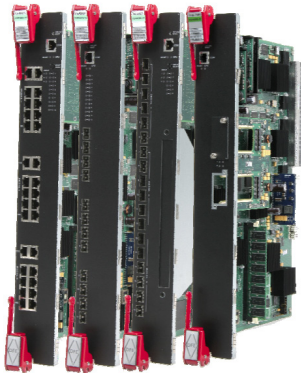


# N-Series Diamond DFE

Convergence-ready, 10GE Modular L2/L3/L4 Switch for Edge-to-Core and Data Center



Optimized for network core and data center deployments with enhanced policy capabilities

Industry-leading 24x7x365 business continuity via a fully Distributed Switch Routing architecture

Extends the N-Series industry-leading investment protection

Flow-based architecture optimized for iSCSI and Server Virtualization

1.68 Tbps switching architecture enables high density Gigabit and 10 Gigabit Ethernet switching and routing deployments

## Product Overview

Enterasys N-Series Diamond Distributed Forwarding Engines (DFEs) are optimized for large scale, multi-user policy deployments in data center server farms and at the distribution and core layers of the network. Diamond DFEs support the full range of Secure Networks<sup>™</sup> features, including advanced Quality of Service (QoS) and per-user traffic rate limiting. Available in 10/100/1000, 1000 Base-X and 10 Gigabit configurations, Diamond DFEs include additional processing power, memory, policy capacity expansion, and advanced routing licenses for medium to large enterprise backbone and distribution-layer routing applications.

Capable of being installed in any of the N-Series chassis, Diamond DFEs are designed to provide high-performance, high-density Gigabit and 10 Gigabit Ethernet aggregation at the core and distribution layers of enterprise networks.

N-Series DFEs significantly enhance the multi-user policy capacities of the N-Series, providing support for up to 2,000 authenticated users per chassis, enabling advanced policy management, QoS and firewall-like control for the largest of enterprise or campus networks. This enhanced capacity allows the N-Series to act as a proxy policy gateway for other network devices such as wireless access points and third-party switches, ensuring only authorized users and devices can access the network and its applications.

The N-Series implements the industry's only granular, flow-based architecture to intelligently manage individual user and application conversations—not just ports or VLANs. Policy rules combined with deep-packet inspection that easily and intelligently sense and automatically respond to security threats and Denial of Service (DoS) attacks while ensuring the highest reliability and QoS.

Diamond DFEs utilize the unique, distributed fault-tolerance architecture of the N-Series. Each DFE is an integrated switching, routing, and management module that makes forwarding decisions, enforces security policies, and classifies incoming traffic. Multiple DFEs create a single, highly-manageable logical switching and routing system.

Diamond DFEs are the logical and ideal choice for enterprises that require market-leading reliability, performance, and security in their network.

## Benefits

### Business Alignment

- Flexible, high-performance Gigabit and 10 Gigabit connectivity options for ease of deployment and upgrade
- The industry's most granular multi-layer classification capabilities ensure on-time delivery and prioritization of today's mission-critical applications
- High-availability "always on" networking optimized for VoIP and VoD convergence

### Operational Efficiency

- Advanced data center and backbone routing services including support for large router topologies, server load balancing, comprehensive traffic accounting and capacity planning
- Fully distributed switching architecture that is unmatched for resiliency and availability
- Low power consumption and thermal output BTU/Hour drives down power and cooling costs therefore lowering TCO

### Security

- Flow-based architecture delivers end-to-end visibility and control over users, services, and applications
- Provides security at the core of the network with advanced policy and routing control, supplemented with advanced Anti-DoS attack capabilities and ACL-like security on every port for downstream devices
- Diamond DFEs enhance the N-Series position as the only enterprise switch to enable up to 1000 high-capacity multi-user, multi-method authentications on every port (802.1X, Web, MAC address)

### Support and Services

- Industry-leading customer satisfaction and first call resolution
- Personalized services, including site surveys, network design, installation, and training

**There is nothing more important  
than our customers.**

## Density and Performance

The N-Series provides high performance and high density:

Diamond DFE	N1	N3	N5	N7
Performance (Mpps)	13.5 Mpp	40.5 Mpps	67.5 Mpps	94.5 Mpps
Capacity	18 Gbps	54 Gbps	90 Gbps	126 Gbps
10/100/1000 Base-TX Ports	30	90	150	210
1000 Base-X Ports	24	72	120	168
10G Base-X Ports	4	12	20	28

