5.4 MIPI—In the Smart Factory

### USE CASES

#### In Robots with Machine Vision:
- CSI-2 over C/D/A-PHY as a highly scalable interface to connect ultra-high-resolution cameras enabling low-power vision inferencing and machine vision
- A-PHY can be used in large machines as a long-reach (≤15m), ultra-reliable physical interface, to link the robot to its control system in a noisy EMI environment
- I3C to provide a shared, two-wire interface to drive the sensors and actuators used to enable the robot

#### In Machine Control Systems with Advanced UIs:
- DSI-2 over C/D/A-PHY to drive a high-resolution display
- MIPI Touch over I3C to enable an advanced touchscreen-based user interface
- I3C to provide a shared, two-wire interface to connect simple UI components such as push buttons, LEDs and buzzers
- A-PHY as a long-reach (≤15m), ultra-reliable physical interface to link a control panel to the rest of the system in a noisy EMI environment, such as a factory

#### In Automated Guided Vehicles (AGVs):
- CSI-2 over C/D/A-PHY as a highly scalable interface to connect multiple ultra high-resolution cameras, enabling low-power vision inferencing and machine vision for the AGV to navigate around the factory and avoid obstacles
- A-PHY as a long-reach (≤15m), ultra-reliable physical interface, to link components within the AGV in a noisy EMI environment
- I3C to provide a shared, two-wire interface to drive the sensors and actuators required to control and drive the AGV
- RFFE within radio communications module

#### In Industrial Tools:
- I3C to provide a shared, two-wire interface to connect switches, actuators driving motors, vibration sensors and simple UI components such as LEDs and buzzers
- RFFE within radio communications module

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**Example AVG Schematic**

Associated MIPI SOFTWARE and DEBUG specifications also available to accelerate design process

Use of MIPI specifications can aid product compliance to functional safety standards such as IEC 61508

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**Legend**

- Functionally safe and secure IoT device that will benefit from MIPI’s focus on safety and security
- IoT device with constrained power supply that will benefit from use of MIPI low-power interfaces
- IoT device with wide-area cellular connectivity that will benefit from MIPI’s 5G preparedness
- Size-constrained, tightly packaged IoT device, benefiting from MIPI’s low pin count, low wire count, low EMI interfaces