DATA SHEET

BlackDiamond® X8

HIGHLIGHTS

- High density 1/10GbE, 40GbE and 100GbE switch for high consolidation
- 768 ports of 10GbE SFP+ per switch, 2,304 ports per rack
- 384 ports of 100/1000/10000MbE RJ45 or 1GbE SFP per switch, 1,152 ports per rack (using 10GbE)
- 192 ports of 40GbE QSFP+ per switch, 576 ports per rack
- 32 ports of 100GbE CFP2 per switch, 96 ports per rack
- Orthogonal architecture with 20.48Tbps total switching capacity
- 2.3 µSec port-to-port latency across fabric, sub- µSec within a blade
- High-scale enterprise routing with up to 1 million forwarding entries (future availability)
- Powered by time-tested, modular ExtremeXOS® operating system with resilient and intelligent virtualization features
- Software Defined Networking with OpenFlow and OpenStack
- Enterprise and IXP grade MPLS support
- Converged fabric for reliable IP storage services and transit FCoE traffic
- Low power consumption of 5.6 Watt per 10GbE for low Total Cost of Ownership

Simplify, Virtualize and Converge Enterprise, Data Center, High-Performance Computing/Big Data and Service Provider Networks

Data centers today demand highly virtualized, converged and scalable infrastructure. Multi-tenancy and cloud computing are driving the need for simple but highly virtualized network fabric, along with a need for expandability, performance and service up time. Extreme Networks Open Fabric solution, led by its flagship BlackDiamond® X8 platform, provides seamless any-to-any connectivity through a simple, scalable, and centrally orchestrated network.

Designed for the cloud-scale requirements of Data Centers, High Performance Computing (HPC), multi-site Enterprises and Internet Exchange Points (IXP), the BlackDiamond X8 provides a low-latency, high performance switch fabric with high-density wire-speed solution ranging from 100MbE to 100GbE for edge-to-core applications, all in a compact footprint using only one-third of a rack. As a 'fabric-in-a-box' solution, the BlackDiamond X8 eliminates the use of expensive multi-tier architectures and the associated challenges of inter-device connectivity, up/downlink bandwidth, and latency. The BlackDiamond X8 also leverages a low-power design ideal for green operations and high degrees of energy efficiency, resulting in lower Total Cost of Ownership (TCO).

Key Features/Benefits

"CLOUD-SCALE" SWITCHING

The BlackDiamond X8 provides either 10.24 or 20.48Tbps total switching capacity for traffic growth while supporting 384 1GbE / 768 10GbE / 192 40GbE, or 32 100GbE wire-speed ports in a single chassis. This translates into 1,152 1GbE / 2,304 10GbE / 576 40GbE, or 96 100GbE ports in a single rack or any combination of those. The BlackDiamond X8 design leverages an orthogonal direct mating system between the interface and switch fabric modules, eliminating the performance bottlenecks of backplane or mid-plane designs. The BlackDiamond X8 offers up to 1.28Tbps unidirectional capacity per slot with current switch fabric modules, with an architecture extensible to support even higher capacity switch fabric modules in the future.

HIGH-DENSITY, HIGH-SCALE SERVER VIRTUALIZATION

The BlackDiamond X8, powered by the ExtremeXOS® modular operating system, provides a scalable foundation for virtualized applications. By connecting up to 128000 (1 million in future) Virtual Machines (VMs) per system, spread across as many as 768 connected server ports per chassis, the BlackDiamond X8 enables a highly virtualized network infrastructure.

ExtremeXOS runs on a high-performance control plane and helps simplify network deployment and operation through VM-ready capabilities such as ExtremeXOS Network Virtualization (XNV™) and Extreme Networks Direct Attach™. XNV allows auto-configuration of Virtual Port Profiles (VPP) to automatically detect and provision network policies in a virtualized data center in a hypervisor agnostic manner, providing simplicity in managing VM mobility in data-centers. If a VM is moved from one physical server to the other, associated port policies on the connecting switch port are automatically moved. Direct Attach™ eliminates the virtual switch layer, simplifying the network and improving performance.

Several other virtualization features, such as Multi-Chassis Link Aggregation (M-LAG), Port Isolation and Transparent Interconnection of Lots of Links (TRILL), enable the design of flatter network fabrics for large scale virtualized and multi-tenant data centers, eliminating the need for dedicated networks and the complex Spanning Tree Protocol (STP).

RELIABLE DELIVERY OF CONVERGED STORAGE TRAFFIC

The BlackDiamond X8 is an optimal solution for high-throughput storage applications, synchronous replication, and disaster recovery within data center and HPC environments. The BlackDiamond X8 supports IEEE Data Center Bridging (DCBx) for reliable delivery of IP storage (iSCSI, NFS, CIFS) traffic over a single converged network. With IEEE compliant lossless Ethernet implementation of Priority Flow Control (PFC) and Enhanced Transmission Selection (ETS), storage traffic can be prioritized, queued and bandwidth guaranteed.

