mipi® DEVCON

MIPI ALLIANCE DEVELOPERS CONFERENCE

TAIPEI

18 OCTOBER 2019

Peter Lefkin
MIPI Alliance

State of the Alliance

MIPI.ORG/DEVCON

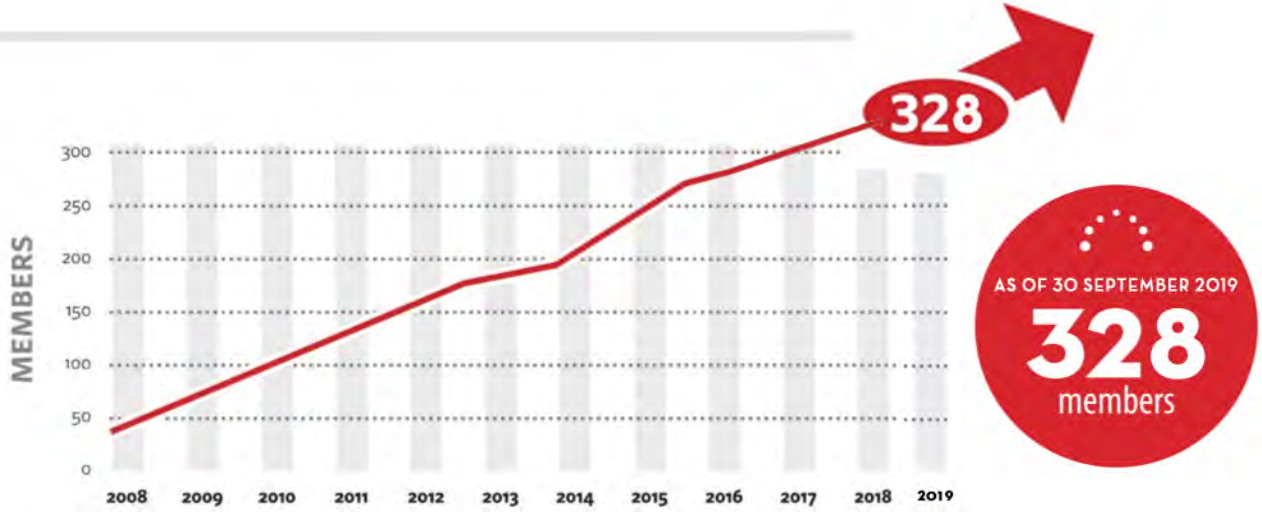
2003 THE CELLPHONE MARKET

2003

MIPI ALLIANCE FORMED TO STANDARDIZE CAMERA AND DISPLAY INTERFACES

MIPI Alliance Membership

MEMBERSHIP CONTINUES YEAR-OVER-YEAR GROWTH



27 Countries with MIPI members

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MIPI Members in Taiwan

Adopter Members

Aspeed Technology Inc.	JMicron Technology Corp.
Chroma Ate Inc.	King Yuan Electronics Co. Ltd.
Elan MicroElectronics Corp.	Novatek Microelectronics Corp.
Explore Microelectronics Inc.	PixArt Imaging Inc.
Fitipower Integrated Technology Inc.	Raydium Semiconductor Corp.
FocalTech Systems Co., Ltd.	RichWave Technology Corporation
Global Unichip Corp.	Silicon Optronics, Inc.
Himax Technologies Inc.	Sitronix Technology Corp.
HTC Corporation	Sonix Technology Co. Ltd.
iCatch Technology, Inc.	Sunplus Innovation Technology, Inc.
Ili Technology Corp.	Walsin Technology Corporation
iSentek Inc.	Wistron Corporation
ITE Tech. Inc.	

Contributor Members

M31 Technology Corp.

MediaTek Inc.

Phison Electronics Corporation

Realtek Semiconductor Corp.

Silicon Motion, Inc.

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Board and Contributor Members

