Configuring Fibre Channel Interfaces

This chapter provides information about Fibre Channel interfaces, its features, and how to configure the Fibre Channel interfaces.

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- Information About Fibre Channel Interfaces, on page 3
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Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at https://tools.cisco.com/bugsearch/ and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the New and Changed chapter or the Feature History table below.
Information About Fibre Channel Interfaces

Forward Error Correction

Forward Error Correction (FEC) is defined in IEEE 802.3™ clause 74 and is implemented in FC without modification. FEC is not supported on 4, 8 and 16-gigabit EL ports. Its use is optional on 16-gigabit EA ports.

The Transmitter Training Signal (TTS) is defined in FC-FS-4(Clause 5.5). It provides the capability for FC ports to negotiate the following two capabilities:

1. Transmitter training, which enables a receiver to send feedback to a transmitter to assist the transmitter in adapting to the characteristics of the link that connects them.

2. FEC usage.

The TTS is not used by 4 and 8-gigabit FC ports. From 32-gigabit speed and higher, its use is mandatory. For 16-gigabit FC ports, EA variants must transmit the TTS during the link speed negotiation, but the use of it by the receiver is optional, and EL variants must not use TTS.

For more information on configuring FEC and TTS, see the Configuring FEC, on page 8 section.

Out-of-Service Interfaces

On supported modules and fabric switches, you might need to allocate all the shared resources for one or more interfaces to another interface in the port group or module. When an interface is taken out of service, all shared resources are released and made available to the other interface in the port group or module. These shared resources include BB_credits and extended BB_credits. All shared resource configurations are returned to their default values when the interface is brought back into service. Corresponding resources must be made available in order for the port to be successfully returned to service.

Caution

If you need to bring an interface back into service, you might disrupt traffic if you need to release shared resources from other interfaces in the same port group.
Guidelines and Limitations

Port Channel Limitations

Port channels have the following restrictions:

**Port Speed Information**

- Cisco MDS 9700 48-Port 32-Gbps Fibre Channel Switching Module (DS-X9648-1536K9) supports 32 Gbps, 16 Gbps, 8 Gbps, and 4 Gbps speed. However, a single 32-Gbps SFP supports only 32 Gbps, 16 Gbps, and 8 Gbps speed and a single 16 Gbps SFP supports only 16 Gbps, 8 Gbps, and 4 Gbps speed. You must not configure speed values other than the values recommended for these SFPs.

- Cisco MDS 9700 48-Port 16-Gbps Fibre Channel Switching Module (DS-X9648-768K9) and the Cisco MDS 9000 24/10-Port SAN Extension Module (DS-X9334-K9) (Fibre Channel ports) supports 16 Gbps, 10 Gbps, 8 Gbps, 4 Gbps, and 2 Gbps speeds. However, a single 16 Gbps SFP supports only 16 Gbps, 8 Gbps, and 4 Gbps speed and a single 8-Gbps SFP supports only 8 Gbps, 4 Gbps, and 2 Gbps speed. For 10 Gbps speeds, the 10 Gbps SFP supports only 10 Gbps. You must not configure speed values other than the values recommended for these SFPs.

The following table describes the results of adding a member to a port channel for various configurations.

