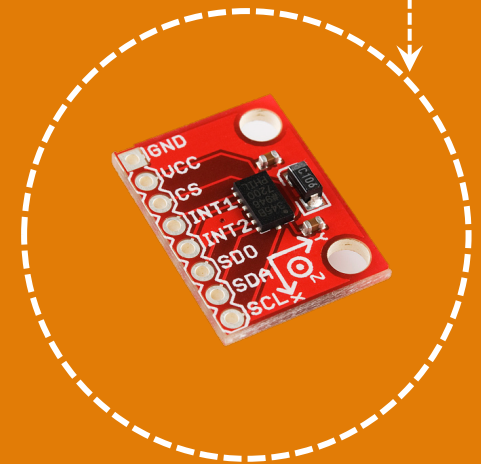
Vibration Motor



Accelerometer



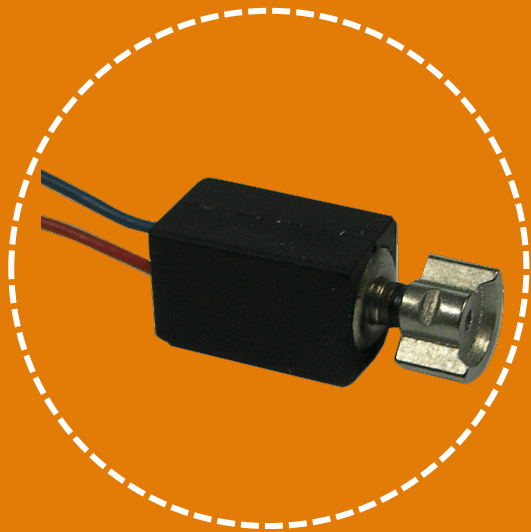
Vibration Motor



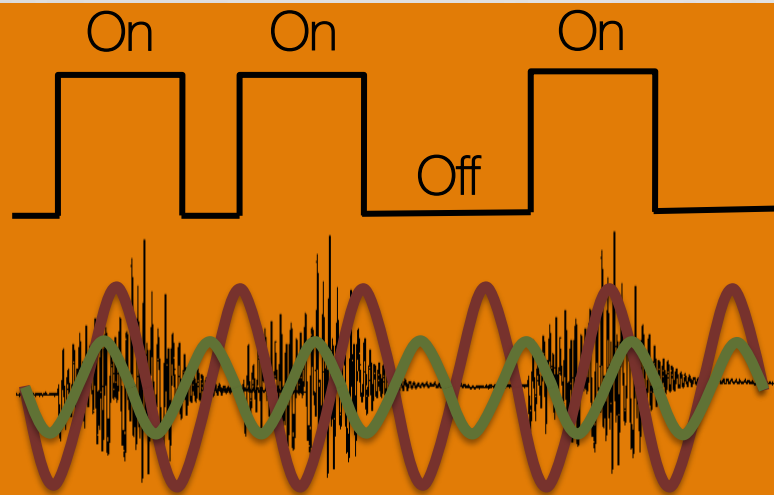
Accelerometer



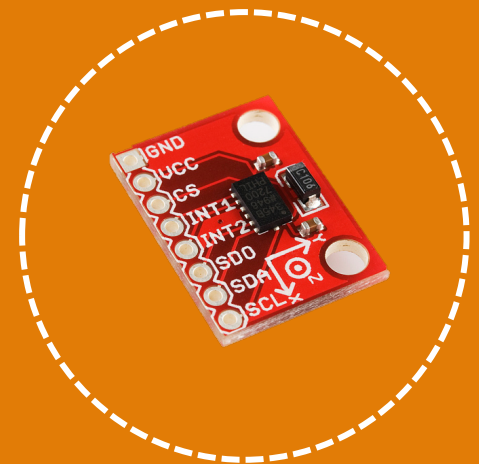
Morse Code Key



