



Configuring T1 or E1 Interfaces

This chapter provides the information about how to configure a T1 or E1 interface.

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Setting the Card Type

To set the card type for the T1/E1 interfaces, complete these steps:

```
enable
configure terminal
card type t1 0 1
exit
```

Configuring the Controller

To configure T1 interface, use the following commands:

```
enable
configure terminal
controller t1 0/1/0
clock source internal
framing esf
cablelength short 110
linecode b8zs
no shut
exit
```



Note For T1 interface, the default frame mode is Extended Super Frame (ESF).

To configure E1 interface, use the following commands:

```

enable
configure terminal
controller e1 0/1/0
clock source internal
framing crc4
linecode hdb3
no shut
exit

```



Note For E1 interface, the default frame mode is Cyclic Redundancy Check 4 (CRC4).

Starting with Cisco IOS XE Cupertino 17.7.1, the cable length short values are modified for the following interface modules:

- NCS4200-48T1E1-CE
-

Table 1: Cable Length Short Values

Cable Length Short (in ft)	Range (in ft)
110	0–133
220	134–266
330	267–399
440	400–533
550	534–655

For the following interface modules, the cable length short values remain the same:

Table 2: IM Port Support - Cable Length Short

Port Supported	IM
T1 Port	NCS4200-8E1T1-CE

Table 3: Cable Length Short Values - IMs

Cable Length Short (in ft)	Range (in ft)
110	0–110
220	111–220
330	221–330
440	331–440
550	441–550

Verifying the Controller Configuration

Use the **show controllers** command to verify the controller configuration:

```
Router# show controller e1 0/2/0
E1 0/2/0 is up.
Applique type is ASR903-48T1E1-CE

Cablelength is short 110
No alarms detected.
alarm-trigger is not set
Soaking time: 3, Clearance time: 10
AIS State:Clear LOS State:Clear LOF State:Clear
Framing is ESF, FDL is ansi, Line Code is B8ZS, Clock Source is Line.
BER thresholds: SF = 10e-3 SD = 10e-6
Data in current interval (230 seconds elapsed):
Near End
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavailable Secs
  0 Path Failures, 0 SEF/AIS Secs
Far End
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavailable Secs
  0 Path Failures
Data in Interval 1:
Near End
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 0 Fr Loss Secs, 14 Line Err Secs, 0 Degraded Mins
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 15 Unavailable Secs
  1 Path Failures, 0 SEF/AIS Secs
Far End Data
  0 Line Code Violations, 0 Path Code Violations
  0 Slip Secs, 4 Fr Loss Secs, 2 Line Err Secs, 0 Degraded Mins
  4 Errored Secs, 0 Bursty Err Secs, 4 Severely Err Secs, 0 Unavailable Secs
  0 Path Failures
Total Data (last 1 15 minute intervals):
Near End
  0 Line Code Violations, 0 Path Code Violations,
  0 Slip Secs, 0 Fr Loss Secs, 14 Line Err Secs, 0 Degraded Mins,
  0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 15 Unavailable Secs
  1 Path Failures, 0 SEF/AIS Secs
Far End
  0 Line Code Violations, 0 Path Code Violations,
  0 Slip Secs, 4 Fr Loss Secs, 2 Line Err Secs, 0 Degraded Mins,
  4 Errored Secs, 0 Bursty Err Secs, 4 Severely Err Secs, 0 Unavailable Secs
  0 Path Failures
```

Use the **show platform** command to verify the router information:

Configuring Structure-Agnostic TDM over Packet - T1/E1 Interfaces

To configure Structure-Agnostic TDM over Packet (SAToP), use the following commands:

```
enable
```

```

configure terminal
controller t1 0/1/0
cem-group 0 unframed
exit

```



Note To configure SAToP, the framing mode for the port is set to unframed.

