mipi®
DEVCON

MIPI ALLIANCE
DEVELOPERS
CONFERENCE
TAIPEI
18 OCTOBER 2019

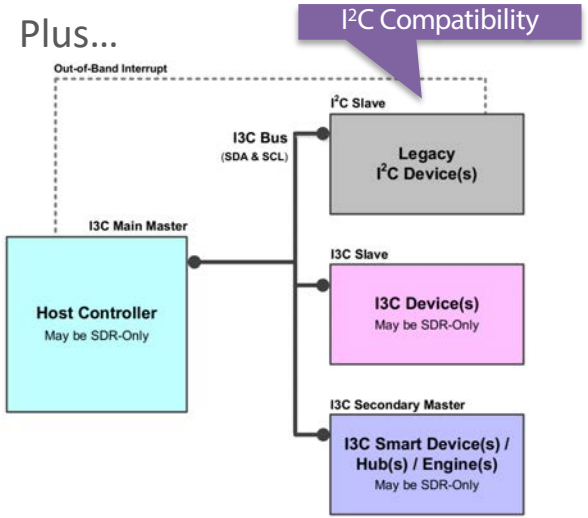
Ken Foust
Intel, Corporation

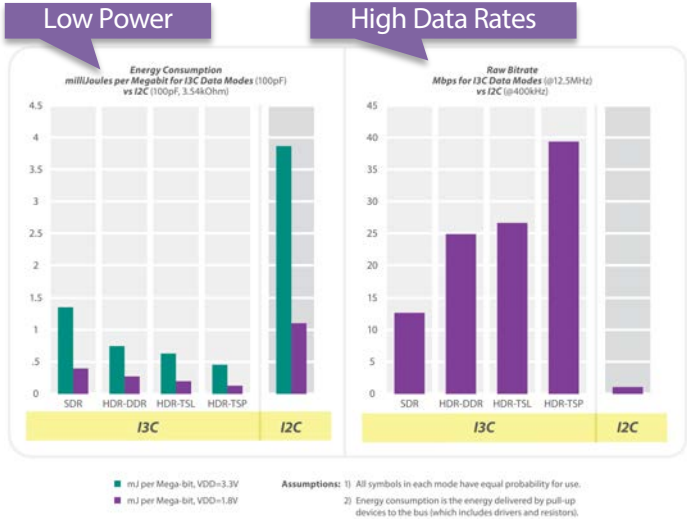
An Introduction to MIPI I3C® v1.1 and What's Next

MIPI.ORG/DEVCON

What is MIPI I3C?

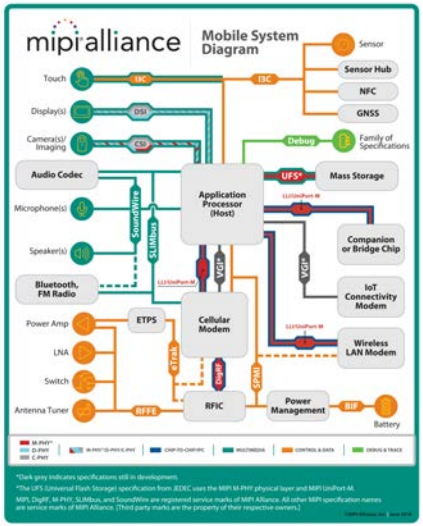
- Innovative new 2-Wire interface for sensing and beyond
- Key features address historical pain points
  - In-band Interrupt, Dynamic Addressing, Multi-Master, Standardized Commands, Time Control, Hot-Join, Error Detection and Recovery
  - Plus…

