Chapter 9

Ethernet Ports

This chapter describes Ethernet ports supported by Arista switches. Sections covered in this chapter include:

9.1   Ethernet Ports Introduction

Arista switches support a variety of Ethernet network interfaces. This chapter describes the configuration and monitoring options available in Arista switching platforms.

9.2   Ethernet Standards

Ethernet, standardized in IEEE 802.3, is a group of technologies used for communication over local area networks. Ethernet communication divides data streams into frames containing addresses (source and destination), payload, and cyclical redundancy check (CRC) information.

IEEE 802.3 also describes two types of optical fiber: single-mode fiber (SMF) and multi-mode fiber (MMF).

- SMF is more expensive, but can be used over longer distances (over 300 meters).

- MMF is less expensive, but can only be used over distances of less than 300 meters.

9.2.1   100 Gigabit Ethernet

The 100 Gigabit Ethernet (100GbE) standard defines an Ethernet implementation with a nominal data rate of 100 billion bits per second over multiple 10 gigabit lanes. 100 Gigabit Ethernet implements full duplex point to point links connected by network switches. Arista switches support 100GBASE-10SR through MXP ports.

9.2.2   40 Gigabit Ethernet

The 40 Gigabit Ethernet (40GbE) standard defines an Ethernet implementation with a nominal data rate of 40 billion bits per second over multiple 10 gigabit lanes. 40 Gigabit Ethernet implements full duplex point to point links connected by network switches. 40 gigabit Ethernet standards are named *40GBASE-xyz*, as interpreted by Table 9-1.

Table 9-1   **40GBASE-xyz Interpretation**

x	y	z
Non-fiber media type, or fiber wavelength	PHY encoding	Number of WWDM wavelengths or XAUI Lanes
C = Copper F = Serial SMF K = Backplane L = Long (1310 nm) S = Short (850 nm)	R = LAN PHY (64B/66B)	No value = 1 (serial) 4 = 4 WWDM wavelengths or XAUI Lanes

9.2.3   10 Gigabit Ethernet

The 10 Gigabit Ethernet (10GbE) standard defines an Ethernet implementation with a nominal data rate of 10 billion bits per second. 10 Gigabit Ethernet implements full duplex point to point links connected by network switches. Half duplex operation, hubs and CSMA/CD do not exist in 10GbE. The standard encompasses several PHY standards; a networking device may support different PHY types through pluggable PHY modules. 10GbE standards are named *10GBASE-xyz*, as interpreted by Table 9-2.

Table 9-2   **10GBASE-xyz Interpretation**

x	y	z
media type or wavelength, if media type is fiber	PHY encoding type	Number of WWDM wavelengths or XAUI Lanes
C = Copper (twin axial) T = Twisted Pair S = Short (850 nm) L = Long (1310 nm) E = Extended (1550 nm) Z = Ultra extended (1550 nm)	R = LAN PHY (64B/66B) X = LAN PHY (8B/10B) W = WAN PHY(*) (64B/66B)	If omitted, value = 1 (serial) 4 = 4 WWDM wavelengths or XAUI Lanes

9.2.4   Gigabit Ethernet

The Gigabit Ethernet (GbE), defined by IEEE 802.3-2008, describes an Ethernet version with a nominal data rate of one billion bits per second. GbE cables and equipment are similar to those used in previous standards. While full-duplex links in switches is the typical implementation, the specification permits half-duplex links connected through hubs.

Gigabit Ethernet physical layer standards that Arista switches support include 1000BASE-X (optical fiber), 1000BASE-T (twisted pair cable), and 1000BASE-CX (balanced copper cable).

- 1000BASE-SX is a fiber optic standard that utilizes multi-mode fiber supporting 770 to 860 nm, near infrared (NIR) light wavelength to transmit data over distances ranging from 220 to 550 meters. 1000BASE-SX is typically used for intra-building links in large office buildings, co-location facilities and carrier neutral internet exchanges.

- 1000BASE-LX is a fiber standard that utilizes a long wavelength laser (1,270–1,355 nm), with a RMS spectral width of 4 nm to transmit data up to 5 km. 1000BASE-LX can run on all common types of multi-mode fiber with a maximum segment length of 550 m.

- 1000BASE-T is a standard for gigabit Ethernet over copper wiring. Each 1000BASE-T network segment can be a maximum length of 100 meters.

9.2.5   10/100/1000 BASE-T

Arista switches provide 10/100/1000 BASE-T Mbps Ethernet out of band management ports. Auto-negotiation is enabled on these interfaces. Speed (10/100/1000), duplex (half/full), and flow control settings are available using the appropriate **speed forced** and **flowcontrol** commands.

9.3   Ethernet Physical Layer

The Ethernet physical layer (PHY) includes hardware components connecting a switch's MAC layer to the transceiver, cable, and ultimately a peer link partner. Data exist in digital form at the MAC layer. On the line side of the PHY, data exist as analog signals: light blips on optical fiber or voltage pulses on copper cable. Signals may be distorted while in transit and recovery may require signal processing.

Ethernet physical layer components include a PHY and a transceiver.

9.3.1   PHYs

The PHY provides translation services between the MAC layer and transceiver. It also helps to establish links between the local MAC layer and peer devices by detecting and signaling fault conditions. The PHY line-side interface receives Ethernet frames from the link partner as analog waveforms. The PHY uses signal processing to recover the encoded bits, then sends them to the MAC layer.

PHY line-side interface components and their functions include:

- Physical Medium Attachment (PMA): Framing, octet synchronization, scrambling / descrambling.
- Physical Medium Dependent (PMD): Consists of the transceiver.
- Physical Coding Sublayer (PCS): Performs auto-negotiation and coding (8B/10B or 64B/66B).

The MAC sublayer of the PHY provides a logical connection between the MAC layer and the peer device by initializing, controlling, and managing the connection with the peer.

Ethernet frames transmitted by the switch are received by the PHY system-side interface as a sequence of digital bits. The PHY encodes them into a media-specific waveform for transmission through the line-side interface and transceiver to the link peer. This encoding may include signal processing, such as signal pre-distortion and forward error correction.

PHY system-side interface components and their functions include:

- 10 Gigabit Attachment Unit Interface (XAUI): Connects an Ethernet MAC to a 10 G PHY.
- Serial Gigabit Media Independent Attachment (SGMII): Connects an Ethernet MAC to a 1G PHY.

9.3.2   Transceivers

A transceiver connects the PHY to an external cable (optical fiber or twisted-pair copper) and through a physical connector (LC jack for fiber or RJ-45 jack for copper).

- Optical transceivers convert the PHY signal into light pulses that are sent through optical fiber.
- Copper transceivers connect the PHY to twisted-pair copper cabling.

Arista Small Form-Factor Pluggable (SFP+) and Quad Small Form Factor Pluggable (QSFP+) modules and cables provide high-density, low-power Ethernet connectivity over fiber and copper media. Arista offers transceivers that span data rates, media types, and transmission distances.

Arista 10 Gigabit Ethernet SFP+ Modules:

- 10GBASE-SR (Short Reach)

  — Link length maximum 300 meters over multi-mode fiber.
  — Optical interoperability with 10GBASE-SRL.

- 10GBASE-SRL (Short Reach Lite)

  — Link length maximum 100 meters over multi-mode fiber.
  — Optical interoperability with 10GBASE-SR.

- 10GBASE-LRL (Long Reach Lite)

— Link length maximum 1 km over single-mode fiber.
— Optical interoperability with 10GBASE-LR (1 km maximum).

- 10GBASE-LR (Long Reach)

    — Link length maximum 10 km over single-mode fiber.
    — Optical interoperability with 10GBASE-LRL (1 km maximum).

- 10GBASE-LRM (Long Reach Multimode)

    — Link length maximum 220 meters over multi-mode fiber (50 um and 62.5 um).

- 10GBASE-ER (Extended Reach)

    — Link length maximum 40 km over single-mode fiber.

- 10GBASE-ZR (Ultra-Extended Reach)

    — Link length maximum 80 km over single-mode fiber.

- 10GBASE-DWDM (Dense Wavelength Division Multiplexing)

    — Link length maximum 80 km over single-mode fiber (40 color options).

Arista 10 Gigabit Ethernet CR Cable Modules:

- 10GBASE-CR SFP+ to SFP+ Cables

    — Link lengths of 0.5, 1, 1.5, 2, 2.5, 3, 5 and 7 meters over twinax copper cable
    — Includes SFP+ connectors on both ends

- 4 x 10GbE QSFP+ to 4 x SFP+ twinax copper cables

    — Link lengths of 0.5, 1, 2 and 3 meters over twinax copper cable

Arista 40 Gigabit Ethernet QSFP+ Cables and Optics:

- 40GBASE-SR4 QSFP+ Transceiver

    — Link length maximum 100 meters over parallel OM3 or 150 meters over OM4 MMF
    — Optical interoperability with 40GBASE-XSR4 (100/150 meter maximum)

- 40GBASE-XSR4 QSFP+ Transceiver

    — Link length maximum 300 meters over parallel OM3 or 450 meters over OM4 MMF
    — Optical interoperability with 40GBASE-SR4 (100/150 meter maximum)

- 40GBASE-LR4 QSFP+

    — Link length maximum 10 km over duplex single-mode fiber

- 40GBASE-CR4 QSFP+ to QSFP+ twinax copper cables

    — Link lengths of 1, 2, 3, 5 and 7 meters over twinax copper cable

Arista Gigabit Ethernet SFP Options:

- 1000BASE-SX (Short Haul)

    — Multi-mode fiber
    — Link length maximum 550 meter

- 1000BASE-LX (Long Haul)

    — Single-mode or multi-mode fiber
    — Link length maximum 10 km (single mode) or 550 meters (multi-mode)

- 1000BASE-T (RJ-45 Copper)

    — Category 5 cabling
    — Full duplex 1000Mbps connectivity

Internal ports

Several Arista switches include internal ports that connect directly to an external cable through an RJ-45 jack. Internal ports available on Arista switches include:

- 100/1000BASE-T (7048T-A)
- 100/1000/10GBASE-T (7050-T)

9.3.3   MXP Ports

MXP ports provide embedded optics that operate in one of three modes: 10GbE (12 ports), 40GbE (3 ports), and 100GbE (1 port). Each mode requires a specified cable is implemented through configuration commands. MXP ports utilize multi-mode fiber to provide support over 150 meters.

- 100GbE mode requires an MTP-24 to MTP-24 cable, which uses 20 of 24 fibers to carry 100Gbe across 10 send and 10 receive channels. When connecting two 100GbE MXP ports, the TX lanes must be crossed with the RX lanes.

- 40GbE mode requires an MTP cable that provides a split into three MTP-12 ends. The cable splits the MXP port into three MTP-12 ends, each compatible with standards based 40GBASE-SR4 ports over OM3 or OM4 fiber up to 100m or 150m.

- 10GbE mode requires an MTP cable that provides a split into 12x10G with LC connectors to adapt the MXP port into 12x10GbE. The cable splits the MXP port into twelve LC ends for using SR or SRL optics over multimode OM3/OM4 cables.

9.4   Interfaces

Arista switches provide two physical interface types that receive, process, and transmit Ethernet frames: Ethernet interfaces and Management interfaces.

Each Ethernet interface is assigned a 48-bit MAC address and communicates with other interfaces by exchanging data packets. Each packet contains the MAC address of its source and destination interface. Ethernet interfaces establish link level connections by exchanging packets. Interfaces do not typically accept packets with a destination address of a different interface.

Ethernet data packets are frames. A frame begins with preamble and start fields, followed by an Ethernet header that includes source and destination MAC addresses. The middle section contains payload data, including headers for other protocols carried in the frame. The frame ends with a 32-bit cyclic redundancy check (CRC) field that interfaces use to detect data corrupted during transmission.

9.4.1   Ethernet Interfaces

Ethernet speed and duplex configuration options depend on the media type of the interface:

- 40G QSFP+: Default operation is as four 10G ports. **Speed forced** command options support configuration as a single 40G port.

- 10GBASE-T: Mode is *autonegotiate* by default, offering 10G and 1G full duplex and 100M. Default setting is 10G. Half duplex and 10M are not supported. Adjustments may be made using **speed forced** commands.

- 10GBASE (SFP+): Port operates as a single 10G port. **Speed forced** commands do not affect configuration.

- 1000BASE-T (copper): Mode is *autonegotiate* by default, offering 1G full and 100M; default setting is 1G full. Autonegotiation that offers only 100M is available through **speed auto 100full** command. Half duplex and 10M are not supported.

- 100G CFP: Default operation is 100G. It cannot be split, and its speed cannot be changed.

- 100G MXP: Default operation is as a single 100G port on the 7500 and 7280 platforms, and as three 40G ports on the 7050 platform. On the 7500 and 7280 platforms, available speed/duplex settings are a single100G port, three 40G ports, or twelve 10G ports. On the 7050 platform, available speed/duplex settings are three 40G ports or twelve 10G ports. Adjustments are made with **speed forced** commands.

