Configuring Synchronous Ethernet

The ME 3800X and ME 3600X switches support Synchronous Ethernet (SyncE), which is the PHY-layer frequency-synchronization solution for IEEE 802.3 links. It is an evolution of the conventional Ethernet and Ethernet + SDH and SONET-based synchronization. SyncE is used to synchronize and send clock information to remote sites on the network. Each network element along the synchronization path must support SyncE. SyncE provides only frequency synchronization, not related to time or space.

- Understanding SyncE, page 6-1
- Configuring SyncE, page 6-9
- Monitoring SyncE, page 6-14

Understanding SyncE

SyncE provides a method to synchronize the Ethernet network by having all Ethernet ports send data based on a reference clock. All devices supporting SyncE must send and receive data in cycles of fixed size and duration. The data size depends on the Ethernet speed. The rate of transmission is 8000 cycles per second. Each device must be able to support a system timing master, which is the synchronization source. A sync port is the port on which synchronization information is received. All SyncE frames coming from the sync port are the source of synchronization for all other ports on the device.

The switch 10 Gigabit Ethernet uplink ports or BITS interface support line clock recovery, sending and receiving clock information. Downlink ports do not perform clock recovery and can only send clock signals.

The switch supports TI (1544 kilobits/s) and E1 (2048 kb/s or 2048 KHz) clock timing synchronization.

- Reference Clocks, page 6-1
- BITS Interface, page 6-2
- Synchronous Ethernet and Ethernet Synchronization Messaging Channel, page 6-3

Reference Clocks

A switch comes up in a free-run state, using the internal oscillator (Stratum 3) for synchronization. If there is a valid clock reference with a set priority, the switch locks to that reference. If there is no reliable clock source available, the switch remains in free-run mode. If the current clock becomes invalid, the switch goes into holdover mode and replays the saved clock from the last source. The switch SyncE LEDs show the status of the internal clock: locked (green), free run (off), or in a holdover state (amber).
The reference clock source can be:

- A Building Integrated Timing Supply (BITS) clock input
- A PHY-recovered clock from uplink ports. The ME 3800X and 3600X switch supports a PHY-recovered clock only from the small form-factor pluggable (SFP+) uplink ports with 10 Gigabit SFP+ or 1000BASE-X fiber SFP modules.

All uplink and downlink ports transmit data on the same reference clock.

The switch monitors each input clock for frequency accuracy and activity. An input clock with a frequency out-of-band alarm or an activity alarm is invalid. Invalid clocks are not selected as the reference clock.

During normal operation, the reference clock is selected based on an algorithm that uses the priority rankings that you assign to the input clocks by using the `network-clock input-source priority` global configuration command. Priority 1 is the highest, and priority 15 is the lowest. If you try to assign the same priority to more than one clock, an error message appears. Unused input clocks are given a priority value of 0, which disables the clocks and makes them unavailable for selection. The clock selection is based on signal failure, priority, and manual configuration. If you have not manually configured a reference clock, the algorithm selects the clock with the highest priority that does not experience signal failure.

With this configuration, pure priority-based mode, an intermittent failure or changes in the network topology can cause timing loops or a loss of connectivity with the clock reference. The Ethernet Synchronous Messaging Channel (ESMC) with Synchronization Status Messages (SSM) provides a way to implement quality in synchronous networks.

Reference clocks operate in revertive or nonrevertive mode, configured by using the `network-clock revertive` global configuration command. The reverence clocks will be in non-revertive mode by default.

- In revertive mode, if an input clock with a higher priority than the selected reference becomes available, the higher priority reference is immediately selected.
- In nonrevertive mode, if a new input clock with a higher priority becomes available, the higher-priority clock is selected. This means, among all available input reference clocks, the higher-priority clock is selected.
- In non revertive mode, when an input clock with a high priority present on the system becomes invalid or unavailable, a lower priority clock will be selected. However when the higher priority clock becomes available again, it will not be selected.

**Note**

In revertive mode of operation, when the lost high priority reference becomes available again, it is selected. However, in non-revertive mode of operation, the regained high priority reference is not selected.

You can use the `network-clock switch` privileged EXEC command to configure the input reference to be either forced or automatically selected by the selection algorithm based on the highest priority valid input clock. In revertive mode, the forced clock automatically becomes the selected reference. In nonrevertive mode, the forced clock becomes the selected reference only when the existing reference is invalidated or unavailable.

