

Frequency Synchronization Commands

This chapter describes the Cisco IOS XR frequency synchronization commands that are used to distribute precision frequency around a network.

- Enabling Frequency Synchronization, on page 2
- clear Frequency Synchronization esmc statistics, on page 3
- clear Frequency Synchronization wait-to-restore, on page 4
- log selection, on page 5
- priority (Frequency Synchronization), on page 6
- quality itu-t option, on page 7
- quality receive, on page 8
- quality transmit, on page 11
- selection input, on page 14
- clock-interface, on page 15
- show Frequency Synchronization configuration-errors, on page 16
- show frequency synchronization interfaces, on page 17
- show frequency synchronization clock-interfaces, on page 19
- show controllers slice-control all location, on page 22
- show controllers timing controller, on page 23
- show frequency synchronization interfaces brief, on page 25
- show Frequency Synchronization selection, on page 26
- show Frequency Synchronization selection back-trace, on page 30
- show Frequency Synchronization selection forward-trace, on page 31
- show running-config frequency synchronization, on page 32
- ssm disable, on page 33
- wait-to-restore, on page 34

Enabling Frequency Synchronization

To enable Frequency Synchronization globally on the router and to configure Frequency Synchronization options for a controller or interface, use the **frequency synchronization** command in the appropriate configuration mode. To disable Frequency Synchronization, use the **no** form of this command.

frequency synchronization
no frequency synchronization

Syntax Description

This command has no keywords or arguments.

Command Default

Disabled

Command Modes

Global configuration (config)

Interface configuration (config-interface)

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

When you configure Frequency Synchronization in global configuration mode, the default clocking is configured for Internal Oscillator. Line timing is used only if Frequency Synchronization is enabled on Line interfaces.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to enable Frequency Synchronization in global configuration:

```
RP/0/RP0:hostname# config
RP/0/RP0:hostname(config)# frequency synchronization
RP/0/RP0:hostname(config-freqsync)# commit
```

The following example shows how to enable Frequency Synchronization on an Ethernet interface:

```
RP/0/RP0:hostname# config
RP/0/RP0:hostname(config)# interface tenGigE 0/5/0/0
RP/0/RP0:hostname(config-if)# frequency synchronization
RP/0/RP0:hostname(config-if-freqsync)# commit
```

clear Frequency Synchronization esmc statistics

To clear the Ethernet Synchronization Messaging Channel (ESMC) statistics, use the **clear frequency synchronization esmc statistics** command in EXEC mode.

clear frequency synchronization esmc statistics interface {*interface* | **all** | **summary** **location** {*node-id* | **all**}}

Syntax Description

interface	The command can be restricted to clear the ESMC statistics for a particular interface by specifying the interface.
node-id	The output can be restricted to clear the ESMC statistics for a particular node by specifying the location. The *node-id* argument is entered in the *rack*/*slot*/*module* notation.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to clear the ESMC statistics on specific interface: :

```
RP/0/RP0:hostname# clear frequency synchronization esmc statistics interface tenGigE0/1/0/1
```

clear Frequency Synchronization wait-to-restore

To clear the Frequency Synchronization wait-to-restore timer, use the **clear frequency synchronization wait-to-restore** command in EXEC mode.

clear frequency synchronization wait-to-restore {**all** | {**frequency synchronization** *port-num* **location** *node-id*} | **interface** {*type interface-path-id* | **all**}}

Syntax Description

all	Clears all wait-to-restore timers.
interface *type interface-path-id*	Clears the wait-to-restore timers for a specific interface or all interfaces.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to clear the Frequency Synchronization wait-to-restore timer on specific interface:

```
RP/0/RP0:ios# clear frequency synchronization wait-to-restore interface tenGigE0/1/0/1
```

log selection

To enable logging of changes or errors to Frequency Synchronization, use the **log selection** command in Frequency Synchronization configuration mode. To disable logging, use the **no** form of this command.

log selection {**changes** | **errors**}
no log selection

Syntax Description

changes	Logs every time there is a change to the selected source, including any logs that the **errors** keyword logs.
errors	Logs only when there are no available frequency sources, or when the only available frequency source is the internal oscillator.

