

## BlackDiamond 6800 Chassis Series

### Key Points

**Flexibility** – With 3 options of BlackDiamond chassis, you can scale from the most minimum closet edge needs to the largest core requirements, all delivering cutting-edge performance and capabilities.

**Scalability** – Every BlackDiamond module fits in every member of the BlackDiamond family, no matter the size of the chassis, so the full range of core capabilities can be implemented everywhere you deploy a BlackDiamond.

**Reliability** – A passive backplane, redundant management and switch fabric modules, and redundant hot-swappable power supplies deliver carrier class resiliency.

**Connectivity** – ATM and packet-over-SONET modules for the BlackDiamond chassis provide investment protection by allowing Gigabit Ethernet connectivity over legacy network connections. pull in the migration story.

**Security** – The BlackDiamond 6800 series integrates the most comprehensive set of security features in the industry, including Denial of Service capabilities, Network Login, Access Control Lists, and more.



### Target Market and Benefits

#### Enterprise

**Critical Needs:** High density for functional scalability as well as for capital expenditure scalability; a secure, highly reliable aggregation point for a large number of switches at the edge and distribution layers of the network.

BlackDiamond 6800 Series Feature	Benefit
Redundant load-sharing hot-swappable power supplies, redundant management and switch fabric, and passive backplane	Industry-leading reliability and redundancy, so users are never without network service
Wire-speed non-blocking architecture on all 10/100/1000 interfaces	High performance and throughput for maximum scalability
Link aggregation of up to 8 links in a single trunk with sub-second fail-over and fail-back capabilities	Resiliency through multiple links and higher bandwidth by logically making 8 links look like one
OSPF, RIPv1 and RIPv2, IP Multicast, BGP4 routing	Layer 3 redundancy for highest availability and throughput
Extreme Standby Router Protocol (ESRP™), Ethernet Automatic Protection Switching (EAPS), Spanning Tree Protocol and Extreme STP extensions, link aggregation	Layer 3 and Layer 2 redundancy within network uplinks to ensure that failure in other equipment will not result in lost connectivity for users
Policy-Based Quality of Service (QoS) with eight queues per port, bidirectional rate shaping and bandwidth management	Prioritize mission-critical applications and traffic to deliver maximum productivity; deliver delay-sensitive applications such as voice and video
ACLs, Network Login, Denial of Service (DoS) protection	Highest levels of security at the core of the network

#### Metro Service Provider

**Critical Needs:** Reliability and non-blocking architecture with carrier-class availability; scalability, bandwidth management and ease of billing for services.

BlackDiamond 6800 Series Feature	Benefit
MPLS connectivity	Point-to-point and point-to-multipoint Layer 2 VPNs offer a scalable, cost-effective means of delivering transparent LAN services across metro networks

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BlackDiamond 6800 Series Feature	Benefit
Bidirectional rate shaping	Allows limiting and shaping of both ingress and egress traffic to a client based on bandwidth utilization
ATM and packet-over-SONET connectivity	Protects the investment in ATM and SONET technologies by allowing Ethernet connectivity over these interfaces
Extreme Standby Router Protocol (ESRP™), Ethernet Automatic Protection Switching (EAPS), Spanning Tree Protocol and Extreme STP extensions, link aggregation	Layer 2 redundancy within network uplinks ensure that failure in other equipment will not result in lost connectivity for users and delivers SONET-like resiliency
Redundant load-sharing hot-swappable power supplies, redundant management and switch fabric, and passive backplane	Carrier-class availability and connectivity maximizes uptime and return on investment
10 Gigabit Ethernet	The bandwidth is there when you need it

### Choosing the Right BlackDiamond 6800 Series Chassis

The extensive BlackDiamond 6800 series chassis fits the entire span of application spaces within an enterprise and a metro network, giving full coverage from the core to the edge. The BlackDiamond series offers the highest flexibility in network connectivity, delivering MPLS, EAPS, packet-over-SONET, ATM, WDM, accounting and routing capabilities, and 10 Gigabit Ethernet.

