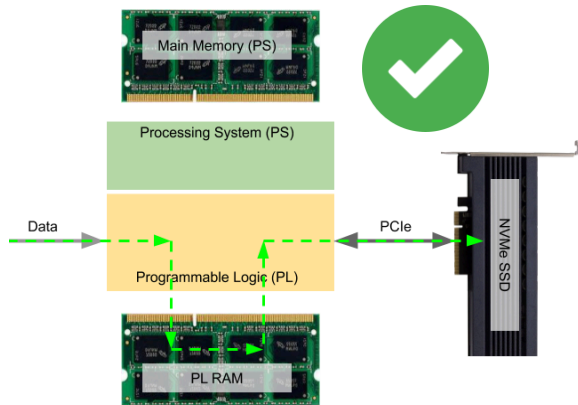


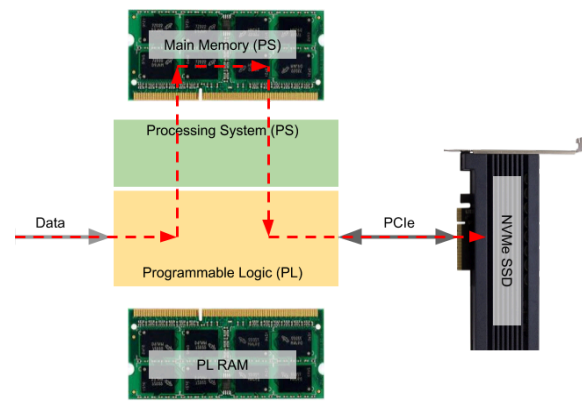
NVMe (Non-Volatile Memory Express) has become the prominent choice for connecting SSD (Solid-State Drives) when read/write performance is key. MLE releases NVMe Streamer, a Full Accelerator NVMe Host Controller subsystem integrated into AMD Versal and Zynq UltraScale+ MPSoC / RFSoc devices.

NVMe Streamer Accelerated



- Direct path between PL and SSD
- PL-RAM used as Stream Buffer (optional)

Non-Accelerated Mode

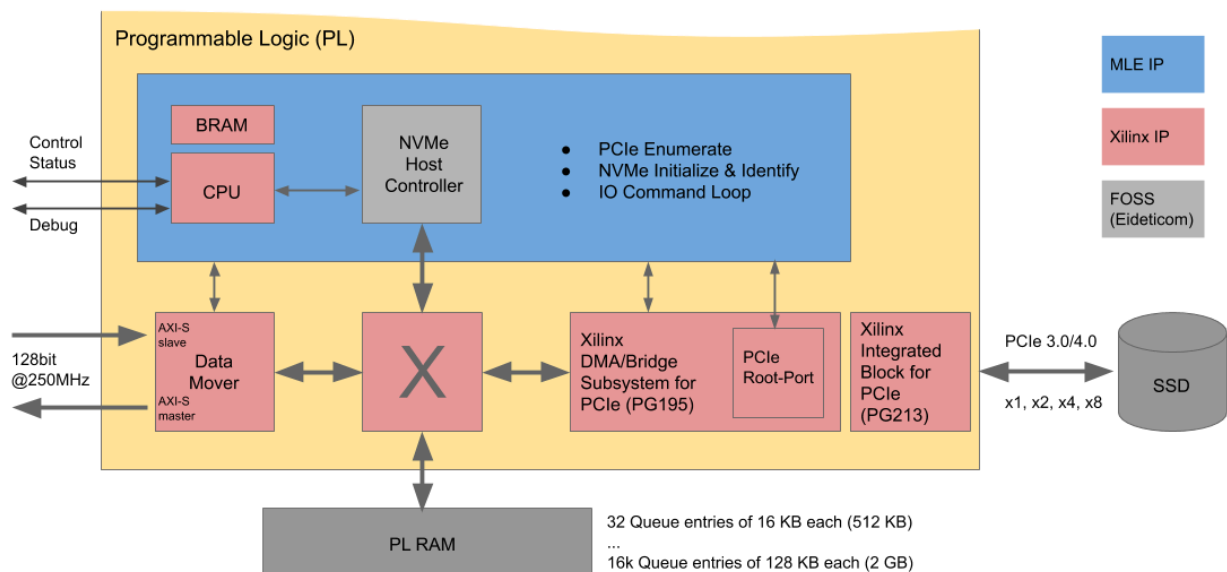


- Data flows through main memory adding latency and decreasing bandwidth

Key Features

- Provides multiple NVMe host ports (i.e. PCIe Root Ports) for NVMe SSD connect
- "CPU-less" Full-Accelerator operation
- Fully integrated and tested NVMe Host Controller IP Core
- PCIe Enumeration, NVMe Initialize & Identify, NVMe Queue Management
- Control & Status interface for NVMe IO Commands and drive administration
- Compatible w/ PCIe Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), Gen 3 (8 GT/s), Gen 4 (16 GT/s)
- Scalable to PCIe x1, x2, x4, x8

