



Huawei MZ510 NIC
V100R001

White Paper

Issue **09**
Date **2016-11-21**

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About This Document

Purpose

This document describes the MZ510 in terms of its functions, appearance, features, applications, and technical specifications. You can obtain comprehensive information about the MZ510 by reading this document.





Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Enterprise presales engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	Alerts you to a high risk hazard that could, if not avoided, result in serious injury or death.
 WARNING	Alerts you to a medium or low risk hazard that could, if not avoided, result in moderate or minor injury.
 CAUTION	Alerts you to a potentially hazardous situation that could, if not avoided, result in equipment damage, data loss, performance deterioration, or unanticipated results.
 NOTE	Provides additional information to emphasize or supplement important points in the main text.

Change History

Issue 09 (2016-11-21)

This issue is the ninth official release.

Issue 08 (2016-08-17)

This issue is the eighth official release.

Issue 07 (2016-05-15)

This issue is the seventh official release.

Type	Change Description
Modify	The document content is optimized.

Issue 06 (2016-03-31)

This issue is the sixth official release.

Issue 05 (2015-10-19)

This issue is the fifth official release.

Issue 04 (2015-05-30)

This issue is the fourth official release.

Issue 03 (2014-12-02)

This issue is the third official release.

Type	Change Description
Delete	The trademark Tecal is deleted from the document name and content.

Issue 02 (2014-11-10)

This issue is the second official release.

Issue 01 (2014-09-15)

This issue is the first official release.

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1 Overview

About This Chapter

[1.1 Functions](#)

[1.2 Appearance](#)

1.1 Functions

The MZ510 is a 10GE converged network adapter (CNA). It is used for E9000 compute nodes and provides two 10GE ports for compute nodes to connect to switch modules in the chassis.

The MZ510 uses the Emulex BladeEngine3 (BE3) chip, and supports NIC, Fibre Channel over Ethernet (FCoE), and Internet Small Computer System Interface (iSCSI) applications to achieve converged network solutions.

NOTE

The MZ510 with firmware 4.6.423.0 or later supports the iSCSI function.

1.2 Appearance

The MZ510 can be installed in slot Mezzanine1 (Mezz1 for short) or Mezzanine2 (Mezz2 for short) on a half-width E9000 compute node or in slot Mezz1, Mezz2, Mezzanine3 (Mezz3 for short), or Mezzanine4 (Mezz4 for short) on a full-width E9000 compute node.

The MZ510 provides network ports for connecting to switch modules:

- When the MZ510 is installed in slot Mezz1 or Mezz3, its two 10GE ports connect to switch modules in slots 2X and 3X.
- When the MZ510 is installed in slot Mezz2 or Mezz4, its two 10GE ports connect to switch modules in slots 1E and 4E.