Contributor Members

Board Members

intel
QUALCOMM
BOSCH
SAMSUNG
life.augmented
SYNOPSYS
TEXAS INSTRUMENTS
TOSHIBA

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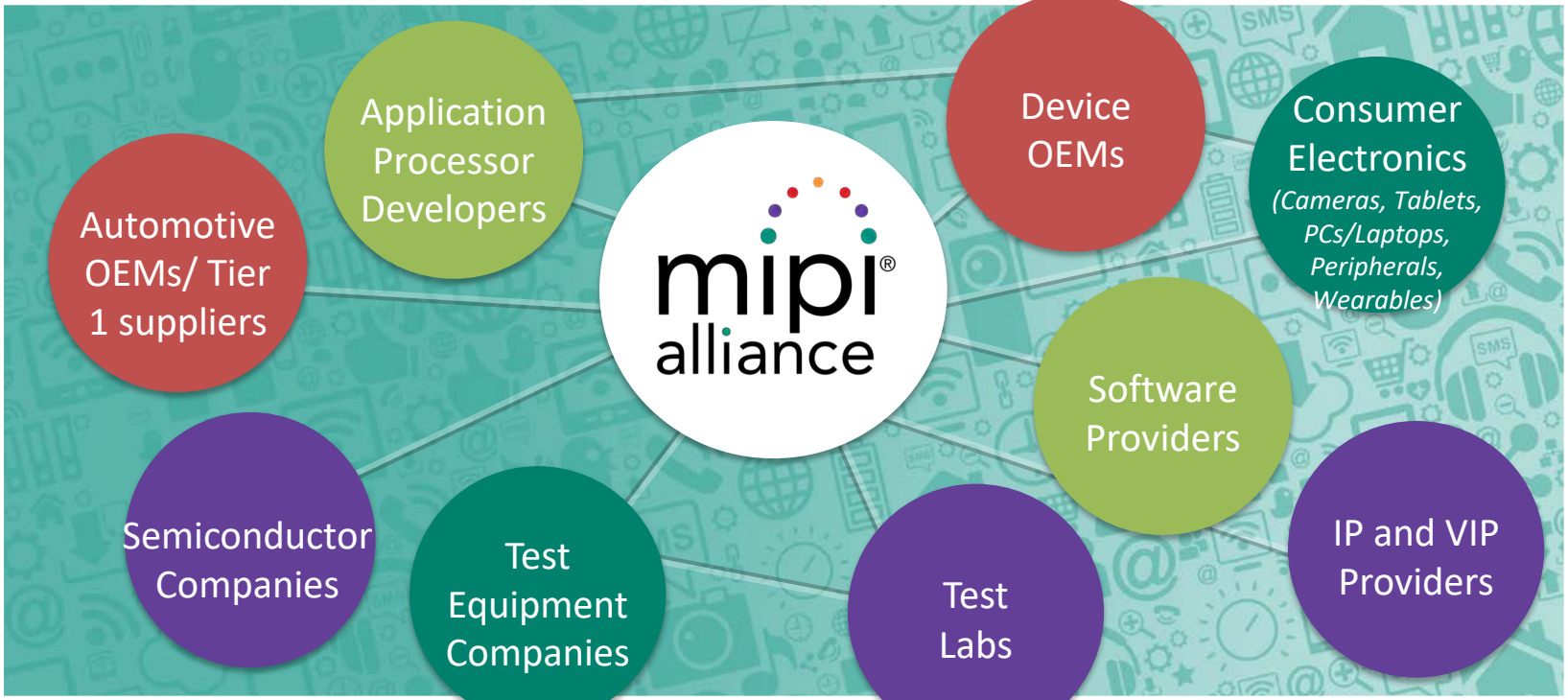
MIPI Alliance Member Ecosystem



MIPI Specifications Today

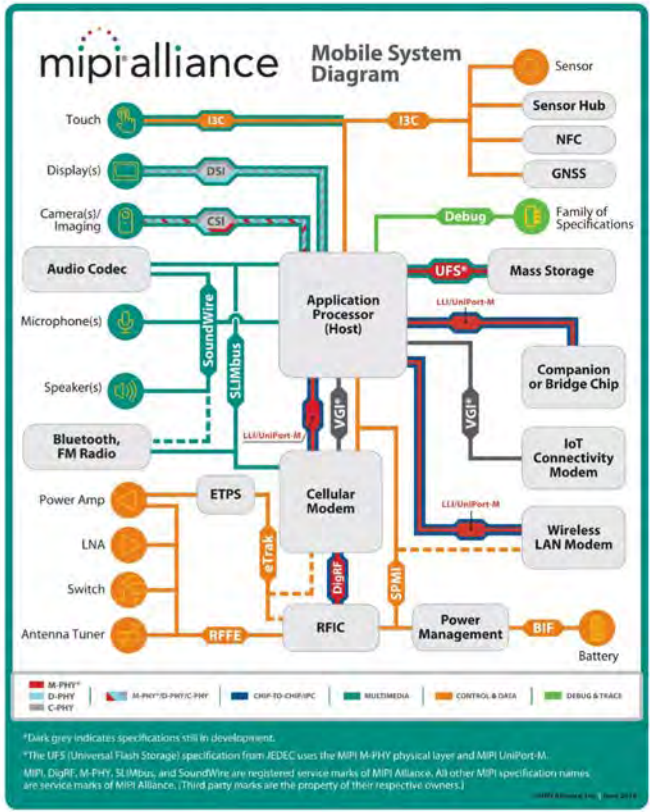
Number of current specifications

48+

MIPI specifications are crafted with these 3 key attributes:

1. Low power
2. High-bandwidth
3. Low electromagnetic interference (EMI)

All MIPI specifications are offered royalty-free for MIPI members



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MIPI Specifications Leveraged Beyond Mobile

MIPI SPECIFICATIONS CAN BE FOUND IN BILLIONS OF DEVICES AND IN EVERY SMARTPHONE ON THE MARKET

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2019 MIPI Specifications

8

MIPI Specifications Expected by Year End

Adopted in 2019

- SOUNDWIRE v1.2
- SPP v2.0
- C-PHY v2.0
- DISCO FOR I3C v1.0
- CSI-2 v3.0

Targeted for Completion This Year

- I3C v1.1
- MIPI D-PHY v2.5
- CCS v1.1

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Areas of Focus & Recent Activities

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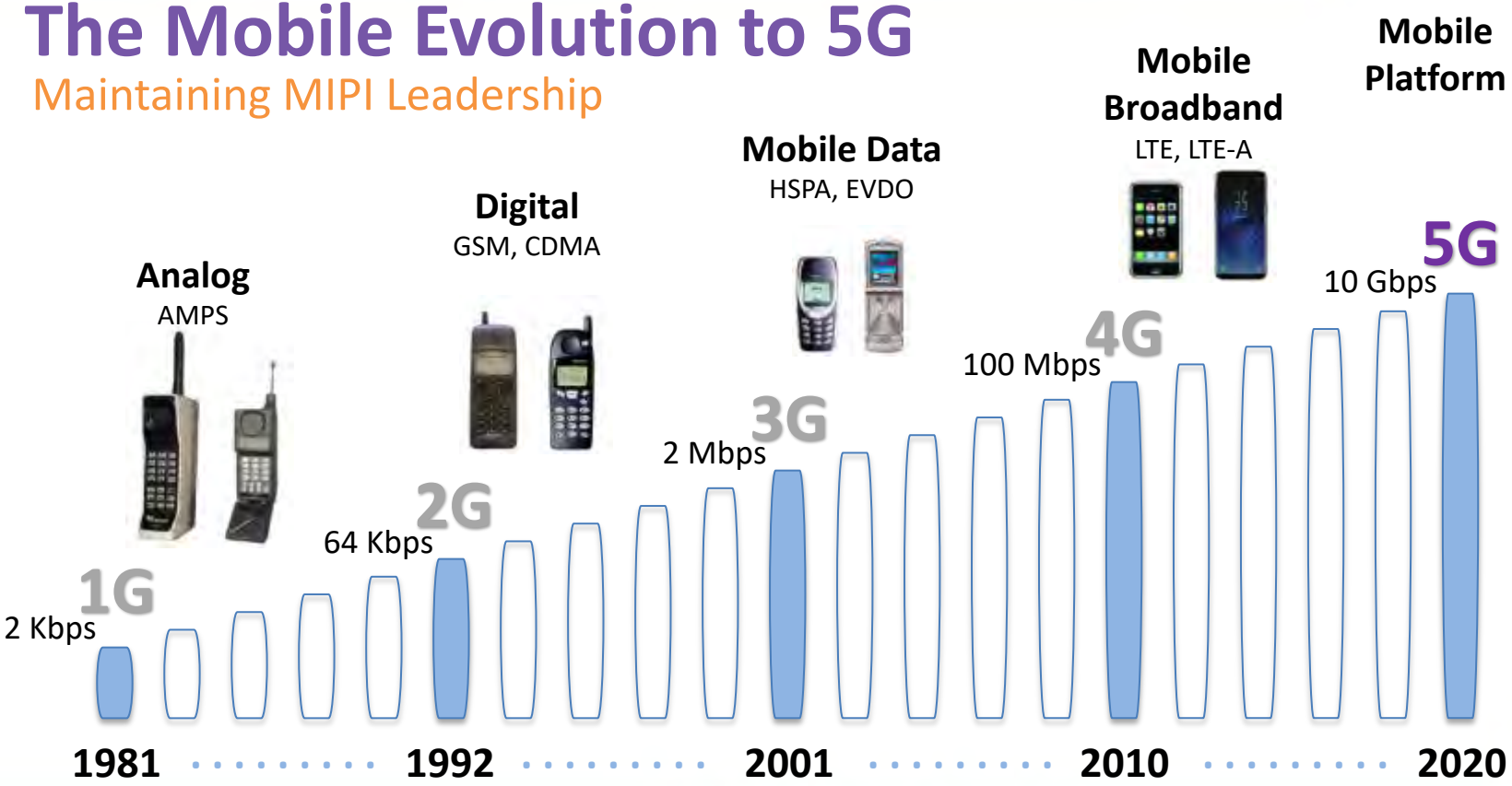
The Mobile Evolution to 5G