System Block Diagram

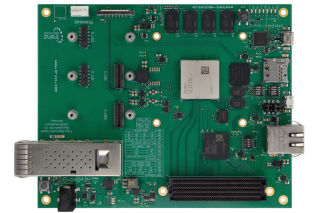


Application Use Cases

- Bring high-performance NVMe host connectivity to FPGAs
- High-speed analog and digital data acquisition systems
- Lossless and gapless recording, e.g. of sensor data
- Camera surveillance systems
- Automotive & Aerospace Datalogging
- Data streaming from SSDs
- Storage protocol offloading (NVMe/TCP)



▲ Opsero MCIO PCIe Host FMC Gen4



▲ AMD Versal AI Edge on TE0950

Exemplary Evaluation Reference Designs (ERD)

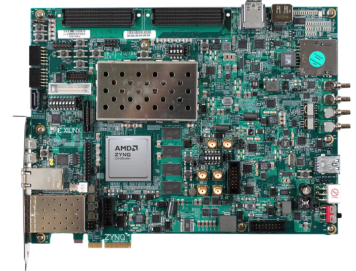
- Less than 44k LUTs and 143 BRAM tiles
- Single / dual M.2 NVMe SSD connectivity via [FPGA Drive FMC](#)
- Single U.2 NVMe SSD connectivity via [MCIO PCIe Host FMC](#)

AMD Versal™ AI Edge on TE0950 Evalboard (VE2302)

- AMD PCIe Gen 4 x8 Hard IP
- 4 GTYP Transceivers
- 8GB PL-attached DDR4 RAM for Stream Buffering

AMD Zynq™ UltraScale+™ MPSoC ZCU106 Evaluation Kit (ZU7EV)

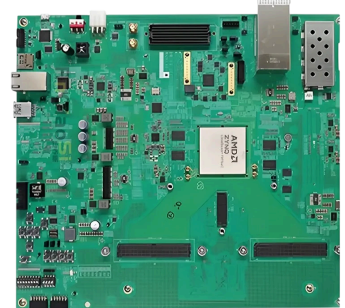
- AMD PCIe Gen 3 x4 Hard IP
- GTHv4 Transceivers
- PL-attached DDR4 RAM for Stream Buffering



▲ AMD Zynq US+ MPSoC ZCU106

AMD Zynq™ UltraScale+™ RFSoc ZCU216 Evaluation Kit (ZU49DR)

- AMD PCIe Gen 4 / Gen 3 x8 Hard IP
- 16 GTY Transceivers
- 4GB PL-attached DDR4 RAM for Stream Buffering



▲ AMD Zynq US+ RFSoc ZCU216

Deliverables

- As IP Core or customized FPGA subsystem
- Single-Project-Use Netlist (or equiv.)
- Multi-Project-Use Source Code
- Customized, integrated turnkey solutions
- Application-specific expert design services

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About Missing Link Electronics (MLE)

We are a Silicon Valley based technology company with offices in Germany. We are partner to leading electronic device and solution providers and have been enabling key innovators in the automotive, defense, industrial, medical, test & measurement markets with FPGA-based subsystems and systems.

Our mission is to offload CPUs and accelerate software-rich system stacks via so-called Domain-Specific Architectures. To implement this we make heavy use of heterogeneous processing such as FPGAs which we program using C++/C/SystemC as well as VHDL and Verilog HDL.

Our expertise is to "proudly source elsewhere" which means rather than re-inventing the wheel we license (and sublicense) 3rd party IP cores from our growing list of partners and combine this with Open Source Software like Linux to deliver Full System Stacks for FPGA. Today, we offer high-performance (embedded) compute, image-processing, storage and network systems and solutions as well as licensable system stacks for adaptable compute platforms.