Figure 1-1 MZ510 appearance



Figure 1-2 MZ510 installation positions on a half-width compute node

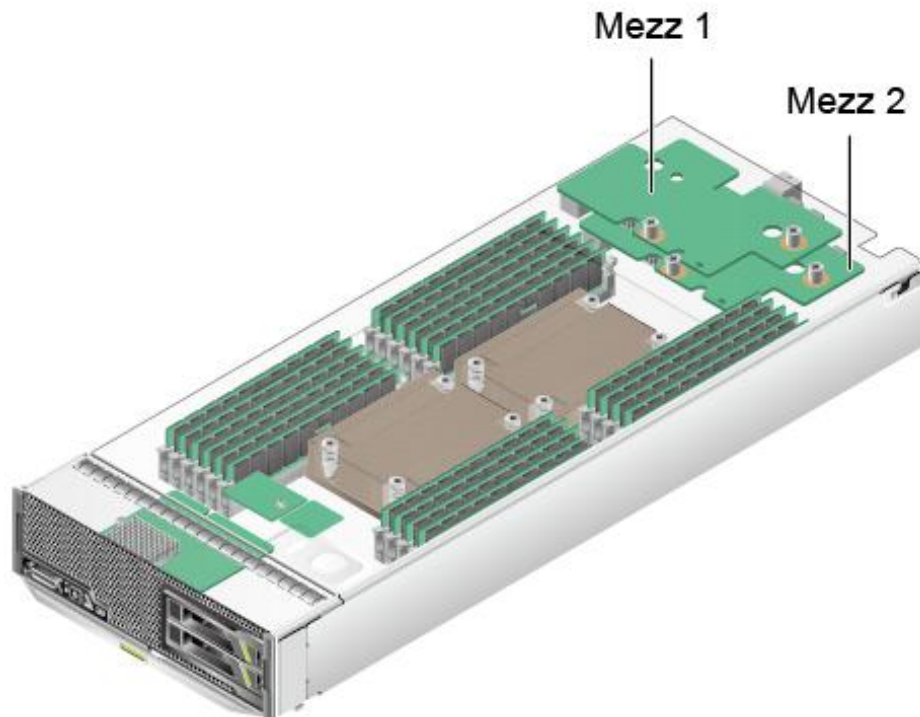
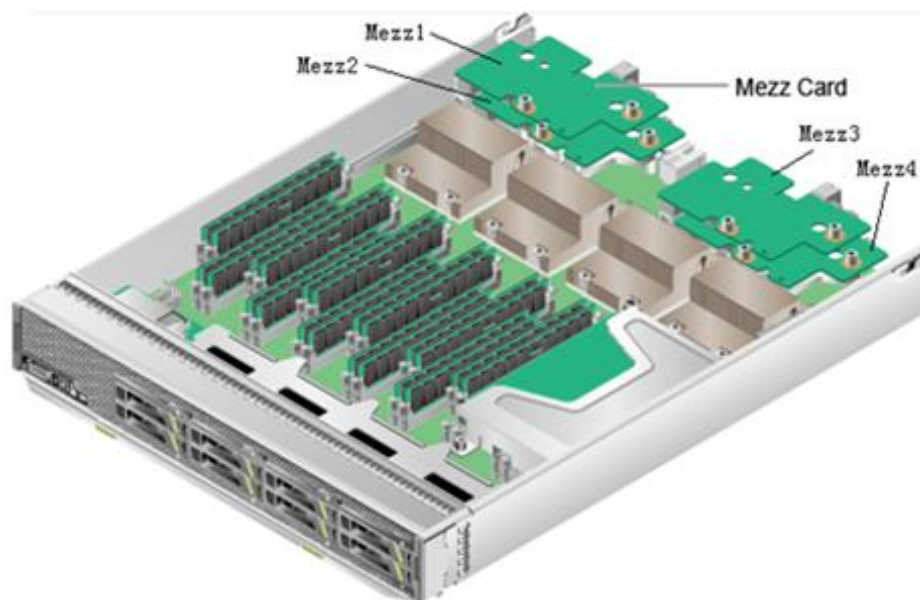


Figure 1-3 MZ510 installation positions on a full-width compute node



2 Features

About This Chapter

[2.1 Feature List](#)

[2.2 Feature Description](#)

[2.3 Standards Compliance](#)

2.1 Feature List

The MZ510 supports the following features and performance specifications:

- FCoE, supporting hardware-based FCoE Offload
- N_Port_ID Virtualization (NPIV), supporting a maximum of 255 virtual N_Port_IDs per port
- iSCSI, supporting hardware-based iSCSI Offload
- Universal Multi-Channel (UMC), that is, multi-PF
- Priority-based Flow Control (PFC), Enhanced Transmission Selection (ETS), and Data Center Bridging Exchange (DCBX)
- Single Root I/O Virtualization (SR-IOV), supporting a maximum of 56 virtual functions (VFs)
- Virtual Machine Queue (VMQ) and NetQueue
- Ethernet PXE, FCoE storage area network (SAN) Boot, and iSCSI Boot
- TCP Checksum Offload, Receive Side Scaling (RSS), Large Receive Offload (LRO), and Large Send Offload (LSO)
- 802.1Q VLAN, supporting a maximum of 4094 VLANs
- Jumbo frames of 9 KB

2.2 Feature Description

UMC

The MZ510 supports UMC, that is, multi-PF. Each physical 10GE port can be divided into four PFs (logical channels). Each NIC supports a total of eight PFs. The four PFs derived from each physical 10GE port can be configured as four NICs (four native Ethernet logical channels) or three NICs and one FCoE/iSCSI (three native Ethernet logical channels and one storage logical channel). Each PF must be assigned a VLAN ID and channel bandwidth. The four PFs on a physical 10GE port are independent of each other, and share the 10 Gbit/s bandwidth of the 10GE port. The UMC feature leverages the PCIe function defined in PCI-SIG specifications, independent of the operating system (OS) or Hypervisor.