The BlackDiamond X8 also supports transit Fiber Channel over Ethernet (FCoE) for carrying converged fiber channel storage traffic. In converged networks, TRILL enables the building of flat and efficient networks for storage traffic while eliminating complications resulting from STP. With BlackDiamond X8, storage nodes can be connected using wire-speed 10GbE or 40GbE to provide a highly reliable yet flexible and cost-effective network to provision reliable storage services.

LOW LATENCY FOR FASTER RESPONSE TIME

For low-latency applications such as High Performance Computing (HPC) or High Frequency Trading (HFT), the BlackDiamond X8 provides only 2.3 microsecond port-to-port latency from any IO module to any IO module with a single-tier "fabric in a box" design, and under 3 microsecond latency with a two-tier "open fabric" architecture using Extreme Networks Summit® X770 series Top-of-Rack switch with the BlackDiamond X8. The latency is sub-microsecond between the ports on the same IO module.

With the growth of mobile devices, an increasing number of applications are hosted in data centers, resulting in increased east-west and north-south traffic. Though total latency is a result of the compute, storage and transmission latencies, the BlackDiamond X8 can deliver the benefits of lower network latency to improve customer experiences and overall application response time.

ORCHESTRATION THROUGH SOFTWARE DEFINED NETWORKING

Software Defined Networking (SDN) is revolutionizing the way networks are designed and operated. SDN helps in virtualization, visibility, optimization and orchestration for better handling of the network, compute and storage from a single and granular command and control perspective.

The BlackDiamond X8 supports standards-based Open Flow to work with third party and open source SDN controllers and provides a complete SDN solution. The BlackDiamond X8 enables SDN by providing a programmable control path and a scalable fabric that can be programmed in an efficient manner. Additionally, the BlackDiamond X8 supports the Open Stack Neutron plugin for cloud level orchestration.

The BlackDiamond X8 can be leveraged in hybrid networks for simultaneous SDN and non-SDN based deployments. Off-the-shelf or home-grown SDN based applications can be used for network control, traffic engineering, quality of service, SLA management, monitoring, analytics, virtualization and other advanced implementations.

HIGH SCALE ENTERPRISE ROUTING

With future availability, the BlackDiamond X8 will support two types of interface modules: the existing Non-XL modules for high-density, low-latency moderate-scale edge and core applications, and the future XL modules for the high-scale core or border applications. By supporting up to one million Layer 2/ Layer 3 entries on its 40GbE and 100GbE XL-series interface modules (future availability), the BlackDiamond X8 eliminates the need for high cost traditional routers

in the data center core. The XL and non-XL modules can be deployed together within the same core switch without impacting one another - not only collapsing tiers to simplify the network, but also reducing build-out and maintenance costs.

XL-series modules can also be deployed for the high-scale edge applications where a large number of host routes or access control lists (ACL) are required, such as managed hosting and

cloud. The 40GbE and 100GbE module can also be used to break down the ports into multiple 10GbE ports for high-density, high-scale edge connectivity.

INTER-DATA CENTER CONNECTIVITY

The BlackDiamond X8 is designed with combined data center core and border connectivity in mind. For this reason, BlackDiamond X8 10GbE SFP+ and 100GbE CFP2 modules provide long-range connectivity for up to 80 and 10 kilometers respectively using a range of optics. In future when supported, the BlackDiamond X8 XL-series modules will offer more capacity to store large scale internet routing tables and MPLS forwarding entries, eliminating the need for expensive routers.

The BlackDiamond X8 can provide VM mobility between the active/active data centers using MPLS Virtual Private LAN System (VPLS). The Virtual Router (VR) support enables logical partitioning of the BlackDiamond X8 core into multiple instances that can be mapped into multiple VPLS pseudo-wires for complete isolation and integrity of tenant traffic end-to-end.

HIGH AVAILABILITY FOR SERVICE ASSURANCE

Today's mission critical data centers and service provider networks cannot afford service blackouts and upset customers. Designed for Tier-3 and 4 data centers and service providers, the BlackDiamond X8 prevents any single point of failure at the hardware level through isolated control and data planes, fully redundant 1+1 management modules, N+1 redundant switching fabric, and N+1 redundant fans. For the power system, the BlackDiamond X8 offers N+1 power supply level and N+N power grid level redundancy.

At the software level, modular ExtremeXOS software increases network availability by monitoring independent processes in real time. If any of these processes become unresponsive or stop running they can be automatically restarted without impacting other processes. The BlackDiamond X8 supports a set of high availability features, including In-Service Software Upgrade (ISSU), Multi-Chassis Link Aggregation (M-LAG) and Ethernet

