



CSM

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General

The Compact Subscriber Module (CSM) supports Circuit Emulation Services (CES) on an E1/DS1 interface. The CSM (DS1 and E1 interfaces) provides adaptation from time-division multiplexed (TDM) equipment (i.e. PBX's, WAN multiplexers, channel banks, video codecs, etc.) and traffic to ATM. In both E1 and DS1 modes structured and unstructured services can be provided with a maximum of 96 and 120 connections supported on each module.

The CSM Network Module has 4 ports which support fractional DS1 services ($n \times 56$ kbps/ $n \times 64$ kbps) where 1 to 24 contiguous or non-contiguous DS0 channels are mapped to a single ATM VCC not to exceed 127 total connections.

Structured services provide digital access and cross-connect system connectivity where $n \times 64$ kbps and $n \times 56$ kbps digital signal level zero (DS0) channels are adapted to ATM cells and mapped to unique ATM virtual connections (VCCs). Unstructured services provide support and maintenance of a single full bandwidth 1.544 Mbps (DS1) or 2.048 Mbps (E1) clear channel across a single ATM virtual connection. Configurations of both the DS1 and the E1 version of the CSM module are detailed in this chapter.

The CSM, shown in Figure 14-1 utilizes the AAL1 SAR and enables transferring PBX calls over an ATM network. Its front panel is shown in Figure 1-5 (chapter 1).

Figure 14-1 CSM in system

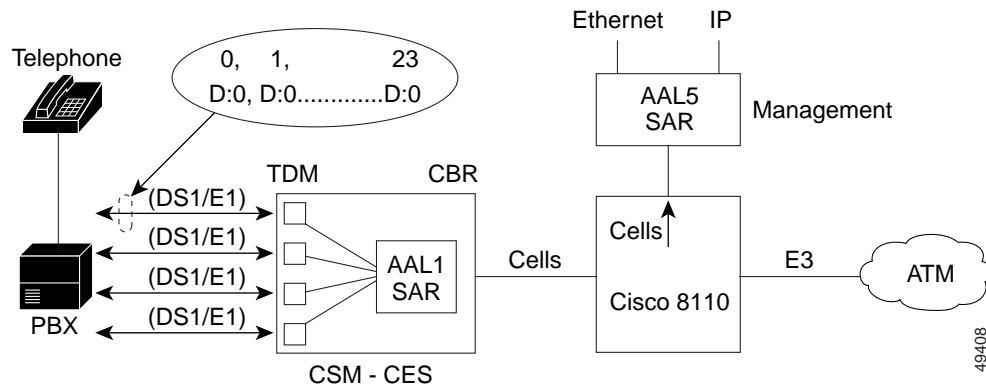
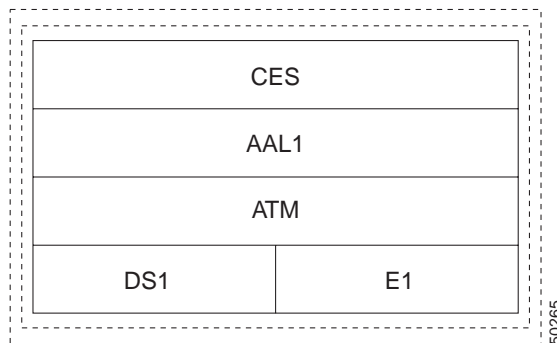


Figure 14-2 ATM Layers



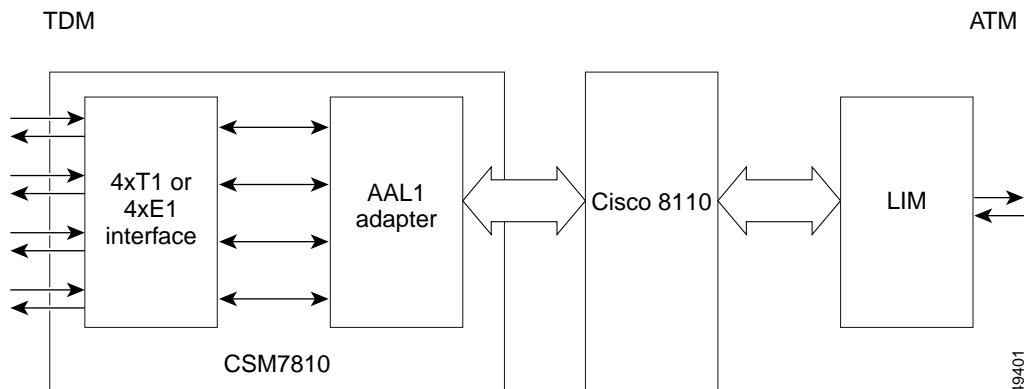
Circuit Emulation Service (CES)