- 100G QSFP100: Available speeds are transceiver-dependent. The QSFP100 transceiver supports a single 100G port, four 25G ports, or two 50G ports; the QSFP+ transceiver supports one 40G port or four 10G ports; the CWDM transceiver supports all five configurations. Adjustments are made using **speed forced** commands. **Note**: 7500 and 7280 families do not currently support 25G or 50G speeds.

For information relating to transceivers, please see Transceivers.

9.4.2   Subinterfaces

Subinterfaces divide a single ethernet or port channel interface into multiple logical L3 interfaces based on the 802.1q tag (VLAN ID) of incoming traffic. Subinterfaces are commonly used in the L2/L3 boundary device, but they can also be used to isolate traffic with 802.1q tags between L3 peers by assigning each subinterface to a different VRF.

While subinterfaces can be configured on a port channel interface (the virtual interface associated with a port channel), the following restrictions apply:

- An L3 interface with subinterfaces configured on it should not be made a member of a port channel.

- An interface that is a member of a port channel should not have subinterfaces configured on it.

- A subinterface cannot be made a made of a port channel.

Subinterfaces on multiple ports can be assigned the same VLAN ID, but there is no bridging between subinterfaces (or between subinterfaces and SVIs), and each subinterface is considered to be in a separate bridge domain.

The following features are supported on subinterfaces:

- Unicast and multicast routing

- BGP, OSPF, ISIS, PIM

- VRF

- VRRP

- SNMP

- Subinterface counters (on some platforms)

- VXLAN (on some platforms)

- MPLS (on some platforms)

- GRE (on some platforms)

- PBR (on some platforms)

- QoS (on some platforms)

- Inheriting QoS settings (trust mode and default DSCP) from the parent interface

- Inheriting MTU setting from parent interface

The following are *not* supported on subinterfaces:

- BFD

- ACL

- Per-subinterface MTU setting

- Per-subinterface SFLOW settings

- Per-subinterface mirroring settings

9.4.3   Agile Ports

Agile Ports are a feature of the 7150S Series that allows the user to configure adjacent blocks of 4 x SFP+ interfaces as a single 40G link. The set of interfaces that can be combined to form a higher speed port is restricted by the hardware configuration. Only interfaces that pass through a common PHY component can be combined. One interface within a combinable set is designated as the primary port. When the primary interface is configured as a higher speed port, all configuration statements are performed on that interface. All other interfaces in the set are subsumed and not individually configurable when the primary interface is configured as the higher speed port. This feature allows the 7150S-24 to behave as a 4x40G switch (using 16 SFP+) and the remaining SFP+ provide 8 x 10G ports. On the 7150S-52 this allows up to 13x 40G (all 52 ports grouped as 40G) and on the 7150S-64 Agile Ports allows the switch to be deployed with up to 16 native 40G interfaces - 4 are QSFP+ and the remaining 12 as 4xSFP+ groups.

Section 9.5.11 describes the configuration of agile ports.

9.4.4   Management Interfaces

The management interface is a layer 3 host port that is typically connected to a PC for performing out of band switch management tasks. Each switch has one or two management interfaces. Only one port is needed to manage the switch; the second port, when available, provides redundancy.

Management interfaces are 10/100/1000 BASE-T interfaces. By default, auto-negotiation is enabled on management interfaces. All combinations of speed 10/100/1000 and full or half duplex is enforceable on these interfaces through **speed** commands.

Management ports are enabled by default. The switch cannot route packets between management ports and network (Ethernet interface) ports because they are in separate routing domains. When the PC is multiple hops from the management port, packet exchanges through layer 3 devices between the management port and PC may require the enabling of routing protocols.

The Ethernet management ports are accessed remotely over a common network or locally through a directly connected PC. An IP address and static route to the default gateway must be configured to access the switch through a remote connection.

9.4.5   Tunable SFP

Tuning of DWDM 10G SFP+ transceivers (10GBASE-DWDM) includes:

- Tuning transceiver wavelength/frequency by channel number
- Showing wavelengths/frequencies for specified channels supported by the transceiver
- Showing current wavelength/frequency settings of the transceiver interface

For information relating to tuning the transceiver wavelength/frequency by channel number, refer to the command transceiver channel. To show the current wavelength/frequency settings for specified channels, refer to the command show interfaces transceiver channels. To show the current wavelength/frequency settings of an interface, refer to the command show interfaces transceiver hardware.

9.5   Ethernet Configuration Procedures

These sections describe Ethernet and Management interface configuration procedures:

- Section 9.5.1: Physical Interface Configuration Modes
- Section 9.5.2: Assigning a MAC Address to an Interface
- Section 9.5.3: Port Groups (QSFP+ and SFP+ Interface Selection)
- Section 9.5.4: Referencing Modular Ports
- Section 9.5.5: Referencing Multi-lane Ports
- Section 9.5.6: QSFP+ Ethernet Port Configuration
- Section 9.5.7: QSFP100 Ethernet Port Configuration
- Section 9.5.8: CFP2 Ethernet Port Configuration
- Section 9.5.9: MXP Ethernet Port Configuration
- Section 9.5.10: Port Speed Capabilities
- Section 9.5.11: Agile Ports
- Section 9.5.12: Subinterface Configuration
- Section 9.5.13: Autonegotiated Settings
- Section 9.5.14: Displaying Ethernet Port Properties

9.5.1   Physical Interface Configuration Modes

The switch provides two configuration modes for modifying Ethernet parameters:

- Interface-Ethernet mode configures parameters for specified Ethernet interfaces.
- Interface-Management mode configures parameters for specified management Ethernet interfaces.

Physical interfaces cannot be created or removed.

Multiple interfaces can be simultaneously configured. Commands are available for configuring Ethernet specific, layer 2, layer 3, and application layer parameters. Commands that modify protocol specific settings in Ethernet configuration mode are listed in the protocol chapters.

- The **interface ethernet** command places the switch in Ethernet-interface configuration mode.
- The **interface management** command places the switch in management configuration mode.

Examples
- This command places the switch in Ethernet-interface mode for Ethernet interfaces 5-7 and 10.

```
switch(config)#interface ethernet 5-7,10
switch(config-if-Et5-7,10)#
```

- This command places the switch in management-interface mode for management interface 1.

```
switch(config)#interface management 1
switch(config-if-Ma1)#
```

9.5.2   Assigning a MAC Address to an Interface

Ethernet and Management interfaces are assigned a MAC address when manufactured. This address is the *burn-in address*. The **mac-address** command assigns a MAC address to the configuration mode interface in place of the burn-in address. The **no mac-address** command reverts the interface's current MAC address to its burn-in address.

Examples
- This command assigns the MAC address of *001c.2804.17e1* to Ethernet interface 7.

```
switch(config-if-Et7)#mac-address 001c.2804.17e1
```

- This command displays the MAC address of Ethernet interface 7. The active MAC address is *001c.2804.17e1*. The burn-in address is *001c.7312.02e2*.

```
switch(config-if-Et7)#show interface ethernet 7
Ethernet7 is up, line protocol is up (connected)
  Hardware is Ethernet, address is 001c.2804.17e1 (bia 001c.7312.02e2)
  Description: b.e45
<-------OUTPUT OMITTED FROM EXAMPLE-------->

switch(config-if-Et7)#
```

9.5.3   Port Groups (QSFP+ and SFP+ Interface Selection)

Several of Arista's fixed switches limit the number of 10G data lanes in operation through the use of port groups. A port group is a set of interfaces that can be configured as four SFP+ interfaces or a single QSFP+ interface. When configured in SFP+ mode, the port group enables 4 standalone 10GbE interfaces using SFP+ optics. When configured in QSFP+ mode, the port group enables a single QSFP+ interface (in addition to the dedicated QSFP+ ports), which can operate as a single 40GbE port, or as four 10GbE ports with the appropriate breakout cabling.

Hardware port groups are used on the following systems:

- DCS-7050Q-16

- DCS-7050QX-32S

Use the **hardware port-group** command to select the interface mode for the specified port group.

Important The **hardware port-group** command restarts the forwarding agent, which disrupts traffic on all switch ports.

Example
- These commands configure the DCS-7050-Q16 switch to enable four SFP+ interfaces and one extra QSFP+ interface by enabling the SFP+ interfaces in port group 1 and the QSFP+ interface in port group 2.

```
switch(config)#hardware port-group 1 select Et17-20
switch(config)#hardware port-group 2 select Et16/1-4
```

The **show hardware port-group** command displays the status of ports in the port groups.

Example

- This command displays the status of the flexible ports within the two port groups on a DCS-7050Q-16 switch.

```
switch#show hardware port-group

Portgroup: 1    Active Ports: Et17-20
Port            State
----------------------------------------
Ethernet17      Active
Ethernet18      Active
Ethernet19      Active
Ethernet20      Active
Ethernet15/1    ErrDisabled
Ethernet15/2    ErrDisabled
Ethernet15/3    ErrDisabled
Ethernet15/4    ErrDisabled


Portgroup: 2    Active Ports: Et16/1-4
Port            State
----------------------------------------
Ethernet16/1    Active
Ethernet16/2    Active
Ethernet16/3    Active
Ethernet16/4    Active
Ethernet21      ErrDisabled
Ethernet22      ErrDisabled
Ethernet23      ErrDisabled
Ethernet24      ErrDisabled
```

9.5.3.1   DCS-7050Q-16

The DCS-7050Q-16 has 14 dedicated QSFP+ ports, plus two port groups. The port groups support either two additional QSFP+ ports or eight SFP+ ports as shown in Table 9-3.

Table 9-3   DCS-7050Q-16 Port Groups

Port Group 1 Active Interface(s)		Port Group 2 Active Interface(s)	
In SFP+ Mode	**In QSFP+ Mode (Default)**	**In SFP+ Mode**	**In QSFP+ Mode (Default)**
Et17-20 (four SFP+ ports)	Et15/1-4 (one QSFP+ port)	Et21-24 (four SFP+ ports)	Et16/1-4 (one QSFP+ port)

9.5.3.2   DCS-7050QX-32S

The DCS-7050QX-32S has 31 dedicated QSFP+ ports, plus one port group. The port group supports either one additional QSFP+ port or four SFP+ ports as shown in Table 9-4.

Table 9-4   DCS-7050QX-32S Port Groups

Port Group 1 Active Interface(s)	
In SFP+ Mode	**In QSFP+ Mode (Default)**
Et1-4 (four SFP+ ports)	Et5/1-4 (one QSFP+ port)

9.5.4   Referencing Modular Ports

Arista modular switches provide port access through installed linecards. The maximum number of linecards on a modular switch varies with the switch series and model.

Several CLI commands modify modular parameters for all ports on a specified linecard or controlled by a specified chip. This manual uses these conventions to reference modular components:

- *card_x* refers to a line card.
- *module_y* refers to a QSFP+ module.
- *port_z* refers to a linecard or module port.

Commands that display Ethernet port status use the following conventions:

- SFP ports: : *card_x/port_z* to label the linecard-port location of modular ports
- QSFP ports: *card_x/module_y/port_z* to label the linecard-port location of modular ports

Section 9.5.6 describe QSFP+ module usage.

Example

- This command displays the status of interfaces 1 to 9 on linecard 4:

```
switch>show interface ethernet 4/1-9 status
Port          Name              Status      Vlan        Duplex  Speed Type
Et4/1                           connected   1             full   10G Not Present
Et4/2                           connected   1             full   10G Not Present
Et4/3                           connected   1             full   10G Not Present
Et4/4                           connected   1             full   10G Not Present
Et4/5                           connected   1             full   10G Not Present
Et4/6                           connected   1             full   10G Not Present
Et4/7                           connected   1             full   10G Not Present
Et4/8                           connected   1             full   10G Not Present
Et4/9                           connected   1             full   10G Not Present
switch>
```

9.5.5   Referencing Multi-lane Ports

EOS supports two types of Ethernet ports:

- single-lane (also called fixed-lane)

- multi-lane (also called flexible-lane)

Single-lane (or "fixed-lane") ports are always modeled as a single interface within EOS. While the speed of the interface may be configurable, the physical port can never be broken out into multiple lower-speed interfaces. Single-lane ports use the following naming scheme:

- Ethernet<port #> (for fixed switches)

- Ethernet<module #>/<port #> (for modular switches)

Multi-lane (or "flexible lane") ports are made up of multiple parallel lanes, each served by its own laser. Multi-lane ports can be configured to combine the lanes and operate as a single native high-speed interface (a 40GbE or 100GbE interface), or to operate each lower-speed interface independently (four 10GbE or 25GbE interfaces). Multi-lane ports use the following naming scheme:

- Ethernet<port #>/<lane #> (for fixed switches)

- Ethernet<module #>/<port #>/<lane #> (for modular switches)

The operational state displayed for each lane of a multi-lane port is determined by the configuration applied to the primary lane(s), as shown in Table 9-5. When broken out into multiple lower-speed interfaces, all lanes will be active in parallel, and each will display its operational state as *connected* or

not connected. In high-speed mode, only the primary lane(s) will be displayed as active, with the remaining lanes showing as *errdisabled*. The exception is the CFP2 module: when it is configured as a single 100GbE port, the primary lane is displayed as active in the CLI while the other lanes are hidden.