Maintaining MIPI Leadership



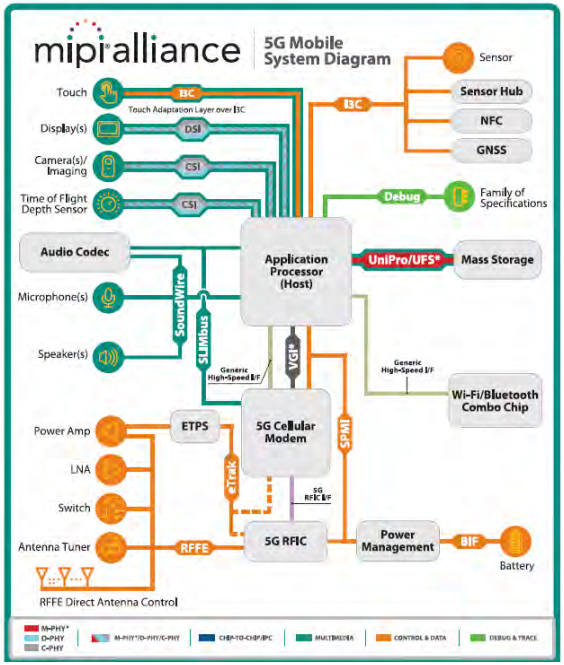
Implications of 5G for MIPI Specifications

Considerations:

- 5G is not just mobile - broader application use cases
- 5G NR - key RF technology innovations
- Changing requirements: performance, reach, power, etc.

Examples of potential impacts / implications:

- **MIPI RFFE℠** – Massive MIMO, mmWave
- **MIPI CSI-2℠** – Movement from camera to vision and imaging in emerging use cases
- **MIPI DSI-2℠** – Increase in display resolution, reach, expansion to touch and XR use cases
- **MIPI I3C®** – More and more highly accurate sensors



Learn more about MIPI RFFE development in today's program

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White Paper Assesses MIPI's 5G Readiness

- Provides an overview and main use cases for 5G
- Details how each specification meets industry bandwidth, performance and feature requirements for a wide variety of 5G use cases
- **All MIPI specifications relevant for applications in mobile platforms were found to be 5G ready**
- Continued work underway for beyond mobile applications

5G
MIPI Mobile Interfaces:
WIRING THE FUTURE OF 5G

https://mipi.org/mipi-specification-5G-readiness-assessment

Leveraging MIPI Specifications in IoT

CSI-2
Camera

I3C
Sensor data and control

DSI-2
Display

M-PHY/UniPro
Storage

RFFE
Radio control

SoundWire/SW13S
Audio

Touch
Human interface

A-PHY
Long-reach physical layer (in development)

C-/D-PHY
Short-and medium-reach physical layer

Debug
Family of specifications

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Automotive & A-PHY

CSI-2
Camera Serial Interface protocol
Protocol for cameras, lidar, radar sensors

DSI-2
Display Serial Interface protocol
Protocol for smartphone, IOT and automotive displays

C-PHY
3-phase physical layer for CSI-2 & DSI-2
Short-reach physical layer for cameras and displays

D-PHY
Differential physical layer for CSI-2 & DSI-2
Short-reach physical layer for cameras and displays

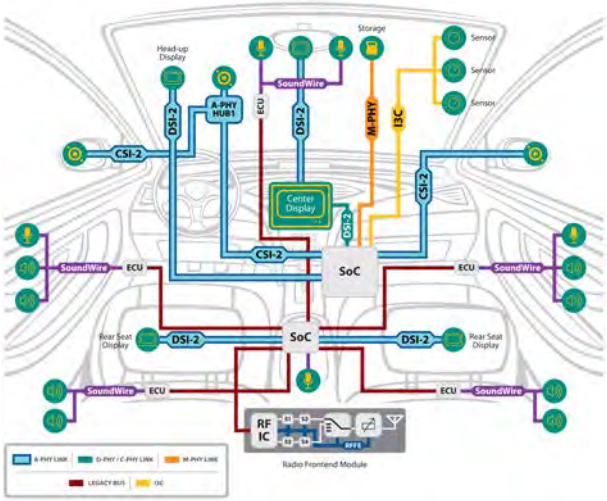
I3C
Control and data bus protocol and interface
Sensor and general purpose data and control interface within a module

