

# CONNECTRIX ED-DCX7 ENTERPRISE DIRECTORS

64Gb/s Enterprise Directors

## Overview

The Connectrix ED-DCX7 Directors provide a modular building block, purpose-built for scalability to accommodate growth and power large-scale storage environments. With a 50% latency reduction compared to the previous generation, the ED-DCX7 Directors maximize the performance of NVMe storage and high-transaction workloads, eliminating I/O bottlenecks and unleashing the full performance of next-generation storage. In addition, the ED-DCX7 Directors lay the foundation for the Connectrix B-Series autonomous SAN. With autonomous SAN technology, the director harnesses the power of analytics and the simplicity of automation to optimize performance, ensure reliability, and simplify management. Leveraging these capabilities enables organizations to realize a self-learning, self-optimizing and self-healing SAN.

The ED-DCX7 directors provide up to 512 64Gb ports or up to 384 32Gb/s ports, enabling organizations to scale more devices, applications and workloads. With diverse deployment options, multiprotocol flexibility and mixed blade capability, organizations can adapt and optimize their businesses to meet next-generation storage and server requirements. Connectrix Directors support the concurrent use of both traditional Fibre Channel and NVMe storage traffic, allowing organizations to seamlessly integrate Fibre Channel networks with next-generation NVMe-based storage, without a disruptive rip-and-replace.

## Connectrix ED-DCX7 Chassis Models

There are two Connectrix ED-DCX7 models to address all your storage networking requirements. To accommodate the requirements of today's data centers, the ED-DCX7 director models provide two airflow options for each chassis. Having two airflow options extends the flexibility for hot/cold aisle network designs. Non-port-side intake to port-side exhaust or port-side intake to non-port-side exhaust options are available.

**Note:** Content within parenthesis below are ordering SKUs. For example, "210-AWYK" is the SKU for the legacy "ED-DCX7-8B" model number.

- **ED-DCX7-8B (210-AWYK):** This 14U chassis has eight vertical blade slots to provide up to 384 64Gb/s line rate ports, or up to 512 32Gb/s line rate ports for device connectivity. An additional 32 Inter-Chassis Link (ICL) connections provide 128 ports for chassis-to-chassis interconnect.
- **ED-DCX7-4B (210-AWYJ):** This 8U chassis has four horizontal blade slots to provide up to 192 64Gb/s line rate ports, or up to 256 32Gb/s line rate ports for device connectivity. An additional 16 ICL connections provide 64 ports for chassis-to-chassis interconnect.

The following port blade types are available for purchase with the ED-DCX7 Directors:

- **ED-DCX7 48-port 64Gb blade:** This Fibre Channel port blade provides 48 x 64Gb/s Fibre Channel ports with backward-compatibility support for 8, 10, 16, and 32Gb/s Fibre Channel connectivity.
- **ED-DCX7 48-port 32Gb blade:** This Fibre Channel port blade provides 48 x 32Gb/s Fibre Channel ports with backward-compatibility support for 4, 8, 10, and 16Gb/s Fibre Channel connectivity. Short wave and long wave models of this blade are available.
- **ED-DCX6/7 SAN Extension blade:** This extension blade is designed to accelerate and harden disaster recovery and data protection storage solutions over long distances. This blade provides flexible Fibre Channel and IP storage replication deployment options with 16 32Gb/s Fibre Channel ports, 16 1/10-GbE ports, and 2 40GbE ports.

Specific SKUs and configurations for each port blade offered by Dell can be found in the Fibre Channel blade models section in the table below.

ED-DCX7 directors build upon years of innovation and leverage the core technology of Connectrix B-Series systems to consistently deliver five-nines availability in the world's most demanding data centers. Delivering non-disruptive software upgrades, hot-pluggable components, and a no-single-point-of-failure design, the Connectrix ED-DCX7 offers a highly resilient solution for today's enterprise-class storage environments.