Table 9-5   Lane States

Parent Port Configured Mode	Primary Lane(s)	Secondary Lanes
single high-speed interface	**active** (connected/not connected)	**inactive** (errdisabled)
multi-interface breakout	**active** (connected/not connected)	**active** (connected/not connected)

A multi-lane port is configured as a single high-speed interface or multiple breakout interfaces by using the **speed** command on the primary lane(s) of the port. For specific configuration instructions and details regarding the primary lane(s) of a specific interface, refer to the configuration section for the appropriate interface type:

- QSFP+ Ethernet Port Configuration
- QSFP100 Ethernet Port Configuration
- CFP2 Ethernet Port Configuration
- MXP Ethernet Port Configuration

Important Use of the **speed** command to configure a multi-lane port is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

9.5.6   QSFP+ Ethernet Port Configuration

Each QSFP+ module contains four data lanes which can be used individually or combined to form a single, higher-speed interface. This allows a QSFP+ Ethernet port to be configured as a single 40GbE interface or as four 10GbE interfaces.

When the four lanes are combined to form a 40GbE interface, display commands will show lane /1 as *connected* or *not connected*, and will show lanes /2 through /4 as *errdisabled*.

The following sections describe the configuration of QSFP+ ports.

9.5.6.1   Configuring a QSFP+ Module as a Single 40GbE Interface

To configure the port as a single 40GbE interface, combine the module's four data lanes by using the **speed** command (**speed forced 40g full**) on the port's /1 lane (the primary lane).

Important The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1 Enter interface Ethernet configuration mode for lane /1 of the QSFP+ Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2   Enter the **speed forced 40gfull** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 40gfull
```

Step 3   Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port         Name            Status       Vlan    Duplex Speed  Type            Flags
Et1                          connected    2       full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                      connected    1       full   40G    40GBASE-SR4
Et5/1/2                      errdisabled  1       unconf unconf 40GBASE-SR4
Et5/1/3                      errdisabled  1       unconf unconf 40GBASE-SR4
Et5/1/4                      errdisabled  1       unconf unconf 40GBASE-SR4
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.6.2   Configuring a QSFP+ Module as Four 10GbE Interfaces

To configure the port as four 10GbE interfaces, use the **speed** command (**speed forced 10000full**) on the port's /1 lane (the primary lane).

Important   The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1   Enter interface Ethernet configuration mode for lane /1 of the QSFP+ Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2   Enter the **speed forced 10000full** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 10000full
```

Step 3   Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port         Name            Status       Vlan    Duplex Speed  Type            Flags
Et1                          connected    2       full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                      connected    1       full   10G    40GBASE-SR4
Et5/1/2                      connected    1       full   10G    40GBASE-SR4
Et5/1/3                      connected    1       full   10G    40GBASE-SR4
Et5/1/4                      connected    1       full   10G    40GBASE-SR4
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.7   QSFP100 Ethernet Port Configuration

Each QSFP100 module contains four data lanes which can be used individually or combined to form a single, higher-speed interface. This allows a QSFP100 Ethernet port to be configured as a single 100GbE interface, a single 40GbE interface, or four 10GbE interfaces. The default mode is a single 100GbE interface.

The 7060X, 7260X and 7320X platforms also allow a QSFP100 port to be configured as two 50GbE interfaces or four 25GbE interfaces.

When the lanes are combined to form a higher-speed interface, display commands will show the primary lane(s) as *connected* or *not connected*, and will show the other lanes as *errdisabled*.

The following sections describe the configuration of QSFP+ ports.

9.5.7.1   Configuring a QSFP100 Module as a Single 100GbE Interface

By default, the QSFP100 module operates as a single 100GbE interface; using the **default speed** or **no speed** command on the primary lane restores the default behavior.

To explicitly configure the port as a single 100GbE interface, combine the module's four data lanes by using the **speed** command (**speed forced 100gfull**) on the port's /1 lane (the primary lane).

Important The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1 Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2 Enter the **speed forced 100gfull** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 100gfull
```

Step 3 Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port         Name            Status        Vlan     Duplex Speed  Type           Flags
Et1                          connected     2        full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                      connected     1        full   100G   100GBASE-SR4
Et5/1/2                      errdisabled   1        unconf unconf 100GBASE-SR4
Et5/1/3                      errdisabled   1        unconf unconf 100GBASE-SR4
Et5/1/4                      errdisabled   1        unconf unconf 100GBASE-SR4
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.7.2   Configuring a QSFP100 Module as Two 50GbE Interfaces

To configure the port as a two 50GbE interfaces, configure the module's four data lanes by using the **speed** command (**speed forced 50gfull**) on the port's /1 and /3 lanes. This configuration is available on 7060X, 7260X and 7320X platforms.

Important The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1 Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2 Enter the **speed forced 50gfull** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 50gfull
```

Step 3 Repeat the above steps for lane /3.

```
switch(config-if-Et5/1/1)#interface ethernet 5/1/3
switch(config-if-Et5/1/3)#speed forced 50gfull
```

Step 4   Use the show interfaces status command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port         Name            Status      Vlan    Duplex Speed  Type          Flags
Et1                          connected   2       full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                      connected   1       full   50G    100GBASE-SR4
Et5/1/2                      errdisabled 1       unconf unconf 100GBASE-SR4
Et5/1/3                      connected   1       full   50G    100GBASE-SR4
Et5/1/4                      errdisabled 1       unconf unconf 100GBASE-SR4
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.7.3   Configuring a QSFP100 Module as a Single 40GbE Interface

To configure the port as a single 40GbE interface, combine the module's four data lanes by using the speed command (**speed forced 40gfull**) on the port's /1 lane (the primary lane).

Important   The speed command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1   Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2   Enter the **speed forced 40gfull** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 40gfull
```

Step 3   Use the show interfaces status command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port         Name            Status      Vlan    Duplex Speed  Type          Flags
Et1                          connected   2       full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                      connected   1       full   40G    100GBASE-SR4
Et5/1/2                      errdisabled 1       unconf unconf 100GBASE-SR4
Et5/1/3                      errdisabled 1       unconf unconf 100GBASE-SR4
Et5/1/4                      errdisabled 1       unconf unconf 100GBASE-SR4
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.7.4   Configuring a QSFP100 Module as Four 25GbE Interfaces

To configure the port as four 25GbE interfaces, use the speed command (**speed forced 25gfull**) on the port's /1 lane (the primary lane). This configuration is available on 7060X, 7260X and 7320X platforms.

Important   The speed command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1   Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2   Enter the **speed forced 25gfull** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 25gfull
```

Step 3   Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port         Name            Status       Vlan     Duplex Speed  Type            Flags
Et1                          connected    2        full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                      connected    1        full   25G    100GBASE-SR4
Et5/1/2                      errdisabled  1        unconf unconf 100GBASE-SR4
Et5/1/3                      errdisabled  1        unconf unconf 100GBASE-SR4
Et5/1/4                      errdisabled  1        unconf unconf 100GBASE-SR4
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.7.5   Configuring a QSFP100 Module as Four 10GbE Interfaces

To configure the port as four 10GbE interfaces, use the **speed** command (**speed forced 10000full**) on the port's /1 lane (the primary lane).

Important   The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1   Enter interface Ethernet configuration mode for lane /1 of the QSFP100 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2   Enter the **speed forced 10000full** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 10000full
```

Step 3   Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port         Name            Status       Vlan     Duplex Speed  Type            Flags
Et1                          connected    2        full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                      connected    1        full   10G    100GBASE-SR4
Et5/1/2                      connected    1        full   10G    100GBASE-SR4
Et5/1/3                      connected    1        full   10G    100GBASE-SR4
Et5/1/4                      connected    1        full   10G    100GBASE-SR4
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.8   CFP2 Ethernet Port Configuration

Each CFP2 module contains ten data lanes. The configuration options available on the port depend on the optic inserted:

- **CFP2-100G-LR4** optics operate only in 100GbE mode.
- **CF2-100G-ER4** optics operate only 100GbE mode.
- **CFP2-100G-XSR10** optics can be configured as a single 100GbE interface or as ten 10GbE interfaces.

When the port is configured as ten 10GbE interface, each lane is active and visible in CLI display commands. When the lanes are combined to form a single 100GbE interface, display commands will show the primary lane as *connected* or *not connected*; all other lanes will be hidden.

The following sections describe the configuration of CFP2 ports.

9.5.8.1   Configuring a CFP2 Module a as a Single100GbE Interface

To configure the port as a single 100GbE interface (the default configuration), combine the module's ten data lanes by using the **speed** command (**speed forced 100gfull**) on the port's /1 lane (the primary lane).

This configuration is available for all pluggable optics.

Important The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1 Enter interface Ethernet configuration mode for lane /1 of the CFP2 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2 Enter the **speed forced 100gfull** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 100gfull
```

Step 3 Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port         Name             Status       Vlan      Duplex Speed  Type          Flags
Et1                           connected    2         full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                       connected    1         full   100G   100GBASE-SR1
Et5/2/1                       connected    1         full   100G   100GBASE-SR1
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.8.2   Configuring a CFP2 Module as Ten 10GbE Interfaces

To configure the port as four 10GbE interfaces, use the **speed** command (**speed forced 10000full**) on the port's /1 lane (the primary lane).

This configuration is available only for CFP2-100G-XSR10 optics.

Important The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1 Enter interface Ethernet configuration mode for lane /1 of the CFP2 Ethernet interface.

```
switch(config)#interface ethernet 5/1/1
```

Step 2 Enter the **speed forced 10000full** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/1/1)#speed forced 10000full
```

Step 3   Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/1/1)#show interfaces status
Port          Name            Status        Vlan      Duplex Speed  Type           Flags
Et1                           connected     2         full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                       connected     1         full   10G    100GBASE-SR1
Et5/1/2                       connected     1         full   10G    100GBASE-SR1
Et5/1/3                       connected     1         full   10G    100GBASE-SR1
Et5/1/4                       connected     1         full   10G    100GBASE-SR1
Et5/1/5                       connected     1         full   10G    100GBASE-SR1
Et5/1/6                       connected     1         full   10G    100GBASE-SR1
Et5/1/7                       connected     1         full   10G    100GBASE-SR1
Et5/1/8                       connected     1         full   10G    100GBASE-SR1
Et5/1/9                       connected     1         full   10G    100GBASE-SR1
Et5/1/10                      connected     1         full   10G    100GBASE-SR1
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.9   MXP Ethernet Port Configuration

Each MXP module contains twelve data lanes which can be used individually or combined to form one or more higher-speed interfaces. This allows an MXP Ethernet port to be configured as a single 100GbE interface, up to twelve 10GbE interfaces, or a mixture of 40GbE and 10GbE ports.

MXP ports do not use pluggable optics: instead, an MTP-24 ribbon is inserted directly into the port. The remote end of the MTP 24 ribbon must then be broken out using a splitter cable or cartridge based on the operational mode and speed of the MXP port.

When four lanes of an MXP interface are combined to form a 40GbE port, CLI commands will show the primary lane of that group as *connected or not connected* and the other three lanes as *errdisabled*.

The following sections describe the configuration of MXP interfaces.

9.5.9.1   Configuring an MXP Module as a Single 100GbE Interface

To configure the port as a single 100GbE interface (the default configuration), enter the **speed** command (**speed forced 100gfull**) on the port's /1 lane (the primary lane). This combines lanes 1-10 and disables lanes 11 and 12.

Under this configuration, CLI display commands will show lane /1 as *connected* or *not connected*, and show lanes /2-/12 as *errdisabled*.

Important   The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1   Enter interface Ethernet configuration mode for lane /1 of the MXP Ethernet interface.