Vibration Motor

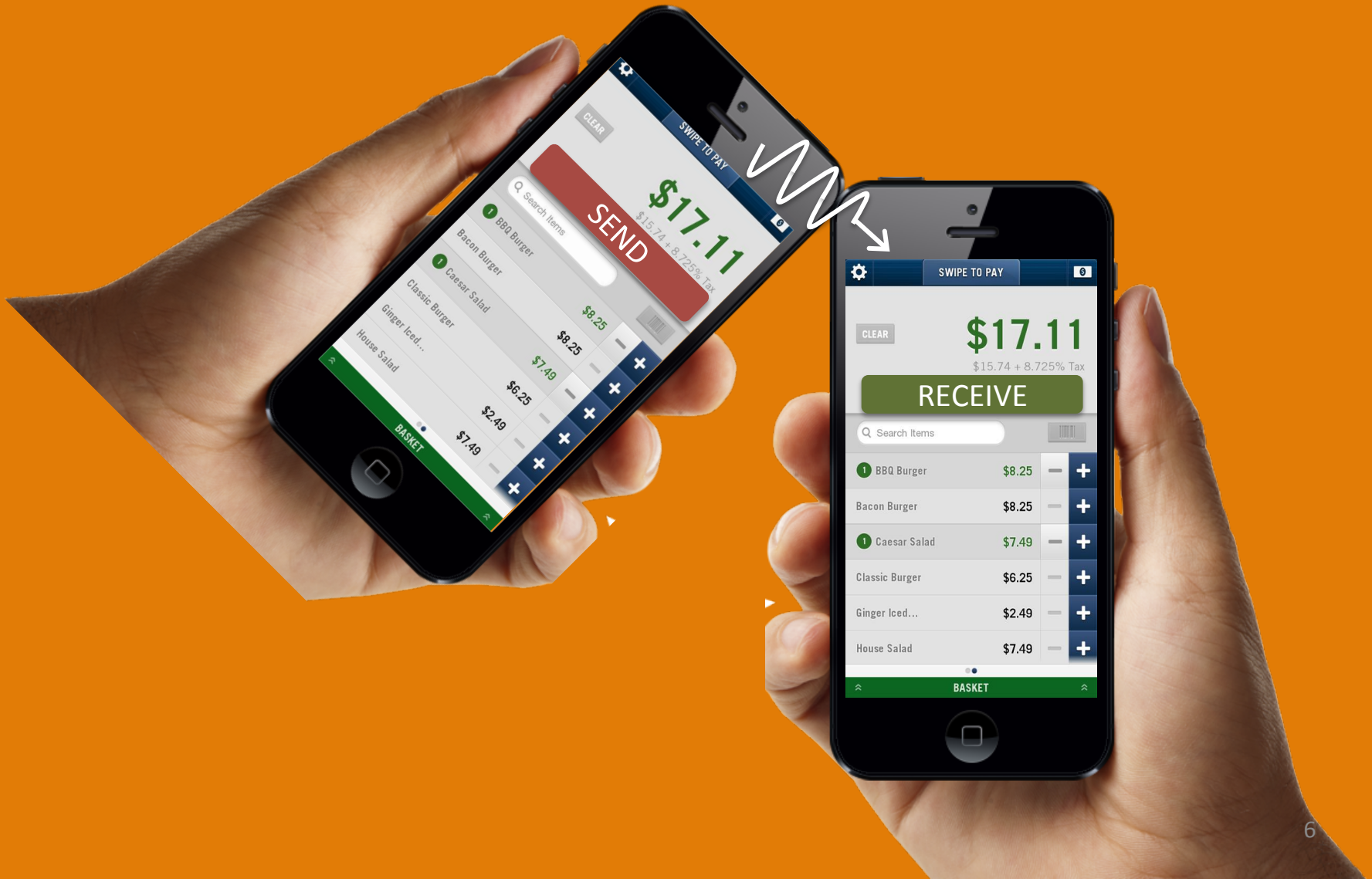


Modulated vibration

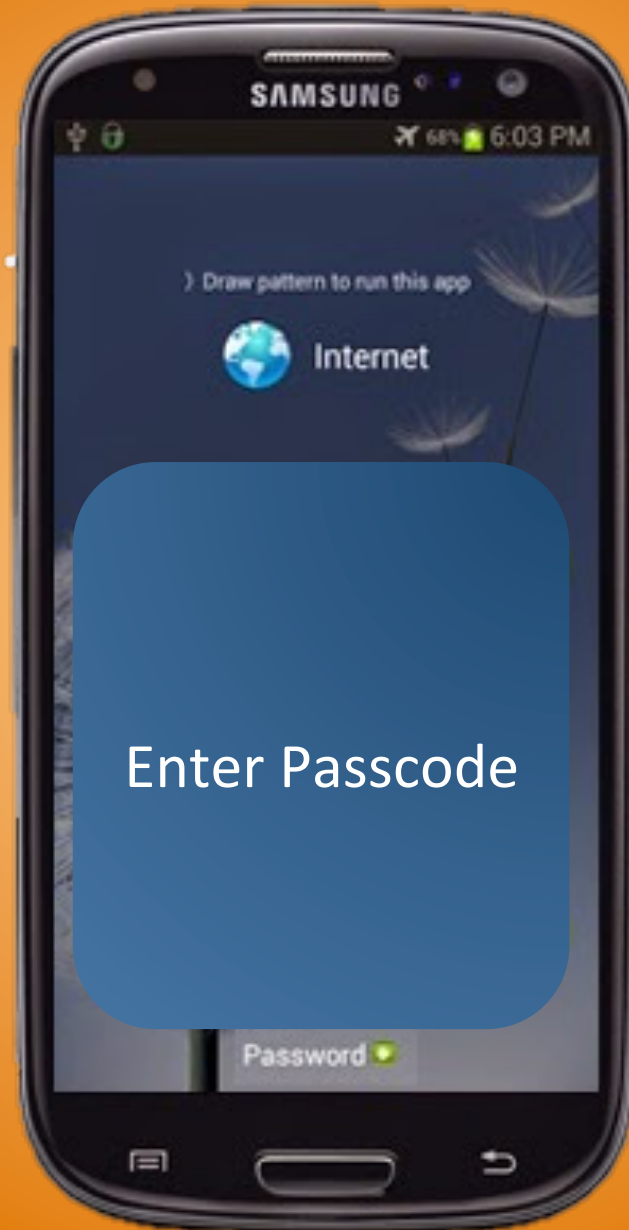


Accelerometer

Applications: Mobile Money Transfer



Applications: Authentication with Ring