## Performance/Capacity

### Switching Fabric Bandwidth

18 Gbps per DFE

### Switching Throughput

13.5 Mpps (Measured in 64-byte packets)

### Routing Throughput

13.5 Mpps (Measured in 64-byte packets)

### Address Table Size

65,536 MAC Addresses

### VLANs Supported

4094

### Transmit Queues

4/12

### Classification Rules

57,344/chassis

### Memory

Main Memory: 256 MB

Flash Memory: 32 MB

## Standards and Protocols

### Switching/VLAN Services

- 802.1Q VLANs
- 802.1D MAC Bridges
- 802.1w Rapid-reconvergence of Spanning Tree
- 802.1s Multiple Spanning Tree
- 802.3ad Link Aggregation
- 802.3ae Gigabit Ethernet
- 802.3az 10 Gigabit Ethernet
- 802.3x Flow Control
- IP Multicast (IGMP support v1, v2, per VLAN querier offload)
- Jumbo Packet with MTU Discovery Support for Gigabit
- Link Flap Detection
- Dynamic Egress (Automated VLAN Port Configuration)
- Generic VLAN Registration Protocol (GVRP)

### IP Routing

- RFC 1812 General Routing
- RFC 792 ICMP
- RFC 1256 ICMP Router Discovery Protocol
- RFC 826 ARP
- RFC 1027 Proxy ARP
- Static Routes
- RFC 1058 RIPv1
- RFC 1723 RIPv2 with Equal Cost Multi-path Load Balancing
- RFC 1812 RIP Requirements
- RFC 1519 CIDR
- RFC 2338 Virtual Router Redundancy Protocol (VRRP)
- Standard ACLs
- DHCP Server RFC 1541/ Relay RFC 2131

### Extended IP Routing

- RFC 1583/RFC 2328 OSPFv2
- RFC 1587 OSPFv2 NSSA
- RFC 1745 OSPF Interactions
- RFC 1746 OSPF Interactions
- RFC 1765 OSPF Database Overflow
- RFC 2154 OSPF with Digital Signatures (Password & MD5)
- OSPF with Multi-path Support
- OSPF Passive Interfaces
- RFC 2391 Load Sharing using Network Address Translation
- Extended ACLs
- Policy-based Routing
- RFC 1112 IGMP
- RFC 2236 IGMPv2
- DVMRP v3-10
- RFC 2361 Protocol Independent Multicast - Sparse Mode

### Network Security and Policy Management

- 802.1X Authentication
- Web-based Authentication (PWA+)
- MAC-based Authentication
- Convergence Endpoint Discovery with Dynamic Policy Mapping (Siemens HFA, Cisco VoIP, H.323 and SIP, LLDP-MED)
- Multiple Authentication Types per Port Simultaneously (802.1x, MAC, PWA+)
- Multiple Authenticated Users per Port with Unique Policies per User/End System (VLAN Association Independent)
- RFC 3580 IEEE 802.1 RADIUS Usage Guidelines, with VLAN-to-Policy Mapping & VLAN Assignment via Authentication
- Worm Suppression (Flow Set-Up Throttling)
- Broadcast Suppression
- ARP Storm Prevention
- MAC-to-Port Locking

- Span Guard (Spanning Tree Protection)
- Stateful Intrusion Detection System Load Balancing
- Stateful Intrusion Prevention System and Firewall Load Balancing
- Behavioral Anomaly Detection/Flow Collector (Non-sampled Netflow Version 5 and Version 9)
- Static Multicast Group Provisioning
- Multicast Group, Sender, and Receiver Policy Control VLAN TAG Overwrite

## Class of Service

- Strict Priority Queuing
- Weighted Fair Queuing with Queue Bandwidth Shaping
- 4/16 Transmit Queues per Port (1000BaseX SFP)
- 4 Transmit Queues per Port (10/100/1000)
- 16 Transmit Queues Per port (10 Gigabit Ethernet)
- Up to 1024 Rate Limiters
- Packet Count or Bandwidth-based Rate Limiters
- IP ToS/DSCP Marking/Remarking
- 802.1D Priority-to-Transmit Queue Mapping

## Network Management

- NMS Console
- NMS Policy Manager
- NMS Inventory Manager
- NMS Automated Security Manager

## Management, Control, and Analysis

- SNMP v1/v2c/v3
- Web-based Management Interface
- Industry Common Command Line Interface
- Multiple Software Image Support with Revision Roll Back
- Multi-configuration File Support
- Editable Text-based Configuration File
- COM Port Boot Prom and Image Download via ZMODEM
- Telnet Server and Client
- Secure Shell (SSHv2)
- Cabletron Discovery Protocol
- Cisco Discovery Protocol v1/v2
- IEEE 802.1AB LLDP, TIA/ANSI 1057 LLDP-MED
- Syslog
- FTP Client