Command Default

No default behavior or values

Command Modes

Frequency Synchronization configuration

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

This example shows how to enable logging of changes to Frequency Synchronization:

```
RP/0/RP0:ios(config)# config
RP/0/RP0:ios(config)# frequency synchronization
RP/0/RP0:ios(config-freqsync)# log selection changes
RP/0/RP0:ios(config-freqsync)# commit
```

priority (Frequency Synchronization)

To configure the priority of the frequency source on an interface, use the **priority** command in the Interface Frequency Synchronization configuration mode. To return the priority to the default value, use the no form of this command.

priority *priority-value*
no priority *priority-value*

Syntax Description

priority-value	Priority of the frequency source. The priority is used to select between sources with the same Quality Level (QL). The range is 1 (highest priority) to 254 (lowest priority).

Command Default

100

Command Modes

Interface Frequency Synchronization configuration

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to configure the Frequency Synchronization priority on an interface:

```
RP/0/RP0:ios(config)# config
RP/0/RP0:ios(config)# interface tenGigE 0/1/0/1
RP/0/RP0:ios(config-if)# frequency synchronization
RP/0/RP0:ios(config-if-freqsync)# priority 150
RP/0/RP0:ios(config-if-freqsync)# commit
```

quality itu-t option

To configure the quality level (QL) options, use the **quality itu-t option** command in Frequency Synchronization configuration mode. To return to the default levels, use the **no** form of this command.

quality itu-t option {**1** | **2 generation** {**1** | **2**}}
no quality

Syntax Description

{**1** | **2 generation** {**1** | **2**}} Specifies the quality level for the router. Valid options are:

- **1**—ITU-T QL option 1, which uses the PRC, SSU-A, SSU-B, SEC and DNU quality levels.
- **2 generation 1**—ITU-T QL option 2 generation 1, which uses the PRS, STU, ST2, ST3, SMC, ST4, RES and DUS quality levels.
- **2 generation 2**—ITU-T QL option 2, generation 2, which uses the PRS, STU, ST2, ST3 TNC, ST3E, SMC, ST4, PROV and DUS quality levels.

Command Default

ITU-T option 1

Command Modes

Frequency Synchronization configuration

Note The QL should match with what is configured in global option.

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

The QL configured with the **quality itu-t option** command must match the QL specified in the **quality transmit** and **quality receive** commands configured in interface Frequency Synchronization configuration mode.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to configure the ITU-T QL options:

```
RP/0/RP0:ios#config
RP/0/RP0:ios(config)# frequency synchronization
RP/0/RP0:ios(config-freqsync)# quality itu-t option 1
RP/0/RP0:ios(config-freqsync)# commit
```

quality receive

To configure all the Synchronization Status Message (SSM) quality levels (QLs) for the frequency source from the receive interface, use the **quality receive** command in the appropriate Frequency Synchronization mode. To return to the default levels, use the no form of this command.

quality receive itu-t option { **lowest** *ql-option ql* [**highest** *ql*] | **highest** *ql-option ql* | **exact** *ql-option ql* }
no quality receive

Syntax Description

ql-option Quality Level (QL) options.

Valid values are:

- **1**—ITU-T Option 1
- **2 generation 1**—ITU-T Option 2 Generation 1
- **2 generation 2**—ITU-T Option 2 Generation 2

ql Quality Level (QL) value.

For line interfaces and clock interface with SSM support, any of the following combinations of QL values can be specified to modify the QL value received via SSM:

- If the **exact** keyword is used and the received or default QL is not DNU, then this value is used (rather than the received/default QL).
- If the **lowest** keyword is used and the received QL is a lower quality than this, then the received QL value is ignored and DNU is used instead.
- If the **highest** keyword is used and the received QL is higher quality than this, then the received QL value is ignored and this value is used instead.
- If the **lowest** and **highest** keywords are used, the behavior is as above. The maximum QL must be at least as high quality as the minimum QL.

Valid QL values for ITU-T Option 1 are:

- PRC
- SSU-A
- SSU-B
- SEC
- DNU

Valid QL values for ITU-T Option 2 Generation 1 are:

- PRS
- STU
- ST2
- ST3
- SMC
- ST4
- RES
- DUS

Valid QL values for ITU-T Option 2 Generation 2 are:

- PRS
- STU
- ST2
- TNC
- ST3E
- ST3
- SMC
- ST4
- PROV
- DUS

Command Default

QL is unmodified.

Command Modes

Interface Frequency Synchronization

Note Quality configuration should match with what is configured in global option.

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

In cases where the clock interface supports SSM but it is not always enabled, all options are available.