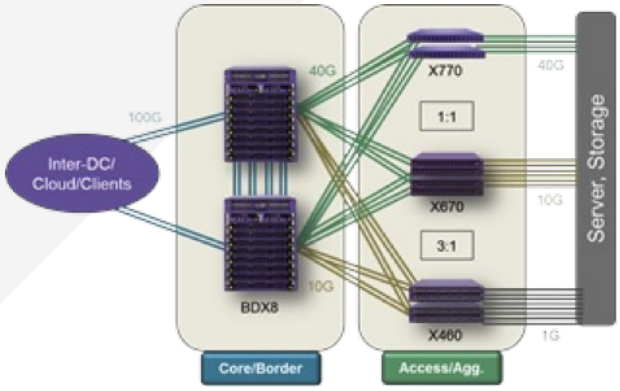
LOWER OPERATING COSTS, BETTER BUSINESS MARGINS

The BlackDiamond X8 is designed for power cooling and space efficiency. Power consumption as low as 5.6 Watts per 10GbE port is enabled through an obstruction-less orthogonal design, and variable speed fans that assist in lower heat dissipation and more efficient use of data center cooling resources. This results in lower utility bills to operate the network. The very high density design of the BlackDiamond reduces space and rack requirements, providing fast return on investment per RU. By leveraging CFP2 optical technology, the 100GbE module is not only denser than legacy CFP-based solutions, but also uses less than half as much power. The BlackDiamond X8 also supports CLI migration utilities to reduce the learning curve of technical personnel and save cost. Overall, the BlackDiamond X8 results in lower TCO compared to other switches in its class.

Applications

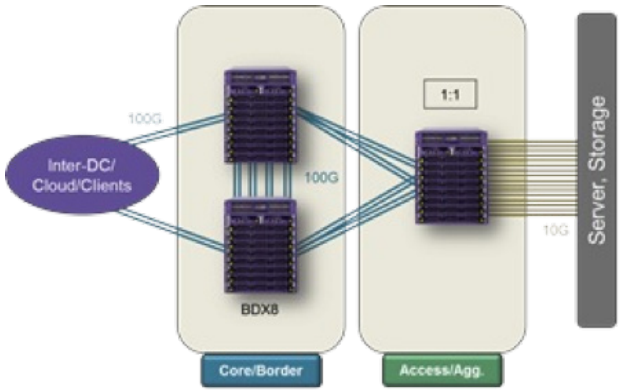
SCALABLE DATA CENTER CORE/SPINE

The BlackDiamond X8 is designed for tier 1 through 4 enterprise, multi-tenant and cloud data center core and border deployments. In these applications, the BlackDiamond X8 can be used with XL and non-XL series modules to provide a mix of high- and modest- scale connectivity in a spine-leaf architecture. The non-XL series modules provide 10GbE and 40GbE downlink connectivity for leaf switches such as the Extreme Network Summit X670 and X770, while the XL series modules provide a high-scale 10GbE,40GbE and 100GbE solution for inter-DC, disaster recovery, or cloud connectivity. The CFP2-based 100GbE module supports connectivity over short (<150m) or long (<10Km) ranges, providing maximum flexibility for any data center configuration. A pair of BlackDiamond X8 switches connected through M-LAG provides a robust and scalable core solution. Virtualization features such as Virtual Routers (VR), MPLS L3 VPN and MPLS VPLS provide traffic isolation and VM mobility between the Active/Active data centers while the overall network can be software managed and orchestrated using Extreme Data Center Manager (DCM, OpenFlow and OpenStack solution.



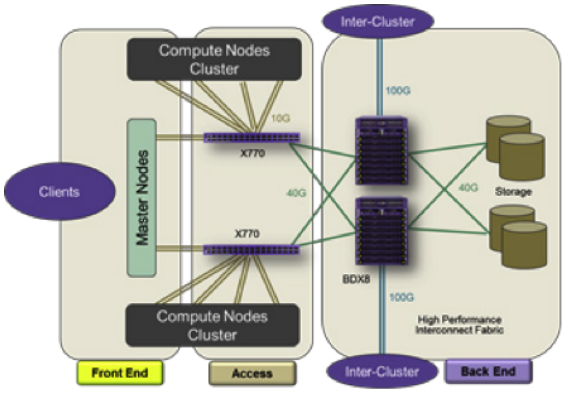
EXPANDABLE DATA CENTER EDGE

For high-density, high-throughput environments such as hosted data centers and digital media, the BlackDiamond X8 provides wire-speed 1GbE, 10Gb and 40 GbE server and storage connectivity as an end-of-row/middle-of-row aggregation solution. This enables seamless 1GbE to 10GbE server migration using BlackDiamond X8 10GbE copper or fiber modules with regular or LAN on Motherboard (LoM) based servers. The BlackDiamond X8 is connected to the core using 40GbE or 100GbE uplinks. Features such as VEPA, Port Isolation and TRILL can play key role in building a scalable flat network. The combination of SDN using OpenFlow and OpenStack overall helps orchestrate the flatter network end to end.