**Table 1: Port Channel Configuration and Addition Results**

<table>
<thead>
<tr>
<th>Port Channel Members</th>
<th>Configured Speed</th>
<th>New Member Type</th>
<th>Addition Type</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS-X9448-768K9 and DS-X9334-K9</td>
<td>Auto</td>
<td>Auto max 4000</td>
<td>DS-X9448-768K9 and DS-X9334-K9</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Auto max 4000</td>
<td>Auto max 4000</td>
<td>DS-X9448-768K9 and DS-X9334-K9</td>
<td>Normal or Force</td>
</tr>
<tr>
<td></td>
<td>Auto max 4000</td>
<td>Auto max 8000 or auto max 16000</td>
<td>DS-X9448-768K9 and DS-X9334-K9</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Auto max 8000 or auto max 16000</td>
<td>Auto max 4000</td>
<td>DS-X9448-768K9 and DS-X9334-K9</td>
<td>Normal</td>
</tr>
<tr>
<td>Port Channel Members</td>
<td>Configured Speed</td>
<td>New Member Type</td>
<td>Addition Type</td>
<td>Result</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>---------------</td>
<td>--------</td>
</tr>
<tr>
<td>Auto</td>
<td>Auto</td>
<td>DS-X9448-768K9, DS-X9334-K9, and DS-X9648-1536K9</td>
<td>Normal or Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto</td>
<td>Auto max 8000 or auto max 16000</td>
<td>DS-X9448-768K9, DS-X9334-K9, and DS-X9648-1536K9</td>
<td>Normal</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto</td>
<td>Auto max 32000</td>
<td>DS-X9648-1536K9</td>
<td>Normal or Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto max 8000</td>
<td>Auto max 8000</td>
<td>DS-X9448-768K9, DS-X9334-K9, and DS-X9648-1536K9</td>
<td>Normal</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto max 8000</td>
<td>Auto max 16000</td>
<td>DS-X9448-768K9, DS-X9334-K9, and DS-X9648-1536K9</td>
<td>Normal</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto max 8000</td>
<td>Auto max 32000</td>
<td>DS-X9648-1536K9</td>
<td>Normal</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto max 16000</td>
<td>Auto max 16000</td>
<td>DS-X9448-768K9, DS-X9334-K9, and DS-X9648-1536K9</td>
<td>Normal or Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto max 16000</td>
<td>Auto max 8000</td>
<td>DS-X9448-768K9, DS-X9334-K9, and DS-X9648-1536K9</td>
<td>Normal</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto max 16000</td>
<td>Auto max 32000</td>
<td>DS-X9648-1536K9</td>
<td>Normal</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto max 32000</td>
<td>Auto max 32000</td>
<td>DS-X9648-1536K9</td>
<td>Normal or Force</td>
<td>Pass</td>
</tr>
<tr>
<td>Auto max 32000</td>
<td>Auto max 4000, or auto max 16000</td>
<td>DS-X9448-768K9, DS-X9334-K9, and DS-X9648-1536K9</td>
<td>Normal</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Force</td>
<td>Pass</td>
</tr>
</tbody>
</table>
Use the `show port-channel compatibility parameters` command to obtain information about port channel addition errors.
Configuring Fibre Channel Interfaces

Configuring Port Speed

---

**Note**
Changing port speed and rate mode disrupts traffic on the port. Traffic on other ports in the port group is not affected.

To configure the port speed on an interface, perform these steps:

---

**Step 1**
`switch# configure terminal`
Enters configuration mode.

**Step 2**
`switch(config)# interface fc 1/1`
Selects the interface and enters interface configuration submode.

**Step 3**
`switch(config-if)# switchport speed {1000 | 2000 | 4000 | 8000 | 10000 | 16000 | 32000}`
Configures the port speed in megabits per second. The auto parameter enables autosensing on the interface.

**Step 4**
`switch(config-if)# switchport speed auto`
Configures autosensing for an interface.

**Note**
The auto speed configurations are available only for the specific modules.

**Step 5**
`switch(config-if)# no switchport speed`
Reverts to the default speed for the interface (auto).

Use the `show interface` command to verify the port speed configuration for an interface.

```
switch# show interface fc 9/1
fc9/1 is up
    Hardware is Fibre Channel, SFP is short wave laser w/o OFC (SN)
    Port WWN is 22:01:00:05:30:01:9f:02
    Admin port mode is F
    snmp traps are enabled
    Port mode is F, FCID is 0xeb0002
    Port vsan is 1
    Speed is 2 Gbps
    Rate mode is shared
    Transmit B2B Credit is 64
    Receive B2B Credit is 16
    Receive data field Size is 2112
    Beacon is turned off
    5 minutes input rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
    5 minutes output rate 0 bits/sec, 0 bytes/sec, 0 frames/sec
    226 frames input, 18276 bytes
    0 discards, 0 errors
    0 CRC, 0 unknown class
    0 too long, 0 too short
```
Configuring FEC

FEC has the following restrictions:

- FEC is supported on the DS-X9334-K9, DS-X9648-1536K9, and DS-X9448-768K9 modules in the Cisco MDS 9700 Series switch. FEC is also supported on the Cisco MDS 9132T, MDS 9396S, MDS 9148T, and MDS 9396T switches.

- FEC fallback is not supported on the Cisco MDS 9700 48-Port 32-Gbps Fibre Channel Switching Module (DS-X9648-1536K9) when its interfaces are configured at 16-Gbps Fibre Channel fixed speed. However, FEC fallback is supported on the Cisco MDS 9700 48-Port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9) when its interfaces are configured at 16-Gbps Fibre Channel fixed speed.

- Modifying the FEC configuration briefly disrupts traffic on the port.

