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Data Sheet

Cisco Nexus 7000 F3-Series 48-Port 1 and 10 Gigabit Ethernet Module

Product Overview

The Cisco Nexus® 7000 F3-Series 48-Port 1 and 10 Gigabit Ethernet Module offers outstanding flexibility and wire-rate performance on each port for high-density, low-latency, scalable data center architectures.

Powering Cisco Unified Fabric Architecture

Cisco Nexus 7000 Series Switches are the foundation of Cisco® Unified Fabric and meet the demands of mission-critical data centers. They deliver exceptional availability, scalability, and the proven, comprehensive feature set of Cisco NX-OS Software.

The first in the next generation of data center switching platforms, 7000 Series switches provide integrated resilience and are optimized for availability, reliability, scalability, and ease of management. The fabric architecture of 7000 Series switches scales beyond 17 terabits per second (Tbps) and supports high-density 10 Gigabit, 40 Gigabit Ethernet, and 100 Gigabit Ethernet deployments. A single chassis supports up to 768 native 10-Gbps ports, 192 40-Gbps ports, and 96 100-Gbps ports.

The 7000 F3-Series module (Figure 1) is a low-latency, high-performance, high-density 1/10 Gigabit Ethernet module. It supports all 7000 Series switches and shares a common system architecture and application-specific integrated circuit (ASIC) technology. Up to 768 wire-rate 10 Gigabit Ethernet ports are supported in a single Cisco Nexus 7000 18-Slot Switch chassis (Table 1).

Figure 1. Cisco Nexus 7000 F3-Series Module

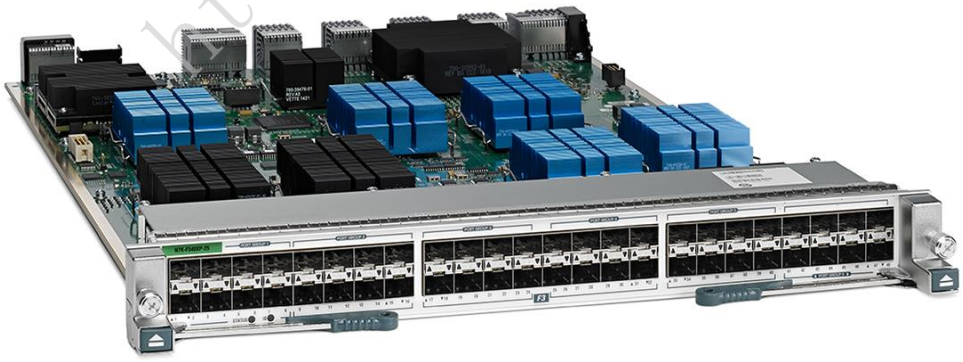

Table 1. Cisco Nexus 7000 Series Switches 10 Gigabit Ethernet Maximum Port Density

Cisco Nexus 7000 Series Chassis	Maximum Wire-Rate Port Density
Cisco Nexus 7000 18-Slot Switch	768
Cisco Nexus 7000 10-Slot Switch	384
Cisco Nexus 7000 9-Slot Switch	336
Cisco Nexus 7000 4-Slot Switch	96

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The 7000 F3-Series module is based on the Cisco Nexus F3-Series switch-on-a-chip (SoC) ASIC, which increases performance and lowers the module's power and cooling requirements. The F3-Series SoC is powered by a flexible packet engine, making it an excellent solution for building public and private cloud environments. The F3-Series module supports all of the foundational networking protocols needed to build Layer 2 and Layer 3 networks. It also supports highly virtualized environments with virtual overlay networking and hardware support for Cisco Virtual Extensible LAN (VXLAN) and Locator/ID Separation Protocol (LISP) technology. The 7000 F3-Series modules let customers transparently interconnect their data centers with protocols such as Overlay Transport Virtualization (OTV), Multiprotocol Label Switching (MPLS), and Virtual Private LAN Service (VPLS).

The 7000 F3-Series module delivers 720 million packets per second (mpps) of distributed Layer 2 and Layer 3 forwarding and up to 480 Gbps of data throughput. A 7000 18-Slot Switch fully populated with the 7000 F3-Series module can deliver up to 11.5 bpps and 15.4 Tbps of switching performance.

Features and Benefits

Note: N7K-SUP2 or N7K-SUP2E is required to support F3-Series modules in the chassis.

The 7000 F3-Series module integrates a broad set of data center switching technologies and combines the benefits of classical fabric interface line cards with the advanced routing features of edge interface modules. It offers exceptional investment protection for organizations consolidating data center environments as they migrate to dense multiservice 10 Gigabit Ethernet networks.