The Cisco 8110 supports up to two CSM 7810 modules, each providing 4 CES User ports. Port and Service modes and parameters can be configured.

CES is an option supported by Cisco 8110 software release 4.0 and up. To add CES support to the Cisco 8110 at least one CM7810 module should be installed in interface slots 1 or 3 (User side). The Cisco 8110 supports two of these modules.

Each CSM7810 supports 4 ports that can be configured to be 4xT1 or 4xE1 interfaces. CES mode can be selected for each port to be UDT or SDT.

Figure 14-3 Circuit Emulation Service Signal Flow



CSM7810 Application

TDM Ports

The four TDM ports can be selected to be either E1 or T1, for each CSM7810. The framing format and line code can be selected.

Supported line codes are:

- For T1: B8ZS and AMI
- For E1: HDB3

Supported framing formats are:

- For T1: SF and ESF
- For E1: FAS, MFAS, FAS+CRC, MFAS+CRC

Channels may be programmed individually to carry CAS signaling or not. Different option of trunk conditioning in case of failures are provided.

Maintenance and statistics are accumulated for each port in a similar way to other LIM cards, but no cells related parameters are accumulated (Ingress, Egress and Errored cells), since the interface is TDM and not ATM.

The CSM7810 can provide the Cisco 8110 clock source from the recovered clock of any of its input signals.

CES modes

UDT and SDT modes are supported on a per port basis.

In UDT mode only one service can be configured per port. The alarms handling can be selected to handle only LOS alarms, to handle LOS and monitor all other frame alarms, or to monitor and handle all frame alarms.

In SDT mode up to 24 (T1) or 31 (E1) services can be configured per port. Each service may include between one and all channels of a port. Each service can be selected to carry or not CAS signaling.

In both modes the clock recovery scheme can be selected. The supported schemes are: Internal, Adaptive and Loop timed. Cells fill level can be set to reduce delay.

ATM Level

Each service should be associated with a VC. The VC features are the same as for a regular VC in the Network side. In the User side no OAM generation or handling is performed, since the ATM Interface in the User side is internal to the Cisco 8110.

By default CES related alarms will not force VC-AIS alarms. VC alarms are reported to the CES level for consequent actions.

Line Configuration

The CSM card is configured on both the CBR and ATM side. Configuration of the CBR side of the CSM may be performed using the following menus. Access to CSM configuration is via the DSX1 configuration menu.

-
- Step 1** When you log into the Cisco 8110 and type `?` at the prompt, the Root Menu is displayed
 - Step 2** Type any portion of the word `configuration` and press RETURN. Then type `?` and press RETURN. The Configuration Menu is displayed.
 - Step 3** Type `dsx1` at the prompt and press RETURN. Then type `?` and press RETURN to display the **DSX1 Configuration menu**:

Figure 14-4 DSX1 Configuration Menu

```
Cisco 8110::host:configuration:dsx1$ ?
line_typebuild_out  attenuation  line_bal
payloadcoset       csm>           alarm>
pm>up              top           exit
?
```

LINE_TYPE This command allows the user to select the protocol (E1, T1). This selection remains until reconfigured. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
usage: line_type <lim 1..3> (t1|e1)
```

<lim 1..3>	LIM selection
e1	Selects E1 mode
t1	Selects T1(DS1) mode

BUILD_OUT This command sets the physical interface line buildout characteristics for CSM-T1 and LIM-T1 modes. At the prompt, type the command and press RETURN. The following prompt is displayed: T-1 Mode Only