Note If SSM is disabled, only the exact QL option is available.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following examples shows how to configure all the SSM quality levels for the frequency source from the receive interface:

```
RP/0/RP0:ios# config
RP/0/RP0:ios(config)# int tenGigE0/2/0/7
RP/0/RP0:ios(config-if)# frequency synchronization
RP/0/RP0:ios(config-if-freqsync)# quality receive exact itu-t option 1 PRC
RP/0/RP0:ios(config-if-freqsync)# commit


RP/0/RP0:ios# config
RP/0/RP0:ios(config)# clock-interface Rack0-Bits0-In
```

```
RP/0/RP0:ios(config-clock-if)# port-parameters etsi bits-input e1 fas ami
RP/0/RP0:ios(config-clock-if)# frequency synchronization
RP/0/RP0:ios(config-clk-freqsync)# selection input
RP/0/RP0:ios(config-clk-freqsync)# wait-to-restore 0
RP/0/RP0:ios(config-clk-freqsync)# quality receive highest itu-t option 1 PRC
RP/0/RP0:ios(config-clk-freqsync)# commit
```

quality transmit

To configure all the Synchronization Status Message (SSM) quality levels for the frequency source from the transmit interface, use the **quality transmit** command in the appropriate Frequency Synchronization mode. To return to the default levels, use the **no** form of this command.

quality transmit itu-t option { **lowest** *ql-option ql* [**highest** *ql*] | **highest** *ql-option ql* | **exact** *ql-option ql* }
no quality transmit

Syntax Description

ql-option Quality Level (QL) ITU-T options.

Valid values are:

- **1**—ITU-T Option 1
- **2 generation 1**—ITU-T Option 2 Generation 1
- **2 generation 2**—ITU-T Option 2 Generation 2

ql Quality Level (QL) value.

For line interfaces with SSM support, any of the following combinations of QL values can be specified to modify the QL value received via SSM:

- If the **exact** keyword is used and the received or default QL is not DNU, then this value is used (rather than the received/default QL).
- If the **lowest** keyword is used and the received QL is a lower quality than this, then the received QL value is ignored and DNU is used instead.
- If the **highest** keyword is used and the received QL is higher quality than this, then the received QL value is ignored and this value is used instead.
- If the **lowest** and **highest** keywords are used, the behavior is as above. The maximum QL must be at least as high quality as the minimum QL.

Valid QL values for ITU-T Option 1 are:

- PRC
- SSU-A
- SSU-B
- SEC
- DNU

Valid QL values for ITU-T Option 2 Generation 1 are:

- PRS
- STU
- ST2
- ST3
- SMC
- ST4
- RES
- DUS

Valid QL values for ITU-T Option 2 Generation 2 are:

- PRS
- STU
- ST2
- TNC
- ST3E
- ST3
- SMC
- ST4
- PROV
- DUS

Command Default

The QL is unmodified

Command Modes

Interface Frequency Synchronization

Note Quality configuration should match with what is configured in global option.

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

If the interface is the selected source, DNU is always sent regardless of this configuration.

This configuration has no effect when SSM is disabled.

Note For clock interfaces that do not support SSM, only the lowest QL can be specified. In this case, rather than sending DNU, the output is squelched, and no signal is sent.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following examples show how to configure all the SSM quality levels for the frequency source from the transmit interface:

```
RP/0/RP0:ios# config
RP/0/RP0:ios(config)# int tenGigE0/2/0/7
RP/0/RP0:ios(config-if)# frequency synchronization
RP/0/RP0:ios(config-if-freqsync)# quality transmit exact itu-t option 2 generation 1 PRS
RP/0/RP0:ios(config-if-freqsync)# commit
```

```
RP/0/RP0:ios# config
RP/0/RP0:ios(config)# clock-interface Rack0-Bits0-Out
RP/0/RP0:ios(config-clock-if)# port-parameters etsi bits-input e1 fas ami
RP/0/RP0:ios(config-clock-if)# frequency synchronization
RP/0/RP0:ios(config-clk-freqsync)# quality transmit highest itu-t option 1 PRC
RP/0/RP0:ios(config-clk-freqsync)# commit
```

selection input

To configure an interface so that it is available as a timing source for selection by the system, use the **selection input** command in the appropriate Frequency Synchronization configuration mode. To remove the interface as an available timing source, use the **no** form of this command.



Note At a time, only two configured line interfaces participate in frequency synchronization.

selection input
no selection input

Syntax Description

This command has no keywords or arguments.