## Analyze the SAN to Optimize Performance and Reliability

IT organizations are responsible for delivering non-stop performance and reliability to ensure that service-level agreements (SLAs) are met. They need analytics to help extract actionable intelligence from their environment and simplified management tools to easily understand the state of their environment. This requires an infrastructure that can automatically learn its performance and health characteristics, identify potential risks, and provide recommended actions to resolve issues.

With ED-DCX7 Directors, a self-learning SAN is enabled that gathers and transforms millions of data points into actionable intelligence to make fast, informed decisions to optimize performance and ensure reliability. Connectrix products proactively monitor I/O performance and behavior data points through integrated network sensors to gain deep insight into the environment. The information captured is displayed in Connectrix SANnav™ Management Portal to quickly identify and isolate problems before they impact application availability. With built-in best practice recommendations, organizations can simplify troubleshooting by identifying and isolating issues to resolve them as fast as possible. Combining these tools with automation, Connectrix technology can detect abnormal traffic behaviors and degraded performance to automatically take corrective action, eliminating the potential impact of this issue. These new autonomous SAN technologies greatly simplify SAN management and enable unparalleled network performance and reliability.

Click here for video on [Connectrix B-Series Autonomous SAN](#).

# Connectrix ED-DCX7 Directors

## System Architecture

## Technical Specification

Chassis	<p>Single chassis</p> <ul style="list-style-type: none"> <li> <b>ED-DCX7-8B:</b> Non-blocking architecture             <ul style="list-style-type: none"> <li>ED-DCX7-8B Director with 48 64Gb/s port blades, 31Tb/s of aggregate chassis bandwidth (384 device ports with a 64Gb/s data rate plus 32 Inter-Chassis Links (ICLs))</li> <li>ED-DCX7-8B Director with 64 32Gb/s port blades: 22.8Tb/s of aggregate chassis bandwidth (512 device ports with a 32Gb/s data rate plus 32 Inter-Chassis Links (ICLs))</li> </ul> </li> <li> <b>ED-DCX7-4B:</b> Non-blocking architecture             <ul style="list-style-type: none"> <li>ED-DCX7-4B Director with 48 64Gb/s port blades, 15.5Tb/s of aggregate chassis bandwidth (192 device ports with a 64Gb/s data rate plus 16 Inter-Chassis Links (ICLs))</li> <li>ED-DCX7-4B Director with 64 32Gb/s port blades: 11.4Tb/s of aggregate chassis bandwidth (256 device ports with a 32Gb/s data rate plus 16 Inter-Chassis Links (ICLs))</li> </ul> </li> </ul> <p>Each provides support for (E, F, D, M, SIM, and EX) Fibre Channel ports using 48-port 64Gb/s Fibre Channel blades.</p>
Control processor	Redundant (active/standby) control processor modules