```
usage: build_out <lim1..3> (1|2|3|4|all) short|133|266|399|533|long)
```

<lim 1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
short	less than 133 feet
133	133-266 feet
266	266-399 feet
399	399-533 feet
533	533-655 feet
long	Over 655 feet .

ATTENUATION This command is used to set the attenuation in LIM-T1 and CMS-T1 (when build-out is long). At the prompt, type the command and press RETURN. The following prompt is displayed:

```
usage: attenuation <lim 1..3> (1|2|3|4|all) (0db|7.5db|15db|22.5db)
```

<lim 1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
0db	0 dB attenuation
7.5db	7.5 dB attenuation
15db	15 dB attenuation
22.5db	22.5 dB attenuation

LINE_BAL This command is used to enable or disable line balance for LIM-E1.

```
usage: line_bal <lim 1..3> (balance|unbalance)
```

<1..3>	LIM selection
balance unbalance	Enable / disable line balance

PAYLOAD This command enables the payload scrambling at the ATM level for all types of LIM (i.e. LIM-E1, LIM-T1).

```
usage: payload <lim 1..3> (1|2|3|4|all) (scrambling|none)
```

<1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces

scramling enables payload scrambling
none disabled

COSET An ATM parameter which indicates when to calculate the header error correction bit if it is to be ORed with another value or not (known as the COSET Polynomial). It is applicable for LIM-E1 and LIM-T1.

usage: coset <lim 1..3> (1|2|3|4|all) (enable|disable)

<1..3> LIM selection
1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
all - selects all interfaces
enable|disable activates / deactivates Coset

CSM This command configures the Circuit Emulation Services. At the prompt, type the command and press RETURN. The following screen is displayed:

Figure 14-5 CSM Configuration submenu

```
Cisco 8110::host::configuration:dsx1:csms?
t1_framing e1_framing line_code trunk_condition dt_mode udt_alarm
clock_source clock_recovery up top exit ?
```

T1_FRAMING This command is used to enable or disable CAS (Channel Associated Signalling). At the prompt, type the command and press RETURN. The following prompt is displayed:

usage: t1_framing <lim 1..3> (1|2|3|4|all) (esf|sf)

<lim 1..3> LIM selection
1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
all - selects all interfaces
esf Extended super-frame
sf Super-frame

E1_FRAMING This command is used to enable or disable Channel Associated Signalling. At the prompt, type the command and press RETURN. The following prompt is displayed:

usage: e1_framing <lim 1..3> (1|2|3|4|all)
(e1|crc_e1|mf|crc_mf)

<lim 1..3> LIM selection
1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
all - selects all interfaces

e1	E1 mode
crc_e1	Cyclic redundancy Check. in E1 mode
mf	Multiframe (SDT Mode Only)
crc_mf	CRC and Mutiframe mode (SDT Mode Only)

LINE_CODE This command defines the line encoding in T1 mode only and allows selection between two standards: AMI or B8ZS. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
usage: line_code <lim 1..3> (1|2|3|4|all) (b8zs|ami)
```

<lim 1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
b8zs ami	Selection of standard

TRUNK_CONDITION This command is used to enable the trunk conditioning option for SDT mode. This configures the a,b,c,d (a,b in T1-SF mode) bit. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
usage: trunk_condition <lim 1..3> (1|2|3|4|all) (mode_01|mode_10|only_1|only_0|none)
{<ch val 0..0xff>}
```

<lim 1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
mode_01	mode 01 enabled
mode_10	mode 10 enabled
only_1	mode 1 enabled
only_0	mode 0 enabled
none	no mode selected
<0..0xff>	channel value

DT_MODE This command is used to select the type of data transfer (structured or unstructured). At the prompt, type the command and press RETURN. The following prompt is displayed:

```
usage: dt_mode <lim 1..3> (1|2|3|4|all) (sdt|udt)
```

<lim 1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces

sdt structured data transfer selected
udt unstructured data transfer selected (not in E1-MF mode)

UDT_ALARM This command is used to select the Unstructured Data Transfer, UDT, option and determine when to declare an alarm and which action is to be taken. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
usage: udt_alarm <lim 1..3> (1|2|3|4|all) (los|monitor_all
consequent_action)
```

