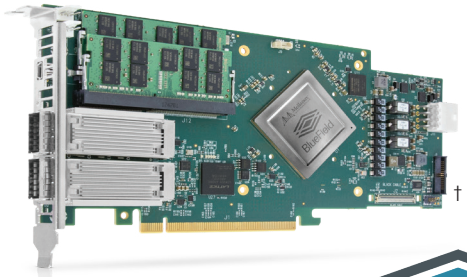
CONTROLLER CARD
PRODUCT BRIEF



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BF1600
NVIDIA® Mellanox® BlueField® Dual Port 100Gb/s Controller Card for InfiniBand and Ethernet

Bringing advanced application offload capabilities to high-performance storage and cloud platforms

The Mellanox BF1600 BlueField Dual Port 100Gb/s Controller Card is the perfect solution for managing NVMe storage drives in storage and hyperconverged systems. BlueField Dual Port 100Gb/s Controller Card delivers the highest NVMe-oF target performance, reducing TCO and increasing ROI.

Boosting Storage Performance

Three main trends are driving today's storage OEM market. OEMs seek innovative, scalable and cost-effective storage solution designs. In addition storage companies strive to extend product lifetimes and reduce TCO by reusing existing designs. Finally, storage vendors turn to NVMe-oF based solutions as these provide storage scalability and easy migration to the cloud.

Mellanox is a leading provider of NVMe-oF network adapters. Mellanox was first to market with 25, 40, 50, and 100 GbE adapters, and is leading the fifth generation Remote Direct Memory Access (RDMA) products, which are at the base of NVMe-oF technology. By deploying Mellanox BF1600 Controller Cards, customers are taking advantage of Mellanox's vast and proven success in RoCE and NVMe-oF deployments.

BlueField Data Processing Unit (DPU)

Mellanox BlueField is a highly efficient controller optimized for NVMe storage systems, Network Functions Virtualization (NFV), cloud and AI workloads.

Ideal solution for JBOF and JBOD systems

BlueField DPU integrates all the discrete components of a storage system appliance into a single chip (CPU, PCIe switch, and network controller), making it the premier solution for building Just-a-Bunch-Of-Flash (JBOF) systems, All-Flash-Array and storage appliances for NVMe over Fabrics.

With an integrated NVMe-oF offload accelerator, the BlueField DPU gives the BF1600 Controller Card a superior performance advantage over existing JBOF systems, significantly reducing storage transaction latency, while increasing IOPs (I/O operations per second).

Key Benefits

BF1600 Controller Cards are standard PCIe cards that can transform existing JBOF systems into NVMe-oF compliant solutions, simply by plugging the cards into PCIe slots. BF1600 supports up to 32 PCIe Gen3.0 lanes, and enables connectivity for up to 16 SSD drives without the need for an external PCIe switch. The small form factor of the cards allows customers to install multiple BlueField Controller Cards in a single system to support a larger number of SSDs as well as high-availability storage architecture.

BENEFITS

- Increases ROI by leveraging the NVMe-oF accelerator to maximize performance
- Enables a shorter time to market
- ReducesTCO by replacing both CPU and adapter with a single BlueField Dual Port 100Gb/s Controller Card
- Supports up to 16 NVMe SSDs without requiring an external PCIe switch
- Can be used as a GPU controller card for Machine Learning systems

FEATURES

- Two QSFP ports supporting:
  - 10/25/40/50/100 GbE
  - EDR/FDR InfiniBand speeds
- Integrated BlueField DPU
- SPI flash for NIC firmware
- 16GB eMMC flash memory for software
- FH¾L form factor standard PCIe Gen3.0 x16
- Expandable to PCIe Gen3.0 x32

† For illustration only. Actual products may vary.

BF1600 Controller Cards offers a wide range of dedicated offloads to maximize virtualization scalability and efficiency, via a powerful blend of hardware accelerators, embedded software and fully integrated advanced network capabilities.

The integration of crypto engines within the BlueField BF1600 Controller Card simplifies the implementation of security applications. These enhanced security capabilities reduce the threat of exposure and minimize risk, while enabling real-time prevention, detection and responses to potential threats.

BlueField also offers cost-effective and integrative solutions for Machine Learning appliances, enabling efficient data delivery for real-time analytics and data insights based on superior RDMA and GPUDirect® RDMA technologies.

Software Support

BF1600 Controller Cards are shipped with Mellanox BlueOS® and a UEFI-based bootloader pre-installed. BlueOS is a Linux reference distribution targeted at BlueField-based embedded systems; Mellanox OFED and NVMe-oF support are installed by default.

BlueOS itself is based on the Yocto Project Poky distribution. Through the use of the OpenEmbedded Build System and provided metadata, BlueOS can be easily modified by customers to meet their specific Linux distribution requirements.

BlueOS is Linux-based and run all customer Linux applications seamlessly. Storage customers may also choose to run the Linux distribution of their choice instead of BlueOS.

Features

BF1600 Controller Card

- FH¾L form factor
- BlueField DPU with 16 Armv8 A72 cores (64 bit)
- PCIe Gen3.0 x16 golden finger connector (root complex)
- Two on-card x8 PCIe Gen3.0 I-PEX connectors
- Dual-port BlueField Virtual Protocol Interconnect (VPI) interface:
  - Ethernet: 10/25/40/50/100GbE QSFP ports
  - InfiniBand: FDR/EDR QSFP ports
- Single-slot/dual-slot width heatsink - passive cooling
- NC-SI connector on card
- External PCIe power connector
- CPLD for SSD control signals expansion
- 16GB eMMC memory for BIOS and OS
- SPI flash for NIC firmware

DRAM DIMM Support

- 2 sockets for DRAM DIMMs
- 2x 8GB DDR4 SODIMM
- 16GB on-board DDR

Table 1 - Part Numbers and Feature Set Breakdown

OPN	Card Model	BlueField Series	PCI Express Interface	Crypto Support	Memory Support	Form Factor
MBF1M656A-ESNAT	BF1600 BlueField Controller Card, Dual Port VPI 100Gb/s QSFP28	E-Series 16 cores	PCIe Gen3.0 x16 + auxiliary card with PCIe Gen3.0 x16	No crypto	2x 8GB DIMM	FH¾L + adjacent slot

Notes: 1. All BF1600 Controller Cards are shipped with the tall bracket mounted and a short bracket as an accessory.
2. PCIe auxiliary cards include 2 x CABLINE-CA II PLUS 350mm cables.
3. Refer to BlueField Software and Firmware release notes for feature availability.

350 Oakmead Parkway, Suite 100, Sunnyvale, CA 94085
Tel: 408-970-3400 • Fax: 408-970-3403
www.mellanox.com

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