Scalability	Full-fabric architecture of 239 switches
Certified maximum	6000 active devices per switch; 56 switches, 19 hops in FOS fabrics; larger fabrics certified as required
Fibre Channel blade models	<p><b>PB-DCX7-FC6464GSW (210-BBHK):</b> 48 x 64/32/16/10/8 Gb/s 64 Gb/s port blade fully populated with 64 Gb/s short wave SFP+ optics. 4 Gb/s Fibre Channel is not supported with this blade</p> <p><b>PB-DCX7-FC6432GSW (210-AWYL):</b> 48 x 64/32/16/10/8 Gb/s 64 Gb/s port blade fully populated with 32 Gb/s short wave SFP+ optics. 4 Gb/s Fibre Channel is not supported with this blade</p> <p><b>PB-DCX7-FC6432GLW (210-AWYM):</b> 48 x 64/32/16/10/8 Gb/s 64 Gb/s port blade fully populated with 32 Gb/s long wave SFP+ optics. 4 Gb/s Fibre Channel is not supported with this blade</p> <p><b>PB-DCX7-FC32-SW (210-AWYN):</b> 48 x 32/16/10/8/4 Gb/s port blade fully populated with 32 Gb/s short wave SFP+ optics</p> <p><b>PB-DCX7-FC32-LW (210-AWYO):</b> 48 x 32/16/10/8/4 Gb/s port blade fully populated with 32 Gb/s long wave SFP+ optics</p>
Extension blade	<b>PB-DCX6-SX6-SW (210-AWUP):</b> Extension blade provides Fibre Channel extension (16x32Gb/s Fibre Channel ports) and IP extension over IP networks (16x1GbE/10GbE and 2x40GbE ports). This blade can be used in ED-DCX6 directors as well.
Performance	<p><b>PB-DCX7-FC64 Port Blade:</b> Fibre Channel: 8.5Gb/s line speed, full duplex; 10.53Gb/s line speed, full duplex; 14.025Gb/s line speed, full duplex; 28.05Gb/s line speed, full duplex; 57.8Gb/s line speed, full duplex. Autosensing of 8, 16, 32, and 64G port speeds depending on SFPs used. 10G port speeds with dedicated SFPs.</p> <p><b>PB-DCX7-FC32 Port Blade:</b> Fibre Channel: 4.25Gb/s line speed, full duplex; 8.5Gb/s line speed, full duplex; 10.53Gb/s line speed, full duplex; 14.025Gb/s line speed, full duplex; 28.05Gb/s line speed, full duplex. Autosensing of 4, 8, 16, and 32G port speeds depending on SFPs used. 10G port speeds with dedicated SFPs.</p>
ISL trunking	Frame-based trunking with up to eight 64Gb/s ports per ISL trunk; up to 512Gb/s per ISL trunk; exchange-based load balancing across ISLs with DPS included in FOS
ICL trunking	<p>Chassis-to-chassis linkage through connectors on the Core Routing (CR) blade. Can configure the following maximum number of QSFPs per trunk depending on blade type, connecting:</p> <ul style="list-style-type: none"> <li>Up to four QSFP ports in a trunk group between two CR64-4 blades. For trunks that contain four or fewer QSFP ports, ports in a trunk must be located in the same port group on each blade.</li> <li>Up to four QSFP ports in a trunk group between a CR64-4 blade and a CR64-8 blade. For trunks that contain four or fewer QSFP ports, ports in a trunk must be located in the same port group on each blade.</li> </ul> <p>A minimum of two QSFP connections are required for a trunk, and up to four QSFP trunks between pairs of CR64-8 (CR64-4) and CR32-8 (CR32-4).</p>