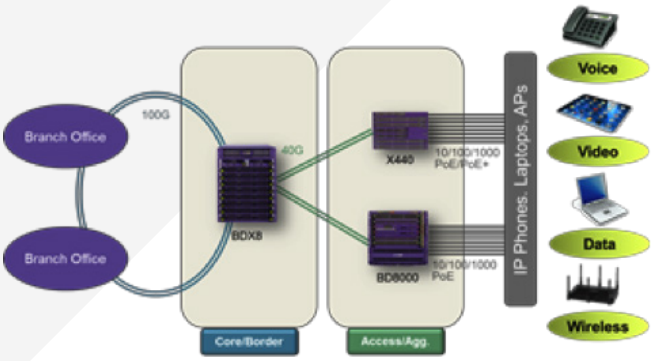
HIGH PERFORMANCE COMPUTE CLUSTER

In High Performance Computing and Super Computing, where large numbers of compute nodes and storage need to be connected using low-latency 10 and 40GbE, the BlackDiamond X8 provides high-density, low-latency access and back-end connectivity. On the access side, BlackDiamond X8 or Summit X770 series low-latency compact switches can provide 10GbE or 40GbE connectivity to connect compute nodes within the cluster. On the back-end, the BlackDiamond X8 can provide a 2-way or 4-way ECMP high-performance, low-latency HPC core for future cluster expansions.



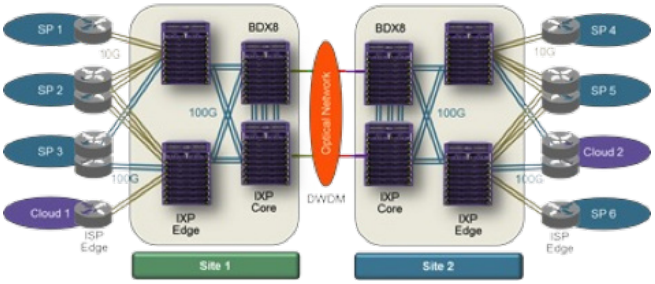
RESILIENT CAMPUS BACKBONE

As mobility, BYOD (bring your own device), video and collaboration applications demand more bandwidth on the campus edge, this puts back pressure on a more scalable and higher performance campus core. For large enterprises with more than one campus, connectivity to other regional offices as well as the enterprise data center requires a very resilient backbone. The BlackDiamond X8 can provide a resilient backbone ring based on 10GbE, 40GbE or 100GbE and the time tested EAPS (Extreme Automatic Protection Service) protocol. Optionally, MPLS could be used on top of the resilient backbone and for the internet connectivity.



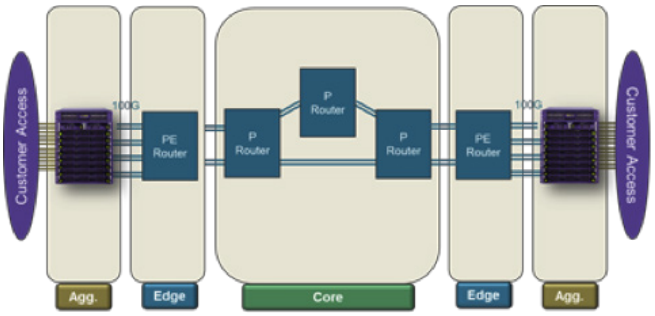
VIRTUALIZED INTERNET EXCHANGE POINT

The BlackDiamond X8 offers a great solution for Internet Exchange Points (IXP) due to its density and performance. The IXP can use BlackDiamond X8 to provision 10GbE and 100GbE ports on the customer edge and can use the same 10GbE or 100GbE in the core as well. The BlackDiamond X8 supports long-range optics on both 10GbE and 100GbE to provide flexible customer connectivity options. An IXP can use the BlackDiamond X8 to provision 10GbE and 100GbE services on the customer edge and can consolidate bandwidth with 100GbE links in the core. In addition, features such as MPLS VPLS, LSP load share, Selective VLAN, VLAN Bridging and TRILL provide capabilities to virtualize the IXP network for flexible virtual services delivery.

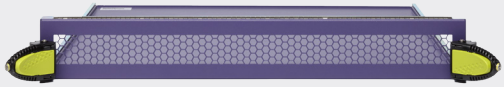
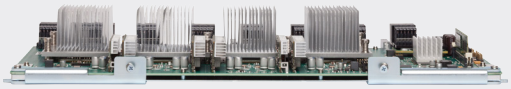
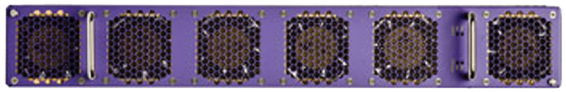


SERVICE PROVIDER AGGREGATION OFFLOAD

Service Providers are facing a major challenge. As Internet traffic continues to grow exponentially, the majority of it remains best-effort IP traffic such as consumer video. This does not justify the investments put into expensive MPLS and router-based edge and core network tiers, which results into high cost per Megabit. Moreover, conventional routers do not scale cost-effectively when it comes to port density and cost. Advanced and high-performance routing-switches like the BlackDiamond X8 can help service providers by building a high-density aggregation layer to terminate more 10GbE ports, which allows them to be consolidated over fewer 40GbE or 100GbE ports toward the PE router. The BlackDiamond X8 can serve as a L2, L3 or MPLS extension point. As a result, this offloads the PE routers and prolongs the investments made in the core while lowering the cost/Mb.