NOTE

Either UMC or SR-IOV can be enabled for the MZ510.

PFC

The 10GE ports on the MZ510 support the PFC feature. This feature supports flow control and back pressure on a per class-of-service (CoS) basis. The MZ510 supports a maximum of eight CoS queues. If both the MZ510 and its connected peer device support PFC, the link between them supports PFC. The MZ510 can identify PFC frames sent by the peer device and adjusts the transmitting bandwidth. If the inbound traffic exceeds the threshold, the MZ510 sends PFC frames to instruct the peer device to control the traffic.

The MZ510 can negotiate with the peer device about PFC parameters over DCBX. Typically, CoS3 is used for FCoE traffic, which is assigned by the FCoE Forwarder (FCF). When FCoE

is enabled, only two CoS queues are available: one for FCoE traffic, and the other for native Ethernet traffic.

ETS

The 10GE ports on the MZ510 support the ETS feature. This feature assigns port transmitting bandwidth based on priority groups (PGs). The MZ510 supports a maximum of eight CoS queues and two PGs. The minimum bandwidth and maximum bandwidth are assigned to each PG. The minimum bandwidth means the committed bandwidth, which is also known as the committed information rate (CIR). The maximum bandwidth means the maximum shared bandwidth, which is also known as the peak information rate (PIR). If other PGs are underloaded, the local PG can share (borrow) their bandwidths and its maximum bandwidth can reach 10 Gbit/s.

802.1Q VLAN

The MZ510 supports a maximum of 4094 VLANs. When UMC is disabled, each physical 10GE port supports 4094 VLANs. When UMC is enabled, each PF supports 4094 VLANs. The VLAN IDs are integers ranging from 1 to 4094.

When UMC is disabled, the MZ510 does not tag or untag packets, but transparently transmits them. VLAN IDs are specified by the OS on an E9000 compute node.

When UMC is enabled for the MZ510, a PVID (native VLAN ID) must be assigned to each PF. When receiving untagged packets from the OS, the MZ510 adds PVIDs to the packets based on the PFs that the packets belong to. When receiving tagged packets from the OS, the MZ510 directly transparently transmits them, without processing the packet tags. The MZ510 checks the VLAN tag of each received packet. If a packet VLAN tag is the same as a PF PVID, the MZ510 removes the VLAN tag from the packet and then forwards the packet to the OS. If the packet VLAN tag is different from any PF PVID, the MZ510 directly forwards the packet to the OS, without processing the VLAN tag. If a packet is untagged, the MZ510 discards the packet.



The VLAN tags specified by the OS must be different from the PVIDs assigned to the PFs.

SR-IOV

The MZ510 supports the SR-IOV feature. SR-IOV is available only when UMC is disabled. When UMC is disabled, the NIC supports a maximum of two physical functions (10GE physical ports) and 56 VFs. Each PF supports a maximum of 28 VFs. When UMC is enabled, the NIC supports a maximum of 8 PFs and does not support VFs.

The VFs derived from each PF can be assigned to virtual machines (VMs). In this way, the mapping between VFs and VMs is set up.

In VMware, each physical port or PF supports a maximum of 16 VFs.



Either SR-IOV or UMC can be enabled for the MZ510.

NPIV

The MZ510 supports the NPIV feature when it operates in FCoE mode. With this feature, each port supports a maximum of 255 virtual N_Port_IDs and its own physical N_Port_ID.

Virtual N_Port_IDs can be assigned to VMs. In this way, the mapping between virtual N_Port_IDs and VMs is set up.

PXE, SAN Boot, and iSCSI Boot

The MZ510 supports PXE, SAN Boot, and iSCSI Boot.

- PXE is used for remote boot over the Ethernet or IP network. It enables users to connect to the remote PXE server for loading an OS.
- SAN Boot is used for remote boot over the FC or FCoE SAN. It enables users to connect to the remote FC or FCoE array for loading an OS.
- iSCSI Boot is used for remote boot over the Ethernet or IP network. It enables users to connect to the remote iSCSI array for loading an OS.

