

P411W-32P

NVMe Switch Adapter

Enabling Enterprise Class x4 NVMe Acceleration and Caching Solutions

Overview

The Broadcom® P411W-32P is the industry's first fully managed Gen 4 NVMe switch adapter, providing enterprise class options for NVMe solid state drive (SSD) attach requirements. The P411W-32P leverages Broadcom's world-class board design, PEX88048 PCIe Gen 4 switch chip, and solid firmware expertise, to provide advanced features not available using traditional NVMe drive attach methods. Similar to Broadcom HBAs, the P411W-32P adapter is supplied with fully validated and supported firmware and standards based out of band manageability features.

The P411W-32P switch adapter delivers several innovative features, including true surprise add and removal, Downstream Port Containment and Read Tracking, which can help the users avoid typical situations that could cause a kernel panic. The integrated management processor delivers added features, such as SES compatible LED control and BMC support.

True Surprise Drive Add and Remove Support

The P411W-32P enables support for Surprise Drive Add and Remove using standard system BIOS and OS software. The adapter enables allocation of empty drive slots for future drive addition by:

- Creating synthetic hierarchy to isolate host from physical PCIe topology changes and errors
- Creating "Placeholder Endpoints" for any empty slots where a NVMe endpoint device could be later installed to the system
- Delivering information required to map PCIe Device IDs back into PCIe system memory, which fools the system into thinking all slots are populated. This occurs as a result of the host enumerating the PCIe topology and querying the P411W-32P. The host will then allocate memory locations for the empty slots.
- Managing the process when a physical device is inserted, to take care of all the required protocol handshakes and replace the placeholder endpoint with the actual information of the device. This saves the system from going through another round of enumeration and allows for the new device to be used in a graceful manner.

Key Features

- x16 PCIe Gen 4 Host Interconnect
- Up to 8 x4, 16 x2, or 32 x1 NVMe SSD connect
- SRIS and REFCLK support
- SFF-9402 compliant connector pinout
- Downstream port containment
- Read tracking
- Surprise Add and Remove
- Synthetic Hierarchy generation
- FRU Inventory support
- Hardware Secure Boot
- LED Management
- Universal Bay Management (UBM)-Ready (SFF-TA1005)

Applications

- High Performance x4 NVMe connect
- Application acceleration improving database and real-time data processing

During a surprise remove scenario, the PEX88048 chip powering the adapter, uses the Downstream Port Containment and Read Tracking features to contain any error messages that would normally cause a kernel panic or blue screen event. The actual device is replaced with a placeholder endpoint similar to how an empty slot is pre-allocated for surprise device add. Finally a hot unplug event is generated to the host. The user can then replace the drive by doing a surprise add without powering down the system or going through a new enumeration event.

Out-of-Band Management Access

Broadcom continues to provide industry-leading out-of-band management access to its ROC, IOC and synthetic switch-based adapters using MCTP over PCIe. Broadcom out-of-band management continues to differentiate the controllers as the best choice for data center management integration.

Broadcom Storage

Broadcom is the #1 trusted market leader in storage connectivity and continues to innovate and invest in the industry's broadest products portfolio including PCIe Switches, SAS/SATA Controllers and Expanders, HBAs, RAID Adapters, Fibre Channel, HDD SoCs and PreAmps and SSD SoCs.

With a 25-year history delivering high quality silicon, advanced firmware, innovative board design, and extensive HDD/SSD validation processes, Broadcom is the leading supplier of choice for server and external storage OEMs, system builders and Hyperscale customers.

Adapter	P411W-32P
PCIe Switch	PEX88048
Connectors	Four x8 SFF-8654
Storage Interface	PCIe (NVMe): x4, x2, x1
Host Interface	x16 PCIe 4
Form Factor	LP MD2
Physical Dimensions	6.127 in × 2.712 in. (155.90 mm × 68.90 mm)
Maximum Operating Conditions	Operating: 0°C to 55°C, 5% to 90% non-condensing Storage: -45°C to +105°C, 5% to 95% non-condensing
MTBF	>5,000,000 hours at 40°C
Typical Power	21W
Operating Voltage	+12V ±8%; 3.3V ±9%
Hardware Warranty	3 years with advanced replacement option Free technical support at https://www.broadcom.com/support/pcie-switches-bridges
Regulatory Certifications	USA (FCC 47 CFR part 15 Subpart B, class B); Canada (ICES -003, Class B); Taiwan (CNS 13438); Japan (VCCI V-3); Australia/New Zealand (AS/NZS CISPR 22); Korea (RRA no 2013-24 & 25); Europe (EN55022/EN55024); Safety: EN/IEC/UL 60950; RoHS; WEEE.
Ordering Information	Single Pack: 05-50054-00