```
switch(config)#interface ethernet 5/49/1
```

Step 2   Enter the **speed forced 100gfull** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/49/1)#speed forced 100gfull
```

Step 3   Use the show interfaces status command to confirm the change in configuration.

```
switch(config-if-Et5/49/1)#show interfaces status
Port          Name              Status       Vlan     Duplex Speed  Type           Flags
Et1                             connected    2        full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/49/1                        connected    1        full   100G   100GBASE-SR1
Et5/49/2                        errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/3                        errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/4                        errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/5                        errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/6                        errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/7                        errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/8                        errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/9                        errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/10                       errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/11                       errdisabled  1        unconf unconf 100GBASE-SR1
Et5/49/12                       errdisabled  1        unconf unconf 100GBASE-SR1
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.9.2   Configuring an MXP Module With 40GbE Interfaces

Each set of four lanes on the MXP module is independently configurable as a single 40GbE interface or four 10GbE interfaces. To configure four lanes as a single 40GbE interface, enter the speed command (**speed forced 40gfull**) on the group's primary lane (/1, /5, or /9). To revert a group of four lanes to functioning as four independent 10GbE interfaces, enter the **speed forced 10000full** command on the primary lane of the group.

When four lanes of an MXP interface are combined to form a 40GbE port, CLI commands will show the primary lane of that group as *connected* or *not connected* and the other three lanes as *errdisabled*. In groups of four lanes which are configured as four independent 10GbE interfaces, each lane will be displayed in the CLI as *connected* or *not connected*.

Note that a **speed forced 100gfull** command entered on the /1 lane takes precedence over **speed forced 40gfull** commands on the /5 and /9 lanes.

Important The speed command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

The example below shows the steps for configuring an MXP module as three 40GbE interfaces.

Step 1   Enter interface Ethernet configuration mode for lane /1 of the MXP Ethernet interface.

```
switch(config)#interface ethernet 5/49/1
```

Step 2   Enter the speed forced 40gfull command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/49/1)#speed forced 40gfull
```

Step 3   Repeat the above steps for lanes /5 and /9.

```
switch(config-if-Et5/49/1)#interface ethernet 5/49/5
switch(config-if-Et5/49/5)#speed forced 40gfull
switch(config-if-Et5/49/5)#interface ethernet 5/49/9
switch(config-if-Et5/49/9)#speed forced 40gfull
```

Step 4   Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/49/9)#show interfaces status
Port          Name          Status      Vlan    Duplex Speed  Type         Flags
Et1                         connected   2       full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/49/1                    connected   1       full   40G    100GBASE-SR1
Et5/49/2                    errdisabled 1       unconf unconf 100GBASE-SR1
Et5/49/3                    errdisabled 1       unconf unconf 100GBASE-SR1
Et5/49/4                    errdisabled 1       unconf unconf 100GBASE-SR1
Et5/49/5                    connected   1       full   40G    100GBASE-SR1
Et5/49/6                    errdisabled 1       unconf unconf 100GBASE-SR1
Et5/49/7                    errdisabled 1       unconf unconf 100GBASE-SR1
Et5/49/8                    errdisabled 1       unconf unconf 100GBASE-SR1
Et5/49/9                    connected   1       full   40G    100GBASE-SR1
Et5/49/10                   errdisabled 1       unconf unconf 100GBASE-SR1
Et5/49/11                   errdisabled 1       unconf unconf 100GBASE-SR1
Et5/49/12                   errdisabled 1       unconf unconf 100GBASE-SR1
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.9.3   Configuring an MXP Module as Twelve 10GbE Interfaces

Each lane of an MXP port functions as a 10GbE interface when it is not included in a higher-speed interface configuration (either actively or as an *errdisabled* port).

To explicitly configure the port as twelve 10GbE interfaces, use the **speed** command (**speed forced 10000full**) on all twelve lanes of the port.

When each lane is configured as an independent 10GbE interface, CLI display commands show each lane as *connected* or *not connected*.

Important The **speed** command is hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, this command restarts the forwarding agent, which will result in traffic disruption.

Step 1   Enter interface Ethernet configuration mode for all twelve lanes of the MXP Ethernet interface.

```
switch(config)#interface ethernet 5/49/1-12
```

Step 2   Enter the **speed forced 10000full** command. Depending on the platform, this command may restart the forwarding agent, disrupting traffic on all ports for 60 seconds or more.

```
switch(config-if-Et5/49/1-12)#speed forced 10000full
```

Step 3   Use the **show interfaces status** command to confirm the change in configuration.

```
switch(config-if-Et5/49/1-12)#show interfaces status
Port          Name          Status      Vlan    Duplex Speed  Type         Flags
Et1                         connected   2       full   1G     10GBASE-T
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et5/1/1                     connected   1       full   10G    100GBASE-SR1
Et5/1/2                     connected   1       full   10G    100GBASE-SR1
Et5/1/3                     connected   1       full   10G    100GBASE-SR1
Et5/1/4                     connected   1       full   10G    100GBASE-SR1
Et5/1/5                     connected   1       full   10G    100GBASE-SR1
Et5/1/6                     connected   1       full   10G    100GBASE-SR1
Et5/1/7                     connected   1       full   10G    100GBASE-SR1
Et5/1/8                     connected   1       full   10G    100GBASE-SR1
Et5/1/9                     connected   1       full   10G    100GBASE-SR1
Et5/1/10                    connected   1       full   10G    100GBASE-SR1
<-------OUTPUT OMITTED FROM EXAMPLE-------->
```

9.5.10   Port Speed Capabilities

The supported speeds supported on each Arista platform per interface type are described in Table 9-6.

Table 9-6   Supported Speeds (GbE)

Platform	SFP+	QSFP+	QSFP100	MXP	CFP2
7050	1, 10	1, 10, 40	N/A	N/A	N/A
7050X	1, 10	1, 10, 40	N/A	10, 40	N/A
7060X	1, 10	10, 40	10, 25, 40, 50, 100	N/A	N/A
7250X	N/A	1, 10, 40	N/A	N/A	N/A
7260X	1, 10	10, 40	10, 25, 40, 50, 100	N/A	N/A
7150S	1, 10	1, 10, 40	N/A	N/A	N/A
7048T	1, 10	N/A	N/A	N/A	N/A
7500	1, 10	1, 10, 40	N/A	N/A	N/A
7500E	1, 10	1, 10, 40	10, 40, 100	10, 40, 100	10, 100
7280SE	1, 10	1, 10, 40	10, 40, 100	10, 40, 100	N/A
7210T	1, 10	N/A	N/A	N/A	N/A

9.5.11   Agile Ports

An agile port is an interface that can function as a 10G port or can subsume a predefined set of 10G interfaces to form an interface with higher speed capabilities.

The set of interfaces that can be combined to form a higher speed port is restricted by the hardware configuration. Only interfaces that pass through a common PHY component can be combined. One interface within a combinable set is designated as the primary port.

- To view the set of available agile ports and the subsumable interfaces that comprise them, enter **show platform fm6000 agileport map**.

- To configure the primary port as a higher speed port, enter **speed** **forced 40gfull** or **speed** **auto 40gfull**.

- To revert the primary port and its subsumed ports to 10G interfaces, enter **no speed**.

Example
- These commands displays the agile port map for the switch, then configures ethernet interface 13 as a 40G port.

```
switch#show platform fm6000 agileport map

-----------------------------------------------------------------
Agile Ports       |          Interfaces subsumed in 40G link
-----------------------------------------------------------------
Ethernet1         |    Ethernet3      Ethernet5      Ethernet7
Ethernet2         |    Ethernet4      Ethernet6      Ethernet8
Ethernet13        |    Ethernet15     Ethernet17     Ethernet19
Ethernet14        |    Ethernet16     Ethernet18     Ethernet20
switch#config
switch(config)#interface ethernet 13
switch(config-if-Et13)#speed forced 40gfull
```

```
            WARNING!  Executing this command will cause the forwarding agent
                      to be restarted. All interfaces will briefly drop links
                      and forwarding on all interfaces will momentarily stop.


                      Do you wish to proceed with this command? [y/N]

Ethernet17 configured for 40G.
Ethernet15, Ethernet17 and Ethernet19 are now subsumed.
switch(config-if-Et13)#
This command reverts the agile 40G port to a 10G port and frees its subsumed ports
as individual 10G ports.
switch(config-if-Et13)#no speed

  WARNING!  Executing this command will cause the forwarding agent
            to be restarted. All interfaces will briefly drop links
            and forwarding on all interfaces will momentarily stop.


            Do you wish to proceed with this command? [y/N]

Ethernet13 no longer configured for 40G.
Ethernet15, Ethernet17 and Ethernet19 are now free.
switch(config-if-Et13)#
```

9.5.12   Subinterface Configuration

For a subinterface to be operational on an Ethernet or port channel interface, the parent interface must be configured as a routed port and be administratively up, and a VLAN must be configured on the subinterface. If the parent interface goes down, all subinterfaces automatically go down as well, but will come back up with the same configuration once the parent interface is up.

Note that a port channel should not contain Ethernet interfaces with subinterfaces configured on them, and that subinterfaces cannot be members of a port channel.

Subinterfaces are named by adding a period followed by a unique subinterface number to the name of the parent interface. Note that the subinterface number has no relation to the ID of the VLAN corresponding to the subinterface.

A maximum of 750 subinterfaces can be configured on a switch, and a maximum of 250 subinterfaces can be configured under a single parent interface.

Subinterfaces are available on the following platforms:

- DCS-7050X
- DCS-7060X
- DCS-7250X
- DCS-7260X
- DCS-7280E
- DCS-7300X
- DCS-7320X
- DCS-7500E

9.5.12.1   Creating a Subinterface

To create a subinterface on an Ethernet or port channel interface:

Step 1   Bring up the parent interface and ensure that it is configured as a routed port.

```
switch(config)#interface Ethernet1/1
switch(config-if-Et1/1)#no switchport
switch(config-if-Et1/1)#no shutdown
```

Step 2   Configure a VLAN on the subinterface. The **encapsulation dot1q vlan** command is also used for VLAN translation, but in this context it associates a VLAN with the subinterface.

```
switch(config-if-Et1/1)#interface Ethernet1/1.1
switch(config-if-Et1/1.1)#encapsulation dot1q vlan 100
```

Step 3   Configure an IP address on the subinterface (optional) and ensure that it is up.

```
switch(config-if-Et1/1)#ip address 10.0.0.1/24
switch(config-if-Et1/1)#no shutdown
switch(config-if-Et1/1)#
```

9.5.12.2   Creating a Range of Subinterfaces

A range of subinterfaces can also be configured simultaneously. The following example configures subinterfaces 1 to 100 on Ethernet interface 1/1, and assigns VLANs 501 through 600 to them. Note that the range of interfaces must be the same size as the range of VLAN IDs.

Example
```
switch(config)#interface eth1/1.1-100
switch(config-if-Et1/1.1-100)no shutdown
switch(config-if-Et1/1.1-100)encapsulation dot1q vlan {501,600}
switch(config-if-Et1/1.1-100)exit
switch(config)#
```

9.5.12.3   Parent Interface Configuration

For subinterfaces to function, the parent interface must be administratively up and configured as a routed port.

Some settings are inherited by subinterfaces from the parent interface. These include QoS (trust mode and default DSCP) and MTU.

Additionally, on the DCS-7050X, DCS-7250X, and DCS-7300X platforms, the parent interface may be configured with an IP address. In this case, untagged packets are treated as incoming traffic on the parent interface

9.5.12.4   Configuring Routing Features on a Subinterface

Once a subinterface is created, the following features can be configured on it:

- Unicast and multicast routing
- BGP, OSPF, ISIS, PIM
- VRF
- VRRP
- SNMP
- Inheritance of QoS (trust mode and default DSCP) and MTU settings from the parent interface

Additionally, these features can be configured on subinterfaces on Arad (DCS-7500E and DCS-7280E) platforms:

- Subinterface counters on ingress

- VXLAN

- MPLS

- GRE

- PBR

- QoS

9.5.12.5   Displaying Subinterface Information

Subinterface information is displayed using the same show commands as for other interfaces.

Examples

This command displays summary information for all IP interfaces on the switch, including subinterfaces.

```
switch>show ip interfaces brief
 Interface      IP Address      Status      Protocol      MTU
 Ethernet1/1    10.1.1.1/24     up          up            1500
 Ethernet1/1.1  10.0.0.1/24     up          up            1500
 Ethernet1/2    unassigned      up          up            1500
```

This command displays information for subinterface Ethernet 1/1.1.

```
switch>show interface ethernet 1/1.1
Ethernet1/1.1 is down, line protocol is lowerlayerdown (notconnect)
  Hardware is Subinterface, address is 001c.735d.65dc
  Internet address is 10.0.0.1/24
  Broadcast address is 255.255.255.255
  Address determined by manual configuration
  IP MTU 1500 bytes , BW 10000000 kbit
  Down 59 seconds
switch>
```

This command displays status information for all subinterfaces configured on the switch.

```
switch>show interfaces status sub-interfaces
Port        Name      Status      Vlan      Duplex Speed  Type                      Flags
Et1.1                 connect     101       full   10G    dot1q-encapsulation
Et1.2                 connect     102       full   10G    dot1q-encapsulation
Et1.3                 connect     103       full   10G    dot1q-encapsulation
Et1.4                 connect     103       full   10G    dot1q-encapsulation
switch>
```

9.5.13   Autonegotiated Settings

In autonegotiation, the transmission speed, duplex setting, and flow control parameters used for Ethernet-based communication can be automatically negotiated between connected devices to establish optimized common settings.

9.5.13.1   Speed and Duplex

The **speed** command affects the transmission speed and duplex setting for the configuration mode interface. When a **speed forced** command is in effect on an interface, autonegotiation of speed and duplex settings is disabled for the interface; to enable autonegotiation, use the **speed auto** command.