- FEC can be configured only on fixed speed 16-Gbps Fibre Channel ports or ports that are fixed or negotiate to 32 Gbps. FEC is not supported for ports that are configured with 2000/4000/8000/auto/auto-max maximum speed.

- 32-Gbps Fibre Channel ports come up automatically in FEC. You do not have to configure the ports using the `switchport fec` and `switchport fec tts` commands, as they are meant only for 16-Gbps Fibre Channel ports and have no effect on 32-Gbps Fibre Channel ports.

- From Cisco MDS NX-OS Release 6.2(11c), FEC with Transmitter Training Signal (TTS) is supported on the Cisco MDS 9396S 16-Gbps Multilayer Fabric Switch and Cisco MDS 9700 48-Port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9), except in Cisco MDS NX-OS Release 6.2(13).

  From Cisco MDS NX-OS Release 8.2(1), FEC with Transmitter Training Signal (TTS) is supported by default and cannot be disabled on the Cisco MDS 9132T, MDS 9396S, MDS 9148T, MDS 9396T switches, and Cisco MDS 9700 48-Port 32-Gbps Fibre Channel Switching Module (DS-X9648-1536K9).

- From Cisco MDS NX-OS Release 8.2(1), FEC with TTS feature is supported in Simple Network Management Protocol (SNMP) and Device Manager (DM). This feature is not supported in Cisco MDS NX-OS Release 8.1(1) or earlier.

  
  ![Note](image)

  **Note**

  FEC is supported in Device Manager.

  - From Cisco MDS NX-OS Release 8.4(1), FEC admin state has changed from up or down to on or off respectively.

  - Device Manager uses SNMP to get switch updates.

To configure FEC on an interface, perform these steps:
**Step 1**
switch# configure terminal
Enters configuration mode.

**Step 2**
switch(config)# interface fc 1/1
Selects the interface and enters interface configuration submode.

**Step 3**
switch(config-if)# switchport speed [16000 | 32000]
Sets the port speed.

**Step 4**
switch(config-if)# switchport fec
*Note* The switchport fec command works only on interfaces that support fixed 16 Gbps and higher speeds and a message stating the same appears when you execute this command.

Enables FEC for the interface.
- FEC is active if it is configured on both local and peer switches.
- FEC is not active if it is configured only on the local switch, but not on the peer switch.

**Step 5**
switch(config-if)# switchport fec tts
(Optional) Enables TTS, that allows negotiation of FEC. This command is only accepted on interfaces with fixed 16 Gbps and higher speeds and FEC enabled.

*Note* The switchport fec tts command can be used only after configuring FEC using the switchport fec command.

Use the show interface command to verify the port speed configuration for an interface:

This example displays the FEC state when FEC is enabled:

```
switch# show interface fc3/15 | i fec
 admin fec state is on
 oper fec state is down
```

This example displays the FEC state when FEC is disabled:

```
switch# show interface fc3/15 | i fec
 admin fec state is off
 oper fec state is down
```
Configuring Rate Mode

Note

- Changing port speed and rate mode disrupts traffic on the port.
- Dedicated and shared rate modes are not supported on interfaces that support 16 Gbps or higher speeds.
- Interfaces that are on modules and switches that support 16 Gbps and higher speeds operate in dedicated mode.

To configure the rate mode (dedicated or shared) on an interface on a Fibre Channel switching module, perform these steps:

Step 1  switch# configure terminal
Enters configuration mode.

Step 2  switch(config)# interface fc 1/1
Selects the interface and enters interface configuration submode.

Step 3  switch(config-if)# switchport rate-mode dedicated
Reserves dedicated bandwidth for the interface.

Note  If you cannot reserve dedicated bandwidth on an interface, you might have exceeded the port group maximum bandwidth. Use the show port-resources command to determine what resources are already allocated.

Step 4  switch(config-if)# switchport rate-mode shared
Reserves shared (default) bandwidth for the interface.

Step 5  switch(config-if)# no switchport rate-mode
Reverts to the default state (shared).