Verifying CEM Configuration for SAToP

Use the following command to verify the CEM configuration for T1/E1 interfaces:

```

Router# show cem circuit interface CEM 0/1/0

CEM0/1/0, ID: 0, Line: UP, Admin: UP, Ckt: ACTIVE
Controller state: up, T1 state: up
Idle Pattern: 0xFF, Idle CAS: 0x8
Dejitter: 5 (In use: 0)
Payload Size: 192
Framing: Unframed
CEM Defects Set
None

Signalling: No CAS
RTP: No RTP

Ingress Pkts:    475471          Dropped:          0
Egress Pkts:    475471          Dropped:          0

CEM Counter Details
Input Errors:    0              Output Errors:    0
Pkts Missing:   0              Pkts Reordered:  0
Misorder Drops: 0              JitterBuf Underrun: 0
Error Sec:      0              Severly Errored Sec: 0
Unavailable Sec: 0              Failure Counts:   0
Pkts Malformed: 0              JitterBuf Overrun: 0

```

Configuring Framed SAToP



Note Framing type should be maintained same in all routers end to end.

To configure framed SAToP:

```

enable
configure terminal
controller t1 0/1/0
framing esf
cem-group 0 framed
exit

```

Verifying Framed SAToP Configuration

Use the following command to verify the CEM configuration for T1/E1 interfaces:

```
Router# show cem circuit interface cem 0/1/0

CEM0/1/0, ID: 0, Line: UP, Admin: UP, Ckt: ACTIVE
Mode :T1, CEM Mode: T1-SAToP
Controller state: up, T1 state: up
Idle Pattern: 0xFF, Idle CAS: 0x8
Dejitter: 5 (In use: 0)
Payload Size: 192
Framing: Framed SAToP
CEM Defects Set
None

Signalling: No CAS
RTP: No RTP

Ingress Pkts: 7836 Dropped: 0
Egress Pkts: 7836 Dropped: 0

CEM Counter Details
Input Errors: 0 Output Errors: 0
Pkts Missing: 0 Pkts Reordered: 0
Misorder Drops: 0 JitterBuf Underrun: 0
Error Sec: 0 Severly Errored Sec: 0
Unavailable Sec: 0 Failure Counts: 0
Pkts Malformed: 0 JitterBuf Overrun: 0
Generated Lbits: 0 Received Lbits: 0
Generated Rbits: 0 Received Rbits: 0
```

Verifying CEM Statistics for Framed SAToP

Use the following commands to verify the pseudowire configuration for SAToP:

- **show cem circuit**—Displays information about the circuit state, administrative state, the CEM ID of the circuit, and the interface on which it is configured. If cross connect is configured under the circuit, the command output also includes information about the attachment circuit status.

```
Router# show cem circuit

<0-4294967295>    CEM ID
detail           Detailed information of cem ckt(s)
interface        CEM Interface
summary          Display summary of CEM ckts
|                Output modifiers
Router# show cem circuit

CEM Int.  ID  Ctrlr  Admin  Circuit  AC
-----
CEM0/1/0  1   UP     UP     Active  UP
CEM0/1/1  2   UP     UP     Active  UP
CEM0/1/2  3   UP     UP     Active  UP
CEM0/1/3  4   UP     UP     Active  UP
CEM0/1/4  5   UP     UP     Active  UP
```

- **show cem circuit cem-id** — Displays the detailed information about that particular circuit.

```
Router# show cem circuit 0
CEM0/1/2, ID: 0, Line: UP, Admin: UP, Ckt: ACTIVE
```

```

Mode :T1, CEM Mode: T1-SAToP
Controller state: up, T1 state: up
Idle Pattern: 0xFF, Idle CAS: 0x8
Dejitter: 5 (In use: 0)
Payload Size: 192
Framing: Framed SAToP
CEM Defects Set
None

Signalling: No CAS
RTP: No RTP

Ingress Pkts: 167027103 Dropped: 0
Egress Pkts: 167027102 Dropped: 0

CEM Counter Details
Input Errors: 0 Output Errors: 0
Pkts Missing: 0 Pkts Reordered: 0
Misorder Drops: 0 JitterBuf Underrun: 0
Error Sec: 0 Severly Errored Sec: 0
Unavailable Sec: 0 Failure Counts: 0
Pkts Malformed: 0 JitterBuf Overrun: 0
Generated Lbits: 0 Received Lbits: 0
Generated Rbits: 0 Received Rbits: 0