- Simple Network Time Protocol (SNTP)
- Netflow Version 5 and Version 9
- RFC 3580 VLAN Authorization
- RFC 2865 RADIUS
- RFC 2866 RADIUS Accounting
- TACACS+ for Management Access Control
- Management VLAN
- 16 Many-to-One Port, One-to-Many Ports, VLAN Mirror Sessions (64 when DFE Deployed with an N1/NSA Chassis)

## IETF and IEEE MIB Support

- RFC 1213 & RFC 2011 IP-MIB
- RFC 1493 Bridge MIB
- RFC 1659 RS-232 MIB
- RFC 1724 RIPv2 MIB
- RFC 1850 OSPF MIB
- RFC 2012 TCP MIB
- RFC 2013 UDP MIB
- RFC 2096 IP Forwarding Table MIB
- RFC 2276 SNMP-Community MIB
- RFC 2578 SNMPv2 SMI
- RFC 2579 SNMPv2-TC
- RFC 2613 SMON MIB
- RFC 2674 802.1p/Q MIB
- RFC 2737 Entity MIB
- RFC 2787 VRRP MIB
- RFC 2819 RMON MIB (Groups 1-9)
- RFC 2863 IF MIB
- RFC 2864 IF Inverted Stack MIB
- RFC 2922 Physical Topology MIB
- RFC 3273 HC RMON MIB
- RFC 3291 INET Address MIB
- RFC 3411 SNMP Framework MIB
- RFC 3412 SNMP-MPD MIB
- RFC 3413 SNMPv3 Applications
- RFC 3414 SNMP User-based SM MIB
- RFC 3415 SNMP View-based ACM MIB
- RFC 3417 SNMPv2-TM
- RFC 3418 SNMPv2 MIB
- RFC 3621 Power Ethernet MIB
- RFC 3635 EtherLike MIB
- RFC 3636 MAU MIB
- IEEE 802.3 LAG MIB
- IEEE 802.1PAE MIB
- RSTP MIB
- USM Target Tag MIB
- U Bridge MIB
- Draft-ietf-idmr-dvmrp-v3-10 MIB
- Draft-ietf-pim-sm-v2-new-09 MIB
- SNMP-REARCH MIB
- IANA-ADDRESS-FAMILY-NUMBERS MIB

## Private MIBs

- Ct-broadcast MIB
- Ctron-CDP MIB
- Ctron-Chassis MIB
- Ctron-igmp MIB
- Ctron-q-bridge-mib-ext MIB
- Ctron-rate-policing MIB
- Ctron-tx-queue-arbitration MIB
- Ctron-alias MIB
- Cisco-TC MIB
- Cisco-CDP MIB
- Cisco-netflow MIB
- Enterasys-configuration-management MIB
- Enterasys-MAC-locking MIB
- Enterasys-convergence-endpoint MIB
- Enterasys-notification-authorization MIB
- Enterasys-netflow MIB
- Enterasys-license-key MIB
- Enterasys-aaa-policy MIB
- Enterasys-class-of-service MIB
- Enterasys-multi-auth MIB
- Enterasys-mac-authentication MIB
- Enterasys-pwa MIB
- Enterasys-upn-tc MIB
- Enterasys-policy-profile MIB
- Enterasys-flow-limiting MIB

## DDoS Attack Protection

### Tested Against

- TCP/UDP Port Scan
- Christmas Tree Attack
- Fraggles Attack
- Fragmented & Large ICMP
- ICMP Flood
- Invalid ICMP Attacks
- ICMP Re-direct Attack
- LAND
- TCP Syn Fin Attack
- TCP Syn Flood
- Tear Drop Attack
- UDP Port Flood
- Invalid UDP Attacks
- Invalid IGMP Attacks
- Cisco Global Exploiter
- Shadowcode TTL Attack
- NTP DoS
- Open TCP Session Attacks
- Flood TCP Session

# Specifications

## Physical Specifications

- Dimensions (H x W x D):  
46.43 cm x 6.05 cm x 29.51 cm (18.28" x 2.38" x 11.62")
- Weight Range
  - Shipping: 4.98 kg (10.95 lbs) to 7.09 kg (15.60 lbs)
  - Net: 3.36 kg (7.40 lbs) to 5.43 kg (11.95 lbs)

## Environmental Specifications

- Operating Temperature: +5° C to +40° C (41° F to 104° F)
- Storage Temperature: -30° C to +73° C (-22° F to 164° F)
- Operating Humidity: 5% to 90% relative humidity, non-condensing
- Power Consumption: 100 to 125 VAC or 200 to 250 VAC;  
50 to 60 Hz

## Agency and Standards Specifications

- Safety: UL 60950, CSA 60950, EN 60950, EN 60825, and IEC 60950
- Electromagnetic compatibility: 47 CFR Parts 2 and 15, CSA C108.8, EN 55022, EN 55024, EN 61000-3-2, EN 61000-3-3, AS/NZS CISPR 22, and VCCI