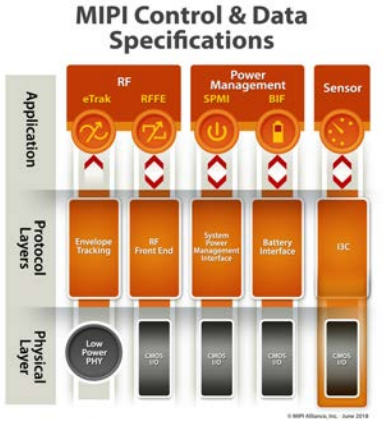




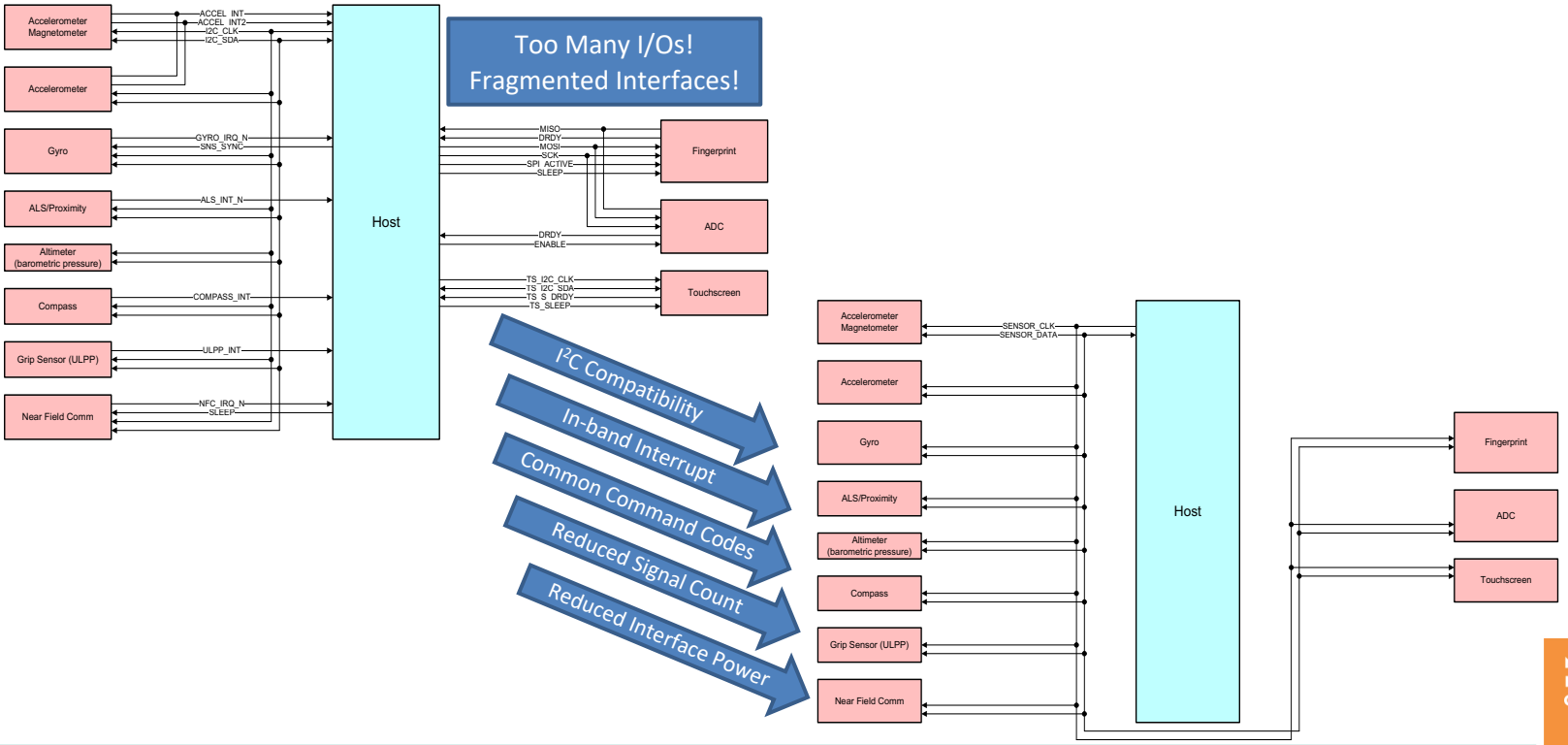
MIPI I3C for Ubiquitous Low Speed Interfacing

- Anywhere sensors are used, MIPI I3C belongs
- Aimed toward historical I²C, SPI and UART applications in…