<lim 1..3> LIM selection
1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
all - selects all interfaces
los Monitor LOS only
monitor_all Monitor any alarm
consequent_action Send VC-AIS in UDT Mode

CLOCK_SOURCE This command defines the transmitted clock source. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: clock_source <lim 1..3> <port 1..4>
```

<lim 1..3> LIM selection
<port 1..4> Port selection

CLOCK_RECOVERY This command is used to select the clock recovery scheme. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
usage: clock_recovery <lim 1..3> (1|2|3|4|all) (internal|loop_timed|adaptive)
```

<lim 1..3> LIM selection
1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
all - selects all interfaces
internal internal (built-in) clock source selected
loop_timed loopback clock source selected
adaptive adaptive clock source selected

ALARM This command enters the DSX1 alarm configuration submenu. At the prompt, type the command and press RETURN. The following screen as shown in Figure 14-6 is displayed:

Figure 14-6 DSX1 Alarm Configuration Submenu

```
Cisco 8110::host:configuration:dsx1:alarm$ ?
show          high_ber          low_ber          up          top          exit          ?
```

SHOW This command displays the DSX1 alarm configuration. At the prompt, type the command and press RETURN. The following information as shown in Figure 14-7 is displayed:

Figure 14-7 DSX1 Alarm Configuration Display

```
Cisco 8110::host:configuration:alarm$ show 1 1
      DSX1 Alarm Parameters
      -----
High BER : 10E-4
Low  BER          : 10E-6
```

HIGH_BER This command sets BER high alarm threshold to 10^{-x} . At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: high_ber <lim 1..3> (1|2|3|4|all) <3..6>
```

<1..3> LIM selection

1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
all - selects all interfaces

<3..6> BER selection

LOW_BER This command sets BER low alarm threshold to 10^{-x} . At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: low_ber <1..3> (1|2|3|4|all) <5..9>
```

<1..3> LIM selection

1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
all - selects all interfaces

<5..9> BER selection

PM This command enters the DS1 Performance Monitoring submenu. At the prompt, type the command and press RETURN. The screen shown in Figure 14-8 is displayed:

Figure 14-8 DS1 LIM Performance Monitoring Submenu

```
Cisco 8110::host:configuration:lim:pm$ ?

show          clear          degraded          unacceptable
unavailable   up          top          exit
?
```

SHOW This command displays the DS1 LIM performance monitoring thresholds. At the prompt, type the command and press RETURN. The type of information shown in Figure 14-9 is displayed:

Figure 14-9 LIM Performance Monitoring Configuration

```
Cisco 8110::host:configuration:dsxl:pm$ show 1
DSXL PM Configuration
-----
Port LCV      LCV      UAS      UAS      FE      FE      SES PM
id  Degraded Unacceptable Degraded Unacceptable Degraded Unacceptable th state
-----
1    5000     5000     3        3        3        3        6  Enabled
```

Enter **show** to display the following prompt:

```
Usage: show <lim 1..3> (1|2|3|4|all)
```

<lim 1..3> LIM selection
1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
 all - selects all interfaces

DEGRADED This command defines how many Line Code Violations should have occurred in the previous 24 hours to declare a degraded performance. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: degraded (es|ses|sefs|fe|lcv|uas|hcs) <lim 1..3> (1|2|3|4|all) <int>
```

es Errored Seconds - Enter the number of ES alarms required to declare Unacceptable and Degraded performance
ses Severely Errored Seconds - Enter the number of SES alarms required to declare Unacceptable and Degraded performance
sefs Severely Errored Frame Seconds - Enter the number of SEFS alarms required to declare Unacceptable and Degraded performance
fe Frame Error - Enter the number of FE alarms required to declare Unacceptable and Degraded performance
lcv Line Code Violation - Enter the number of Line CV alarms required to declare Unacceptable and Degraded performance
uas Unavailable Seconds - Enter the number of UAS alarms required to declare Unacceptable and Degraded performance
hcs Header Check Sequence - Enter the number of HCS alarms required to declare Unacceptable and Degraded performance
<1..3> LIM selection
1|2|3|4|all 1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available)
 all - selects all interfaces
<int> CV count

UNACCEPTABLE This command defines how many Line Code Violations should have occurred in the previous 15 minute to declare an unacceptable performance. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: unacceptable (es|ses|sefs|fe|lcv|uas|hcs) <lim 1..3> (1|2|3|4|all) <int>
```