- The 7000 F3-Series module is powered by the proven and comprehensive NX-OS feature set. With its comprehensive set of Layer 2 and Layer 3 functions, this module is suited for data center networks that require high density, high performance, and continuous system operation.
- The 7000 F3-Series module supports Cisco FabricPath, a valuable feature for organizations building resilient, flexible, and massively scalable Layer 2 networks. FabricPath protects enterprises' investments by allowing existing spanning-tree-based deployments to be connected to a FabricPath network.
- The 7000 F3-Series module can be used in conjunction with Cisco Nexus 2000 Series Fabric Extenders (FEX). The 2000 Series fabric extenders simplify data center architecture and operations by dramatically reducing the number of points of management.
- The 7000 F3-Series module offers integrated Fibre Channel over Ethernet (FCoE) to simplify the network infrastructure. It helps reduce costs by supporting unified data center fabrics that consolidate data center traffic onto a single, general-purpose, high-performance, highly available network. With the 7000 F3-Series module, FCoE can be deployed in director-class modular platforms for the access layer and core of converged networks.
- The 7000 F3-Series module supports wire-rate VXLAN, offering the architectural flexibility needed to expand cloud deployments with repeatable pods in different Layer 2 domains. VXLAN can also enable migration of virtual machines between servers across Layer 3 networks.
- With its advanced data center interconnect (DCI) protocols, including Cisco OTV and VPLS, the 7000 F3-Series module helps customers simplify the extension of applications across geographically dispersed data center sites.
- The 7000 F3-Series module supports high-performance MPLS for 1 and 10 Gigabit Ethernet data center deployments.

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- Support for Cisco LISP allows enterprises and service providers to simplify multihomed routing and scalable any-to-any WAN connectivity while supporting data center virtual machine mobility.
- The virtual device context (VDC) feature helps enable the virtualization of a single physical device in one or more logical devices. Each provisioned logical device is configured and managed as if it were a separate physical device.
- The 7000 F3-Series module offers exceptional security and integrated hardware support for:
  - Configurable Control-Plane Policing (CoPP), which protects the supervisor CPU from excessive traffic
  - Access control list (ACL) counters and logging capability to provide deeper packet visibility
  - Layer 2 to Layer 4 ACL for both IPv4 and IPv6 traffic
  - Cisco TrustSec® technology and ACL processing for security group tags (SGTs)
  - IEEE MAC security standard (IEEE 802.1AE MACsec) on ports 41 to 48

Note: This document describes capabilities of the F3-Series modular hardware. Please consult your Cisco representative to confirm the appropriate NX-OS release required to enable these features.

Product Specifications

Table 2 lists product specifications for the 7000 F3-Series module. Tables 3 and 4 list specifications for Cisco SFP and SFP+ transceivers installed in the module's ports to enable connectivity over the physical medium. Refer to the release notes for up-to-date software version information to see which optics and copper assemblies are supported. Complete information about supported transceivers can be found at https://www.cisco.com/en/US/products/hw/modules/ps5455/prod_models_home.html.

Table 2. Product Specifications

Item	Specification
System	
Product compatibility	Supported on Cisco Nexus 7000 4-, 9- 10-, and 18-Slot Switch chassis
Software compatibility	Cisco NX-OS Software Release 6.2.12 or later
Front-panel LEDs	• Status: Green (operational), red (faulty), or orange (module booting) • Link: Green (port enabled and connected), orange (port disabled), off (port enabled and not connected), or blinking green and orange in conjunction with ID LED blue (port flagged for identification; beacon) • ID: Blue (operator has flagged this card for identification; beacon) or off (module not flagged)
Programming interfaces	• XML • Scriptable command-line interface (CLI) • Cisco Data Center Network Manager (DCNM) web services • Python • Tool Command Language (TCL) Interpreter • Cisco Embedded Event Manager (EEM) • Cisco ONE Platform Kit (OnePK™) • OpenFlow
Physical Interfaces	
Connectivity	48 ports of 1 and 10 Gigabit Ethernet (SFP and SFP+)
Maximum port density	• 768 ports of 10 Gigabit Ethernet in 7000 18-Slot chassis • 384 ports of 10 Gigabit Ethernet in 7000 10-Slot chassis • 336 ports of 10 Gigabit Ethernet in 7000 9-Slot chassis • 96 ports of 10 Gigabit Ethernet in 7000 4-Slot chassis
Queues per port	4 ingress and 4 egress