Multi-chassis ICL ports	Up to 4608 Fibre Channel ports; ICL ports (32 for 8-slot or 16 per 4-slot chassis, optical QSFP) connect up to 9 chassis in a full-mesh topology or up to 12 chassis in a core-edge topology
Chassis bandwidth	ED-DCX7-8B: 31Tb/s per chassis with 384 device ports + 32 ICL connections supporting 128 ports ED-DCX7-4B: 15.5Tb/s per chassis with 192 device ports + 16 ICL connections supporting 64 ports
Slot bandwidth	3072Gb/s providing line-rate performance for the PB-DCX6-64P32G blade
Maximum frame size	2112-byte payload
Frame buffers	24,000 per switching ASIC
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Fibre Channel port types	<b>CR64-8 and CR64-4 CR blades:</b> E_Port, EX_Port, and D_Port. <b>PB-DCX7-FC64 and PB-DCX7-FC32 port blades:</b> F_Port, E_Port, EX_Port, M_Port, SIM, and D_Port. (FC32-X7-48 at 4G speed supports only F_Port connectivity.) <b>SX6 extension blade:</b> F_Port, FL_Port, E_Port, SIM, and EX_Port on FC and VE_Port on GbE. Self-discovery is based on switch type (U_Port) with an optional port type control.
Data traffic types	Fabric switches supporting unicast
Media types	<b>PB-DCX7-FC64 port blade</b> 64G FC SFP+ LC connector: SWL, LWL, ELWL 32G FC SFP+ LC connector: SWL, LWL, ELWL 10G FC SFP+ LC connector: LWL  <b>PB-DCX7-FC32 port blade</b> 32G FC SFP+ LC connector: SWL, LWL, ELWL 16G FC SFP+ LC connector: SWL, LWL, ELWL 10G FC SFP+ LC connector: LWL  <b>SX6 Extension Blade</b> 32G FC SFP+ LC connector: SWL, LWL, ELWL 16G FC SFP+ LC connector: SWL, LWL, ELWL 10G FC SFP+ LC connector: SWL, LWL  Ethernet QSFP+ MPO connector: 40GBASE-SR4 10GbE SFP+ LC connector: SR, LR, USR 1GbE SFP+ LC connector: SR, LR 1GbE SFP+ copper connector  Core Routing (CR) blades, CR64-4 and CR64-8 FC QSFP+ MPO connector: SWL, 2 km* 4x32G FC QSFP+ SMF LC connector: SWL, 2 km  Note: MPO connectors require 1x12 ribbon cable up to 66m over OM3 or 100m over OM4.  *Use of the 2KM2-km ICL QSFP is subject to the following environmental ratings for maximum intake air temperature: 0–40°C at sea level; 0–35°C up to 1500m (4921 ft) elevation; and 0–30°C from 1500m- to 3000m (9843 ft) elevation.
USB	One USB port per control processor for firmware download, SupportSave, and configuration upload or download
Fabric services	BB Credit Recovery; Advanced Zoning (Default Zoning, Port/WWN Zoning, Peer Zoning); Congestion Signaling; Dynamic Path Selection (DPS); Extended Fabrics; Fabric Performance Impact Notification; Fabric Vision; FDMI; FICON CUP; Flow Vision; F_Port Trunking; FSPF; Integrated Routing; ISL Trunking; Management Server; Name Server; NPIV; NTP v3; Port Decommission/Fencing; QoS Registered State Change Notification (RSCN); ; Target-Driven Zoning; Traffic Optimizer; Virtual Fabrics (Logical Switch, Logical Fabric); VMID+ and AppServer.
Extension	Supports DWDM, CWDM, and FC-SONET Devices; Fibre Channel; In-flight Compression (LZO) and Encryption (AES-GCM-256); BB Credit Recovery; FCIP; IP Extension; Adaptive Rate Limiting (ARL); Data Compression; Fast Write; Read/Write Tape Pipelining; QoS
FICON	FICON cascading; support for lossless DLS; FICON CUP; Advanced Accelerator for FICON (IBM z/OS Global Mirror and read/write Tape Pipelining) (FICON connectivity is not supported on the PB-DCX6-64P32G blade)