2.3 Standards Compliance

[Table 2-1](#) lists the standards and protocols that the MZ510 complies with.

Table 2-1 Standards compliance

Standard	Protocol
IEEE 802.3x	Flow Control and Back Pressure
IEEE 802.3z	1000BASE-X
IEEE 802.3ap	10GBASE-KR
IEEE 802.1Qbb	Priority-based Flow Control (PFC)
IEEE 802.1Qaz	Enhanced Transmission Selection (ETS)
IEEE 802.1ab	Station and Media Access Control Connectivity Discovery (LLDP)
IEEE 802.3ad	Link Aggregation Control Protocol (LACP)
IEEE 802.1Qbg	Edge Virtual Bridging (EVB)
FC-LS	FC Link Service
FC-FS-2	FC Framing and Signaling
FC-GS-5	FC Generic Service
FCP-3	Fibre Channel Protocol for SCSI
FC-BB-5	Fibre Channel-Backbone-5 (FCoE)
DCBX	Data Center Bridging Exchange

3 Application

About This Chapter

[3.1 Compatible Compute Nodes](#)

[3.2 Connected I/O Modules](#)

[3.3 MZ510 Networking](#)

[3.4 Supported OSs](#)

[3.5 Connected FC Devices](#)

3.1 Compatible Compute Nodes

The MZ510 can be installed in slot Mezz1 or Mezz2 on a half-width compute node or in slot Mezz1, Mezz2, Mezz3, or Mezz4 on a full-width compute node. [Table 3-1](#) lists the compute nodes that support the MZ510 and its installation positions on them.

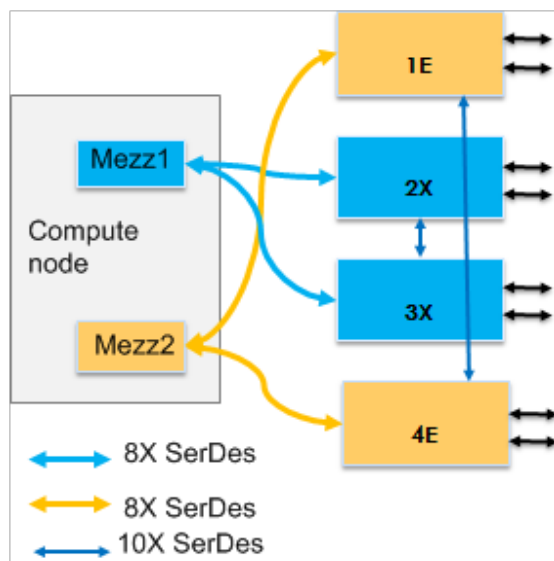
Table 3-1 Compute nodes that support the MZ510

Compute Node	Number of Mezz Module Slots	MZ510 Installation Position
CH121	2	Mezz1 and Mezz2
CH121 V3	2	Mezz1 and Mezz2
CH220	1	Mezz1
CH220 V3	4	Mezz1, Mezz2, Mezz3, and Mezz4
CH221	1	Mezz1
CH222	2	Mezz1 and Mezz2
CH222 V3	2	Mezz1 and Mezz2
CH240	2	Mezz1 and Mezz2
CH242	4	Mezz1, Mezz2, Mezz3, and Mezz4
CH242 V3	4	Mezz1, Mezz2, Mezz3, and Mezz4

3.2 Connected I/O Modules

MZ510s can connect to I/O modules (switch modules or interface boards). [Figure 3-1](#) shows the connections between the MZ510s on a half-width compute node and the ports on I/O modules.

Figure 3-1 Connections between the MZ510s on a half-width compute node and the ports on I/O modules



There are two or four groups of Serializer/Deserializer (SerDes, known as high-speed interconnect line) between each compute node and I/O module slots.

- Mezz1: 8X SerDes for connecting to I/O module slots 2X and 3X
- Mezz2: 8X SerDes for connecting to I/O module slots 1E and 4E
- Mezz3 (available only on a full-width compute node): 8X SerDes for connecting to I/O module slots 2X and 3X
- Mezz4 (available only on a full-width compute node): 8X SerDes for connecting to I/O module slots 1E and 4E

NOTE

The MZ510 provides two ports, and only 1X of each 8X SerDes is used.