	BlackDiamond 6804	BlackDiamond 6808	BlackDiamond 6816
<b>Bandwidth</b>	64 Gbps throughput	128 Gbps throughput	256 Gbps throughput
<b>I/O Slots</b>	4	8	16
<b>Redundant Power Supplies</b>	Yes; Hot-swappable	Yes; Hot-swappable	Yes; Hot-swappable
<b>ExtremeWare</b>	Yes	Yes	Yes
<b>Memory</b>	256 MB	256 MB	256 MB
<b>Dimensions</b>	(H) 19.25 in x (W) 17.32 in x (D) 19.0 in	(H) 26.25 in x (W) 17.32 in x (D) 18.0 in	(H) 61.25 in x (W) 19.0 in x (D) 18.0 in
<b>10/100 Density</b>	384	768	1536
<b>GbE Port Density</b>	32	64	128

	Large	Medium	Small
<b>Core &amp; Data Center</b>	BlackDiamond 6808 or 6816	BlackDiamond 6808	BlackDiamond 6804
<b>Aggregation</b>	BlackDiamond 6808 or 6816	BlackDiamond 6804	N/A
<b>Closet Edge</b>	BlackDiamond 6804	BlackDiamond 6804	BlackDiamond 6804
<b>WAN Edge and "hard to reach"</b>	BlackDiamond 6804	BlackDiamond 6804	N/A
<b>Branch Office</b>	BlackDiamond 6804	BlackDiamond 6804	N/A

## BlackDiamond 6800 Chassis Series

## Competitive Landscape

**BlackDiamond 6804**

	BlackDiamond 6804	Cisco 6506	Foundry NetIron 400	Riverstone RS8000
Throughput (Mpps)	48	30	16	12.5
I/O Slots	4 (plus 2 slots for MSM)	6	4	8 (plus 2 switching card slots?)
Redundant Control and Switching Configuration	2 x MSM	2 x SFM + 2 x Sup-2 with MSFC-2 & PFC-2	2 x Management (Control and Switching)	1 x Control, 1 x Switching (No redundancy)
I/O Slots Remaining in Redundant Configuration	4	2	2	6
Dimensions	(H) 19.25 in x (W) 17.32 in x (D) 18.0 in (11 RU)	(H) 20.1 in x (W) 17.2 in x (D) 18.1 in (12 RU)	(H) 8.75 in x (W) 17.5 in x (D) 15.0 in (5 RU)	(H) 8.75 in x (W) 17.25 in x (D) 12.25 in (5 RU)
GbE Port Density	32	32	16	14
PoS Features	OC3/OC12; PPP	OC3/OC12/OC48; PPP or FR	OC3/OC12/OC48; PPP or FR	OC3/OC12; PPP
ATM Features	OC3	OC12	OC3/OC12	OC3/OC12

**BlackDiamond 6808**

	BlackDiamond 6808	Cisco 6509	Foundry NetIron 800	Riverstone RS8600	Enterasys X-Pedition 8600
Throughput (Mpps)	96	30	69	25	25
I/O Slots	8 (plus 2 slots for MSM)	9	8	16 (plus 2 switching card slots?)	16 (plus 2 switching card slots?)
Redundant Control and Switching Configuration	2 x MSM	2 x SFM + 2 x Sup-2 with MSFC-2 & PFC-2	2 x Management (Control and Switching)	2 x Control, 2 x Switching	2 x Control, 2 x Switching
I/O Slots Remaining in Redundant Configuration	8	5	6	14	14
Dimensions	(H) 26.25 in x (W) 17.32 in x (D) 18.1 in (15 RU)	(H) 25.2 in x (W) 17.2 in x (D) 18.1 in (15 RU)	(H) 20.75 in x (W) 17.5 in x (D) 15.25 in (12 RU)	(H) 19.25 in x (W) 17.25 in x (D) 12.25 in (11 RU)	(H) 19.25 in x (W) 17.25 in x (D) 12.25 in (11 RU)
GbE Port Density	64	80	69	28	28
PoS Features	OC3/OC12; PPP	OC3/OC12/OC48; PPP or FR	OC3/OC12/OC48; PPP or FR	OC3/OC12; PPP	None
ATM Features	OC3	OC12	OC3/OC12	OC3/OC12	OC3/OS3

## BlackDiamond 6800 Chassis Series

## BlackDiamond 6816

	BlackDiamond 6816	Cisco 6513	Foundry NetIron 1500	Riverstone RS3800	Enterasys X-Pedition ER/16
Throughput (Mpps)	192	97.5	149.5	33	33
I/O Slots	16 (plus 2 slots for MSM)	13	15	16 (plus 2 switching card slots)	16 (plus 2 switching card slots)
Redundant Control and Switching Configuration	2 x MSM	2 x SFM + 2 x Sup-2 with MSFC-2 & PFC-2	2 x Management (Control and Switching)	2 x Control, 2 x Switching	2 x Control, 2 x Switching
I/O Slots Remaining in Redundant Configuration	16	9	13	14	14
Dimensions	(H) 61.25 in x (W) 19.0 in x (D) 19.0 in (35 RU)	(H) 25.2 in x (W) 17.2 in x (D) 18.1 in (15 RU)	(H) 29.75 in x (W) 19.0 in x (D) 15.25 in (17 RU)	(H) 35.0 in x (W) 17.25 in x (D) 19.0 in (20 RU)	(H) 35.0 in x (W) 17.25 in x (D) 19.0 in (20 RU)
GbE Port Density	128	144	104	112	112