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System Components	Technical Specification
Fibre Channel ports	ED-DCX7-8B: Up to 384 64Gb/s ports or up to 512 32Gb/s ports, universal (E_Port, F_Port, EX_Port, M_Port, D_Port, SIM Port, FICON) ED-DCX7-4B: Up to 192 64Gb/s ports or up to 256 32Gb/s ports, universal (F_Port, E_Port, EX_Port, M_Port, D_Port, SIM Port, FICON)
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
ANSI Fibre Channel protocol	FC-PH (Fibre Channel Physical and Signaling Interface standard)
Port-to-port latency	Local switching: 460 ns at 64Gb/s (including FEC as part of the FC standard). Blade to blade: 1.4 µs

## Connectrix ED-DCX7 Directors

High Availability	Technical Specification
Architecture	Non-blocking shared memory; passive backplane; redundant active/passive control processor; redundant active/active core switching blades; redundant WWN cards
Chassis power	<p><b>ED-DCX7-8B</b></p> <ul style="list-style-type: none"> <li>Four power supplies required for AC low-line (100 VAC to 120 VAC).</li> <li>Two power supplies required for AC high-line (200 VAC to 240 VAC).</li> <li>Chassis ships empty only. PSU and fans must be ordered separately. Three PSUs are required for 2+1 redundancy. Two PSUs provide system power, but four PSUs must be installed to provide power efficiency and 2+2 redundancy.</li> </ul> <p><b>ED-DCX7-4B</b></p> <ul style="list-style-type: none"> <li>Two power supplies required for AC low-line (100 VAC to 120 VAC).</li> <li>One power supply required for AC high-line (200 VAC to 240 VAC).</li> <li>Chassis ships empty only. PSU and fans must be ordered separately. One PSU provides system power, but both PSUs must be installed to provide power efficiency and 1+1 redundancy.</li> </ul>
Cooling	<p><b>ED-DCX7-8B</b></p> <ul style="list-style-type: none"> <li>Requires three fan tray assemblies. A failure condition is one failed fan from any fan tray.</li> <li>Each assembly contains two fans for a total of six fans. The system requires five of six functioning fans for the system requires five of six functioning fans for operation in the DCX7-8. One fan tray assembly can be hot-swapped and should be replaced immediately in the event of a failure.</li> </ul> <p><b>ED-DCX7-4B</b></p> <ul style="list-style-type: none"> <li>Requires two fan tray assemblies. A failure condition is one failed fan from any fan tray.</li> <li>Each assembly contains two fans for a total of four fans. The system requires three of four functioning fans for operation in the DCX7-4. One fan assembly can be hot-swapped and should be replaced immediately in the event of a failure.</li> </ul>
Airflow	Non-port-side intake (NPI) to port-side exhaust and port-side intake to non-port-side exhaust (NPE) options are available
Solution availability	Designed to provide 99.999% uptime capabilities; hot-pluggable redundant power supplies, fans, WWN cards, processors, core switching, port blades, and optics; online diagnostics; non-disruptive firmware download and activation

## Connectrix ED-DCX7 Directors

Management	Technical Specification
Management	Advanced Web Tools; Brocade SANnav Management Portal and SANnav Global View; Command Line Interface (CLI); HTTP/HTTPS; RESTful API; SSH; SNMP v1/v3 (FE MIB, FC Management MIB); trial licenses for add-on capabilities.
Security	AES-GCM-256 encryption on FC ISLs (E_Port); Device Connection Control (DCC); DH-CHAP (between switches and end devices); Fabric Configuration Server (FCS); FCAP switch authentication; FIPS 140-2 compliant; HTTPS; IP filtering; LDAP with IPv6; OpenLDAP; RADIUS; user-defined Role-Based Access Control (RBAC); Secure Boot; Secure Copy (SCP); SFTP; SSH v2; Switch Binding; TACACS+; TLS v1.2/v1.3; USGv6 compliant.
Management access	10/100/1000Mb/s Ethernet (RJ-45) per control processor; serial console port (RJ-45) and one USB per control processor module; DHCP/DHCPv6; call-home integration enabled through SANnav Management Portal
Diagnostics	Active Support Connectivity (ASC) and Brocade Support Link (BSL); built-in flow generator; ClearLink® optics and cable diagnostics, including electrical/optical loopback, link traffic/latency/distance; Fabric Performance Impact Monitoring (FPI); flow mirroring; Forward Error Correction; frame viewer; IO Insight for SCSI and NVMe monitoring; Monitoring and Alerting Policy Suite (MAPS); nondisruptive daemon restart; optics health monitoring; POST and embedded online/offline diagnostics, including environmental monitoring, FCping, and Pathinfo (FC traceroute); power monitoring; RAStrace logging; Rolling Reboot Detection (RRD); Syslog/Audit Log; VM Insight.