**BITS Interface**

The ME 3800X and ME 3600X switch supports a BITS interface through an RJ-45 connector. The connection can be used for sending and receiving T1 and E1 timing signals.
You can configure all Ethernet ports to send data referenced to the BITS recovered clock. The BITS signal is used as long as it does not have these faults:

- loss of signal
- out of frame
- alarm-indication signal
- remote alarm indication

The switch supports BITS IN and BITS OUT, and recovers and sends BITS timing, T1, E1. The switch does not support T1 or E1 data transmission. You can configure the BITS interface input and output, including line coding and line buildout (output). You can also shut down the BITS controller.

The switch supports these BITS configurations:

- **E1 Mode:**
  - 2048 KHz
  - Framing mode: FAS, MFAS, FASCRC4, MFASCRC4 with line coding: AMI, HDB3

- **T1 Mode:**
  - Framing mode: D4 and ESF
  - Line coding: AMI, B8ZS
  - Line buildout (output): 0 to 133 feet, 133 to 266 feet, 266 to 399 feet, 399 to 533 feet, or 533 to 655 feet

### Synchronous Ethernet and Ethernet Synchronization Messaging Channel

The ME3600/ME3800 switches support the following Synchronous Ethernet (SyncE) and Ethernet Synchronization Messaging Channel (ESMC) features:

- Common IOS CLI configuration
- Configuration on all ports, including BITS ports and copper ports
- Can be enabled or disabled on individual ports
- Synchronous Ethernet clock derived from user configuration
- Synchronous Status Message (SSM) on BITS interface
- Ethernet Synchronous Messaging Channel (ESMC) on all Ethernet ports

**Note**

Cisco ME3600X-24CX switch does not support SSM.

Clock selection is configured by the user based on clock priority and ESMC/SSM messages received from all sources and ports.

A Synchronous Status Message (SSM) informs the peer about the quality of the local clock source and is used to detect and avoid timing loops. SSMS are transported over the Ethernet Synchronization Messaging Channel (ESMC). All SSM information transported over Ethernet ports must be in the ESMC message format (G.8264).

The BITS port can be configured as a T1 or E1 interface.
For T1s, SSM messages are transported over the 4 Kbps datalink channel.
For E1s, SSM messages are transported over the E1 signaling channel.

**Configuration**

To configure synchronous ethernet

1. Replace existing syncE configurations with the new configurations given in the “Configuring Synchronous Ethernet” section.
2. Copy the changed configuration to startup-config
3. Reload the switch with the image.

**Restrictions**

T1 mode supports only D4 and ESF framing.

---

**Configuring Synchronous Ethernet**

The following sections show the old and new methods of configuring synchronous ethernet on the ME3600/ME3800 and ME3600X-24CX switches:

- Configuring Input Clock and Priority
- Configuring Hold-off timer
- Configuring Hold-over Timer
- Configuring Wait-to-Restore Timer
- Configuring Revertive Mode
- Configuring EEC Option
- Configuring BITS
- Configuring BITS Input
- Configuring BITS Output
- Configuring Output Clock
- SyncE Show Commands

---

**Configuring Input Clock and Priority**

**Old Configuration**

Switch(config)# network-clock_select 2 ?
   BITS   BITS port clock
   SYNC   Sync Ethernet

Switch(config)# network-clock_select 2 SYNC ?
   <0-1>   port

**New Configuration**

Switch(config)# network-clock input-source ?
   <1-250> Priority
Switch(config)# network-clock input-source 1 ?
   external   External Interface (BITS/SSU/GPS)
interface Specify Ethernet, SONET or ToP Interface

**SynchE as Clock Source Example Configuration**

Switch(config)# network-clock input-source 1 interface tenGigabitEthernet 
0-0 TenGigabitEthernet interface number

**BITS as Clock Source Example Configuration**

Switch(config)# network-clock input-source 1 external 1/0/0 e1 
cas E1 Channel Associated Signal Mode
crc4 E1 With CRC4 Signal Mode
fas E1 Frame Alignment Signal Mode

**Note**

Currently, the E1 and T1 modes cannot be configured independently.