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Applications: Authentication with Ring



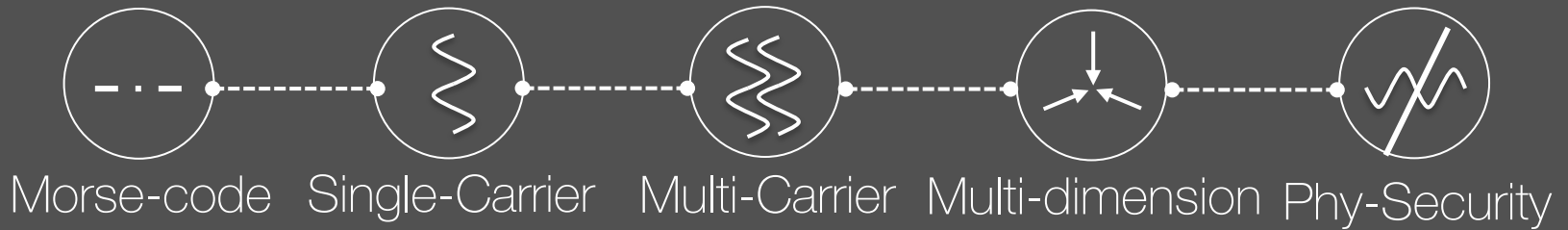
Applications: Body-Area Network



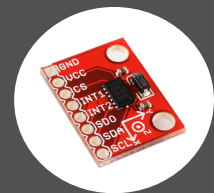
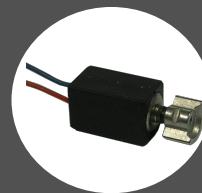
Ripple - I