Command Default

Disabled

Command Modes

Interface Frequency Synchronization configuration

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to configure an interface so that it is available as a timing source for selection by the system:

```
RP/0/RP0:hostname# config
RP/0/RP0:hostname(config)# interface tenGigE0/1/0/1
RP/0/RP0:hostname(config-if)# frequency synchronization
RP/0/RP0:hostname(config-if-freqsync)# selection input
RP/0/RP0:hostname(config-if-freqsync)# commit
```

clock-interface

To configure a clock controller, use the **clock-interface** command in the config mode. To delete the controller, use the no form of this command.

clock-interface [**Rack0-Bits0-In** | **Rack0-Bits0-Out** | **Rack0-Bits1-In** | **Rack0-Bits1-Out**]
port-parameters [**Interface Type**] [**bits-input** | **bits-output**] [**BITS mode**]

Following are valid port-parameter commands:

port-parameters [**ansi** | **etsi**] **bit-input 64k**
port-parametersetsi [**bit-input** | **bit-output**] **2m**
port-parametersetsi [**bit-input** | **bit-output**] **e1 crc-4** [**sa4** | **sa5** | **sa6** | **sa7** | **sa8**] [**ami** | **hdb3**]
port-parametersetsi [**bit-input** | **bit-output**] **e1 fas** [**ami** | **hdb3**]
port-parametersansi bit-output j1 [**d4** | **esf**] [**ami** | **b8zs**]
port-parametersansi bit-input [**j1** | **t1**] [**d4** | **esf**] [**ami** | **b8zs**]
port-parametersansi bit-output t1 [**d4** | **esf**] [**ami** | **b8zs**] [**0** | **1** | **2** | **3** | **4**]
no port-parameters

Syntax Description

Interface Type	Type of clock interface. Valid values are ANSI and ETSI.
BITS mode	BITS mode.

Command Default

None.

Command Modes

Config mode

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Examples

The following example shows how to configure a clock interface:

```
RP/0/RP0:hostname# configure
RP/0/RP0:hostname(config)# clock-interface Rack0-Bits0-Out
RP/0/RP0:hostname(config-Optics)# port-parameters etsi bits-output e1 crc-4 sa4 ami
RP/0/RP0:hostname(config-Optics)# commit
```

show Frequency Synchronization configuration-errors

To display information about any configuration inconsistencies that are detected, but that are not rejected by verification, use the **show frequency synchronization configuration-errors** command in EXEC mode.

show frequency synchronization configuration-errors [**location** *node-id*]

Syntax Description

location	Location of the card, specified by *node-id*.
node-id	The output can be restricted to a particular node by specifying the location. The *node-id* argument is entered in the *rack*/*slot*/*module* notation.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

This example shows the normal output for the **show frequency synchronization configuration-errors** command:

```
RP/0/RP0:hostname # show frequency synchronization configuration-errors

Thu Jan 19 09:55:42.779 UTC
Node 0/RP0:
==============
interface TenGigE0/13/0/7 frequency synchronization quality
transmit exact itu-t option 2 generation 1 PRS
* The QL that is configured is from a different QL option set than is configured globally.
```

show frequency synchronization interfaces

To show the Frequency Synchronization information for all interfaces or for a specific interface, use the **show frequency synchronization interfaces** command in EXEC mode.

show frequency synchronization interfaces {**brief** | **summary** [**location** *node-id*] | *type interface-path-id*}

Syntax Description

brief	Displays brief information for all interfaces.
summary [**location** *node-id*]	Displays summary information for all notes or a specific node. The *node-id* argument is entered in the *rack*/*slot*/*module* notation.
type interface-path-id	Displays information for a specific interface.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows the display output for the **show frequency synchronization interfaces** command:

```
RP/0/RP0:hostname#show frequency synchronization interfaces
Interface FortyGigE0/7/0/2 (unknown)
  Wait-to-restore time 0 minutes
  SSM Enabled
  Input:
    Down - not assigned for selection
    Supports frequency
  Output:
    Selected source: None
    Effective QL: DNU
  Next selection points: LC7_ING_SEL
```

The output in brief mode is as follows:

```
RP/0/RP0:hostname#show frequency synchronization interfaces brief

Flags:  > - Up               D - Down             S - Assigned for selection
        d - SSM Disabled     x - Peer timed out   i - Init state
        s - Output squelched
Fl   Interface               QLrcv QLuse Pri QLsnd Output driven by
```

```
==== ======================== ===== ===== === ===== ========================
>S   TenGigE0/2/0/7           ST3   ST3   100 PRS   TenGigE0/13/0/7
>S   TenGigE0/2/0/8           ST3   ST3   100 PRS   TenGigE0/13/0/7
>    TenGigE0/13/0/5          PRS   Fail  100 PRS   TenGigE0/13/0/7
>    TenGigE0/13/0/6          PRS   Fail  100 PRS   TenGigE0/13/0/7
>S   TenGigE0/13/0/7          PRS   PRS   100 DUS   TenGigE0/13/0/7
>S   TenGigE0/13/0/8          ST3   ST3   100 PRS   TenGigE0/13/0/7
D    HundredGigE0/13/0/0      Fail  Fail  100 PRS   TenGigE0/13/0/7
```