The default values for the E1 mode are as follows:

- Framing: FAS
- Line coding: AMI

The default values for the T1 mode are as follows:

- Framing: D4
- Line coding: AMI
- Line build out: 0-133ft

**Configuring Hold-off Timer**

**Old Configuration**

Switch(config)# network-clock_select hold-off-timeout ?
0-10000 holdoff-val in ms, default 300 ms

**New Configuration**

Switch(config)# network-clock hold-off ?
0 holdoff disable
0-10000 msec (default 300 msecs)

**Configuring Hold-over Timer**

**Old Configuration**

Switch(config)# network-clock_select hold-timeout ?
0-86400 hold-timeout-val
infinite infinite hold-over.

**New Configuration**

CLI is not available.
Configuring Synchronous Ethernet

Configuring Wait-to-Restore Timer

Old Configuration
Switch(config)# network-clock_select wait-to-restore-timeout ?
  <0-720>  wtr-val in seconds, default 300 seconds

New Configuration
Switch(config)# network-clock wait-to-restore ?
  <0-86400>  sec (default 300 seconds)

Configuring Revertive Mode

Old Configuration
Switch(config)# network-clock_select mode ?
  nonrevert  Specify non revertive mode.
  revert    Specify revertive mode.

New Configuration
Switch(config)# network-clock revertive
Switch(config)# no network-clock revertive

Configuring EEC Option

Old Configuration
Switch(config)# network-clock_select option ?
  option1  EEC Option 1.
  option2  EEC Option 2.

New Configuration
Switch(config)# network-clock synchronization ssm option ?
  1  Synchronization networking Option I
  2  Synchronization networking Option II
Switch(config)# network-clock synchronization ssm option 2 ?
  GEN1  Option II Generation 1
  GEN2  Option II Generation 2

Configuring BITS

New Configuration
Switch(config)# network-clock input-source 1 external 1/0/0 e1 ?
  cas   E1 Channel Associated Signal Mode
  crc4  E1 With CRC4 Signal Mode
  fas   E1 Frame Alignment Signal Mode

Old Configuration
Switch(config)# controller BITS ?
  input  Configure BITS INPUT
output    Configure BITS OUTPUT
shutdown  Shut down BITS controller

Configuring BITS Input

New Configuration
Switch(config)# network-clock input-source 1 external 1/0/0 e1 ?
cas   E1 Channel Associated Signal Mode
crc4  E1 With CRC4 Signal Mode
fas   E1 Frame Alignment Signal Mode

Old Configuration
controller BITS input applique ?
E1 Link type E1
T1 Link type T1
Switch(config)# controller BITS input applique E1 ?
2048KHz  2048 KHz clock interface
framing  BITS framing options for E1
Switch(config)# controller BITS input applique E1 framing ?
fas_crc4  FASCRC4
fas_nocrc  FAS
mfas_crc4  MFASCRC4
mfas_nocrc  MFAS

Switch(config)# controller BITS input applique E1 framing fas_crc4 linecode ?
ami   AMI encoding
hdb3  HDB3 encoding

Configuring BITS Output

New Configuration
Router(config)# network-clock output-source system 1 external 1/0/0 e1 ?
cas   E1 Channel Associated Signal Mode
crc4  E1 With CRC4 Signal Mode
fas   E1 Frame Alignment Signal Mode

Old Configuration
Switch(config)# controller BITS output applique ?
E1 Link type E1
T1 Link type T1
Switch(config)# controller BITS output applique T1 framing ?
d4    D4
esf   Extended Superframe
Switch(config)# controller BITS output applique T1 framing d4 linecode ?
ami   AMI encoding
b8zs  B8ZS encoding
Switch(config)# controller BITS output applique T1 framing d4 linecode ami line-build-out?

0-133ft  0 ft to 133 ft
133-266ft 133 ft to 266 ft
266-399ft 266 ft to 399 ft
399-533ft 399 ft to 533 ft
533-655ft 533 ft to 655 ft

The controller BITS CLIs should be used to configure shutdown, linecode and line-build-out as these options are missing in netsync PI infrastructure CLIs. Once the netsync infrastructure CLIs implement these configuration options, the platform "controller BITS" CLIs will be deprecated.