Technical Specifications**

MODULES AND DENSITY	
COMPONENT	
	Management Module • 2 Management Modules for 1+1 control plane redundancy • Minimum 1 required
	48-Port 10GbE Copper Interface Module • 8 Interface Modules maximum • Maximum 384 10GbE wire-speed ports per system • Supports 100/1000/10000 MbE(10GbE) RJ45 and negation overCat6a/7 cabling • Suited for high-density edge applications
	48-Port 10GbE Fiber Interface Module • 8 Interface Modules maximum • Maximum 384 10GbE wire-speed ports per system • Supports 1/10GbE SFP/SFP+ with SR/LR/ER/ZR optics and cables • Suited for high-density, low-latency edge/core applications
	12-Port 40GbE Interface Module • 8 Interface Modules maximum • Maximum 96 40GbE or 384 10GbE wire-speed ports per system • Supports 40GbE QSFP+ with SR/LR optics and cables • Suited for high-density, low-latency edge and core applications
	24-Port 40GbE Interface Module • 8 Interface Modules maximum • Maximum 192 40GbE or 768 10GbE wire-speed ports per system • Supports 40GbE QSFP+ with SR/LR optics and cables • Suited for high-density, low-latency edge and core applications
	4-Port 100GbE Fiber Interface Module • 8 Interface Modules maximum • Maximum 32 100GbE or 320 10GbE wire-speed ports per system • Supports 100GbE CFP2 with SR/LR optics and cables • Suited for high-bandwidth core applications
	IO-Blank Panel • 8 Blank Panels maximum • Required for the IO and Switch Fabric Modules to maintain proper airflow for cooling. If not present, the modules may overheat and shut-down.
	2.56Tbps (10T) Switch Fabric Module • 4 SFM total for 10.24Tbps capacity and N+1 redundancy • Minimum 3 required for wire-speed across all ports 4th SFM required for N+1 redundancy • Suited up to mid-point density (384 ports) applications
	5.12Tbps (20T) Switch Fabric Module • 4 SFM total for 20.48Tbps capacity and N+1 redundancy • Minimum 3 required for wire-speed cross all ports 4th SFM required for N+1 redundancy • Suited up to full density (768 ports) applications
	Fan Tray • Front to Back airflow • 5 Fan Trays total • All 5 required (included with the chassis)
	2500 Watt AC Power Supply • 8 Power Supplies total split across 2 bays • 2500 Watt with 220V, 1250 Watt with 110V • N+1 and N+N level power redundancy (depending on the configuration)

BlackDiamond X8 Series

GENERAL SPECIFICATIONS

PERFORMANCE

- 10.24 or 20.48 Tbps data switching capacity option
- 22.8 BPPS forwarding throughput (using existing modules)
- 30.5 BPPS forwarding throughput (using fabric capacity)
- Store-and-Forward and Cut-Through switching support
- 2.3 micro-second port-to-port latency(64-byte packet) across fabric, sub 1.5 micro-second within IO module

DENSITY

- 100 MbE Port Density:
  - 384 wire-speed 100MBASE-T RJ45 ports using 48-port 10 GbE I/O module
- 1 GbE Port Density:
  - 384 wire-speed 1GBASE-T RJ45 or 1GBASE-X SFP ports using 48-port 10 GbE I/O modules
- 10 GbE Port Density:
  - 768 wire-speed 10GBASE-X SFP+ ports using 24-port 40 GbE I/O module
  - 384 wire-speed 10GBASE-X SFP+ ports using 48-port 10 GbE or 12-port 40 GbE I/O modules
  - 320 wire-speed 10GBASE-X SFP+ ports using 4-port 100 GbE I/O module
  - 384 wire-speed 10GBASE-T RJ45 ports using 48-port 10 GbE modules
- 40 GbE Port Density:
  - 192 wire-speed 40GBASE-X QSFP+ ports using 24-port 40 GbE I/O module
  - 96 wire-speed 40GBASE-X QSFP+ ports using 12-port 40 GbE I/O module
- 100 GbE Port Density:
  - 32 wire-speed 100GBASE-X CFP2 ports using 4-port 100 GbE I/O module (future availability)

CPU, MEMORY

- Intel i7 Dual Core 2GHz
- 2GB ECC DDR3 SDRAM
- 1GB Compact Flash

LED INDICATORS

- Per port status LED for link/packet activity
- Per port status LED for link/packet activity for breakout (40/100GbE)
- System Status LEDs: management, fan, fabric and interface modules and power supplies

SCALE

Using non-XL (and *XL with future availability) modules:

PARAMETERS	10/40GBE MODULES	100GBE MODULES	
	NON-XL	NON-XL	XL*
Largest Frame	9216 Bytes		
VLAN	4,094		
MAC Forwarding	128K	384K	1032K
IPv4 Host	16K	130K	268K
IPv4 LPM	16K	16K	1024K
IPv6 Host	6K		32K
IPv6 LPM	8K	8K	512K
IPv4 Multicast	6K	64K	64K
IPv6 Multicast	3K	8K	8K
MPLS Forwarding	8K	16K	64K
ACL	8K	16K	128K
LAG Groups	384		
LAG Members	64		
QoS Queues/Port	8		
Rate Limiting Granularity	**8Kbps-1Mbps** Ingress and egress bandwidth policing/rate limiting per flow/ACL Egress bandwidth rate shaping per egress queue and per port		