## General BlackDiamond 6800 Series Comparison

	Extreme BlackDiamond 6800 Series	Cisco 65xx Series	Foundry NetIron & BigIron	Riverstone Product Family	Enterasys X-Pedition Series
PoS Features	OC3/OC12; PPP	OC3/OC12/OC48; PPP or FR	OC3/OC12/OC48; PPP or FR	None in RS3800; OC3/OC12 + PPP in RS 8x00	OC3; PPP or FR
ATM Features	OC3	OC12 only	OC3/OC12	None in RS3800; OC3/OC12 in RS 8x00	OC3 only
MPLS Features	RSVP-TE, Layer 2 point-to-point and point-to-multipoint VPN	RSVP-TE, Layer 2 point-to-point VPN; OSPF-TE	RSVP-TE, Layer 2 point-to-point and point-to-multipoint VPN, OSP-TE	RSVP-TE, Layer 2 point-to-point and point-to-multipoint VPN, OSP-TE	RSVP-TE, Layer 2 point-to-point and point-to-multipoint VPN
Layer 2 Loop Prevention & Spanning Tree	PVST, Rapid Root failover (subset of 802.1w), EMISTP, EAPS, BPDU tunneling	PVST, MISTP (multi-instance spanning tree); MISTP uses a "modified" form of 802.1w (non-standard)	MSTP (=PVST), RSTP (subset of 802.1w), "Superspan" (BPDU tunneling).	802.1w, Rapid Ring Spanning Tree (RRSTP) = EAPS; not in user guide for shipping image), PVST.	802.1w, Rapid Ring Spanning Tree (RRSTP) = EAPS; not in user guide for shipping image), PVST.
Rate Limiting	1M granularity, ASIC based; Triumph based modules will support 64kbps granularity.	Can specify CIR/PIR; mark or drop actions; port or VLAN based limiting; simultaneous use of microflow and aggregate policers permitted. Extremely difficult to configure.	CPU based or Jetcore ASIC based in latest cards; 256kbps granularity on Jetcore with port-and-priority or ACL-based RL; 4802: max. 50 port-based, 200 port-and-priority, or 102 ACL policies.	25kbps, 97kbps, 375kbps, 1.45M or 5.9M granularity (depends on mode and card); ASIC based or CPU based depending on rate limiting type.	25kbps, 97kbps, 375kbps, 1.45M or 5.9M granularity (depends on mode and card); ASIC based or CPU based depending on rate limiting type.

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## BlackDiamond 6800 Chassis Series

	Extreme BlackDiamond 6800 Series	Cisco 65xx Series	Foundry NetIron & BigIron	Riverstone Product Family	Enterasys X-Pedition Series
<b>VMAN Functionality</b>	VMAN	VLAN stacking	“Super Aggregated VLAN”	VLAN stacking	VLAN stacking
<b>Port Mirroring</b>	Yes; 1 dest. port	Yes; up to 64 dest. ports	1 per module; mirror ports on module only.	Yes; 1 port per system	Yes; 1 port per system
<b>Queues Supported</b>	8	3	4	4	4
<b>VLAN Aggregation</b>	Yes	Unknown	Unknown	Yes	Yes
<b>802.3ad</b>	Up to 8 links/group; LACP supported; link chosen by MAC/IP hash, packet round-robin, or port-based	Load sharing is limited	“Trunk group load sharing” of 2 or 4 ports; LACP supported	“SmartTRUNK”; LACP and DEC Hunt Groups supported; link chosen by low link utilization or flow-based round-robin	“SmartTRUNK”; LACP and DEC Hunt Groups supported; link chosen by low link utilization or flow-based round-robin
<b>Multicast Support</b>	PIM-SM, PIM-DM, IGMP, DVMRP	IGMP, GMRP, RGMP, PIM-SM, PIM-DM; no DVMRP, MBGP or MSDP	PIM-SM, PIM-DM, IGMP, DVMRP, MSDP, MBGP, mtrce, mroute, minfo	IGMP, DVMRP, PIM-SM	IGMP, DVMRP, PIM-SM
<b>VRRP Type Protocols</b>	VRRP, ESRP (VRRP plus L2 loop prevention)	VRRP	VRRP, FSRP, VRRPE (no adv. over VRRP)	VRRP	VRRP
<b>MAC Lockdown</b>	Yes	Unknown	Yes	Unknown	No
<b>802.1x</b>	No	Yes	No	No	No