Taking Interfaces out of Service

Note

- The interface must be disabled using a shutdown command before it can be taken out of service.
- The interface cannot be a member of a port channel.
- Taking interfaces out of service releases all the shared resources to ensure that they are available to other interfaces. This causes the configuration in the shared resources to revert to default when the interface is brought back into service. Also, an interface cannot come back into service unless the default shared resources for the port are available. The operation to free up shared resources from another port is disruptive.
To take an interface out of service, perform these steps:

**Step 1**
```
switch# configure terminal
```
Enters configuration mode.

**Step 2**
```
switch(config)# interface fc 1/1
```
Selects the interface and enters interface configuration submode.

**Step 3**
```
switch(config-if)# no channel-group
```
Removes the interface from a port channel.

**Step 4**
```
switch(config-if)# shutdown
```
Disables the interface.

**Step 5**
```
switch(config-if)# out-of-service
```
Takes the interface out of service.

This example shows a 24-port 4-Gbps module:

```
switch# show port-resources module 1
Module 1
Available dedicated buffers for global buffer #0 [port-group 1] are 2618
Available dedicated buffers for global buffer #1 [port-group 2] are 2149
Available dedicated buffers for global buffer #2 [port-group 3] are 2150
Available dedicated buffers for global buffer #3 [port-group 4] are 1102
Available dedicated buffers for global buffer #4 [port-group 5] are 2150
Available dedicated buffers for global buffer #5 [port-group 6] are 2150
Available dedicated buffers for global buffer #6 [port-group 7] are 2150
Available dedicated buffers for global buffer #7 [port-group 8] are 2150
Available dedicated buffers for global buffer #8 [port-group 9] are 2150
Available dedicated buffers for global buffer #9 [port-group 10] are 2150
Available dedicated buffers for global buffer #10 [port-group 11] are 2150
Available dedicated buffers for global buffer #11 [port-group 12] are 2150

Port-Group 1
Total bandwidth is 64.0 Gbps
Allocated dedicated bandwidth is 64.0 Gbps

<table>
<thead>
<tr>
<th>Interfaces in the Port-Group</th>
<th>B2B Credit Buffers</th>
<th>Bandwidth (Gbps)</th>
<th>Rate Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>fc1/1</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/2</td>
<td>32</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/3</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/4</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
</tbody>
</table>

Port-Group 2
Total bandwidth is 64.0 Gbps
Allocated dedicated bandwidth is 52.0 Gbps

<table>
<thead>
<tr>
<th>Interfaces in the Port-Group</th>
<th>B2B Credit Buffers</th>
<th>Bandwidth (Gbps)</th>
<th>Rate Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>fc1/5</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/6</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/7</td>
<td>500</td>
<td>4.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/8</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
</tbody>
</table>
Port-Group 12
Total bandwidth is 64.0 Gbps
Allocated dedicated bandwidth is 64.0 Gbps

<table>
<thead>
<tr>
<th>Interfaces in the Port-Group</th>
<th>B2B Credit Buffers</th>
<th>Bandwidth (Gbps)</th>
<th>Rate Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>fc1/45</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/46</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/47</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
<tr>
<td>fc1/48</td>
<td>500</td>
<td>16.0</td>
<td>dedicated</td>
</tr>
</tbody>
</table>
Verifying Fibre Channel Interfaces Configuration

To display Fibre Channel interface configuration information, perform one of the following tasks:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>show module</td>
<td>Displays the module.</td>
</tr>
<tr>
<td>show module slot recovery-steps</td>
<td>Displays the slot for the module.</td>
</tr>
<tr>
<td>show port-resources module slot</td>
<td>Displays the port resources for the slot.</td>
</tr>
<tr>
<td>show interface fc slot/port</td>
<td>Displays the slot or port information. FEC admin and operational states are displayed.</td>
</tr>
<tr>
<td>show interface brief</td>
<td>Displays the interface.</td>
</tr>
<tr>
<td>show port index-allocation</td>
<td>Displays the port in the index allocation.</td>
</tr>
<tr>
<td>show port index-allocation startup</td>
<td>Displays the startup port in the index allocation.</td>
</tr>
<tr>
<td>show port-channel compatibility parameters</td>
<td>Displays the port channel compatibility parameters.</td>
</tr>
<tr>
<td>show module slot bandwidth-fairness</td>
<td>Displays the module slot bandwidth fairness information.</td>
</tr>
</tbody>
</table>

For detailed information about the fields in the output from these commands, refer to the Cisco MDS 9000 Series Command Reference.

Displaying FEC Module Interfaces

This example shows a 32-Gbps Fibre Channel interface status:

Note

36-gigabit Fibre Channel ports comes up automatically in FEC and need not be configured.

switch# show interface fc 10/21 brief
------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Interface</th>
<th>Vsan</th>
<th>Admin Mode</th>
<th>Admin Trunk Mode</th>
<th>Status</th>
<th>SFP Oper Mode</th>
<th>Oper Speed</th>
<th>Port Channel</th>
<th>Logical Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>fc10/21</td>
<td>1</td>
<td>auto</td>
<td>on</td>
<td>trunking</td>
<td>swl</td>
<td>TE</td>
<td>32</td>
<td>core</td>
</tr>
</tbody>
</table>

switch# show interface fc10/21
fc10/21 is trunking
Hardware is Fibre Channel, SFP is short wave laser w/o OFC (SN)
Port WWN is 22:55:54:7f:ee:ea:1f:00
Peer port WWN is 22:24:54:7f:ee:ea:1d:00
Admin port mode is auto, trunk mode is on
snmp link state traps are enabled
Port mode is TE
Port vsan is 1
Admin Speed is auto max 32 Gbps
Operating Speed is 32 Gbps
Rate mode is dedicated
Port flow-control is R_RDY

Transmit B2B Credit is 500
Receive B2B Credit is 500
B2B State Change Number is 14
Receive data field Size is 2112
Beacon is turned off
fec is enabled by default
Logical type is core
Trunk vsans (admin allowed and active) (1)
Trunk vsans (up) (1)
Trunk vsans (isolated) ()

Displaying SFP Diagnostic Information

You can use the `show interface interface-range transceiver details` command to display small form-factor pluggable (SFP) diagnostic information.