The output in summary mode is as follows, for each node:

```
RP/0/RP0:hostname#show frequency synchronization summary

1 Ethernet interfaces in Synchronous mode, 0 assigned for selection, 1 with SSM enabled

    ESMC SSMs        Total  Information     Event    DNU/DUS
      Sent:          23236        23168        68        200
      Received:      23164        23162         2      19364
```

show frequency synchronization clock-interfaces

To display the frequency synchronization information for all clock-interfaces or for a specific node, use the **show frequency synchronization clock-interfaces** command in EXEC mode.

show frequency synchronization clock-interface [**brief**] [**location** *node-id*]

Syntax Description

brief	Displays summary information for all clock interfaces.
location *node-id*	(Optional) Displays information for a specific interface. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute
sonet-sdh	execute

Examples

The following example shows the display output for the **show frequency synchronization clock-interfaces** command:

```
RP/0/RP0:hostname#show frequency synchronization clock-interfaces

Node 0/RP0:
==============
Clock interface Sync0 (Down: NONE)
    Wait-to-restore time 5 minutes
    SSM supported and enabled
    Input:
      Down - not assigned for selection
      Last received QL: None
      Supports frequency
    Output is disabled
  Next selection points: T0_SEL

  Clock interface Sync1 (Down: NONE)
    Wait-to-restore time 0 minutes
    SSM supported and enabled
    Input is disabled
    Output:
      Selected source: None
      Effective QL: DNU
  Next selection points: None
```

```
  Clock interface Sync2 (Down: NONE)
    Wait-to-restore time 5 minutes
    SSM supported and enabled
    Input:
      Down - not assigned for selection
      Last received QL: None
      Supports frequency
    Output is disabled
  Next selection points: T0_SEL

  Clock interface Sync3 (Down: NONE)
    Wait-to-restore time 0 minutes
    SSM supported and enabled
    Input is disabled
    Output:
      Selected source: None
      Effective QL: DNU
  Next selection points: None

  Clock interface Internal0 (Up)
    Assigned as input for selection
    Input:
      Default QL: None
      Effective QL: Failed, Priority: 255, Time-of-day Priority 255
      Supports frequency
  Next selection points: T0_SEL T4_SEL
```

The output in brief mode is as follows:

```
RP/0/RP0:hostname#show frequency synchronization clock-interfaces brief

Flags:  > - Up                D - Down              S - Assigned for selection
        d - SSM Disabled      s - Output squelched  L - Looped back
Node 0/RP0:
==============
  Fl    Clock Interface     QLrcv  QLuse  Pri QLsnd  Output driven by
  ===== ================== ====== ====== === ====== ========================
  D     Sync0               None   Fail   100 n/a    n/a
  D     Sync1               n/a    n/a    n/a DNU    None
  D     Sync2               None   Fail   100 n/a    n/a
  D     Sync3               n/a    n/a    n/a DNU    None
  DS    Internal0           n/a    Fail   255 n/a    n/a
```

The output for particular location is as follows:

```
RP/0/RP0:hostname#show frequency synchronization clock-interfaces location 0/RP0

Node 0/RP0:
==============
  Clock interface Sync0 (Unknown state)
    Wait-to-restore time 5 minutes
    SSM supported and enabled
    Input:
      Down - not assigned for selection
      Last received QL: None
      Supports frequency
    Output is disabled
  Next selection points: T0_SEL

  Clock interface Sync1 (Unknown state)
    Wait-to-restore time 5 minutes
    SSM supported and enabled
```

```
  Input is disabled
  Output:
    Selected source: None
    Effective QL: DNU
Next selection points: None

Clock interface Sync2 (Unknown state)
  Wait-to-restore time 5 minutes
  SSM supported and enabled
  Input:
    Down - not assigned for selection
    Last received QL: None
    Supports frequency
  Output is disabled
Next selection points: T0_SEL

Clock interface Sync3 (Unknown state)
  Wait-to-restore time 5 minutes
  SSM supported and enabled
  Input is disabled
  Output:
    Selected source: None
    Effective QL: DNU
Next selection points: None

Clock interface Internal0 (Unknown state)
  Assigned as input for selection
  Input:
    Default QL: None
    Effective QL: Failed, Priority: 255, Time-of-day Priority 255
    Supports frequency
Next selection points: T0_SEL T4_SEL
```

show controllers slice-control all location

To display the clock source information for the LC, use the **show controllers slice-control all location** command in EXEC mode.

show controllers slice-control all location <*LC location*>

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 5.2.4	This command was introduced.