The scope and effect of the **speed** command depends on the interface type; see Ethernet Interfaces and Ethernet Configuration Procedures for detailed information on the speed settings for different interfaces.

9.5.13.2   Flow Control

Flow control is a data transmission option that temporarily stops a device from sending data because of a peer data overflow condition. If a device sends data faster than the receiver can accept it, the receiver's buffer can overflow. The receiving device then sends a PAUSE frame, instructing the sending device to halt transmission for a specified period.

Flowcontrol commands configure administrative settings for flow control packets.

- The **flowcontrol receive** command configures the port's ability to receive flow control pause frames.

    — *off*: port does not process pause frames that it receives.
    — *on*: port processes pause frames that it receives.
    — *desired*: port autonegotiates; processes pause frames if peer is set to *send* or *desired*.

- The **flowcontrol send** command configures the port's ability to transmit flow control pause frames.

    — *off*: port does not send pause frames.
    — *on*: port sends pause frames.
    — *desired*: port autonegotiates; sends pause frames if peer is set to *receive* or *desired*.

Desired is not an available parameter option. Ethernet data ports cannot be set to *desired*. Management ports are set to *desired* by default and with the **no flowcontrol receive** command.

The port linking process includes flow control negotiation. Ports must have compatible flow control settings to create a link. Table 9-7 lists the compatible flow control settings.

Table 9-7   Compatible Settings for Flow Control Negotiation

local port	peer port
receive on	send on or send desired
receive off	send off or send desired
receive desired	send on , send off, or send desired
send on	receive on or receive desired
send off	receive off or receive desired
send desired	receive on , receive off, or receive desired

Example

- These commands set the flow control receive and send to **on** on Ethernet interface 5.

```
switch(config)#interface ethernet 5
switch(config-if-Et5)#flowcontrol receive on
switch(config-if-Et5)#flowcontrol send on
switch(config-if-Et5)#
```

9.5.14   Displaying Ethernet Port Properties

Show commands are available to display various Ethernet configuration and operational status on each interface. Ethernet settings that are viewable include:

- Port Type
- PHY Status
- Negotiated Settings
- Flow Control

- Capabilities

Port Type

The port type is viewable from the output of **show interfaces status**, **show interfaces capabilities**, and **show interfaces transceiver properties** commands.

Example

- This **show interfaces status** command displays the status of Ethernet interfaces 1-5.

```
switch>show interfaces status
Port        Name                    Status      Vlan        Duplex  Speed Type
Et1                                 connected   1              full    10G 10GBASE-SRL
Et2                                 connected   1              full    10G 10GBASE-SRL
Et3                                 connected   1              full    10G 10GBASE-SRL
Et4                                 connected   1              full    10G 10GBASE-SRL
Et5                                 notconnect  1              full    10G Not Present
switch>
```

- This **show interfaces capabilities** command displays the speed, duplex, and flow control capabilities of Ethernet interfaces 2 and 18.

```
switch>show interfaces ethernet 2,18 capabilities
Ethernet2
  Model:        DCS-7150S-64-CL
  Type:         10GBASE-CR
  Speed/Duplex: 10G/full,40G/full,auto
  Flowcontrol:  rx-(off,on,desired),tx-(off,on,desired)
Ethernet18
  Model:        DCS-7150S-64-CL
  Type:         10GBASE-SR
  Speed/Duplex: 10G/full
  Flowcontrol:  rx-(off,on),tx-(off,on)
switch>
```

- This command displays the media type, speed, and duplex properties for Ethernet interfaces 1.

```
switch>show interfaces ethernet 1 transceiver properties
Name : Et1
Administrative Speed: 10G
Administrative Duplex: full
Operational Speed: 10G (forced)
Operational Duplex: full (forced)
Media Type: 10GBASE-SRL
```

PHY

PHY information for each Ethernet interface is viewed by entering the **show interfaces phy** command.

Example

- This command summarizes PHY information for Ethernet interfaces 1-3.

```
switch>show interfaces ethernet 1-3 phy
Key:
    U    = Link up
    D    = Link down
    R    = RX Fault
    T    = TX Fault
    B    = High BER
    L    = No Block Lock
    A    = No XAUI Lane Alignment
    0123 = No XAUI lane sync in lane N


                              State    Reset
    Port           PHY state   Changes   Count PMA/PMD PCS   XAUI
    -------------- --------------- -------- -------- ------- ----- --------
    Ethernet1      linkUp           14518    1750 U..     U.... U.......
    Ethernet2      linkUp           13944    1704 U..     U.... U.......
    Ethernet3      detectingXcvr        3       1              D..A0123
switch>
```

Negotiated Settings

Speed, duplex, and flow control settings are displayed through the show interfaces capabilities, PHY information for each Ethernet interface is viewed by entering the **show interfaces capabilities**, **show flowcontrol**, and **show interfaces status** commands.

Example

- This command displays speed/duplex and flow control settings for Ethernet interface 1.

```
switch>show interfaces ethernet 1 capabilities
Ethernet1
  Model:        DCS-7150S-64-CL
  Type:         10GBASE-SR
  Speed/Duplex: 10G/full
  Flowcontrol:  rx-(off,on),tx-(off,on)
switch>
```

- This command shows the flow control settings for Ethernet interfaces 1-2.

```
switch>show flowcontrol interface ethernet 1-2
Port       Send FlowControl  Receive FlowControl RxPause        TxPause
           admin    oper     admin    oper
---------  -------- -------- -------- --------    -------------- -------------
Et1        off      off      off      off         0              0
Et2        off      off      off      off         0              0
switch>
```

- This command displays the speed type and duplex settings for management interfaces 1-2.

```
switch>show interfaces management 1-2 status
Port     Name            Status      Vlan        Duplex  Speed Type
Ma1                      connected   routed      a-full a-100M 10/100/1000
Ma2                      connected   routed      a-full   a-1G 10/100/1000
switch>
```

9.6   Ethernet Configuration Commands

Global Configuration Commands

Interface Configuration Commands – Ethernet and Management Interfaces

Interface Display Commands

flowcontrol receive

The **flowcontrol receive** command configures administrative settings for inbound flow control packets. Ethernet ports use flow control to delay packet transmission when port buffers run out of space. Ports transmit a pause frame when their buffers are full, signaling their peer ports to delay sending packets for a specified period.

The **flowcontrol receive** command configures the configuration mode port's ability to receive flow control pause frames.

- *off*: port does not process pause frames that it receives.
- *on*: port processes pause frames that it receives.
- *desired*: port autonegotiates flow control; processes pause frames if the peer is set to *send desired*.

  Desired is not an available parameter option. Ethernet data ports cannot be set to *desired*. Management ports are set to *desired* by default and with the **no flowcontrol receive** command.

The port linking process includes flow control negotiation. Ports must have compatible flow control settings to create a link. Table 9-8 lists the compatible flow control settings.

Table 9-8   Compatible Settings for Flow Control Negotiation – Local Port Receiving

local port	peer port
receive on	send on or send desired
receive off	send off or send desired
receive desired	send on , send off, or send desired

The **no flowcontrol receive** and **default flowcontrol receive** commands restore the default flow control setting for the configuration mode interface by removing the corresponding **flowcontrol receive** command from *running-config*. The default setting is *off* for Ethernet data ports and *desired* for Management ports.

Command Mode   Interface-Ethernet Configuration
                      Interface-Management Configuration

Command Syntax

```
flowcontrol receive STATE
no flowcontrol receive
default flowcontrol receive
```

Parameters

- *STATE*   flow control pause frame processing setting. Options include:

  — **on**
  — **off**

Examples

- These commands set the flow control received on Ethernet interface 5.

  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#flowcontrol receive on
  switch(config-if-Et5)#
  ```

flowcontrol send

The **flowcontrol send** command configures administrative settings for outbound flow control packets. Ethernet ports use flow control to delay packet transmission when port buffers run out of space. Ports transmit a pause frame when their buffers are full, signaling their peer ports to delay sending packets for a specified period.

The **flowcontrol send** command configures the configuration mode port's ability to transmit flow control pause frames.

- *off*: port does not send pause frames.
- *on*: port sends pause frames.
- *desired*: port autonegotiates flow control; sends pause frames if the peer is set to *receive desired*.

    Desired is not an available parameter option. Ethernet data ports cannot be set to *desired*. Management ports are set to *desired* by default and with the **no flowcontrol send** command.

The port linking process includes flow control negotiation. Ports must have compatible flow control settings to create a link. Table 9-9 lists the compatible flow control settings.

Table 9-9   **Compatible Settings for Flow Control Negotiation – Local Port Transmitting**

local port	peer port
send on	receive on or receive desired
send off	receive off or receive desired
send desired	receive on , receive off, or receive desired

The **no flowcontrol send** and **default flowcontrol send** commands restore the default flow control setting for the configuration mode interface by removing the corresponding **flowcontrol send** command from *running-config*. The default setting is *off* for Ethernet data ports and *desired* for Management ports.

Command Mode   Interface-Ethernet Configuration
                       Interface-Management Configuration

Command Syntax

```
flowcontrol send STATE
no flowcontrol send
default flowcontrol send
```

Parameters

- *STATE*   flow control send setting. Options include

    — **on**
    — **off**

Examples

- These commands set the flow control sent on Ethernet interface 5.

    ```
    switch(config)#interface ethernet 5
    switch(config-if-Et5)#flowcontrol send on
    switch(config-if-Et5)#
    ```

hardware port-group

The **hardware port-group** command configures a port group to activate a 40GBASE (QSFP+) interface or four 10GBASE (SFP+) interfaces, affecting QSFP+ and SFP+ availability.

The **no hardware port-group** and **default hardware port-group** commands restore a port group's default setting by removing the corresponding **hardware port-group** command from *running-config*. The QSFP+ interface is active by default in each port group.

The **hardware port-group** command is available on on DCS-7050Q-16 and DCS-7050QX-32S switches, and has different parameters on each platform.

> **Command Mode**   Global Configuration

Command Syntax
```
hardware port-group group_number select PORT_LIST
no hardware port-group group_number
default hardware port-group group_number
```

Parameters

- *group_number*   label of the port group. Valid options are **1** and **2** on the 7050Q-16; only **1** is available on the 7050QX-32S.

- *PORT_LIST*   ports activated by command. Options vary by platform and depend on *group_number* value.

  DCS-7050Q-16

  — **Et15/1-4**   activates QSFP+ port on port group 1. Available when *group_number* is 1.
  — **Et16/1-4**   activates QSFP+ port on port group 2. Available when *group_number* is 2.
  — **Et17-20**   activates SFP+ ports on port group 1. Available when *group_number* is 1.
  — **Et21-23**   activates SFP+ ports on port group 2. Available when *group_number* is 2.

  DCS-7050QX-32S

  — **Et1-4**   activates SFP+ ports on port group 1. Available when *group_number* is 1.
  — **Et5/1-4**   activates QSFP+ port on port group 1. Available when *group_number* is 1.

Example

- These commands enable the QSFP+ interface in port group 1 and SFP+ interfaces in port group 2 on a DCS-7050Q-16 switch, display the port group status, and display interface status.