Configuring Output Clock

Old Configuration
Switch(config)# network-clock_select output ?
<1-23> priority
output Configure BITS OUT (T4 = T0)

Switch(config)# network-clock_select output 2 SYNC ?
<0-1> port

New Configuration
Switch(config)# network-clock output-source ?
line  Line Input
system System clock (T0)

Tengig Clock for BITS OUT Example Configuration
Switch(config)# network-clock output-source line ?
<1-250> Priority
Switch(config)# network-clock output-source line 10 interface tenGigabitEthernet ?
<0-0> TenGigabitEthernet interface number

System Clock for BITS OUT Example Configuration
Switch(config)# network-clock output-source system ?
<1-250> Priority
Switch(config)# network-clock output-source system 10 external 1/0/0 ?
t1  T1 signal mode output

SyncE Show Commands

The following example shows how to display the SyncE network-clock information:

Switch# show network-clock synchronization ?
detail  Detail
external  External Interface (BITS/SSU/GPS)
global   Display global parameters
interface Specify Ethernet or Sonet Interface
runtime  Runtime Information
| Output modifiers

Switch# show network-clock synchronization detail
SyncE Debug Commands

The following example shows the network-clock (PI) debug command:

```
RB#debug network-clock ?
error Network clock error debugging
event Network clock event debugging
pal Network clock PAL debugging
platformNetwork clock platform debugging
sm Network clock state machine debugging
```

Configuring SyncE

SyncE limitations on copper ports:

- To receive clock data from an ME 3600X-TS 1 Gigabit Ethernet copper SFP interface, the link partner must not be the 802.3 master port when 802.3 Clause 28 autonegotiation completes.
- On ME3600X-FS or ME3800X switches, SyncE is not supported on 1 Gigabit Ethernet copper SFPs for the first release.
- Default SyncE Configuration, page 6-9
- Configuring the Network Clock Selection, page 6-10
- Configuring the BITS Interface, page 6-11
- Selecting the Network Clock, page 6-13
- Configuring SyncE using ESMC and SSM, page 6-13

Default SyncE Configuration

Synchronous Ethernet can only be configured on 10 Gigabit Ethernet interfaces.

1 Gigabit Ethernet interfaces transmit SyncE with no configuration required. No configuration is needed to send clock timing in uplink or downlink interfaces.
Configuring the Network Clock Selection

Beginning in privileged EXEC mode, follow these steps to configure the SyncE network clock.

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>configure terminal</td>
</tr>
<tr>
<td></td>
<td>Enter global configuration mode.</td>
</tr>
</tbody>
</table>

**Step 2**

```
network-clock input-source priority [external] [interface]
```
Configure the input clock and its priority.
- For `priority`, the range is from 1 to 15, with 1 being the highest priority and 15 the lowest. Unused input clocks are given a priority value of 0.
- `external`—Select the external interface (BITS/SSU/GPS).
- `interface`—Select the type of interface, Ethernet, Sonet or ToP.

**Step 3**

```
network-clock output-source system priority external
```
Configure the 10 Gigabit Ethernet ports for SYNC output:
- For `priority`, the range is from 1 to 15, with 1 being the highest priority and 15 the lowest.
- `external`—Select the external interface (BITS/SSU/GPS).

**Step 4**

```
network-clock revertive
```
(Optional) Configure the reference switching mode to determine the action to be taken if an input clock with a higher priority than the selected reference becomes valid.
- `revertive`—The higher priority reference is immediately selected as the reference clock.

**Step 5**

```
end
```
Return to privileged EXEC mode.

**Step 6**

```
show network-clocks
```
Verify the configuration.

**Step 7**

```
copy running-config startup config
```
(Optional) Save your entries in the switch startup configuration file.

Enter the `no network-clock priority` or `network-clock output-source` to remove the selected priority. Enter the `no network-clock revertive` to select the other mode.

This example configures the BITS clock with a priority of 2 and the SyncE input port as 10 Gigabit Ethernet port 0/1 with the switching mode as nonrevertive.

```
Switch (config)# network-clock input-source 2 external 1/0/0 e1
Switch (config)# network-clock input-source 1 interface tenGigabitEthernet
Switch (config)# network-clock revertive
Switch (config)# end
```
### Configuring the BITS Interface

Beginning in privileged EXEC mode, follow these steps to configure the BITS interface. The Ethernet Equipment Clock (EEC) mode of operation is based on the area of deployment.

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong>&lt;br&gt;configure terminal</td>
<td>Enter global configuration mode.</td>
</tr>
<tr>
<td><strong>Step 2</strong>&lt;br&gt;network-clock synchronization ssm option {option1</td>
<td>option2}</td>
</tr>
<tr>
<td><strong>Step 3</strong>&lt;br&gt;controller BITS input applique E1 {2048KHz</td>
<td>framing option linecode {ami</td>
</tr>
</tbody>
</table>
Chapter 6     Configuring Synchronous Ethernet

Configuring SyncE

Enter the no network-clock synchronization ssm option option1 or the network-clock synchronization ssm option option2 to select the other option. mode with the default E1 or T1 values. Use the no form of each command to remove the configuration or return to the default.