200 bps

Vibratory Radio

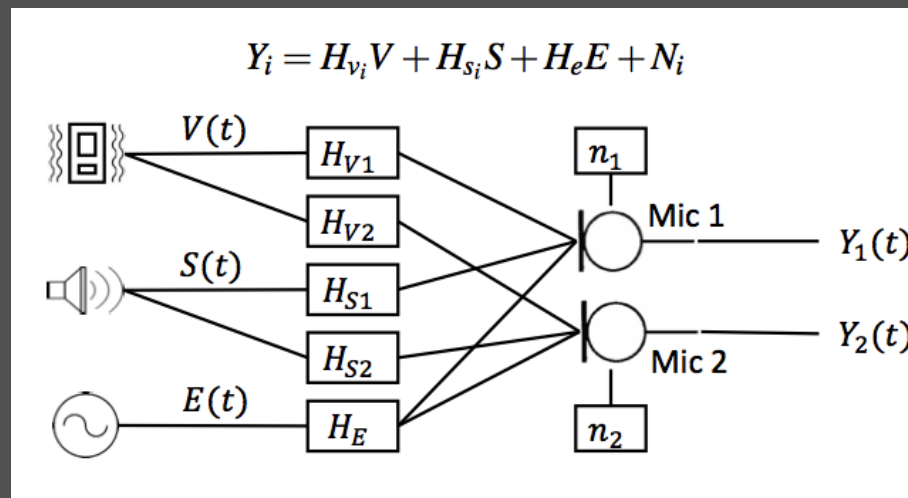
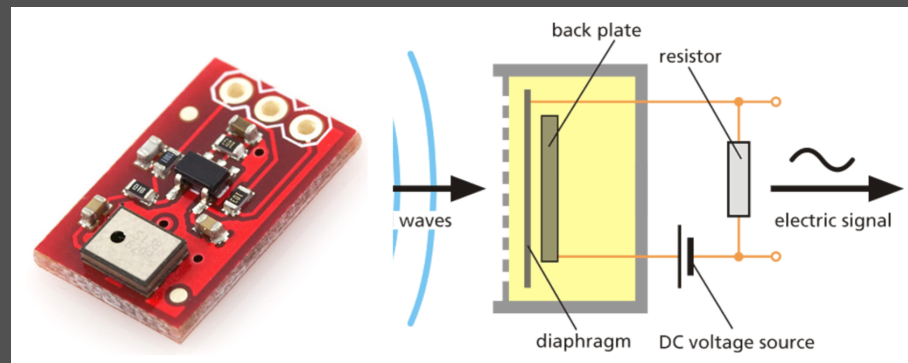