```
switch(config)#hardware port-group 1 select Et15/1-4
switch(config)#hardware port-group 2 select Et21-24
switch(config)#show hardware port-group

Portgroup: 1    Active Ports: Et17-20
Port           State
-----------------------------------------
Ethernet17     ErrDisabled
Ethernet18     ErrDisabled
Ethernet19     ErrDisabled
Ethernet20     ErrDisabled
Ethernet15/1   Active
Ethernet15/2   Active
Ethernet15/3   Active
Ethernet15/4   Active

Portgroup: 2    Active Ports: Et16/1-4
Port           State
-----------------------------------------
Ethernet16/1   Active
Ethernet16/2   Active
Ethernet16/3   Active
Ethernet16/4   Active
Ethernet21     ErrDisabled
Ethernet22     ErrDisabled
Ethernet23     ErrDisabled
Ethernet24     ErrDisabled
switch(config)#show interfaces status
Port       Name                 Status      Vlan        Duplex  Speed Type
Et1/1                           connected   in Po621     full     40G 40GBASE-CR4
Et1/2                           errdisabled inactive    unconf unconf 40GBASE-CR4
<-------OUTPUT OMITTED FROM EXAMPLE-------->
Et15/1                          connected   in Po711     full     40G 40GBASE-CR4
Et15/2                          errdisabled inactive    unconf unconf Not Present
Et15/3                          errdisabled inactive    unconf unconf Not Present
Et15/4                          errdisabled inactive    unconf unconf Not Present
Et16/1                          errdisabled inactive    unconf unconf Not Present
Et16/2                          errdisabled inactive    unconf unconf Not Present
Et16/3                          errdisabled inactive    unconf unconf Not Present
Et16/4                          errdisabled inactive    unconf unconf Not Present
Et17                            errdisabled inactive    unconf unconf Not Present
Et18                            errdisabled inactive    unconf unconf Not Present
Et19                            errdisabled inactive    unconf unconf Not Present
Et20                            errdisabled inactive    unconf unconf Not Present
Et21                            connected   425          full     10G 10GBASE-SRL
Et22                            connected   611          full     10G 10GBASE-SRL
Et23                            connected   in Po998     full     10G 10GBASE-SLR
Et24                            connected   in Po998     full     10G 10GBASE-SLR
switch(config)#
```

interface ethernet

The **interface ethernet** command places the switch in Ethernet-interface configuration mode for the specified interfaces. The command can specify a single interface or multiple interfaces.

Ethernet interfaces are physical interfaces and are not created or removed.

Interface management commands include:

- description
- exit
- load-interval
- mtu
- shutdown (Interfaces)

Ethernet management commands include:

- flowcontrol
- mac-address
- speed

Chapters describing supported protocols and other features list additional configuration commands available from Ethernet interface configuration mode.

    Command Mode   Global Configuration

Command Syntax

```
interface ethernet e_range
```

Parameters

- *e_range*   Ethernet interfaces (number, range, or comma-delimited list of numbers and ranges).

  Valid Ethernet numbers depend on the switch's available Ethernet interfaces.

Example

- This command enters interface configuration mode for Ethernet interfaces 1 and 2:

```
switch(config)#interface ethernet 1-2
switch(config-if-Et1-2)#
```

- This command enters interface configuration mode for Ethernet interface 1:

```
switch(config)#interface ethernet 1
switch(config-if-Et1)#
```

interface ethernet create

The **interface ethernet create** command is used to configure a range of Ethernet subinterfaces. The command places the switch in Ethernet-interface configuration mode for the specified range of subinterfaces.

   Command Mode   Global Configuration

Command Syntax

```
interface ethernet create sub_range
```

Parameters

*   *sub_range*   range of subinterfaces to be configured. Subinterfaces are named by adding a period followed by a unique subinterface number to the name of the parent interface. A maximum of 750 subinterfaces can be configured on a switch, and a maximum of 250 subinterfaces can be configured under a single parent interface.

Example

*   This command enters interface configuration mode for Ethernet subinterfaces 1/1.1-100:

```
switch(config)#interface ethernet create 1/1.100
switch(config-if-Et1/1.1-100)#
```

interface management

The **interface management** command places the switch in management-interface configuration mode for the specified interfaces. The list can specify a single interface or multiple interfaces if the switch contains more than one management interface.

Management interfaces are physical interfaces and are not created or removed.

Interface management commands include:

- description
- exit
- load-interval
- mtu
- shutdown (Interfaces)

Ethernet management commands include:

- flowcontrol
- mac-address
- speed

Chapters describing supported protocols and other features list additional configuration commands available from management-interface configuration mode.

Command Mode   Global Configuration

Command Syntax

```
interface management m_range
```

Parameters

- *m_range*   Management interfaces (number, range, or comma-delimited list of numbers and ranges).

  Valid management numbers depend on the switch's available management interfaces. A value of 0, where available, configures the virtual management interface on a dual-supervisor modular switch. Management interface 0 accesses management port 1 on the active supervisor of a dual-supervisor modular switch.

Examples

- This command enters interface configuration mode for management interfaces 1 and 2.

```
switch(config)#interface management 1-2
switch(config-if-Ma1-2)#
```

- This command enters interface configuration mode for management interface 1:

```
switch(config)#interface management 1
switch(config-if-Ma1)#
```

link-debounce

The **link-debounce** command configures the link debounce time for the configuration mode interface. Link debounce time is the time that advertisements for new link states are delayed after the link state is established. By default, debounce time is set to zero, disabling link debounce.

Debounce times for link-up and link-down transitions can be independently configured.

- Link-up debounce time: the delay before an interface advertises link down to link up transitions.
- Link-down debounce time: the delay before an interface advertises link up to link down transitions.

The **no link-debounce** and **default link-debounce** commands restore the default debounce setting for the configuration mode interface by removing the corresponding **link-debounce** command from *running-config*.

Command Mode   Interface-Ethernet Configuration
Interface-Management Configuration

Command Syntax

```
link-debounce time WAIT_TIME
no link-debounce
default link-debounce
```

Parameters

- *WAIT_TIME*   link debounce period (milliseconds). Options include

  — *<0 - 30000>*   One debounce value assigned as both link up and link down.
  — *<0 - 30000> <0 - 30000>*   Two debounce values: link up is first, link down is second.

  All debounce values range from 0 (disabled) to 30000 (30 seconds).

Examples

- These commands set the link-up and link-down debounce period to 10 seconds on Ethernet interface 5.

  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#link-debounce time 10000
  switch(config-if-Et5)#
  ```

- These commands set the link-up debounce to 10 seconds and the link-down debounce period to zero on Ethernet interface 5.

  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#link-debounce time 10000 0
  switch(config-if-Et5)#
  ```

- These commands set the link-up debounce to zero and the link-down debounce period to 12.5 seconds on Ethernet interface 5.

  ```
  switch(config)#interface ethernet 5
  switch(config-if-Et5)#link-debounce time 0 12500
  switch(config-if-Et5)#
  ```

mac-address

The **mac-address** command assigns a MAC address to the configuration mode interface. An interface's default MAC address is its burn-in address.

The **no mac-address** and **default mac-address** commands revert the interface to its default MAC address by removing the corresponding **mac-address** command from *running-config*.

> **Command Mode**   Interface-Ethernet Configuration
> Interface-Management Configuration

Command Syntax

```
mac-address address
no mac-address
default mac-address
```

Parameters

- *address*   MAC address assigned to the interface. Format is dotted hex notation (H.H.H). Disallowed addresses are 0.0.0 and FFFF.FFFF.FFFF.

Example

- This command assigns the MAC address of 001c.2804.17e1 to Ethernet interface 7, then displays interface parameters, including the assigned address.

```
switch(config)#interface ethernet 7
switch(config-if-Et7)#mac-address 001c.2804.17e1
switch(config-if-Et7)#show interface ethernet 7
Ethernet3 is up, line protocol is up (connected)
  Hardware is Ethernet, address is 001c.2804.17e1 (bia 001c.7312.02e2)
  Description: b.e45
  MTU 9212 bytes, BW 10000000 Kbit
  Full-duplex, 10Gb/s, auto negotiation: off
  Last clearing of "show interface" counters never
  5 seconds input rate 7.84 kbps (0.0% with framing), 10 packets/sec
  5 seconds output rate 270 kbps (0.0% with framing), 24 packets/sec
     1363799 packets input, 222736140 bytes
     Received 0 broadcasts, 290904 multicast
     0 runts, 0 giants
     0 input errors, 0 CRC, 0 alignment, 0 symbol
     0 PAUSE input
     2264927 packets output, 2348747214 bytes
     Sent 0 broadcasts, 28573 multicast
     0 output errors, 0 collisions
     0 late collision, 0 deferred
     0 PAUSE output
switch(config-if-Et7)#
```

show flowcontrol

The **show interfaces flowcontrol** command displays administrative and operational flow control data for the specified interfaces. Administrative data is the parameter settings stored in *running-config* for the specified interface; the switch uses these settings to negotiate flow control with the peer switch. Operational data is the resolved flow control setting that controls the port's behavior.

Command Mode   EXEC

Command Syntax

```
show flowcontrol [INTERFACE]
show [INTERFACE] flowcontrol
```

Parameters

- *INTERFACE*   Interface type and number for which flow control data is displayed.

  — <no parameter>   all interfaces.
  — **ethernet** *e_range*   Ethernet interfaces in the specified range.
  — **management** *m_range*   Management interfaces in the specified range.

  Valid *e_range* and *m_range* formats include number, number range, or comma-delimited list of numbers and ranges.

Example

- This command shows the settings for Ethernet interfaces 1-10.

```
switch>show flowcontrol interface ethernet 1-10
Port         Send FlowControl  Receive FlowControl  RxPause        TxPause
             admin    oper     admin    oper
---------    -------- --------  -------- --------    -------------  -------------
Et1          off      off      off      off         0              0
Et2          off      off      off      off         0              0
Et3          off      off      off      off         0              0
Et4          off      off      off      off         0              0
Et5          off      off      off      off         0              0
Et6          off      off      off      off         0              0
Et7          off      off      off      off         0              0
Et8          off      off      off      off         0              0
Et9          off      off      off      off         0              0
Et10         off      off      off      off         0              0
switch>
```

show hardware port-group

The **show hardware port-group** command displays the status of DCS-7050Q-16 port-groups. Port groups contain one QSFP+ interface and a set of four SFP+ interfaces. In each port group, either the QSFP+ interface or the SFP+ interface set is enabled. The port groups are configured independent of each other.

- Port group 1 contains interface 15 (QSFP+) and interfaces 17-20 (SFP+).
- Port group 2 contains interface 16 (QSFP+) and interfaces 21-24 (SFP+).

  Command Mode   EXEC

Command Syntax

```
show hardware port-group
```

Guidelines

The **hardware port-group** command is available on on DCS-7050Q-16 switches.

Example

- This command displays the status of ports in the two port groups on a DCS-7050Q-16 switch.

```
switch>show hardware port-group

Portgroup: 1    Active Ports: Et15/1-4
Port          State
----------------------------------------
Ethernet17    ErrDisabled
Ethernet18    ErrDisabled
Ethernet19    ErrDisabled
Ethernet20    ErrDisabled
Ethernet15/1  Active
Ethernet15/2  Active
Ethernet15/3  Active
Ethernet15/4  Active

Portgroup: 2    Active Ports: Et16/1-4
Port          State
----------------------------------------
Ethernet16/1  Active
Ethernet16/2  Active
Ethernet16/3  Active
Ethernet16/4  Active
Ethernet21    ErrDisabled
Ethernet22    ErrDisabled
Ethernet23    ErrDisabled
Ethernet24    ErrDisabled
switch>
```

show interfaces capabilities

The **show interfaces capabilities** command displays the model number, interface type, duplex mode, and flow control settings of the specified interfaces. The capabilities command is available on Ethernet and management interfaces.

Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE] capabilities
```

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

  — <no parameter>   all interfaces.
  — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
  — **management** *m_range*   Management interface range specified by *m_range*.

  Valid *e_range* and *m_range* formats include number, number range, or comma-delimited list of numbers and ranges.

Examples

- This command displays the model number, interface type, duplex mode and flow control settings for Ethernet interfaces 2 and 18.

```
switch>show interfaces ethernet 2,18 capabilities
Ethernet2
  Model:        DCS-7150S-64-CL
  Type:         10GBASE-CR
  Speed/Duplex: 10G/full,40G/full,auto
  Flowcontrol:  rx-(off,on,desired),tx-(off,on,desired)
Ethernet18
  Model:        DCS-7150S-64-CL
  Type:         10GBASE-SR
  Speed/Duplex: 10G/full
  Flowcontrol:  rx-(off,on),tx-(off,on)
switch>
```

show interfaces counters

The **show interfaces counters** command displays packet and byte counters for the specified interfaces. Counters displayed by the command include:

- inbound bytes
- inbound unicast packets
- inbound multicast packets
- inbound broadcast packets
- outbound bytes
- outbound unicast packets
- outbound multicast packets
- outbound broadcast packets

    Command Mode   EXEC

Command Syntax

    show interfaces [*INTERFACE*] **counters**

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

    — <no parameter>   all interfaces.
    — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
    — **management** *m_range*   Management interface range specified by *m_range*.
    — **port-channel** *p_range*   Port-Channel Interface range specified by *p_range*.

Related Commands

- **show interfaces counters bins**
- **show interfaces counters errors**
- **show interfaces counters queue**
- **show interfaces counters rates**

Examples

- This command displays byte and packet counters for Ethernet interfaces 1 and 2.

```
switch>show interfaces ethernet 1-2 counters
Port                InOctets      InUcastPkts      InMcastPkts      InBcastPkts
Et1            99002845169         79116358            75557             2275
Et2            81289180585         76278345            86422               11

Port               OutOctets     OutUcastPkts     OutMcastPkts     OutBcastPkts
Et1             4347928323          6085482           356173             2276
Et2             4512762190          5791718           110498               15
switch>
```

show interfaces counters bins

The **show interfaces counters bins** command displays packet counters, categorized by packet length, for the specified interfaces. Packet length counters that the command displays include:

- 64 bytes
- 65-127 bytes
- 128-255 bytes
- 256-511 bytes
- 512-1023 bytes
- 1024-1522 bytes
- larger than 1522 bytes

    Command Mode   EXEC

Command Syntax

    show interfaces [*INTERFACE*] **counters bins**

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

    — <no parameter>   all interfaces.
    — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
    — **management** *m_range*   Management interface range specified by *m_range*.
    — **port-channel** *p_range*   Port-Channel Interface range specified by *p_range*.