PHYSICAL SPECIFICATIONS

Product dimensions and weights without packaging:

	CHASSIS		MANAGEMENT MODULE		SWITCH FABRIC MODULE		INTERFACE MODULE		FAN TRAY		POWER SUPPLY	
	INCHES	CM	INCHES	CM	INCHES	CM	INCHES	CM	INCHES	CM	INCHES	CM
Rack Units	14.5											
Height	25	63.5	3	7.6	20	50.8	3	7.6	24	60.9	1.5	3.8
Width	18	45.7	8	20.3	3	7.6	17	43.1	4	10.1	4.2	10.6
Depth	30	76.2	18	45.7	10	25.4	18	45.7	3	7.6	14.5	36.8
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
Weight (loaded)	420.6	190.7										
Weight (regular)	187.4	85.0	5.5	2.5	9.2	4.1	10.9	4.9	6.2	2.8	5.3	2.4
					10T SFM		48-Port 10GbE					
					9.2	4.1	11.0	5.0				
					20T SFM		12-Port 40GbE					
							14.0	6.3				
							24-Port 40GbE					
							14.6	6.6				
							4-Port 100Gbe					

OPERATING SPECIFICATIONS

- Operating Temperature Range: 0° C to 40° C (32° F to 104° F)
- Operating Humidity: 10% to 95% relative humidity, non-condensing
- Operational Altitude: up to 2000m (6561 feet)
- Operational Shock: 30 m/s^2 (3g), 11ms, 60 Shocks
- Operational Random Vibration: 3-500MHz @ 1.5g rms

PACKAGING AND STORAGE SPECIFICATIONS

- Storage/Transportation Temperature: -40° C to 70° C (-40° F to 158° F)
- Storage and Transportation Humidity: 10% to 93% RH
- Packaged Shock (Half Sine):
  - < 50 kg 180 m/s^2 (10 g), 6 ms, 600 shocks, modules
  - > 50 kg 100 m/s^2 (6 g), 11 ms, 600 shocks, chassis
- Packaged Sine Vibration: 5-62 Hz @ Velocity 5mm/s, 62-500 Hz @ 0.2G
- Packaged Random Vibration: 5-20Hz @ ASD=1.0 & 20-200Hz @-3dB/octave
- Packaged drop height
  - @ 39.5" <22 lb (10 kg) modules
  - @ 11.8" <110 lb (50 kg) chassis

REGULATORY/SAFETY

North American Safety

- cULus 60950-1:2007 2nd Ed., Listed Device (U.S.)
- CSA 22.2#60950-1-03 1st Ed. 2006-07(Canada)
- Complies with FCC 21CFR Chapter1, Subchapter J (U.S. Laser Safety)
- CDRH Letter of Approval (U.S. FDA Approval)

EUROPEAN SAFETY

- CB Scheme, IEC 60950-1:2005+National Deviations
- EN 60825-1:2007 (Lasers Safety)
- 206/95/EC Low Voltage Directive

INTERNATIONAL SAFETY

- GS Mark, EN 60950-1:2006+A11:2009+A1:200+A12:2011
- Taiwan CNS 14336-1(2010) (BSMI)
- AS/NZX 60950-1 (Australia/New Zealand

EMI/EMC STANDARDS

North American EMC Standards

- FCC CFR 47 part 15 Class A (U.S.)
- ICES-003 Class A (Canada)

European EMC Standards

- EN 55022:2010 Class A
- EN 55024:2010 Class A
- EN 55011:2009+A1:2011
- EN 61000-3-2:2006+A2:2009 (Harmonics)
- EN 61000-3-3:2008 (Flicker)
- EN 61000-6-4:2007+A1:2011 (Emissions for Industrial, Scientific & Medical)
- EN 61000-6-2:2005 (Immunity for Industrial, Scientific & Medical)
- ETSI EN 300 386 v1.6.1 (2012-09) EMC Telecommunications
- 2004/108/EC EMC Directive

International EMC Certifications

- CISPR 22:2010), Class A (International Emissions)
- CISPR 24:2010 Class A (International Immunity)
- IEC 61000-4-2:2008 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A
- IEC 61000-4-3:2010 Radiated Immunity 20V/m, Criteria A
- IEC 61000-4-4:2012 Transient Burst, 1kV, Criteria A
- IEC 61000-4-5 2005 Surge, 2kV, 4kV, Criteria A
- IEC 61000-4-6:2008 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A
- IEC 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C

Country Specific

- Japan Class A (VCCI)
- Australia/New Zealand, RCM
- Taiwan EMC CNS 13438(95) Class A, Safety CNS 14336-1(2010) (BSMI)
  - Brazil (ANATEL)
  - China, complex equipment exemption (CCC)
- Mexico (via NRTL Listing)
- South Korea KN22, KN24 (KCC)

TELECOMMUNICATION STANDARDS

- ETSI EN 300 386 v1.6.1 (2012-09) EMC Telecommunications)
- ETSI EN 300 019 (Environmental for Telecommunications)

