

PolarFire® FPGA Ethernet Sensor Bridge

High-Performance, Low-Power Sensor Interface for NVIDIA® AI-Driven Edge Applications

Summary

The PolarFire® FPGA Ethernet Sensor Bridge is a sensor-bridging platform to accelerate the development of edge AI applications using the NVIDIA® Jetson™ AGX Orin™ and IGX Orin developer platforms. Based on the power-efficient PolarFire FPGA architecture, this platform addresses the developer's need for connectivity to a diverse variety of sensors and interfaces. This versatile platform offers design scalability and supports low-latency interfacing when developing next-generation edge AI applications for healthcare, robotics and embedded vision.

The Ethernet Sensor Bridge is fully compatible with the NVIDIA Holoscan Software Development Kit (SDK) and its libraries, AI models and modular components for AI-driven sensor data processing. It supports MIPI® CSI-2® and converts these signals into 10G Ethernet streams, enabling rapid edge-to-cloud development.

Support for additional protocols, including CoaXPress®, SLVS-EC™, SDI and JESD204B, is currently in development and will be available soon. For more information on upcoming releases, please contact FPGA_Marketing@microchip.com.

Part Number: MPF200-ETH-SENSOR-BRIDGE



Key Features

- **Multi-Protocol Sensor Support:** The initial version supports MIPI CSI-2, with support for additional protocols—such as CoaXPress, SLVS-EC, SDI and JESD204B coming soon
- **High-Speed Data Transfer:** Dual 10G SFP+ Ethernet ports ensure fast data transmission over long distances to support real-time processing for AI/ML inferencing on NVIDIA Jetson AGX Orin and IGX Orin developer kits
- **Low Power Consumption:** Powered by a PolarFire FPGA, the low power and thermal footprint is optimized for AI and excellent for power-sensitive applications
- **Embedded Security:** Includes hardware encryption and secure boot for data integrity, ensuring secure, reliable connections between sensors and processors
- **Seamless NVIDIA Holoscan Integration:** Fully compatible with NVIDIA Holoscan SDK for AI-driven sensor data processing, providing libraries, AI models and modular components for accelerated development

Advantages

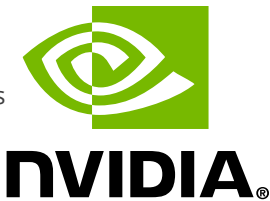
- **Reduced Costs and Complexity:** Simplifies system design with multi-protocol support, reducing hardware needs and lowering total ownership costs
- **Enhanced Reliability:** PolarFire FPGAs feature SEU immunity for reliability in harsh environments and in critical applications like medical and aerospace
- **Scalable and Future Proof:** Supports various protocols and RGMII/SGMII MAC interfaces, making it adaptable to future sensor technologies and evolving needs

Common Applications

- **Medical Imaging:** Real-time processing of diagnostic images for enhanced patient care
- **Industrial Automation:** AI-driven decision-making in automated systems and machine vision
- **Autonomous Systems:** High-speed, low-latency sensor data processing for vehicles and robotics

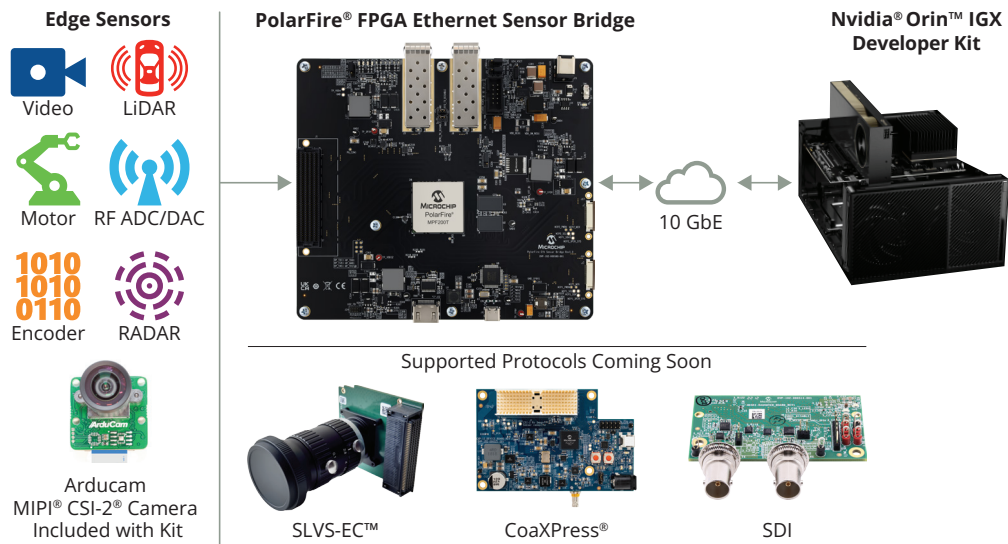
How the PolarFire FPGA Ethernet Sensor Bridge Connects to NVIDIA Devices

The PolarFire FPGA Ethernet Sensor Bridge interfaces with NVIDIA Jetson AGX Orin and IGX Orin developer kits through its dual 10G SFP+ Ethernet ports, converting various sensor data formats into Ethernet packets that are efficiently transmitted to NVIDIA platforms. The connection to NVIDIA platforms allows the bridge to deliver sensor data directly to the GPU for real-time processing and AI inferencing. Here's how it integrates with NVIDIA's ecosystem:



- **Data Conversion and Transfer:** Sensor data from sources such as the included Arducam MIPI CSI-2 camera is converted into 10G Ethernet packets compatible with NVIDIA's Hololink interface, which then transfers this data directly to the Jetson AGX Orin or IGX Orin developer kits for AI processing.
- **Holoscan Integration:** You can use the Holoscan SDK to deploy and optimize neural networks for AI inferencing and take advantage of prebuilt operators for sensor data processing. The PolarFire FPGA Ethernet Sensor Bridge can send real-time data to Holoscan-enabled devices, facilitating applications that require instantaneous insights, such as surgical navigation and automated industrial inspections.
- **Plug-and-Play Compatibility:** The PolarFire FPGA Ethernet Sensor Bridge's integration with NVIDIA devices provides a seamless solution for edge-to-cloud applications, allowing you to quickly connect, configure and deploy sensors without the need for extensive customization.

Connecting Sensors with the PolarFire FPGA Ethernet Sensor Bridge



For More Information

www.microchip.com/POLARFIRE-ESB

[Product Page on Purchasing Portal](#)

Part Number

Part Number	Sensor Protocols	Ethernet Ports	Memory
MPF200-ETH-SENSOR-BRIDGE	MIPI® CSI-2® Note: CoaXPress®, SLVS-EC™, SDI, JESD204B protocols will be supported soon	Two 10G SFP+	2 GB DDR4