**Cisco Systems – Catalyst 6500***Weaknesses*

- Architecturally the control and switching functions are broken out into different cards, so with a typical redundant operation the 6509 has only 5 usable slots after 2 slots are used for supervisor modules and another 2 slots are used for switch fabric cards. Likewise the 6513 has only 9 usable slots and the 6506 only 2 usable slots.
- Supports only 2 queues for Quality of Service: a single high priority traffic queue and one queue for all other traffic as best effort.
- No support for bandwidth management. WRR offers a simple ratio modification, and cannot provide bandwidth or latency guarantees for various applications.
- Max. 34 Mpps performance at Layer 3 is very low compared to 96 Mpps for the BlackDiamond 6808.

**Foundry Networks – NetIron 400, 800, and 1500***Weaknesses*

- Poor performance with access control lists enabled
- No NEBS or CLEI

**Riverstone Networks – RS8x00 and RS38000***Weaknesses*

- The RS 38000 only forwards at 33 Mpps.
- Adding VLANs dramatically reduces forwarding rate.
- Stability problems are showing up as poor performance in the marketplace.

## BlackDiamond 6800 Chassis Series

**Product List****Chassis**

Part Number	Product	Description
50051	BlackDiamond 6804 Chassis	6-slot chassis with 4 I/O slots
50011	BlackDiamond 6808 Chassis	10-slot chassis with 8 I/O slots
53011	BlackDiamond 6816 Chassis	20-slot chassis with 16 I/O slots

**Fans and Power Supply Units (PSU)**

Part Number	Product	Description
50013	Fan Tray	Fan Tray for BlackDiamond
50020	110VACi Power Supply	110V AC PSU for BlackDiamond
50021	220VACi Power Supply	220V AC PSU for BlackDiamond
50022	DCi Power Supply	48V DC PSU for BlackDiamond

**Management Switch Fabric Modules (MSMi)**

Part Number	Product	Description
50015	MSM64i	BlackDiamond 6800 MSM64i with Full Layer 3 ExtremeWare License

**I/O Modules – 10 Gigabit Ethernet**

Part Number	Product	Description
54002	10GLRi	1 Port 10GBASE-LR 1310nm Serial SC Module

**I/O Modules – Gigabit Ethernet**

Part Number	Product	Description
51032	G8Xi	8 Port GBIC Module
51033	G8Ti	8 Port 100/1000BASE-T Module
51034	WDMi	1 Port 8-Channel WDM SC-AFC Module
51040	G12SXi	12 Port 1000BASE-SX Module

**I/O Modules – Fast Ethernet**

Part Number	Product	Description
52011	F48Ti	48 Port 10/100BASE-T Module (RJ45)
52012	F96Ti	96 Port 10/100BASE-T Module (RJ21)
52021	F32Fi	32 Port 100BASE-FX Module (MT-RJ)

## BlackDiamond 6800 Chassis Series

**I/O Modules – PoS and ATM**

Part Number	Product	Description
53010	P3cMi	4 Port SONET/SDH OC-3/STM-1 PoS MMF Module
53012	P3cSi	4 Port SONET/SDH OC-3/STM-1 PoS SMF Module
53020	P12cMi	2 Port SONET/SDH OC-3/STM-4 PoS MMF Module
53021	P12cSi	2 Port SONET/SDH OC-3/STM-4 PoS SMF Module
53110	A3cMi	4 Port SONET/SDH OC-3/STM-1 ATM MMF Module
53111	A3cSi	4 Port SONET/SDH OC-3/STM-1 ATM SMF Module

**I/O Modules – Service Modules**

Part Number	Product	Description
53040	ARM	Accounting and Routing Module
53041	MPLS	Multiprotocol Label Switching Module

**Accessories**

Part Number	Product	Description
10011	SX GBIC	1000BASE-SX GBIC-based transceiver
10013	LX GBIC	1000BASE-LX GBIC-based transceiver
10016	LX70 GBIC	1000BASE-LX70 GBIC-based transceiver
10017	ZX GBIC	1000BASE-ZX GBIC-based transceiver



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