IEEE 802.3 MEDIA ACCESS STANDARDS

- IEEE 802.3z 1000BASE-X
- IEEE 802.3ae 10GBASE-X
- IEEE 802.3ba 40GBASE-X
- IEEE 802.3ac VLAN Tag
- IEEE 802.3ad Link Aggregation

OPERATIONAL / TRANSPORTATION STANDARDS

- EN/ETSI 300 019-2-1 v2.1.2 – Class 1.2 Storage
- EN/ETSI 300 019-2-2 v2.2.1 – Class 2.3 Transportation
- EN/ETSI 300 019-2-3 v2.2.2 – Class 3.1e Operational
- EN/ETSI 300 753 v1.2.1 (2009-7) – Acoustic Noise
- ASTM D3580 Random Vibration Unpackaged 1.5G

FAN AND ACOUSTIC NOISE

- Sound pressure for comparison to legacy standards per ISO 7779:2010(E)
  - Low Speed: 60.3 dB(A) (LpA)
  - Medium Speed: 66.0 dB(A) (LpA)
  - High Speed: 82.3 dB(A) (LpA)
- Sound power per ISO 7779:2010(E), ISO 3744:2010(E), ETSI/EN 300 753:2007(E)
  - Low Speed: 72.0 dB(A) (LWAm)
  - Medium Speed: 78.0 dB(A) (LWAm)
  - High Speed: 94.4 dB(A) (LWAm)
- Declared sound power per 300 753 :2011-11) via ISO 9296:2010 &
  - Low Speed: 7.5 bels (LWAd)
  - Medium Speed: 8.1 bels (LWAd)
  - High Speed: 9.7 bels (LWAd)

WARRANTY

- Ltd. 1-year on Hardware
- 90-days on Software
- For warranty details, visit www.extremenetworks.com/go/warranty

Power Specifications

POWER SUPPLY

- Rated Inputs:
  - Low Range: 100-120VAC, 60/50 Hz, 13 A max each power supply
  - High Range: 200-240VAC , 60/50 Hz, 13 A max each power supply
- Input Ranges:
  - Low Range: 90 -132VAC, 47 - 63 Hz
  - High Range: 185 - 264VAC, 47 - 63 Hz
- Power supply input socket IEC 320 C20
- Power cord input plug IEC 320 C19
- Power cord-sets up to 2m (6.5ft) length require minimum 16 AWG (1.0 mm2) copper stranded wire Power cord-sets greater than 2m (6.5ft) length require minimum 14 AWG (1.25 mm2) copper stranded wire (The power supply cord-set wall plug must be appropriately rated and approved for the country of installation)
- Efficiency 90% typical at full load
- DC voltage output range: 47.5 to 48.5 Vdc
- Nominal DC output:
  - Low Range: 48 Vdc , 25 A maximum each PSU
  - High Range: 48 Vdc , 50 A maximum each PSU
- DC output power:
  - 2500W @ high range for one PSU (See manual for more than one PS)
  - 1250W @ low range for one PSU (See manual for more than one PS)

POWER CONSUMPTION

- Worst case power consumption and heat load (With 10Tbps SFM):
  - 4,436 W at output of power supplies
  - 4,929 W at input of power supplies
  - 16,817 BTU/Hour total heat load
- Worst case power consumption and thermal (With 20Tbps SFM):
  - 6,532 W at output of power supplies
  - 7,258 W at input of power supplies
  - 24,764 BTU/Hour total heat load

EXTREMEXOS SUPPORTED PROTOCOLS

The BlackDiamond X8 switch supports ExtremeXOS version 15.1 or later. Supported protocols and features can be reviewed in the latest ExtremeXOS data sheet available at: http://www.extremenetworks.com/product/extremexos-network-operating-system/

EXTREMEX SUPPORTED OPTICS

100 Base SFP Optics – http://learn.extremenetworks.com/rs/extreme/images/100-Base-SPF-Optics-DS.pdf

1000 Base-X SFP – http://learn.extremenetworks.com/rs/extreme/images/1000Base-SFP-Optics-DS.pdf

10/100/1000 Base-T SFP – http://learn.extremenetworks.com/rs/extreme/images/10-100-1000-Base-T-SFP-DS.pdf

10G-Base-X-SFP – http://learn.extremenetworks.com/rs/extreme/images/10G-Base-X-Optics-DS.pdf

40GE QSFP+ Optics – http://learn.extremenetworks.com/rs/extreme/images/40GE-QSFP-Optics-DS.pdf

40GE QSFP+ Passive Copper Cables – http://learn.extremenetworks.com/rs/extreme/images/40GE-QSFP-Passive-Copper-Cables-DS.pdf

40GE QSFP+ Optical Active Cables – http://learn.extremenetworks.com/rs/extreme/images/40GE-QSFP-Active-Optical-Cables-DS.pdf

40GE QSFP+ Fanout Cables – http://learn.extremenetworks.com/rs/extreme/images/40GE-QSFP-Fanout-Cables-DS.pdf