Examples

The following example shows the display output for the **show controllers slice-control all location** command:

```
RP/2/RP0:MC_FLT+4+1# show controllers slice-control all location 0/LC1
Thu Mar 22 14:36:42.685 IST
CARD 0 IS OFFLINE
CARD 1 IS OFFLINE
CARD 3 IS OFFLINE
CARD 8 IS OFFLINE
CARD 10 IS OFFLINE
CARD 11 IS OFFLINE
CARD 12 IS OFFLINE
CARD 13 IS OFFLINE
CARD 14 IS OFFLINE
=============================================
Slice Controller Context: 2
=============================================
Inserted              : Yes
Physical Slot number  : 3
Logical slot number   : 2
Board type            : 5408a5 (BOARD_TYPE_SCAPA_1x100GE_CPAK_10x10GE)
Slice oper state      : OPERATIONAL
Bao Version           : 0.1.59
Hotplug status        : ONLINE
PCI Bar Address       : 0xb064000000
MSI                   : c9
PLLs locked           : Yes
PLLs Init Status      : PLL Initialized
PLLs Reset Status     : PLL Reset Skipped
Clock Status          : External (RP0)
Hardware ID           : |e08:3_e_2.0
```

show controllers timing controller

To display the summary of the timing controller configuration, use the **show controllers timing controller { clock | te-port}** command in EXEC mode.

show controllers timing controller clock
show controllers timing controller te-port

Syntax Description

clock	Displays the clock interface settings.
te-port	Displays the te interface settings.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.5.25	This command was updated for Multi Chassis.
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows the display output for the **show controllers timing controller clock** command:

```
RP/0/RP0:hostname#show controllers timing controller clock

SYNCEC Clock-Setting:

          Port 0          Port 1          Port 2          Port 3
Config     : No             Yes             No             Yes
BITS Mode  : -              E1              -              E1
Framing    : -              CRC4            -              CRC4
Linecoding : -              AMI             -              AMI
Submode    : -              Sa4             -              Sa4
Shutdown   : No             No              No             No
Direction  : RX             TX              RX             TX
QL Option  : O1             O1              O1             O1
RX_ssm     : -              -               -              -
TX_ssm     : -              SEC             -              SEC
If_state   : ADMIN_DOWN     DOWN            ADMIN_DOWN     DOWN
```

Examples

The following example shows the display output for the **show controllers timing controller te-port** command:

```
RP/2/RP0:MC_FLT+4+1# show controllers timing controller te-port
Thu Mar 22 11:43:01.307 IST

FSYNCDIR TE-Port Setting: Rack 0

FSYNC Mastership Rack 0: MASTER
          TE0-E           TE1-E           TE0-W           TE1-W
TE state : FORWARDING     FORWARDING      FORWARDING      FORWARDING
Rx Signal: No             No              No              No
Link     : Good           Good            Good            Good
PeerRack : 1              1               3               3
PeerPort : TE0-W          TE1-W           TE0-E           TE1-E
DELAY(ns): 240            240             235             240


FSYNCDIR TE-Port Setting: Rack 1

FSYNC Mastership Rack 1: SLAVE
          TE0-E           TE1-E           TE0-W           TE1-W
TE state : FORWARDING     FORWARDING      MASTER          BACKUP
Rx Signal: No             No              Yes             Yes
Link     : Good           Good            Good            Good
PeerRack : 2              2               0               0
PeerPort : TE0-W          TE1-W           TE0-E           TE1-E
DELAY(ns): 235            240             240             240


FSYNCDIR TE-Port Setting: Rack 2

FSYNC Mastership Rack 2: SLAVE
          TE0-E           TE1-E           TE0-W           TE1-W
TE state : ALTERNATE      ALTERNATE       MASTER          BACKUP
Rx Signal: Yes            Yes             Yes             Yes
Link     : Good           Good            Good            Good
PeerRack : 3              3               1               1
PeerPort : TE0-W          TE1-W           TE0-E           TE1-E
DELAY(ns): 240            235             240             240


FSYNCDIR TE-Port Setting: Rack 3

FSYNC Mastership Rack 3: SLAVE
          TE0-E           TE1-E           TE0-W           TE1-W
TE state : MASTER         BACKUP          ALTERNATE       ALTERNATE
Rx Signal: Yes            Yes             Yes             Yes
Link     : Good           Good            Good            Good
PeerRack : 0              0               2               2
PeerPort : TE0-W          TE1-W           TE0-E           TE1-E
DELAY(ns): 235            240             240             235
```

show frequency synchronization interfaces brief

To display frequency synchronization interface details, use the **show frequency synchronization interfaces brief** command in the appropriate mode.

show frequency synchronization interfaces brief

Syntax Description

brief	Displays the brief interface information.

