Mentor Questa VIP

Mentor Questa® VIP (QVIP) integrates seamlessly into advanced verification environments including testbenches built using UVM, Verilog, and VHDL. Mentor, a Siemens Business, supports the leading industry-standard bus families, like PCIe, USB, and Ethernet, as well as thousands of DRAM and FLASH memory models. Questa VIP is the industry’s only VIP with a native SystemVerilog UVM architecture across all protocols, ensuring maximum productivity and flexibility.

Questa VIP for NVMe

NVMe QVIP is a comprehensive solution for exhaustive verification of PCIe-based IP and SoC products, providing the flexibility to create and cover all possible verification scenarios. NVMe QVIP includes ready-to-use verification components and exhaustive stimuli to increase productivity and accelerate verification signoff.
NVMe Questa VIP Use Models

QVIP as Controller
Support for PCIe, AXI transports
Support for admin and IO commands
Fully functional controller VIP
Built-in memory for media
Exhaustive feature support
  – PRP/SGL
  – Arbitration mechanisms
  – All PCIe interrupt support
  – CMB, HMB, PMR
  – Protection info
  – NVMe sets
Automatic handling of all reset types
Configurable delay in command processing
Faster simulation mode with backdoor initialization

QVIP as Host
Auto handshake with transport support
  – Link initialization
  – Controller discovery on PF and VF
Complete controller initialization
Inbuilt queue handling
  – Addition/deletion
  – Doorbell status and updates
  – Queue Read/Write
  – Backdoor access
Built-in interrupt handling
Built-in handling for all NVMe and transport resets
UVM register model support for NVMe controller registers
Backdoor initialization for host QVIP
Configurable delay in each step of command execution

NVMe QVIP Use Models
NVMe Questa VIP Verification Capabilities

Protocol Assertions
Built-in assertions analyze traffic for protocol adherence

Coverage
Ready-to-use cover groups
  – Admin and IO commands
  – Queue management
  – Crosses for commands and possible completion status

Stimulus
Out-of-the-box stimulus
  – To achieve QVIP delivered coverage
  – Detailed scenario wise stimulus
  – Stimulus to cover state transition and protocol packets
  – Error injection

Analysis Components
Scoreboards
  – Scoreboard NVM media
  – Read/Write operations

Performance and latency monitor
  – Various performance stats like IOPS, throughput etc …
  – Latency between each command operation

Loggers
Analysis ports for NVMe commands

Questa Verification IP GUI
**Questa Verification IP Library**

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<th>Ethernet</th>
<th>DRAM</th>
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**Flash**

- SDCard 6.0
- eMMC 5.1
- SDIO 4.1
- UPI
- Toggle
- UFS
- Parallel NOR
- Serial NAND

**Mil-Aero**

- Spacewire
- PCIe 5.0
- PCI
- PCIe 4.0
- SRIO
- PCIe 3.1
- 1553b
- PCIe 2.1

**PCle®**

- NVMe
- PCIe
- NoF 1.0
- PCIe
- NVMe 1.4
- AGP
- PCIe
- NVMe 1.3

**NVMe**

- USB
- USB 3.2
- USB TypeC
- USB PD
- USB 3.1
- USB 3.0
- USB 2.0

**Other**

- Contact Mentor for additional verification IP components not listed here

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**Questa VIP Testbench Architecture**

For the latest product information, call us or visit: www.mentor.com/fv

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