100G CFP2 Optics – http://learn.extremenetworks.com/rs/extreme/images/100G-CFP2-Optics-DS.pdf

Ordering Information

PART NUMBER	PRODUCT NAME	DESCRIPTION
BASE PRODUCTS		
48001	BDX8-AC	BlackDiamond X8 Series chassis with 8 I/O slots. Chassis includes 5 Fan Trays. Power Supplies or Blank Panels are not included
MODULE OPTIONS		
48021	BDX-MM1	Management Module 1 for BlackDiamond X series chassis. 2 modules required for 1+1 redundancy
48032	BDXA-FM10T	2.56Tbps Fabric Module for BlackDiamond X chassis. Minimum 3 modules required for wirespeed performance, 4 required for N+1 redundancy supporting full 10Tbps
48031	BDXA-FM20T	5.12Tbps Fabric Module for BlackDiamond X chassis. Minimum 3 modules required for wirespeed performance, 4 required for N+1 redundancy supporting full 20Tbps
48040	BDXA-10G48T	48-Port 10GBASE-T RJ45 module for BlackDiamond X series chassis. Up to 8 modules in the BlackDiamond X8 chassis support up to 384 wirespeed 100/1000/10000MbE (10GbE) copper ports and work with either 2.56 or 5.12Tbps Fabric Modules
48041	BDXA-10G48X	48-Port 10GBASE-X SFP+ module for BlackDiamond X series chassis. Up to 8 modules in the BlackDiamond X8 chassis support up to 384 wirespeed 10GbE ports and work with either 2.56 or 5.12Tbps Fabric Modules. Optics and cables are not included
48046	BDXA-40G12X	12-Port 40GBASE-X QSFP+ module for BlackDiamond X series chassis. Up to 8 modules in the BDX8 chassis support up to 96 wirespeed 40GbE or 384 wirespeed 10GbE ports and work with either 2.56 or 5.12Tbps Fabric Modules. Optics and cables are not included
48051	BDXA-40G24X	24-Port 40GBASE-X QSFP+ module for BlackDiamond X series chassis. Up to 8 modules in the BDX8 chassis support up to 192 wirespeed 40GbE or 768 wirespeed 10GbE ports and only work with 5.12Tbps Fabric Module. Optics and cables are not included
48061	BDXB-100G4X	4-Port 100GBASE-X CFP2 module for BlackDiamond X series chassis. Up to 8 modules in the BDX8 chassis support up to 32 wirespeed 100GbE or 320 wirespeed 10GbE ports and work with either 2.56 or 5.12Tbps Fabric Modules. Optics and cables are not included
ACCESSORIES, POWER SUPPLIES AND FAN (SPARE)		
48015	BDX8-FAN	Fan Tray for BlackDiamond X8 chassis, spare. 5 fan trays required in the system
48011	BDX-PSU-AC2500	2500W AC Power Supply for BlackDiamond X series chassis. Up to 8 supported in the BDX8 chassis
48018	BDX-IO-BLANK-E	Enhanced Blank Panel for BlackDiamond X series chassis for empty I/O module slot
48020	BDX8-MMK	Mid Mount Kit for BlackDiamond X8 chassis.
SOFTWARE LICENSES		
48091	BDX-CORE-LIC	Core license for the BlackDiamond X8 chassis for scalable Layer 3 rich applications.
48093	BDX-MPLS-LIC	MPLS Feature Pack license for the BlackDiamond X8 chassis.
11011	BDX Direct Attach	Direct Attach Feature Pack for Summit X450a/X460/X480, X650, X670 and BlackDiamond 8800, X Series.
POWER CABLES		
10080	Pwr Cord, 16A,NEMA 6-20P,C19	Power Cord, 16A, NEMA 6-20P, IEC320-C19
10081	Pwr Cord, 16A,CEE 7/7,C19	Power Cord, 16A, CEE 7/7, IEC320-C19
10084	Pwr Cord, 15A,AS/NZZS3112,C19	Power Cord, 15A, AS/NZZS3112, IEC320-C19
10087	Pwr Cord, 13A,BS1363,C19	Power Cord, 13A, BS1363, IEC320-C19

Extreme Supported Optics

The BlackDiamond X8 switch supports the optics listed below:

10/100/1000 BASE-T Optics*:
http://learn.extremenetworks.com/rs/extreme/images/10-100-1000-Base-T-SFP-DS.pdf

1000 BASE-X SFP Optics
http://learn.extremenetworks.com/rs/extreme/images/1000Base-SFP-Optics-DS.pdf

10G BASE-X SFP+ Optics
http://learn.extremenetworks.com/rs/extreme/images/10G-Base-X-Optics-DS.pdf

40G BASE-X QSFP+ Optics
http://learn.extremenetworks.com/rs/extreme/images/40GE-QSFP-Optics-DS.pdf

100G BASE-X CFP2 Optics
http://learn.extremenetworks.com/rs/extreme/images/100G-CFP2-Optics-DS.pdf

**NOTE: Only 1000MbE speed supported on a 10GbE port in a BlackDiamond X8 chassis using 10/100/1000 BASE-T Transceiver*

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Extreme networks

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