# Ordering Information

Part Number	Description
<b>Diamond Distributed Forwarding Engines</b>	
7KR4297-04	Diamond DFE with 4 10 Gigabit Ethernet 10GBase XFP optics slots
7KR4297-02	Diamond DFE with 2 10 Gigabit Ethernet 10GBase XFP optics slots
7KR4290-02	Diamond DFE with 2 10-Gigabit Ethernet 10GBase XenPak optics slots
7GR4280-19	Diamond DFE with 18 1000Base-X ports via Mini-GBIC connectors and one expansion module slot
7GR4270-12	Diamond DFE with 12 1000Base-X ports via Mini-GBIC connectors
7GR4202-30	Diamond DFE with 30 10/100/1000 Ethernet ports via RJ45 connectors
<b>Network Expansion Modules and Network Security Modules</b>	
7G-6MGBIC-B	Network Expansion Module with 6 1000Base-X ports via Mini-GBIC connectors (supports 100-Base-FX Mini-GBIC)
7K-2XFP-6MGBIC	Network Expansion Module with 6 1000Base-X ports via Mini-GBIC connectors, plus 2 10 Gigabit Ethernet ports via XFP
7S-DSNA7-01	N-Series Security Module for Intrusion Detection
7S-NSTAG-01	N-Series Security Module for Network Access Control
WS-C20N-32	N-Series Wireless Controller Module
<b>10 Gigabit Ethernet XENPACs</b>	
10GBASE-ER	10 Gigabit interface, 1550 nm, 9 micron single-mode fiber via SC connector (40 km)
10GBASE-LR	10 Gigabit interface, 1310 nm, serial optic single-mode fiber via SC connector (2-10 km)
10GBASE-LX4	10 Gigabit interface, 1310 nm, 62.5 and 50 micron multi-mode fiber via SC connector (33 m and 66 m)
10GBASE-SR	10 Gigabit interface, 850 nm, 62.5 and 50 micron multi-mode fiber via SC connector (33 m and 66 m)
<b>Gigabit Ethernet Mini-GBICs</b>	
MGBIC-LC01	1000Base-SX Mini-GBIC w/ LC connector
MGBIC-LC03	1000Base-LX/LH (2km) Mini GBIC MMF port w/ LC connector
MGBIC-LC09	1000Base-LX Mini-GBIC w/ LC connector
MGBIC-MT01	1000Base-SX Mini-GBIC w/ MTRJ connector
MGBIC-02	1000Base-T Mini-GBIC w/ RJ45 connector
MGBIC-08	1000Base-LX/LH (70 km Long Haul) Mini-GBIC SMF via LC connector
MGBIC-N-LC04	100Base-FX Mini-GBIC w/ LC connector

## Ordering Information (cont.)

10 Gigabit Ethernet XFPs	
10GBASE-ER-XFP	10 Gigabit interface, 1550 nm, 9 micron single-mode fiber via XFP connector (40 km)
10GBASE-LR-XFP	10 Gigabit interface, 1310 nm, serial optic single-mode fiber via XFP connector (2-10 km)
10GBASE-SR-XFP	10 Gigabit interface, 850 nm, 62.5 and 50 micron multi-mode fiber via XFP connector (33 m and 82 m)
10GBASE-CX4-XFP	10 Gigabit interface, TwinAxial, Copper SFF-8470 via XFP connector (15 m)

### Notes

1. Diamond DFEs can be installed in any slot of a N7, N5, N3, N1 or E7 chassis.
2. Diamond and Platinum DFEs can be mixed in the same chassis; it is recommended that a minimum of two Diamond DFEs are installed per chassis when routing.
3. Diamond DFEs require no additional licenses for routing or policy services.
4. MGBIC-N-LC04 supported on the 7G-6MGBIC-B and 7K-2XFP-6MGBIC only.

### Warranty

As a customer-centric company, Enterasys is committed to providing quality products and solutions. In the event that one of our products fails due to a defect, we have developed a comprehensive warranty that protects you and provides a simple way to get your products repaired or media replaced as soon as possible.

The Enterasys N-Series comes with a one year hardware warranty.

For full warranty terms and conditions please go to

<http://www.enterasys.com/support/warranty.aspx>.

### Service and Support

Enterasys Networks provides comprehensive service offerings that range from Professional Services to design, deploy and optimize customer networks, customized technical training, to service and support tailored to individual customer needs. Please contact your Enterasys account executive for more information about Enterasys Service and Support.

## Contact Us

For more information, call Enterasys Networks toll free at **1-877-801-7082**, or **+1-978-684-1000** and visit us on the Web at [enterasys.com](http://enterasys.com)



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