MIPI I3C Vision



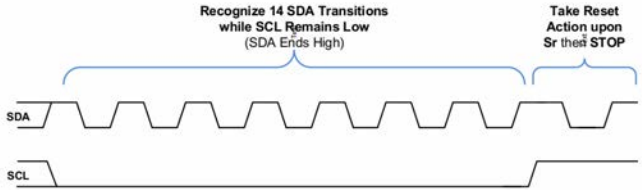
Current Status

- MIPI I3C v1.0 and MIPI I3C Basic v1.0 Specifications are released
- Interoperability confirmed via multiple MIPI sponsored plugfests
- Master and Slave IP available from all major providers
- Test/Analysis equipment available
- Standardized Host Controller Interface (MIPI I3C HCI^{SM} v1.0)
- Linux Kernel support for I3C subsystem
- 5G Ready
- MIPI I3C v1.1 is Sensor WG approved and in formal review process!

Why Adopt MIPI I3C v1.1?

- More clearly written document
- Higher speeds through new HDR mode and multi-lane (Effective Bit Rates in Mbps)

- Configurable, pattern-based Slave Reset



- Grouped Addressing, Device to Device(s) Tunneling, Comprehensive Multi-Mastership…

I3C Basic vs I3C v1.0 vs I3C v1.1 (1/2)

Feature	I3C Basic	I3C v1.0	I3C v1.1
12.5 MHz SDR (Master w/Stall, Slave and Legacy I^2C Slave Compatibility)			
1.0V Operation for 100pf C_{load}			
Slave Reset			
Set Static Address as Dynamic Address CCC (SETAASA)			
1.2V-3.3V Operation for 50pf C_{load}			
In-band Interrupt (w/MDB)			
Dynamic Address Assignment			
Error Detection and Recovery			
Common Command Codes (Required / Optional)	Yes / No		
Secondary Master			
Hot-Join Mechanism			

I3C Basic vs I3C v1.0 vs I3C v1.1 (2/2)

Feature	I3C Basic	I3C v1.0	I3C v1.1
Synchronous Timing Control			
Asynchronous Timing Control (Modes 0-3)			
HDR-DDR			
HDR-TSL/TSP			
HDR-BT (Multi-lane Bulk Transport)			
Grouped Addressing			
Device to Device(s) Tunneling			
Multi-lane for Speed (Dual/Quad for SDR and HDR-DDR)			
Monitoring Device Early Termination			

Looking Ahead at Capabilities…

- Beyond the Mobile Industry
  - Internet of Things (IoT)
  - High Performance Compute / Servers
  - Automotive
- For Usages Beyond Sensing
  - As part of its Charter, the Sensor WG carries the responsibility to ensure MIPI I3C "maintains a relevant feature set and scope"
  - The following notable usages, among others, have been instrumental in evolving I3C forward:
    - MIPI Camera Control Interface (CCI[SM])
    - MIPI Touch over I3C
    - MIPI Debug for I3C
    - System Manageability

What is Next for MIPI I3C?

- Sensor WG ramping up discussion on the next evolution of MIPI I3C
- Considering multiple capabilities / improvements
  - Long reach
  - Specification development improvements
  - Automotive requirements
  - Speed increases
  - New multi-lane uses
  - New PHY approaches
  - Standardized connectors
  - Feature refinements
- Reaching out to Industry partners and forming liaisons
- Join us now to ensure that MIPI I3C evolves to meet the needs of new industries and usages!

ADDITIONAL RESOURCES

- MIPI Sensor WG
  - https://www.mipi.org/groups/sensor
- MIPI I3C Spec
  - https://www.mipi.org/specifications/i3c-sensor-specification
- Whitepaper: Introduction to the MIPI I3C Standardized Sensor Interface
  - http://resources.mipi.org/i3c-sensor-specification-whitepaper-from-mipi-alliance
- MIPI I3C Frequently Asked Questions
  - https://www.mipi.org/resources/I3C-frequently-asked-questions

Any Questions?


mipi®
DEVCON
THANK
YOU
MIPI ALLIANCE
DEVELOPERS
CONFERENCE
TAIPEI
18 OCTOBER 2019
MIPI.ORG/DEVCON