```
switch# show interface fc1/5 transceiver details
fc1/5 sfp is present
   Name is CISCO-AVAGO
   Manufacturer's part number is SFBR-5780APZ-CS2
   Revision is G2.3
   Serial number is AGD151785V6
   Cisco part number is 10-2418-01
   Cisco pid is DS-SFP-FC8G-SW
   FC Transmitter type is short wave laser w/o OFC (SN)
   FC Transmitter supports short distance link length
   Transmission medium is multimode laser with 62.5 um aperture (M6)
   Supported speeds are - Min speed: 2000 Mb/s, Max speed: 8000 Mb/s
   Nominal bit rate is 8500 Mb/s
   Link length supported for 50/125um OM2 fiber is 50 m
   Link length supported for 62.5/125um fiber is 21 m
   Link length supported for 50/125um OM3 fiber is 150 m
   Cisco extended id is unknown (0x0)

   No tx fault, no rx loss, in sync state, diagnostic monitoring type is 0x68

SFP Diagnostics Information:

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Low</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>50.26 C</td>
<td>75.00 C</td>
<td>-5.00 C</td>
<td>70.00 C</td>
</tr>
<tr>
<td>Voltage</td>
<td>3.35 V</td>
<td>3.63 V</td>
<td>2.97 V</td>
<td>3.46 V</td>
</tr>
<tr>
<td>Current</td>
<td>8.33 mA</td>
<td>8.50 mA</td>
<td>2.00 mA</td>
<td>8.50 mA</td>
</tr>
<tr>
<td>Tx Power</td>
<td>-2.45 dBm</td>
<td>1.70 dBm</td>
<td>-14.00 dBm</td>
<td>-1.30 dBm</td>
</tr>
<tr>
<td>Rx Power</td>
<td>-4.81 dBm</td>
<td>3.00 dBm</td>
<td>-17.30 dBm</td>
<td>0.00 dBm</td>
</tr>
<tr>
<td>Transmit Fault Count</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: ++ high-alarm; + high-warning; -- low-alarm; - low-warning
**Configuration Examples for Fibre Channel Interfaces**

**Configuration Example for FEC Module Interfaces**

These steps describe how to configure FEC module interfaces:

---

**Step 1**
Select the interfaces fc 4/1 through fc 4/2.

**Example:**

```bash
switch# configure terminal
switch(config)# interface fc 4/1 - 2
```

**Step 2**
Configure the FEC on the interfaces.

**Example:**

```bash
switch(config-if)# switchport speed 16000
switch(config-if)# switchport fec
```

**Step 3**
Enable the interfaces and return to configuration mode.

**Example:**

```bash
switch(config-if)# no shutdown
switch(config-if)# exit
```

**Step 4**
Select the interfaces fc 4/3 through fc 4/4.

**Example:**

```bash
switch# configure terminal
switch(config)# interface fc 4/3 - 4
```

**Step 5**
Configure the port speed, rate mode, and port mode on the interfaces.

**Example:**

```bash
switch(config-if)# switchport speed 16000
switch(config-if)# switchport fec
```