Table 3-2 describes the I/O modules to which the MZ510 can connect.

Table 3-2 I/O modules to which the MZ510 can connect

I/O Module	I/O Module Slot	MZ510 (Mezz1)	MZ510 (Mezz2)	Typical Configuration	Remarks
CX310	2X/3X	√	X	Yes	-
	1E/4E	X	√	Yes	-
CX311	2X/3X	√	X	Yes	-
	1E/4E	X	√	Yes	-
CX317	2X/3X	√	X	No	It is recommended that the CX317 not be installed in slot 2X or 3X.

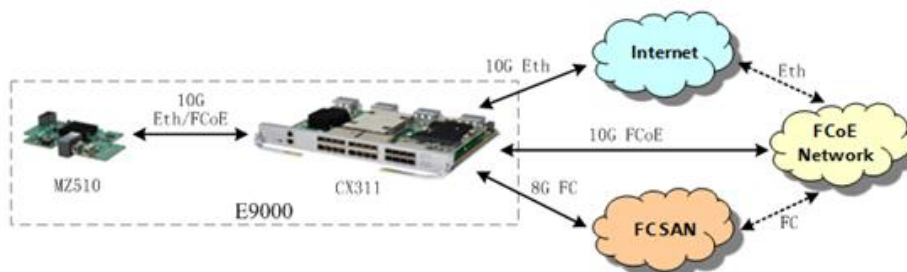
I/O Module	I/O Module Slot	MZ510 (Mezz1)	MZ510 (Mezz2)	Typical Configuration	Remarks
	1E/4E	X	√	Yes	Only 8 of the 16 ports on the CX317 can be used.
CX910	2X/3X	√	X	Yes	-
	1E/4E	X	√	No	It is recommended that the CX910 not be installed in slot 1E or 4E.

3.3 MZ510 Networking

The MZ510 can connect to I/O modules (switch modules or interface boards) to provide Ethernet and FCoE services.

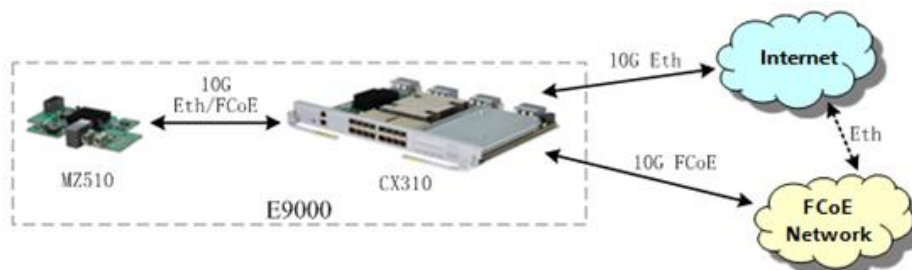
The MZ510 can work with the CX311 switch module to provide 20 Gbit/s bandwidth, and supports the Ethernet service and FCoE storage service. The MZ510 can connect to the Internet, FCoE network, and FC SAN through 10GE, 10G FCoE, and 8G FC ports on the CX311 respectively to achieve converged network solutions. See [Figure 3-2](#).

Figure 3-2 Connection between the MZ510 and the CX311



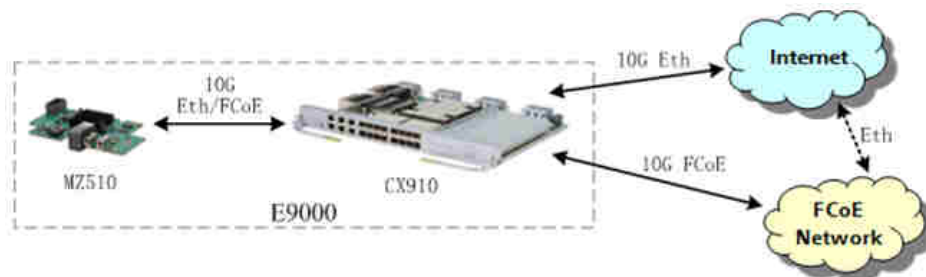
The MZ510 can work with the CX310 switch module to provide 20 Gbit/s bandwidth, and supports the Ethernet service and FCoE storage service. The MZ510 can connect to the Internet and FCoE network through 10GE and 10G FCoE ports on the CX310 respectively to achieve converged network solutions. See [Figure 3-3](#).