## Connectrix ED-DCX7 Directors

Mechanical	Technical Specification
Enclosure	<p><b>ED-DCX-8B:</b> 14U rack-mountable chassis; 27 in. to 31 in. and 22 in. rail kits for the four-post rack; mid-mount kit for the two-post rack.</p> <p><b>ED-DCX-4B:</b> 8U rack-mountable chassis; 27 in. to 31 in. rail, 18 in. to 24 in. rail, and airflow diversion rack-mount kits for the four-post rack; mid-mount kit for the two-post rack.</p>
Mounting	Rack-mountable in a standard 19-inch EIA cabinet.
Size	<p><b>ED-DCX-8B</b> Height: 61.23 cm (24.11 in., 14U) Width: 43.74 cm (17.23 in.) Depth: 61.04 cm (24.04 in.)</p> <p><b>ED-DCX-4B:</b> Height: 34.45 cm (13.56 in., 8U) Width: 43.74 cm (17.23 in.) Depth: 61.04 cm (24.04 in.)</p> <p><b>ED-DCX-4B with airflow diversion rack-mount kit</b> Height: 40.00 cm (15.75 in., 9U) Width: 43.74 cm (17.23 in.) Depth: 61.29 cm (24.09 in.)</p>
System weight	<p><b>ED-DCX-8B</b> 35.61 kg (78.5 lb) for chassis 145.8 kg (321.5 lb) maximum fully populated configuration</p> <p><b>ED-DCX-4B</b> 24.5 kg (54 lb) for chassis 68.95 kg (152.0 lb) maximum fully populated configuration</p>

## Connectrix ED-DCX7 Directors

Environment	Technical Specification
Temperature	Operating: 0°C to 40°C (32°F to 104°F) Non-operating: -25°C to 70°C (-13°F to 158°F)
Humidity	Operating humidity: 5% to 93% RH non-condensing at 40°C (104°F) with a maximum gradient of 10% per hour Non-operating humidity: 10% to 93% RH non-condensing at 70°C (158°F)
Altitude	Up to 3000 meters (9842 feet)
Shock	Operating: 10g, 11 ms, half sine wave Non-operating: 20g, 11 ms, half sine wave
Vibration	Operating: 5 Hz to 10 Hz at +5 dB/oct; 10 Hz to 200 Hz at 0.0005 G <sup>2</sup> /Hz; 200 Hz to 500 Hz at -5 dB/oct; scale 0.5 grms  Non-operating: 3 Hz to 10 Hz at +5 dB/oct; 10 Hz to 200 Hz at 0.0065 G <sup>2</sup> /Hz; 200 Hz to 500 Hz at -5 dB/oct; scale 1.12 grms
Heat dissipation	<b>ED-DCX7-8B</b> 64 Gb/s 384-port configuration, including ICLs: Typical: 10,953 Btu/hr; Max: 158,530 Btu/hr. Power consumed: Typical: 3210W; Max: 4550W. Note: Input power is at 200 VAC with full PSU redundancy.  <b>ED-DCX7-4B</b> 64 Gb/s 192-port configuration, including ICLs: Typical: 5596 Btu/hr; Max: 7523 Btu/hr. Power consumed: Typical: 1640W; Max: 2204W. Note: Input power is at 200 VAC with full PSU redundancy.

## Connectrix ED-DCX7

Power	Technical Specification	
Supported power range	<p><b>Standard AC Power Supplies</b></p> <p><i>Input Voltage</i></p> <p>Standard AC input: Range: 90 VAC to 264 VAC auto-volt Nominal: 100 VAC to 240 VAC</p> <p><i>Power</i></p> <p>85 VAC to 132 VAC: 1450W 180 VAC to 264 VAC: 2870W</p> <p><i>80 PLUS Platinum certified</i></p>	<p><b>High Voltage (HV) Power Supplies</b></p> <p><i>Input Voltage</i></p> <p>Range: 90 VAC to 132 VAC Nominal: 100 VAC to 120 VAC</p> <p>Range: 180 VAC to 305 VAC Nominal: 200 VAC to 277 VAC</p> <p>Range: 192 VDC to 400 VDC Nominal: 240 VDC to 380 VDC</p> <p><i>Power</i></p> <p>90 VAC to 132 VAC: 1450W 180 VAC to 305 VAC: 2870W</p> <p>192 VDC to 400 VDC: 2870W</p>
	In-rush current	35A maximum, peak
Frequency	50 Hz to 60 Hz (Nominal: 50 Hz to 60 Hz)	





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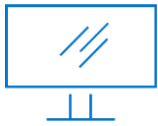
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