Command Default

No default behavior or values

Command Modes

System Admin EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

None

Example

This example shows how to use the **show frequency synchronization interfaces brief** command:

```
RP/0/RP0:MC_OTN#show frequency synchronization interfaces brief

Thu Mar 22 14:42:52.032 IST
Flags:  > - Up                D - Down              S - Assigned for selection
        d - SSM Disabled      x - Peer timed out    i - Init state
        s - Output squelched
Fl   Interface                QLrcv QLuse Pri QLsnd Output driven by
==== ======================== ===== ===== === ===== ========================
>    TenGigE0/9/0/2           DNU   n/a   100 PRC   Rack2-Bits0-In
>S   TenGigE0/9/0/8           PRC   PRC   200 PRC   Rack2-Bits0-In
>S   TenGigE2/4/0/2           SSU-A SSU-A 100 PRC   Rack2-Bits0-In
>S   FortyGigE2/15/0/6        PRC   PRC    10 PRC   Rack2-Bits0-In
```

show Frequency Synchronization selection

To display the Frequency Synchronization selection information for all selection points or for a specific node, use the **show frequency synchronization selection** command in EXEC mode.

show frequency synchronization selection {**location** *node-id*}

Syntax Description

location *node-id*	Displays information for a specific node on the router. The *node-id* argument is entered in the *rack*/*slot*/*module* notation.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

The **show frequency synchronization selection** command shows the status of the timing stream from the timing source

Task ID

Task ID	Operations
ethernet-services	execute

Examples

This example shows the normal output for the **show frequency synchronization selection** command:

```
RP/0/RP0:ios # show frequency synchronization selection

Node 0/RP0:
==============
Selection point: T0_SEL (4 inputs, 1 selected)
  Last programmed 00:05:34 ago, and selection made 00:05:18 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T4_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection
  Used for local line interface output
  S  Input                     Last Selection Point          QL  Pri  Status
  == ========================  ========================  =====  ===  ===========
  1  Sync2 [0/RP0]             n/a                         PRS   99  Locked
     TenGigE0/7/0/9/4          0/RP0 LC7_ING_SEL 1         PRS  100  Available
     TenGigE0/13/0/0/6         0/RP0 LC13_ING_SEL 1        STU  100  Available
     Internal0 [0/RP0]         n/a                         ST3  255  Available

Selection point: T4_SEL (2 inputs, 1 selected)
  Last programmed 00:05:22 ago, and selection made 00:05:18 ago
  Next selection points
    SPA scoped    : None
```

```
    Node scoped   : None
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection
  Used for local clock interface output
  S  Input                      Last Selection Point          QL  Pri  Status
  == ========================  ========================  =====  ===  ===========
  1  Sync2 [0/RP0]              0/RP0 T0_SEL 1              PRS   99  Locked
     Internal0 [0/RP0]          n/a                         ST3  255  Available

Selection point: LC0_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC1_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC2_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC3_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC4_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC5_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection
```

```
Selection point: LC6_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC7_ING_SEL (1 inputs, 1 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:35 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection
  S  Input                     Last Selection Point         QL  Pri  Status
  == ========================  ========================  =====  ===  ===========
  1  TenGigE0/7/0/9/4          n/a                         PRS  100  Available

Selection point: LC8_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC9_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC10_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC11_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC12_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
```

```
  Uses frequency selection

Selection point: LC13_ING_SEL (2 inputs, 1 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:34 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection
  S  Input                     Last Selection Point          QL  Pri  Status
  == ========================  ========================  =====  ===  ===========
  1  TenGigE0/13/0/0/6         n/a                         STU  100  Available
     TenGigE0/13/0/8           n/a                         STU  100  Available

Selection point: LC14_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection

Selection point: LC15_ING_SEL (0 inputs, 0 selected)
  Last programmed 00:05:36 ago, and selection made 00:05:36 ago
  Next selection points
    SPA scoped    : None
    Node scoped   : T0_SEL
    Chassis scoped: None
    Router scoped : None
  Uses frequency selection
```

show Frequency Synchronization selection back-trace

To display the path that was followed by the clock source that is being used to drive a particular interface use the **show frequency synchronization selection back-trace** command in EXEC mode.

show frequency synchronization selection back-trace {*port-num* | **interface** *type interface-path-id* | *node-id*}

Syntax Description

interface *type interface-path-id*	Displays the path to the specified interface.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

The **show frequency synchronization selection back-trace** command displays the trace from the specified target interface, back to the clock source being used to drive it. The display includes the selection points that are being hit along the way.