RFFE
RF control protocol
Front end control within a wireless module

SoundWire & SWI3S
Digital audio and control interface
Audio interface within a module

UniPro for UFS
Data transport protocol for UFS over M-PHY
Transport protocol for UFS storage

M-PHY for UFS
Differential physical layer for UFS storage
Short-reach physical transport for UFS storage



MIPI Automotive Infotainment System Diagram

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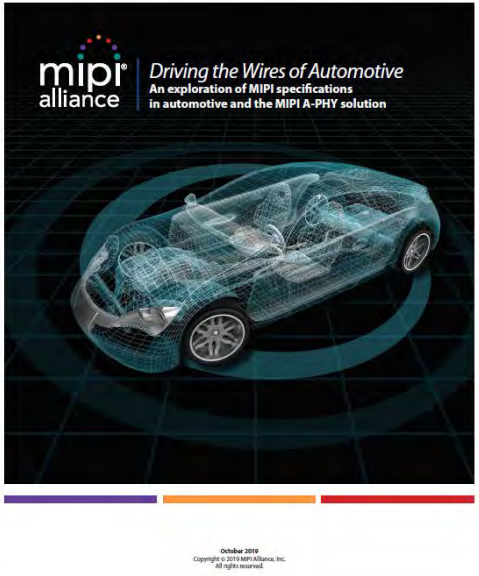
Automotive & A-PHY



New MIPI in Automotive White Paper

- Why MIPI specifications are being leveraged in automotive
- An overview of each MIPI specifications used in automotive today
- An in-depth look at the upcoming MIPI A-PHY

Sign up for the automotive email list and look for upcoming MIPI webinars

Visit mipi.org to download the paper

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Camera

Building Capabilities for Greater Machine Awareness

CSI-2 v3.0 New Features:

Unified Serial Link

for encapsulating connections between an image sensor module and application processor

Crucial for reducing the number of wires in a variety of platforms

Smart Region of Interest

for analyzing images, inferencing algorithms and making better deductions

Could enable medical devices to more surely recognize anomalies such as tumors

RAW-24

for representing individual image pixels with 24-bit precision

Could enable an autonomous vehicle to decipher whether darkness is a harmless shadow or a pothole

IN CSI-2 v4.0:

- Always On Sentinel Controller (AOSC)
- Functional Safety (FSAF)
- Imaging Security (ISEC)
- Adaptation Layer (ADAPL) for A-PHY

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Debug Specs Publicly Available

MIPI SneakPeek Protocol (MIPI SPP) v2.0 introduces MIPI TinySPP, a style of SneakPeek for low-bandwidth and potentially high-latency interfaces

MIPI System Software-Trace (MIPI SyS-T), a universal data format for transmitting software debug and trace information

MIPI Narrow Interface for Debug and Test (MIPI NIDnT), a specification that allows the use of functional ports on a device for debug/testing of finished products

MIPI System Trace Protocol (MIPI STP), a base protocol for application-specific trace functions

MIPI Trace Wrapper Protocol (MIPI TWP), a protocol enabling multiple source trace streams to be combined into a single trace stream

MIPI High-Speed Trace Interface (MIPI HTI) and **MIPI Parallel Trace Interface** (MIPI PTI), for exporting trace data

MIPI Gigabit Debug for USB (MIPI GbD USB) and **MIPI Gigabit Debug for IP Sockets** (MIPI GbD IPS), techniques for using the SPP and TWP protocols over USB and IP sockets

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Security Investigation Group

Purpose:

- Look at security efforts holistically across MIPI
- Determine a broader strategy and set of requirements that could provide working groups with a consistent solution

Deliverables:

- Recommend a MIPI security framework
- Provide documented guidance to working groups, including overarching requirements for MIPI and its members, and guiding principles for the work to be done
- Deliver recommendation(s) for the ongoing support model at the conclusion of the Security IG's work

Wires Behind Wireless Blog

In the blog:

- Information on **new features and specification releases**
- **Use cases and applications** of MIPI specifications
- **Q&As** with working group chairs and other experts
- Latest **MIPI Alliance news**
- **Highlights and key takeaways** from webinars and MIPI DevCon presentations
- Details of MIPI participation in **industry events**

www.mipi.org/blog

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THANK YOU

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