This example configures EEC as T1 with ESF framing, B8ZS line coding, and 1 to 133 foot line buildout.

Switch (config)# no network-clock synchronization ssm option option1
Switch (config)# controller BITS input applique T1 framing esf linecode b8zs
Switch (config)# controller BITS output applique T1 framing esf linecode b8zs
Switch (config)# line-build-out 0-133ft
Switch (config)# end
Switch# show controllers BITS

Applique type is T1

Line Coding is B8ZS(Rx), B8ZS(Tx)

Framing is ESF(Rx), ESF(Tx)
Line Build Out is 0-133ft

No alarms detected.

**Selecting the Network Clock**

You can force selection of a particular network clock or select automatic clock selection where the switch uses the selection algorithm based on the priority and the validity of the input.

Beginning in privileged EXEC mode, use this step to set the SyncE network clock.

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td>`network-clock { clear</td>
<td>set</td>
</tr>
<tr>
<td></td>
<td>• <code>clear</code>—Use to clear network clock synchronization</td>
</tr>
<tr>
<td></td>
<td>• <code>set</code>—Set network clock synchronization</td>
</tr>
<tr>
<td></td>
<td>• <code>switch</code>—Switch selected synchronization source.</td>
</tr>
<tr>
<td></td>
<td>If the switch is in nonrevertive mode, the clock input does not change unless the current clock becomes invalid.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td><code>show network-clocks</code></td>
<td>Verify the configuration.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td><code>copy running-config startup config</code></td>
<td>(Optional) Save your entries in the switch startup configuration file.</td>
</tr>
</tbody>
</table>

**Configuring Synce using ESMC and SSM**

To enable ESMC process use the following steps:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>enable</code></td>
<td>Enter privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td><code>configure terminal</code></td>
<td>Enter global configuration mode.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
</tr>
<tr>
<td><code>esmc process</code></td>
<td>Enables ESMC process.</td>
</tr>
</tbody>
</table>

**Note**

Cisco ME3600X-24CX switch does not support SSM.

To configure the interface to send or receive a particular clock use the following steps:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
</tr>
<tr>
<td><code>enable</code></td>
<td>Enter privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
</tr>
<tr>
<td><code>configure terminal</code></td>
<td>Enter global configuration mode.</td>
</tr>
</tbody>
</table>
To configure BITS port to send or receive a particular-clock use the following steps:

**Step 1**
- **Command:** enable
  - **Purpose:** Enter privileged EXEC mode.

**Step 2**
- **Command:** configure terminal
  - **Purpose:** Enter global configuration mode.

**Step 3**
- **Command:** network-clock source quality-level \{tx | rx\} value external port/slot
  - **Purpose:** Forces the QL value for the line or external timing input and output.

### Monitoring SyncE

Use these privileged EXEC commands to view SyncE configuration on a switch:

- **show controller BITS**
  ```
  Switch# show controller BITS
  
  Applique type is T1
  Line Coding is B8ZS(Rx), B8ZS(Tx)
  Framing is ESF(Rx), ESF(Tx)
  Line Build Out is 0-133ft
  No alarms detected.
  ```

- **show network-clock synchronization**
  ```
  Switch# show network-clock synchronization detail
  
  Symbols:     En - Enable, Dis - Disable, Adis - Admin Disable
  NA - Not Applicable
  * - Synchronization source selected
  # - Synchronization source force selected
  & - Synchronization source manually switched
  
  Automatic selection process : Enable
  Equipment Clock : 1544 (EBC-Option2)
  Clock Mode : QL-Enable
  ESMC : Enabled
  SSM Option : GEN1
  T0 : TenGigabitEthernet0/2
  Hold-off (global) : 300 ms
  Wait-to-restore (global) : 300 sec
  Tsm Delay : 180 ms
  Revertive : No
  Force Switch: FALSE
  Manual Switch: FALSE
  Number of synchronization sources: 2
  Squelch Threshold: QL-ST3
  sm(netsync NETCLK_QL_ENABLE), running yes, state 1A
  Last transition recorded: (ql_mode_enable)-> 1A (begin)-> 1A (src_added)-> 1A
  (src_added)-> 1A (ql_change)-> 1A (ql_change)-> 1A (set_lo)-> 1A (clear_lo)-> 1A
  ```
## Nominated Interfaces