Related Commands

- **show interfaces counters**
- **show interfaces counters errors**
- **show interfaces counters queue**
- **show interfaces counters rates**

Examples

- This command displays packet counter results for Ethernet interfaces 1 and 2.

```
switch>show interfaces ethernet 1-2 counters bins
Input
Port              64 Byte       65-127 Byte      128-255 Byte      256-511 Byte
-------------------------------------------------------------------------------
Et1                 2503          56681135           1045154           1029152
Et2                    8          50216275           1518179           1086297

Port         512-1023 Byte   1024-1522 Byte    1523-MAX Byte
------------------------------------------------------------
Et1              625825         17157823          8246822
Et2              631173         27059077          5755101
switch>
```

show interfaces counters errors

The **show interfaces counters errors** command displays the error counters for the specified interfaces.

Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE] counters errors
```

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

    — <no parameter>   all interfaces.
    — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
    — **management** *m_range*   Management interface range specified by *m_range*.
    — **port-channel** *p_range*   Port-Channel Interface range specified by *p_range*.

Display Values

The table displays the following counters for each listed interface:

- FCS: Inbound packets with CRC error and proper size.
- Align: Inbound packets with improper size (undersized or oversized).
- Symbol: Inbound packets with symbol error and proper size.
- Rx: Total inbound error packets.
- Runts: Outbound packets that terminated early or dropped because of underflow.
- Giants: Outbound packets that overflowed the receiver and were dropped.
- Tx: Total outbound error packets.

Related Commands

- **show interfaces counters**
- **show interfaces counters bins**
- **show interfaces counters queue**
- **show interfaces counters rates**

Examples

- This command displays the error packet counters on Ethernet interfaces 1-2.

```
switch>show interfaces ethernet 1-2 counters errors
Port              FCS     Align   Symbol      Rx    Runts   Giants       Tx
Et1                 0         0        0        0        0        0        0
Et2                 0         0        0        0        0        0        0
switch>
```

show interfaces counters queue

The **show interfaces counters queue** command displays the queue drop counters for the specified interfaces.

    Command Mode   EXEC

Command Syntax

    `show interfaces [INTERFACE] counters queue`

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

  — <no parameter>   all interfaces.
  — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
  — **management** *m_range*   Management interface range specified by *m_range*.
  — **port-channel** *p_range*   Port-Channel Interface range specified by *p_range*.

Related Commands

- **show interfaces counters**
- **show interfaces counters bins**
- **show interfaces counters errors**
- **show interfaces counters rates**

Example

- This command displays the queue drop counters for Ethernet interfaces 1 and 2.

```
switch>show interfaces ethernet 1-2 counters queue
Port                  InDrops
Et1                       180
Et2                       169
switch>
```

show interfaces counters rates

The **show interfaces counters rates** command displays the received and transmitted packet rate counters for the specified interfaces. Counter rates provided include megabits per second (Mbps), kilopackets per second (Kpps) and utilization percentage.

All port rates are calculated approximations. Note that, when displaying rate information for a port channel, the rate value for the port channel will likely differ from the sum of the rates for the member ports. The discrepancy is likely to be larger for port channels with fewer ports, and will be most obvious in single-port port channels. The rate values for individual member ports are less inaccurate than the rate values for the port channel as a whole.

Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE] counters rates
```

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

    — <no parameter>   all interfaces.
    — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
    — **management** *m_range*   Management interface range specified by *m_range*.
    — **port-channel** *p_range*   Port-Channel Interface range specified by *p_range*.

Related Commands

- **show interfaces counters**
- **show interfaces counters bins**
- **show interfaces counters errors**
- **show interfaces counters queue**

Example

- This command displays rate counters for Ethernet interfaces 1 and 2.

```
switch>show interfaces ethernet 1-2 counters rates
Port         Intvl   In Mbps      %  In Kpps  Out Mbps      %  Out Kpps
Et1           0:05      53.3   0.5%        5      31.2   0.3%         2
Et2           0:05      43.3   0.4%        4       0.1   0.0%         0
switch>
```

show interfaces negotiation

The **show interfaces negotiation** command displays the speed, duplex, and flow control auto-negotiation status for the specified interfaces.

Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE] negotiation [INFO_LEVEL]
```

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

  — <no parameter>   Display information for all interfaces.
  — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
  — **management** *m_range*   Management interface range specified by *m_range*.

  Valid *e_range* and *m_range* formats include number, number range, or comma-delimited list of numbers and ranges.

- *INFO_LEVEL*   amount of information that is displayed. Options include:

  — <no parameter>   displays status and negotiated setting of local ports.
  — **detail**   displays status and negotiated settings of local ports and their peers.

Examples

- This command displays the negotiated status of management 1 and 2 interfaces

```
switch>show interface management 1-2 negotiation
Port        Autoneg            Negotiated Settings
            Status  Speed      Duplex    Rx Pause  Tx Pause
---------   -------  --------   --------   --------   --------
Ma1         success  100M       full       off        off
Ma2         success  auto       auto       off        off
switch>
```

- This command displays the negotiated status of management 1 interface and its peer interface.

```
switch>show interface management 1 negotiation detail
Management1 :

Auto-Negotiation Mode     10/100/1000 BASE-T (IEEE Clause 28)
Auto-Negotiation Status   Success

  Advertisements          Speed          Duplex     Pause
                          ---------------  ----------  --------------------
      Local               10M/100M/1G     half/full   Disabled
      Link Partner        None            None        None

  Resolution              100Mb/s         full        Rx=off,Tx=off


switch>
```

show interfaces phy

The **show interfaces phy** command displays physical layer characteristics for the specified interfaces.

Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE] phy [INFO_LEVEL]
```

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

  — <no parameter>   All interfaces.
  — **ethernet** *e_range*   Ethernet interfaces in specified range.

    Valid *e_range* formats include number, number range, or comma-delimited list of numbers and ranges.

- *INFO_LEVEL*   amount of information that is displayed. Options include:

  — <no parameter>   command displays table that summarizes PHY data.
  — **detail**   command displays data block for each specified interface.

Examples

- This command summarizes PHY information for Ethernet interfaces 1-5.

```
switch>show interfaces ethernet 1-5 phy
Key:
    U    = Link up
    D    = Link down
    R    = RX Fault
    T    = TX Fault
    B    = High BER
    L    = No Block Lock
    A    = No XAUI Lane Alignment
    0123 = No XAUI lane sync in lane N


                               State    Reset
    Port            PHY state   Changes  Count PMA/PMD PCS   XAUI
    -------------- --------------- -------- -------- ------- ----- --------
    Ethernet1       linkUp          14518    1750 U..     U.... U.......
    Ethernet2       linkUp          13944    1704 U..     U.... U.......
    Ethernet3       linkUp          13994    1694 U..     U.... U.......
    Ethernet4       linkUp          13721    1604 U..     U.... U.......
    Ethernet5       detectingXcvr       3       1           D..A0123
switch>
```

- • This command displays detailed PHY information for Ethernet interface 1.

```
switch>show interfaces ethernet 1 phy detail
Current System Time: Mon Dec  5 11:32:57 2011
Ethernet1
                               Current State     Changes          Last Change
  PHY state                    linkUp              14523          0:02:01 ago
  HW resets                                         1751          0:02:07 ago
  Transceiver                  10GBASE-SRL          1704          0:02:06 ago
  Transceiver SN               C743UCZUD
  Oper speed                   10Gbps
  Interrupt Count                                  71142
  Diags mode                   normalOperation
  Model                        ael2005c
  Active uC image              microInit_mdio_SR_AEL2005C_28
  Loopback                     none
  PMA/PMD RX signal detect     ok                  11497          0:37:24 ago
  PMA/PMD RX link status       up                  11756          0:37:24 ago
  PMA/PMD RX fault             ok                  11756          0:37:24 ago
  PMA/PMD TX fault             ok                      0              never
  PCS RX link status           up                   9859          0:02:03 ago
  PCS RX fault                 ok                   9832          0:02:03 ago
  PCS TX fault                 ok                    330          0:27:44 ago
  PCS block lock               ok                   9827          0:02:03 ago
  PCS high BER                 ok                   8455          0:02:05 ago
  PCS err blocks               255                                 0:02:03 ago
  PCS BER                      16                  50092          0:02:05 ago
  XFI/XAUI TX link status      up                   1282          0:27:44 ago
  XFI/XAUI RX fault            ok                    585          0:27:44 ago
  XFI/XAUI TX fault            ok                   2142          0:02:05 ago
  XFI/XAUI alignment status    ok                   2929          0:02:05 ago
  XAUI lane 0-3 sync           (0123) = 1111        2932          0:02:05 ago
  XAUI sync w/o align HWM      0                                      never
  XAUI sync w/o align max OK   5
  XAUI excess sync w/o align   0                                      never
  Xcvr EEPROM read timeout                            46    4 days, 6:33:45 ago
  Spurious xcvr detection                              0              never
  DOM control/status fail                              0
  I2C snoop reset              0
  I2C snoop reset (xcvr)       0
  Margin count                 5                 last > 0          0:00:00 ago
  EDC resets                   1                                   0:02:03 ago
  EDC FFE0 - FFE11             -4 -5 57 -6 -6 -2 1 0 -2 -1 1 -1
  EDC FBE1 - FBE4             6 -1 5 -1
  EDC TFBE1 - TFBE4           1 2 1 2
  EDC VGA1, VGA3             12 115
  TX path attenuation          3.0 dB
  TX preemphasis               (0,63,4) (pre,main,post)
switch>
```

show interfaces status

The **show interfaces status** command displays the interface name, link status, vlan, duplex, speed, and type of the specified interfaces. When the command includes a link status, the results are filtered to display only interfaces whose link status match the specified type.

Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE] status [STATUS_TYPE]
```

Parameters

• *INTERFACE*   Interface type and numbers. Options include:

— <no parameter>   All existing interfaces.
— **ethernet** *e_range*   Ethernet interfaces in the specified range.
— **management** *m_range*   Management interfaces in the specified range.
— **port-channel** *p_range*   All existing port-channel interfaces in the specified range.

   Valid *e_range*, *m_range*, and *p_range* formats include number, number range, or comma-delimited list of numbers and ranges.

• *STATUS_TYPE*   interface status upon which the command filters output. Options include:

— <no parameter>   command does not filter on interface status.
— **connected**   interfaces connected to another port.
— **notconnect**   unconnected interfaces that are capable of connecting to another port.
— **disabled**   interfaces that have been powered down or disabled.
— **sub-interfaces**   L3 subinterfaces configured on the switch.

   Command may include multiple status types (**connected notconnect disabled**), which can be placed in any order.

Example

• This command displays the status of Ethernet interfaces 1-5.

```
switch>show interfaces ethernet 1-5 status
Port        Name                 Status      Vlan        Duplex  Speed Type
Et1                              connected   1           full    10G 10GBASE-SRL
Et2                              connected   1           full    10G 10GBASE-SRL
Et3                              connected   1           full    10G 10GBASE-SRL
Et4                              connected   1           full    10G 10GBASE-SRL
Et5                              notconnect  1           full    10G Not Present
switch>
```

This command displays status information for all subinterfaces configured on the switch.

```
switch>show interfaces status sub-interfaces
Port        Name     Status      Vlan     Duplex Speed  Type                   Flags
Et1.1                connect     101      full   10G    dot1q-encapsulation
Et1.2                connect     102      full   10G    dot1q-encapsulation
Et1.3                connect     103      full   10G    dot1q-encapsulation
Et1.4                connect     103      full   10G    dot1q-encapsulation
switch>
```

show interfaces status errdisabled

The **show interfaces status errdisabled** command displays interfaces that are in errdisabled state, including their link status and errdisable cause.

   Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE] status errdisabled
```

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

   — <no parameter>   Display information for all interfaces.
   — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
   — **management** *m_range*   Management interface range specified by *m_range*.
   — **port-channel** *p_range*   Port-Channel Interface range specified by *p_range*.

   Valid *e_range* and *m_range* formats include number, number range, or comma-delimited list of numbers and ranges.

Examples

- This command displays the error-disabled ports.

```
switch>show interfaces status errdisabled
   Port            Name            Status            Reason
------------ ---------------- ---------------- ------------------
   Et49/2                           errdisabled    multi-lane-intf
   Et49/3                           errdisabled    multi-lane-intf
   Et49/4                           errdisabled    multi-lane-intf
switch>
```

show interfaces transceiver

The **show interfaces transceiver** command displays operational transceiver data for the specified interfaces.

Command Mode   EXEC

Command Syntax

show interfaces [*INTERFACE*] **transceiver** [*DATA_FORMAT*]

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

  — <no parameter>   all interfaces.
  — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
  — **management** *m_range*   Management interface range specified by *m_range*.

  Valid *e_range*, and *m_range* formats include number, number range, or comma-delimited list of numbers and ranges.