```

- **show cem circuit summary** — Displays the number of circuits which are up or down per interface basis.

```

Router# show cem circuit summary

CEM Int. Total Active Inactive
-----
CEM0/1/0  1    1    0
CEM0/1/1  1    1    0
CEM0/1/2  1    1    0
CEM0/1/3  1    1    0
CEM0/1/4  1    1    0

```

Verifying CEM Statistics for SAToP

Use the following commands to verify the pseudowire configuration for SAToP:

- **show cem circuit**—Displays information about the circuit state, administrative state, the CEM ID of the circuit, and the interface on which it is configured. If cross connect is configured under the circuit, the command output also includes information about the attachment circuit status.

```

Router# show cem circuit

<0-32000>  CEM ID
detail    Detailed information of cem ckt(s)
interface CEM Interface
summary   Display summary of CEM ckts
|         Output modifiers
Router# show cem circuit

CEM Int.      ID  Line  Admin  Circuit  AC
-----
CEM0/1/0     1  UP    UP     ACTIVE  --/--
CEM0/1/0     2  UP    UP     ACTIVE  --/--
CEM0/1/0     3  UP    UP     ACTIVE  --/--

```

```
CEM0/1/0      4    UP      UP      ACTIVE  --/--
CEM0/1/0      5    UP      UP      ACTIVE  --/--
```

- **show cem circuit *cem-id*** — Displays the detailed information about that particular circuit.

```
Router# show cem circuit 0

CEM0/1/2, ID: 0, Line: UP, Admin: UP, Ckt: ACTIVE
Controller state: up, T1 state: up
Idle Pattern: 0xFF, Idle CAS: 0x8
Dejitter: 5 (In use: 0)
Payload Size: 192
Framing: Unframed
CEM Defects Set
None

Signalling: No CAS
RTP: No RTP

Ingress Pkts:    11060          Dropped:          0
Egress Pkts:    11061          Dropped:          0

CEM Counter Details
Input Errors:    0              Output Errors:    0
Pkts Missing:    0              Pkts Reordered:  0
Misorder Drops:  0              JitterBuf Underrun: 0
Error Sec:       0              Severly Errored Sec: 0
Unavailable Sec: 0              Failure Counts:   0
Pkts Malformed: 0              JitterBuf Overrun: 0
```

- **show cem circuit summary** — Displays the number of circuits which are up or down per interface basis.

```
Router# show cem circuit summary

CEM Int.      Total Active Inactive
-----
CEM0/1/0      1      1      0
```

Configuring CEM Group for SAToP for T1 Interfaces

To configure a CEM group for SAToP.

```
enable
configure terminal
controller t1 0/1/0
cem-group 0 unframed
end
```



Note You need metroaggrservice license to configure CEM group on the Interface Module.
By default, metroaggressive license is enabled for NCS 4200 Series Routers.

Configuring CEM Group for CESoPSN on T1 Interface

The following section describes how to configure a CEM group for CESoPSN.

To configure xconnect over MPLS, use the following commands:

```
enable
configure terminal
controller t1 0/1/32
cem-group 0 timeslots 1-10
```

Configure cross-connect:

```
enable
configure terminal
interface cem 0/1/32
cem 0
xconnect 10.2.2.2 10 encapsulation mpls
```

Perform a similar configuration on the other end of the pseudowire.

```
show running-config | sec 0/1/16
controller t1 0/1/16
 framing esf
 linecode b8zs
 cablelength short 110
  cem-group 0 timeslots 1-10
interface CEM0/1/16
 no ip address
 cem 0
  xconnect 10.2.2.2 10 encapsulation mpls
```