Figure 3-3 Connection between the MZ510 and the CX310



The MZ510 can work with the CX317 pass through module to provide 20 Gbit/s bandwidth, and supports the Ethernet service and FCoE storage service. The MZ510 can connect to the Internet and FCoE network through 10GE and 10G FCoE ports on the CX317 respectively in pass-through mode to achieve converged network solutions. See [Figure 3-4](#).

Figure 3-4 Connection between the MZ510 and the CX317

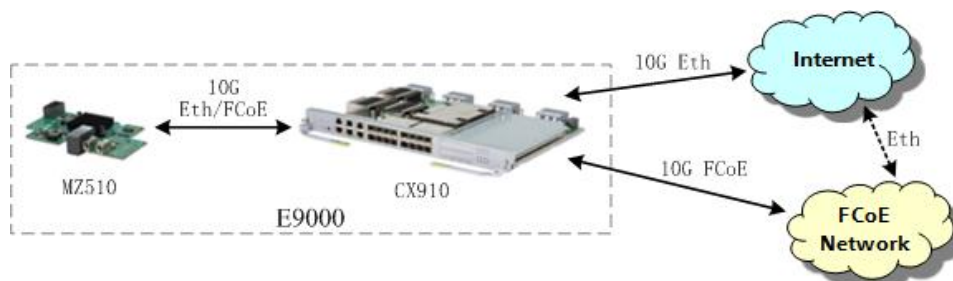


NOTE

When the MZ510 works with the CX317, only eight of the 16 ports on the CX317 are used.

The MZ510 can work with the CX910 switch module to provide 20 Gbit/s bandwidth, and supports the Ethernet service and FCoE storage service. The MZ510 can connect to the Internet and FCoE network through 10GE and 10G FCoE ports on the CX910 respectively to achieve converged network solutions. See [Figure 3-5](#).

Figure 3-5 Connection between the MZ510 and the CX910



3.4 Supported OSs

[Table 3-3](#) lists the OSs supported by the MZ510.

Table 3-3 OSs supported by the MZ510

OS	Version	Remarks
Redhat	RHEL 6.5	-
	RHEL 6.6	-
	RHEL 6.7	-
	RHEL 7.0	-

OS	Version	Remarks
	RHEL 7.1	
	RHEL 7.2	
Suse	SLES 11.3	-
	SLES 11.4	-
	SLES 12.0	-
	SLES 12.1	-
VMware	VMware ESXi 5.1.2	-
	VMware ESXi 5.1.3	-
	VMware ESXi 5.5.2	-
	VMware ESXi 5.5.3	
	VMware ESXi 6.0	
	VMware ESXi 6.0.1	
	VMware ESXi 6.0.2	
Windows	Windows 2008 R2 SP1	-
	Windows 2012	-
	Windows 2012 R2	-

The preceding table is for reference only. Compatible OSs for the MZ510 vary with the compute node type. For details, see the [Huawei Server Compatibility Checker](#).

3.5 Connected FC Devices

Table 3-4 lists the FC arrays, FC switches, and FCoE switches to which the MZ510 can connect.

Table 3-4 FC devices to which the MZ510 can connect

Category	Vendor	Model	Remarks
FC array	EMC	Symmetrix DMX-4	-
		Symmetrix VMAX	-
		Symmetrix VMAXe	-
		VNX	-
	Huawei	HVS85T	-

Category	Vendor	Model	Remarks
		S2200T	-
		S2600T	-
		S5500T	-
		S3900	-
		S5600T	-
		S5800T	-
		S5900	-
		S6800T	-
		S6900	-
	Futijisu	DX80	-
	Synology	DS3611xs	-
		DS3612xs	-
		RS3411RPxs	-
		RS3411xs	-
		RS3412RPxs	-
		RS3412xs	-
FCoE switch	Cisco	Nexus 2232PP Fabric Extender	-
		Nexus 5010	-
		Nexus 5020	-
		Nexus 5548P	-
		Nexus 5548UP	-
		Nexus 5596UP	-
	Juniper	QFX3000 QFabric	-
		QFX3500	-
	Huawei	CX311	The CX311 is a converged switch module on the E9000 and supports the FCF function.
	Brocade	Brocade 8000	-
		VDX6730	-