- *DATA_FORMAT*   format used to display the data. Options include:

  — <no parameter>   table entries separated by tabs.
  — **csv**   table entries separated by commas.

Related Commands

- **show interfaces transceiver properties**

Examples

- This command displays transceiver data on Ethernet interfaces 1 through 4.

```
switch>show interfaces ethernet 1-4 transceiver
If device is externally calibrated, only calibrated values are printed.
N/A: not applicable, Tx: transmit, Rx: receive.
mA: milliamperes, dBm: decibels (milliwatts).
                                Bias     Optical   Optical
           Temp      Voltage   Current   Tx Power  Rx Power  Last Update
Port      (Celsius)  (Volts)   (mA)      (dBm)     (dBm)     (Date Time)
-----     ---------  --------  --------  --------  --------  -------------------
Et1        34.17      3.30      6.75     -2.41     -2.83     2011-12-02 16:18:48
Et2        35.08      3.30      6.75     -2.23     -2.06     2011-12-02 16:18:42
Et3        36.72      3.30      7.20     -2.02     -2.14     2011-12-02 16:18:49
Et4        35.91      3.30      6.92     -2.20     -2.23     2011-12-02 16:18:45
switch>
```

show interfaces transceiver channels

The **show interfaces transceiver channels** command displays current wavelength/frequency settings for the specified channels.

Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE e_range] transceiver channels
```

Parameters

- *INTERFACE*   Interface type and port numbers.

    — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.

Related Commands

- **transceiver channel**

- **show interfaces transceiver hardware**

Examples

- This command displays the supported wavelengths/frequencies and their corresponding channel numbers on Ethernet interface 4 to slot 3 through 4.

```
switch(config-as-if-Et4/1/3)#show interfaces ethernet 4 / 3 / 4 transceiver
channels
 Name: Et4/3/4
 100GHz- 50GHz-
Wavelength   Frequency spacing spacing
(nm)         (GHz)     Channel Channel
----------   --------- ------- -------
1567.95      191,200         1       1
1567.54      191,250                 2
1567.13      191,300         2       3
1566.72      191,350                 4
....
1529.16      196,050                98
1528.77      196,100        50      99
1528.38      196,150               100
switch(config-as-if-Et4/1/3)#
```

show interfaces transceiver hardware

The **show interfaces transceiver hardware** command displays current wavelength/frequency settings for the specified transceiver interfaces.

Command Mode   EXEC

Command Syntax

```
show interfaces [INTERFACE e_range] transceiver hardware
```

Parameters

*   *INTERFACE*   Interface type and port numbers.

    —   **ethernet** *e_range*   Ethernet interface range specified by *e_range*.

Related Commands

*   **transceiver channel**

*   **show interfaces transceiver channels**

Examples

*   This command displays the current wavelength/frequency settings on Ethernet interface 4 to slot 3 through 4.

```
switch(config-as-if-Et4/1/3)#show interfaces ethernet 4 / 3 / 4 transceiver
hardware
 Name: Et4/3/4
 Media Type: 10GBASE-DWDM
 Configured Channel : 39
 Configured Grid (GHz) : 50
 Computed Frequency (GHz) : 193,100
 Computed Wavelength (nm) : 1552.52
 Operational Channel : 39 (Default)
 Operational Grid (GHz) : 50 (Default)
 Operational Frequency (GHz): 193,100
 Operational Wavelength (nm): 1552.52
switch(config-as-if-Et4/1/3)#
```

show interfaces transceiver properties

The **show interfaces transceiver properties** command displays configuration information for the specified interfaces. Information provided by the command includes the media type, interface speed-duplex settings, speed-duplex operating state.

Command Mode   EXEC

Command Syntax

show interfaces [*INTERFACE*] transceiver properties

Parameters

- *INTERFACE*   Interface type and numbers. Options include:

    — <no parameter>   Display information for all interfaces.
    — **ethernet** *e_range*   Ethernet interface range specified by *e_range*.
    — **management** *m_range*   Management interface range specified by *m_range*.

    Valid *e_range* and *m_range* formats include number, number range, or comma-delimited list of numbers and ranges.

Related Commands

- **show interfaces transceiver**

Examples

- This command displays the media type, speed, and duplex properties for Ethernet interfaces 1-3.

```
switch>show interfaces ethernet 1-3 transceiver properties
Name : Et1
Administrative Speed: 10G
Administrative Duplex: full
Operational Speed: 10G (forced)
Operational Duplex: full (forced)
Media Type: 10GBASE-SRL

Name : Et2
Administrative Speed: 10G
Administrative Duplex: full
Operational Speed: 10G (forced)
Operational Duplex: full (forced)
Media Type: 10GBASE-SRL

Name : Et3
Administrative Speed: 10G
Administrative Duplex: full
Operational Speed: 10G (forced)
Operational Duplex: full (forced)
Media Type: 10GBASE-SRL

switch>
```

show platform fm6000 agileport map

The **show platform fm6000 agileport map** command displays the list of Ethernet interfaces that are combinable to form a higher speed port.

Command Mode   Privileged EXEC

Command Syntax

```
show platform fm6000 agileport map
```

Example

• These commands displays the agile port map for the switch, then configures Ethernet interface 13 as a 40G port, subsuming Ethernet interfaces 15, 17 and 19.

```
switch#show platform fm6000 agileport map

----------------------------------------------------------------
Agile Ports        |         Interfaces subsumed in 40G link
----------------------------------------------------------------
Ethernet1          |    Ethernet3        Ethernet5        Ethernet7
Ethernet2          |    Ethernet4        Ethernet6        Ethernet8
Ethernet13         |    Ethernet15       Ethernet17       Ethernet19
Ethernet14         |    Ethernet16       Ethernet18       Ethernet20
switch#config
switch(config)#interface ethernet 13
switch(config-if-Et13)#speed forced 40gfull

   WARNING!  Executing this command will cause the forwarding agent
             to be restarted. All interfaces will briefly drop links
             and forwarding on all interfaces will momentarily stop.


             Do you wish to proceed with this command? [y/N]

Ethernet13 configured for 40G.
Ethernet15, Ethernet17 and Ethernet19 are now subsumed.
switch(config-if-Et13)#
```

speed

The **speed** command configures the transmission speed and duplex setting for the configuration mode interface. The scope and effect of this command depends on the interface type. Interface types include:

- 40GBASE (QSFP+): Default is 4x10G-full. **Speed forced 40gfull** and **Speed auto 40gfull** configure interface as a 40G port.
- 10GBASE-T: Default is 10G-full. **Speed** command affects interface.
- 10GBASE (SFP+): Default is 10G-full. **Speed** command does not affect interface.
- 1000BASE (copper): Default is 1G-full. **speed auto 100full** affects interface.
- 1000BASE (fiber): Default is 1G-full. **Speed** command does not affect interface.
- 10/100/1000: Default is *auto-negotiation*. **Speed** command (10/100/1000 options) affects interface.

The **speed forced 40gfull** and **auto 40gfull** commands configure a QSFP+ Ethernet interface as a 40G port. The **no speed** and **no auto 40gfull** commands configure a QSFP+ Ethernet interface as four 10G ports. These commands must be applied to the /1 port. These commands are hitless on the 7050X, 7060X, 7250X, 7260X, 7280SE, 7300X, 7320X and 7500E series platforms. On all other platforms, these commands restart the forwarding agent, which will result in traffic disruption.

The **no speed** and **default speed** commands restore the default setting for the configuration mode interface by removing the corresponding **speed** command from *running-config*.

Command Mode   Interface-Ethernet Configuration
                      Interface-Management Configuration

Command Syntax

```
speed MODE
no speed
default speed
```

Parameters

- *MODE*   transmission speed and duplex setting. Options include:

  — **auto**   auto negotiation mode.
  — **auto 40gfull**   auto negotiation mode with clause 73 auto negotiation.

Important Interfaces using clause 73 auto negotiation must connect to a device that runs clause 73 auto negotiation.

  — **sfp-1000baset auto**   auto-negotiation mode (1000BASE-T interfaces only).
  — **forced 10000full**   10G full duplex.
  — **forced 1000full**   1G full duplex.
  — **forced 1000half**   1G half duplex.
  — **forced 100full**   100M full duplex.
  — **forced 100gfull**   100G full duplex.
  — **forced 100half**   100M half duplex.
  — **forced 10full**   10M full duplex.
  — **forced 10half**   10M half duplex.
  — **forced 40gfull**   40G full duplex.

On 40GBASE and 100GBASE interfaces, options that change the SFP+ and MXP interfaces (the **auto 40gfull**, the **forced 40gfull,** and the **no speed** options) may restart the forwarding agent on some switch platforms, disrupting traffic on all ports for more than a minute.

Examples

• This command configures a 40GBASE interface as a 40G port.

```
switch(config)#interface ethernet 49/1
switch(config-if-Et49/1)#speed forced 40gfull
switch(config-if-Et49/1)#show interface ethernet 49/1 - 49/4 status
Port        Name            Status      Vlan        Duplex  Speed Type
Et49/1                      connected   in Po999      full     40G 40GBASE-CR4
Et49/2                      errdisabled inactive    unconf unconf 40GBASE-CR4
Et49/3                      errdisabled inactive    unconf unconf 40GBASE-CR4
Et49/4                      errdisabled inactive    unconf unconf 40GBASE-CR4
switch(config-if-Et49/1)#
```

• This command configures a 40GBASE interface as four 10G ports (default configuration).

```
switch(config-if-Et49/1)#no speed
switch(config-if-Et49/1)#show interface ethernet 49/1 - 49/4 status
Port        Name            Status      Vlan        Duplex  Speed Type
Et49/1                      connected   routed        full     10G 40GBASE-SR4
Et49/2                      connected   routed        full     10G 40GBASE-SR4
Et49/3                      connected   routed        full     10G 40GBASE-SR4
Et49/4                      notconnect  inactive      full     10G 40GBASE-SR4
switch(config-if-Et49/1)#
```

transceiver qsfp default-mode

The **transceiver qsfp default-mode** command specifies the transmission mode of all QSFP transceiver modules that are not explicitly configured.

Each QSFP+ module Ethernet interface is configurable as a single 40G port or as four 10G ports. The switch displays four ports for each interface. Each port's status depends on the interface configuration:

- The /1 port is active (*connected* or *not connected*), regardless of the interface configuration.
- The /2, /3, and /4 ports are *error-disabled* when the interface is configured as a single 40G port.
- all ports are active (*connected* or *not connected*), when the interface is configured as four 10G ports.

The only available default-mode value is 4x10G; QSFP modules that are not configured through a **speed** command are operated as four 10G ports.

The **no transceiver qsfp default-mode** and **default transceiver qsfp default-mode** commands restore the default-mode transceiver setting to its default value of 4x10G.

>   **Command Mode**   Global Configuration

Command Syntax

```
transceiver qsfp default-mode 4x10G
no transceiver qsfp default-mode
default transceiver qsfp default-mode
```

Guidelines

The **transceiver qsfp default-mode 4x10g** statement is always in *running-config* and cannot be modified or removed in the current release.

transceiver channel

The **transceiver channel** command displays transceiver wavelength/frequency by channel number. The channel numbering depends on the selected grid-spacing mode. The default grid-spacing mode is 50GHz-spacing.

- If the startup configuration does not specify the channel number for the interface, the transceiver will automatically tune to the default channel (i.e. channel-39 of 50GHz-spacing grid) when it is inserted.
- If the configured wavelength/frequency is not supported by the transceiver, the transceiver will be tuned to the default channel (i.e. channel-39 of 50GHz-spacing grid).

The interface is shutdown before the channel number is configured.

> **Command Mode**   Global Configuration

Command Syntax

```
transceiver channel CHANNEL_NUMBER grid-spacing <SPACING_GRID>
no transceiver channel CHANNEL_NUMBER [GRID_SPACING <SPACING_GRID>
default transceiver channel CHANNEL_NUMBER [GRID_SPACING <SPACING_GRID>
```

Parameters

- *CHANNEL-NUMBER*   The default channel is 39 (50GHz-spacing grid) which corresponds to a frequency of 193,100 GHz and a wavelength of 1552.52 nm.

- *GRID_SPACING*   Grid-spacing mode (optional) depends on the selected grid-spacing mode. The default grid-spacing mode is 50GHz-spacing. For example, channel 39 of 50GHz-spacing grid is equivalent to channel 20 of 100GHz-spacing grid, which corresponds to a frequency of 193,100 GHz and a wavelength of 1552.52 nm.

    — <SPACING_GRID>   default grid-spacing mode in GHz.

Related Commands

- **show interfaces transceiver channels**

- **show interfaces transceiver hardware**

Example

- This command tunes the transceiver on slot number 4 to slot 1 through 3 of 50GHz-spacing grid.

```
switch(config-as)#interface ethernet 4 / 1 / 3
switch(config-if-Et4/1/3)#transceiver channel 1 grid-spacing 50
switch(config-if-Et4/1/3)#
```