Check for cross-connect configuration using the following command:

```
Router#show xconnect all | i 0/1/32
UP pri ac CE0/1/32:0(CESoPSN Basic) UP mpls 10.2.2.2:10 UP

Router#sh controllers t1 0/1/32
T1 0/1/32 is up
Applique type is NCS4200-48T1E1-CE
Cablelength is short 110
No alarms detected.
alarm-trigger is not set
Soaking time: 3, Clearance time: 10
AIS State:Clear LOS State:Clear LOF State:Clear
Framing is ESF, Line Code is B8ZS, Clock Source is Line.
```

Verifying CEM for CESoPSN on T1 Interface

Use the following commands to verify the pseudowire configuration for CESoPSN:

- `show cem circuit`—Displays information about the circuit state, administrative state, the CEM ID of the circuit, and the interface on which it is configured. If cross connect is configured under the circuit, the command output also includes information about the attachment circuit status.

- show mpls l2 vc—Displays information about the MPLS VC.
- show mpls l2 vc detail—Displays detailed information about the MPLS VC.

```

PE1#show mpls l2 vc 10

Local intf      Local circuit          Dest address      VC ID      Status
-----
CE0/1/32        CESoPSN Basic 0       10.2.2.2         10         UP

PE1#sh mpls l2 vc 10 detail
Local interface: CE0/1/32 up, line protocol up, CESoPSN Basic 0 up
  Destination address: 10.2.2.2, VC ID: 10, VC status: up
  Output interface: Te0/0/0, imposed label stack {650}
  Preferred path: not configured
  Default path: active
  Next hop: 209.165.202.129
  Create time: 00:21:25, last status change time: 00:21:25
  Last label FSM state change time: 00:21:25
  Signaling protocol: LDP, peer 10.2.2.2:0 up
  Targeted Hello: 10.1.1.1(LDP Id) -> 10.2.2.2, LDP is UP
  Graceful restart: configured and not enabled
  Non stop routing: not configured and not enabled
  Status TLV support (local/remote) : enabled/supported
    LDP route watch                  : enabled
    Label/status state machine       : established, LruRru
  Last local dataplane status rcvd: No fault
  Last BFD dataplane status rcvd: Not sent
  Last BFD peer monitor status rcvd: No fault
  Last local AC circuit status rcvd: No fault
  Last local AC circuit status sent: No fault
  Last local PW i/f circ status rcvd: No fault
  Last local LDP TLV status sent: No fault
  Last remote LDP TLV status rcvd: No fault
  Last remote LDP ADJ status rcvd: No fault
  MPLS VC labels: local 577, remote 650
  Group ID: local 238, remote 276
  MTU: local 0, remote 0
  Remote interface description:
  Sequencing: receive disabled, send disabled
  Control Word: On (configured: autosense)
  SSO Descriptor: 10.2.2.2/10, local label: 577
  Dataplane:
    SSM segment/switch IDs: 6893171/4140658 (used), PWID: 674
  VC statistics:
    transit packet totals: receive 0, send 0
    transit byte totals: receive 0, send 0
    transit packet drops: receive 0, seq error 0, send 0

```

Configuring DS1 Local Connet

The following section describes how to configure first segment for DS1 local connection:

```

enable
configure terminal
controller T1 0/1/0
framing unframed
clock source internal
linecode b8zs

```

```
cablelength short 110
cem-group 0 unframed
description TO_CE1_0/1/0
```

The following section describes how to configure second segment for DS1 local connection:

```
enable
configure terminal
controller T1 0/1/3
framing unframed
clock source recovered 0
linecode b8zs
cablelength short 110
cem-group 0 unframed
description TO_CE1_0/1/1
```

The following section describes how to create a DS1 local connection:

```
enable
configure terminal
connect dsl_connect CEM0/1/0 0 CEM0/1/3 0
```

Verifying DS1 Local Connect

Use the following commands to verify the DS1 local connection:

- show connection name—Displays information about the connection state and segment state.

```
Router#show connection name dsl_connect

Connection: 673 - dsl_connect
Current State: UP
Segment 1: CEM0/1/0 SATOP T1 0 up
Segment 2: CEM0/1/3 SATOP T1 0 up
```