Hardware



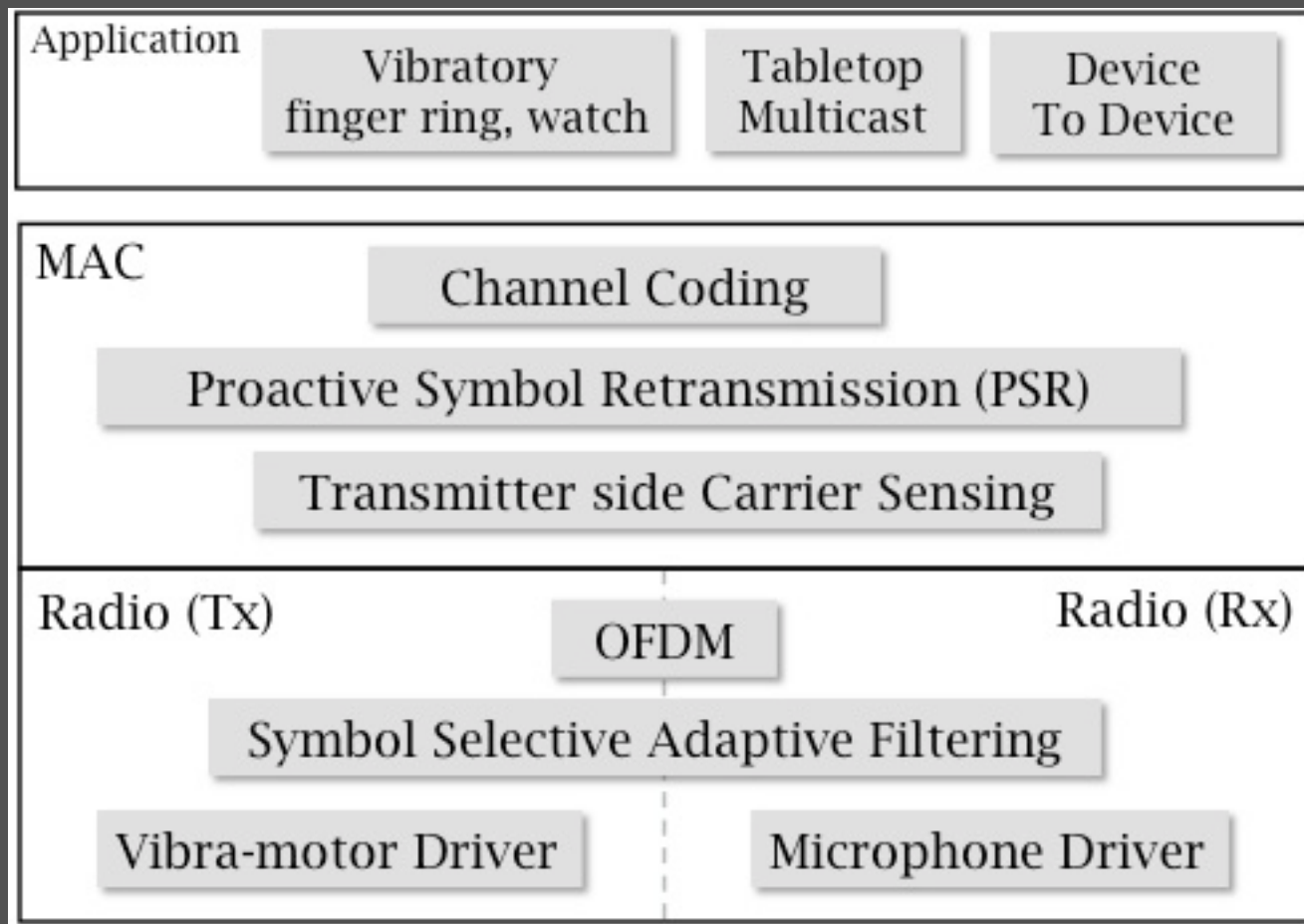
Ripple - II

32 Kbps



Ripple - II

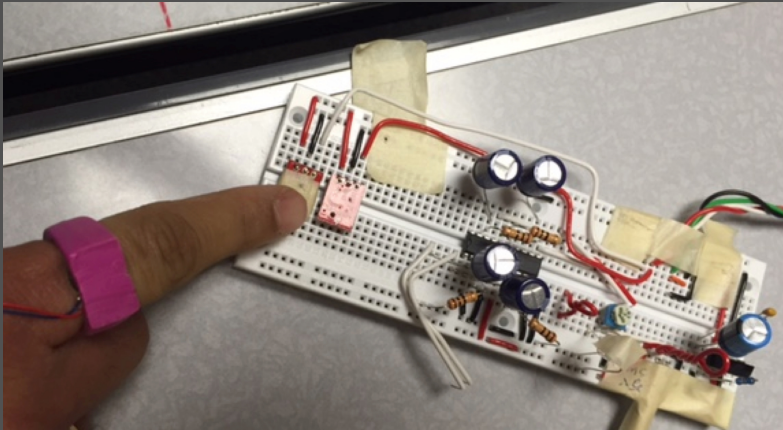
32 Kbps



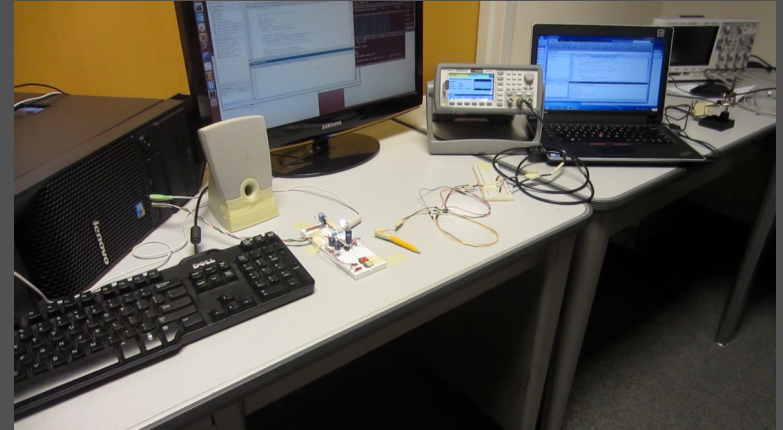
Ripple - II

32 Kbps

Ring Prototype



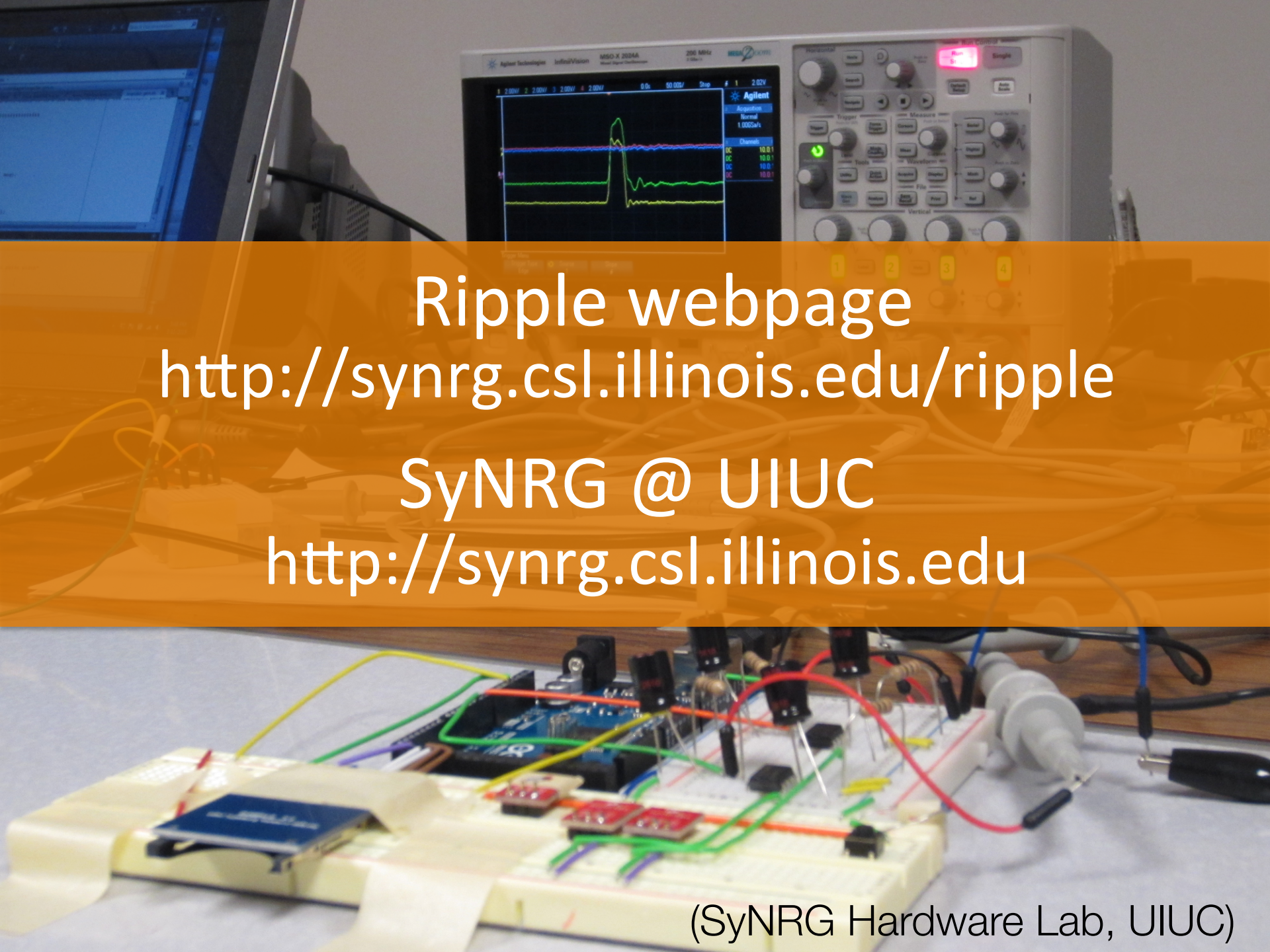
Live audio streaming demo



Ripple - II

32 Kbps

- [1] Ripple: Communicating through Physical Vibrations
NSDI 2015
- [2] Ripple II: Faster Communication through Physical Vibration
NSDI 2016



Ripple webpage
<http://synrg.csl.illinois.edu/ripple>

SyNRG @ UIUC
<http://synrg.csl.illinois.edu>

(SyNRG Hardware Lab, UIUC)