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Item	Specification
Virtual output queue (VOQ) buffer	72 MB per module
Jumbo frame support for bridged and routed packets	Up to 9216 bytes
SoC	
Forwarding performance	720 mpps of Layer 2 and Layer 3 forwarding capacity for both IPv4 and IPv6 packets
MAC address entries	64,000
VLAN	4096 simultaneous VLANs per VDC
IPv4 entries	64,000
IPv6 entries	32,000
Adjacency entries	64,000
ACLs	16,000
CoPP	Supported
Environmental	
Physical dimensions	• Occupies one I/O module slot in a Cisco Nexus 7700 platform chassis • Dimensions (H x W x D): 1.733 x 15.3 x 21.9 in. (4.4 x 38.9 x 55.6 cm) • Weight: 15 lb (6.8 kg)
Environmental conditions	• Operating temperature: 32 to 104°F (0 to 40°C) • Operational relative humidity: 5 to 90%, noncondensing • Storage temperature: -40 to 158°F (-40 to 70°C) • Storage relative humidity: 5 to 95%, noncondensing
Regulatory compliance	• EMC compliance • FCC Part 15 (CFR 47) (USA) Class A • ICES-003 (Canada) Class A • EN55022 (Europe) Class A • CISPR22 (International) Class A • AS/NZS CISPR22 (Australia and New Zealand) Class A • VCCI (Japan) Class A • KN22 (Korea) Class A • CNS13438 (Taiwan) Class A • CISPR24 • EN55024 • EN50082-1 • EN61000-3-2 • EN61000-3-3 • EN61000-6-1 • EN300 386
Environmental standards	• NEBS criteria levels* • SR-3580 NEBS Level 3 (GR-63-CORE and GR-1089-CORE) • Verizon NEBS compliance* • Telecommunications Carrier Group (TCG) Checklist • Century Link NEBS requirements* • Telecommunications Carrier Group (TCG) Checklist • ATT NEBS requirements* • ATT TP76200 level 3 • ETSI* • ETSI 300 019-2-1, Class 1.2 Storage • ETSI 300 019-2-2, Class 2.3 Transportation • ETSI 300 019-2-3, Class 3.2 Stationary Use * Validation in progress

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Item	Specification
Safety	• UL/CSA/IEC/EN 60950-1 • AS/NZS 60950
Warranty	The 7000 Series switches come with the standard Cisco 1-year limited hardware warranty.

Table 3. 10 Gigabit Ethernet Interface Distances and Options

10 Gigabit Ethernet SFP+ Part Number	Wavelength (nanometers)	Fiber and Cable Type	Core Size (microns)	Modal Bandwidth (MHz per km)[1]	Cable Distance[2]
SFP-10G-SR **SFP-10G-SR-S**[7]	• 850	• MMF (FDDI-grade) • MMF (OM1) • MMF (400/400) • MMF (OM2) • MMF (OM3) • MMF (OM4)	• 62.5 • 62.5 • 50.0 • 50.0 • 50.0 • 50.0	• 160 • 200 • 400 • 500 • 2000 • 4700	• 26m • 33m • 66m • 82m • 300m • 400m
SFP-10G-LRM[4]	• 1310	• MMF[6]	• 62.5 • 50 • 50	• 500 • 400 • 500	• 220m • 100m • 220m
		• SMF	• G.652	-	• 300m
SFP-10G-LR **SFP-10G-LR-S**[7]	• 1310	• SMF	• G.652	-	• 10 km
FET-10G	• 850	• MMF (OM2) • MMF (OM3, OM4)	• 50 • 50	• 500 • 2000	• 25m • 100m
SFP-10G-ER[8] **SFP-10G-ER-S**[7, 8]	• 1550	• SMF	• G.652	-	• 40 km[3]
SFP-10G-ZR **SFP-10G-ZR-S**[7, 9]	• 1550	• SMF	• G.652	-	• 80 km
DWDM-SFP10G-xx.xx=	[5]	• SMF	-	-	[6]
SFP-H10GB-CUxM **(x=1, 3, or 5)**	-	• Twinax cable assembly, passive	-	-	1, 3, or 5m
SFP-H10GB-ACUxM **(x=7 or 10)**	-	• Twinax cable assembly, active	-	-	7 or 10m
SFP-10G-AOCxM **(x=1, 2, 3, 5, 7, or 10)**	-	• Active optical cable assembly	-	-	1, 2, 3, 5, 7, or 10m

[1] Bandwidth is specified at the transmission wavelength.

[2] Minimum cabling distance for -SR, -LRM, -LR, and -ER modules is 2m, according to IEEE 802.3ae.

[3] Links longer than 30 km are considered engineered links according to IEEE 802.3ae.

[4] A mode-conditioning patch is required for use over traditional MMF types such as FDDI-grade, OM1, and OM2. Please refer to the product bulletin: https://www.cisco.com/en/US/prod/collateral/modules/ps5455/product_bulletin_c25-530836.html. Note that MMF support with SFP-10G-LRM is on ports 41 to 48 only. 300m SMF support is applicable to all ports.