<table>
<thead>
<tr>
<th>Interface</th>
<th>SigType</th>
<th>Mode/QL</th>
<th>Prio</th>
<th>QL_IN</th>
<th>ESMC Tx</th>
<th>ESMC Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>NA</td>
<td>NA/Dis</td>
<td>251</td>
<td>QL-ST3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Te0/1</td>
<td>NA</td>
<td>Sync/En</td>
<td>1</td>
<td>QL-FAILED</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>*Te0/2</td>
<td>NA</td>
<td>Sync/En</td>
<td>2</td>
<td>QL-PRS</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### T4 Out

<table>
<thead>
<tr>
<th>Interface</th>
<th>SigType</th>
<th>Input</th>
<th>Prio</th>
<th>Squelch</th>
<th>AIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>External 1/0/0</td>
<td>T1 ESF</td>
<td>Internal</td>
<td>2</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
</tbody>
</table>

---

### Local Interface: Internal
- **Signal Type**: NA
- **Mode**: NA (Q1-enabled)
- **SSM Tx**: DISABLED
- **SSM Rx**: DISABLED
- **Priority**: 251
- **QL Receive**: QL-ST3
- **QL Receive Configured**: -
- **QL Receive Overrided**: -
- **QL Transmit**: -
- **QL Transmit Configured**: -
- **Hold-off**: 0
- **Wait-to-restore**: 300
- **Lock Out**: FALSE
- **Signal Fail**: FALSE
- **Alarms**: FALSE
- **Slot Disabled**: FALSE
- **SNMP input source index**: 1
- **SNMP parent list index**: 0

### Local Interface: Te0/1
- **Signal Type**: NA
- **Mode**: Synchronous (Q1-enabled)
- **ESMC Tx**: ENABLED
- **ESMC Rx**: ENABLED
- **Priority**: 1
- **QL Receive**: QL-DUS
- **QL Receive Configured**: -
- **QL Receive Overrided**: QL-FAILED
- **QL Transmit**: -
- **QL Transmit Configured**: -
- **Hold-off**: 300
- **Wait-to-restore**: 300
- **Lock Out**: FALSE
- **Signal Fail**: TRUE
- **Alarms**: FALSE
- **Slot Disabled**: FALSE
- **SNMP input source index**: 2
- **SNMP parent list index**: 0

### Local Interface: Te0/2
- **Signal Type**: NA
- **Mode**: Synchronous (Q1-enabled)
- **ESMC Tx**: ENABLED
- **ESMC Rx**: ENABLED
- **Priority**: 2
- **QL Receive**: QL-PRS
- **QL Receive Configured**: -
Monitoring SyncE

Queued Loss (QL)

- QL Receive Overridden: -
- QL Transmit: QL-DUS
- QL Transmit Configured: -
- Hold-off: 300
- Wait-to-restore: 20
- Lock Out: FALSE
- Signal Fail: FALSE
- Alarms: FALSE
- Slot Disabled: FALSE
- SNMP input source index: 3
- SNMP parent list index: 0

External 1/0/0 t1 esf's Input:
  Internal
  - Local Interface: Internal
  - Signal Type: NA
  - Mode: NA (QL-enabled)
  - SSM Tx: DISABLED
  - SSM Rx: DISABLED
  - Priority: 2
  - QL Receive: QL-ST3
  - QL Receive_configured: -
  - QL Receive Overridden: -
  - QL Transmit: -
  - QL Transmit Configured: -
  - Hold-off: 300
  - Wait-to-restore: 300
  - Lock Out: FALSE
  - Signal Fail: FALSE
  - Alarms: FALSE
  - Slot Disabled: FALSE
  - SNMP input source index: 1
  - SNMP parent list index: 1

- show esmc

Switch# show esmc

Interface: GigabitEthernet0/0/0
Administrative configurations:
  Mode: Synchronous
  ESMC TX: Enable
  ESMC RX: Enable
  QL RX configured: NA
  QL TX configured: NA
Operational status:
  Port status: UP
  QL Receive: QL-SSU-B
  ESMC Information rate: 1 packet/second
  ESMC Expiry: 5 second