Task ID

Task ID	Operation
ethernet-services	read

This example shows sample output from the **show frequency synchronization selection back-trace** command:

```
RP/0/RP0:ios# show frequency synchronization selection back-trace interface TenGigE0/7/0/9/1
Selected Source: TenGigE0/7/0/9/1
Selection Points:
  0/RP0 T0_SEL
  0/RP0 LC7_ING_SEL
```

show Frequency Synchronization selection forward-trace

To display the path that was recovered from a particular interface, use the **show frequency synchronization selection forward-trace**

show frequency synchronization selection forward-trace {*port-nu* | **interface** *type interface-path-id* | *node-id*}

Syntax Description

interface *type interface-path-id*	Displays the path to the specified interface.

Command Default

None

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

The **show frequency synchronization selection forward-trace** command displays the trace from the specified interface, out to all selection points that receive the clock from the interface, and from any interfaces that are potentially being driven by this clock source.

Task ID

Task ID	Operation
ethernet-services	read

This example shows sample output from the **show frequency synchronization selection forward-trace** command:

```
RP/0/RP0:ios#show frequency synchronization selection forward-trace interface TenGigE0/7/0/9/1
0/RP0 LC7_ING_SEL
0/RP0 T0_SEL
0/RP0 T4_SEL
 Sync0 [0/RP0]
 Sync1 [0/RP0]
 Sync2 [0/RP0]
 Sync3 [0/RP0]

TenGigE0/10/0/9/
TenGigE0/7/0/9/1
```

show running-config frequency synchronization

To display the current operating configuration information for frequency synchronization, use the **show running-config frequency synchronization** command in EXEC mode.

show running-config frequency synchronization

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Examples

The following example shows the display output for the **show running-config frequency synchronization** command:

```
RP/2/RP0:MC_FLT+4+1# show running-config frequency synchronization
Thu Mar 22 11:33:30.986 IST
frequency synchronization
clock-interface timing-mode system
```

ssm disable

To disable Synchronization Status Messaging (SSM) on an interface, use the **ssm disable** command in the appropriate Frequency Synchronization configuration mode. To return SSM to the default value of enabled, use the **no** form of this command.

ssm disable
no ssm disable

Command Default

Enabled

Command Modes

Interface Frequency Synchronization configuration

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Usage Guidelines

For Frequency Synchronization interfaces, the **ssm disable** command disables sending ESMC packets, and ignores any received ESMC packets.

The received QL value that is used if SSM is disabled depends on the option:

- Option 1: DNU
- Option 2: STU

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to disable SSM on an interface:

```
RP/0/RP0:ios # config
RP/0/RP0:ios(config)# interface tenGigE 0/1/0/1
RP/0/RP0:ios(config-if)# frequency synchronization
RP/0/RP0:ios(config-if-freqsync)# ssm disable
RP/0/RP0:ios(config-if-freqsync)# commit
```

wait-to-restore

To configure the wait-to-restore time for Frequency Synchronization on an interface, use the **wait-to-restore** command in the appropriate Frequency Synchronization configuration mode. To return the wait-to-restore time to the default value, use the **no** form of this command.

wait-to-restore *minutes*
no wait-to-restore *minutes*

Syntax Description

minutes	The delay time (in minutes) between when an interface comes up and when it is used for synchronization. The range is 0 to 12.

Command Default

There is a 5-minute delay for Frequency Synchronization after an interface comes up.

Command Modes

Interface Frequency Synchronization (config-if-freqsync)

Command History

Release	Modification
Release 6.1.42	This command was introduced.

Task ID

Task ID	Operations
ethernet-services	execute

Examples

The following example shows how to configure the wait-to-restore time for Frequency Synchronization on an interface:

```
RP/0/RP0:ios # config
RP/0/RP0:ios(config)# interface tenGigE0/1/0/1
RP/0/RP0:ios(config-if)# frequency synchronization
RP/0/RP0:ios(config-if-freqsync)# wait-to-restore 0
RP/0/RP0:ios(config-if-freqsync)# commit
```