[5] 40 different wavelengths are offered. See the dense wavelength-division multiplexing (DWDM) SFP optics data sheet for additional product numbers and information: https://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6576/data_sheet_c78-711186.html.

[6] FCoE traffic is supported up to 80 km.

[7] No Fibre Channel over Ethernet (FCoE) support.

[8] Requires 5 dB 1550nm fixed loss attenuator for < 20km. Attenuator is available as a spare.

[9] Requires 15dB attenuator if Link Distance < 5km.
Requires 10dB attenuator if Link Distance is between 5km and 25km.
Requires 5dB attenuator if Link Distance is between 25km and 45km.
Attenuator is available as a spare.

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Table 4. Gigabit Ethernet Interface Distances and Options

Gigabit Ethernet SFP Part Number	Wavelength (nm)	Fiber and Cable Type	Core Size (microns)	Modal Bandwidth (MHz per km)	Cable Distance
GLC-SX-MMD	• 850	• MMF (FDDI-grade) • MMF (OM1) • MMF (400/400) • MMF (OM2) • MMF (OM3 and OM4)	• 62.5 • 62.5 • 50 • 50 • 50	• 160 • 200 • 400 • 500 • 2000	• 220m • 275m • 500m • 550m • 1000m
GLC-LH-SMD	• 1310	• MMF[1]	• 62.5 • 50 • 50	• 500 • 400 • 500	• 550m • 550m • 550m
		• SMF	• G.652	-	• 10 km
GLC-EX-SMD	• 1310	• SMF	• G.652	-	• 40 km
GLC-ZX-SMD	• 1550	• SMF	• G.652	-	• 70 to 100 km[2]
GLC-TE	-	• Category 5	-	-	• 100m
GLC-BX-U	• 1310	• SMF	• G.652	-	• 10 km
GLC-BX-D	• 1490	• SMF	• G.652	-	• 10 km
CWDM-SFP-1xxx=	• [3]	• SMF	-	-	-
DWDM-SFP-xxxx=	• [4]	• SMF	-	-	-

[1] A mode-conditioning patch is required for use over traditional MMF types such as FDDI-grade, OM1, and OM2. Please refer to the product bulletin: https://www.cisco.com/en/US/prod/collateral/modules/ps5455/product_bulletin_c25-530836.html.

[2] 1000BASE-ZX SFP can reach up to 100 km by using dispersion-shifted SMF or low-attenuation SMF; the distance depends on the fiber quality, number of splices, and connectors.

[3] This option is also offered in other wavelengths. See the coarse wavelength-division multiplexing (CWDM) SFP optics data sheet for additional product numbers and information: https://cisco.com/en/US/prod/collateral/modules/ps5455/ps6575/product_data_sheet09186a00801a557c.html.

[4] This option is also offered in other wavelengths. See the dense wavelength-division multiplexing (DWDM) SFP optics data sheet for additional product numbers and information: https://cisco.com/en/US/prod/collateral/modules/ps5455/ps6576/product_data_sheet0900aecd80582763.html.

Note: This data sheet describes the hardware capabilities of the Cisco Nexus 7700 M3-Series 48-Port module. Please refer to the Cisco NX-OS Software release notes (https://www.cisco.com/c/en/us/support/switches/nexus-7000-series-switches/products-release-notes-list.html) or consult your Cisco representative to confirm the current or future NX-OS release required for any of these features.

Ordering Information

Table 5 provides ordering information.

Table 5. Ordering Information

Description	Part Number
Nexus 7000 F3-Series 48-Port Fiber 1 and 10G Ethernet Module (req. SFP/SFP+ modules)	N7K-F348XP-25 N7K-F348XP-25=
Fibre Channel over Ethernet (FCoE) for Cisco Nexus 7000 F3 Series 48-port 10-Gigabit Ethernet SFP+ module (and spare)	N7K-FCOE-F348XP N7K-FCOE-F348XP=

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Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing the Cisco Nexus 7000 Series in your data center. Our innovative services are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operating efficiency and improve your data center network. Cisco Advanced Services uses an architecture-led approach to help you align your data center infrastructure with your business goals and provide long-term value. Cisco SMARTnet® Service helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. With this service, you can take advantage of the Cisco Smart Call Home service capability, which offers proactive diagnostics and real-time alerts on your 7000 Series switch. Spanning the entire network lifecycle, Cisco Services helps increase investment protection, optimize network operations, support migration, and strengthen your IT expertise. For more information about Cisco Data Center Services, visit https://www.cisco.com/go/dcservices.

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For More Information

For more information about the Cisco Nexus 7000 Series, visit the product homepage at https://www.cisco.com/go/nexus or contact your local account representative.

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