Category	Vendor	Model	Remarks
FC switch	Brocade	Brocade 300	The MZ510 connects to Brocade 300 in NPV mode through the CX311 on the E9000.
		Brocade 5100	The MZ510 connects to Brocade 5100 in NPV mode through the CX311 on the E9000.
		Brocade 5300	The MZ510 connects to Brocade 5300 in NPV mode through the CX311 on the E9000.
		Brocade 8510	The MZ510 connects to Brocade 8510 in NPV mode through the CX311 on the E9000.
	Huawei	SNS2124	OEM Brocade 300 The MZ510 connects to SNS2124 in NPV mode through the CX311 on the E9000.
		SNS2248	OEM Brocade 6510 The MZ510 connects to SNS2248 in NPV mode through the CX311 on the E9000.
	Cisco	MDS 9148	The MZ510 connects to MDS 9148 in NPV mode through the CX311 on the E9000.
		MDS 9513	The MZ510 connects to MDS 9513 in NPV mode through the CX311 on the E9000.
		MDS 9505	The MZ510 connects to MDS 9505 in NPV mode through the CX311 on the E9000.
		MDS 9222i	The MZ510 connects to MDS 9222i in NPV mode through the CX311 on the E9000.

4 Technical Specification

About This Chapter

[4.1 Technical Specifications](#)

4.1 Technical Specifications

Table 4-1 lists the technical specifications for the MZ510.

Table 4-1 Technical specifications

Item	Specifications
Dimensions (length x width)	148 mm x 85 mm (5.83 in. x 3.35 in.)
Power supply	12 V DC
Net weight	0.3 kg (0.66 lb)
Maximum power consumption	12 W
Temperature	Operating temperature: 5°C to 40°C (41°F to 104°F) (ASHRAE Class A3 compliant)
	Storage temperature: - 40°C to +65°C (- 40°F to +149°F)
Temperature change rate	15°C/h (27°F/h)
Humidity	Operating humidity: 5% RH to 85% RH (non-condensing)
	Storage humidity: 5% RH to 95% RH (non-condensing)
Altitude	<ul style="list-style-type: none">● 40°C (104°F) at 1800 m (5905.44 ft)● 30°C (86°F) at 3000 m (9842.40 ft) When the MZ510 is used at an altitude between 1800 m and 3000 m, the highest operating temperature decreases by 1°C (1.8°F) as the altitude increases by 120 m (393.70 ft).
PCIe port bandwidth	40 Gbit/s (PCIe 2.0 x8)
Port rate	10.3125 Gbit/s
Number of ports	2
Port type	Ethernet and FCoE
Chip model/ manufacturer	BladeEngine3 (BE3)/Emulex

A Acronyms and Abbreviations

C	
CNA	converged network adapter
CoS	class of service
D	
DCB	Data Center Bridging
DCBX	Data Center Bridging Exchange
E	
ETS	Enhanced Transmission Selection
EVB	Edge Virtual Bridging
F	
FC	Fibre Channel
FCF	FCoE Forwarder
FCoE	Fibre Channel over Ethernet
I	
iSCSI	Internet Small Computer System Interface
L	
LACP	Link Aggregation Control Protocol
LLDP	Link Layer Discovery Protocol
LRO	Large Receive Offload
LSO	Large Segmentation Offload

N	
NIC	network interface card
NPIV	N_Port_ID Virtualization
O	
OS	operating system
P	
PCI-SIG	Peripheral Component Interconnect SpecialInterest Group
PCIe	Peripheral Component Interconnect Express
PF	physical function
PFC	Priority-based Flow Control
PG	priority group
PVID	port default VLAN ID
PXE	Preboot Execution Environment
R	
RSS	Receive Side Scaling
S	
SAN	storage area network
SR-IOV	Single Root I/O Virtualization
T	
TCP	Transmission Control Protocol
U	
UDP	User Datagram Protocol
UMC	Universal Multi-Channel
V	
VEB	Virtual Ethernet Bridging
VF	virtual function
VLAN	virtual local area network

VM	virtual machine
VMQ	Virtual Machine Queue