es	Errored Seconds - Enter the number of ES alarms required to declare Unacceptable and Degraded performance
ses	Severely Errored Seconds - Enter the number of SES alarms required to declare Unacceptable and Degraded performance
sefs	Severely Errored Frame Seconds - Enter the number of SEFS alarms required to declare Unacceptable and Degraded performance
fe	Frame Error - Enter the number of FE alarms required to declare Unacceptable and Degraded performance
lcv	Line Code Violation - Enter the number of Line CV alarms required to declare Unacceptable and Degraded performance
uas	Unavailable Seconds - Enter the number of UAS alarms required to declare Unacceptable and Degraded performance
hcs	Header Check Sequence - Enter the number of HCS alarms required to declare Unacceptable and Degraded performance
<1..3>	LIM Selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
<int>	CV count: Default 5000 Range 0 to 2 ³² - 1, 0 = disabled

SES_THRESHOLD This command defines the number of errored seconds (ES) in the previous 15 minutes to declare a severely errored second. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: ses_threshold <lim 1..3> (1|2|3|4|all) <1...255>
```

<1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
<1...255>	Range of seconds: Default = 6

STATUS This command enables or disables the performance monitoring (PM). At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: status <lim 1..3> (1|2|3|4|all) (enable|disable)
```

<1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
enable	monitoring enabled
disable	monitoring disabled

CLEAR This command clears the relevant performance monitoring (PM) current or history parameters. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: clear (current|history) <lim 1..3> (1|2|3|4|all)
```

current	Selects current data files
history	Selects history data files
<lim 1..3>	LIM selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces

UNAVAILABLE This command defines unavailable seconds. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: unavailable <1..3> <0..10>
```

<1..3>	LIM selection
<0..10>	Set the number of seconds

Maintenance

-
- Step 1** When you log into the Cisco 8110 and type ? at the prompt the Root Menu is displayed.
 - Step 2** Type any portion of the word **maintenance** and press RETURN. Then type ? and press RETURN The Maintenance Menu is displayed.
 - Step 3** Select **dsx1** to display the screen shown in Figure 14-10.

Figure 14-10 Maintenance DSX1 submenu

```
Cisco 8110::host: maintenance:dsx1$ ?
loopback det_loop_codes send_code up
top      exit           ?
```

LOOPBACK This command sets the DSX1 interface loopback mode. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage: loopback <lim 1..3> (1|2|3|4|all) (none|payload|line|diagnostic){(forever)}
```

The parameters are defined as follows:

1..3	LIM Selection
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
none	No loopback
payload	Sets payload loopback
line	Sets line loopback
diagnostic	Sets internal loopback
forever	When this parameter is present, the loop continues until the command is issued with the NONE option

DET_LOOP_CODES This command enables detection of loop codes sent by the remote system.

Usage: `det_loop_codes <lim 1..3> (1|2|3|4|all) (enable|disable)`

The parameters are defined as follows:

lim 1..3	selects LIM
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
enable	enables loopback code detection
disable	disables loopback code detection

SEND_CODE This command sends the pattern of loop code using BOP protocols in order to set loopback in the remote side. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: `send_code <1..3> (1|2|3|4|all)
(line_remote_loop|payload_remote_loop|reset_remote_loop) (Fdl|inband)`

The parameters are defined as follows:

1..3	Selects DS1 LIM
1 2 3 4 all	1 to 4 - selects Interface (for LIM E1/T1 only interface 1 is available) all - selects all interfaces
line_remote_loop	Sends remote line loopback code
payload_remote_loop	Sends remote payload loopback code
reset_remote_loop	Clears remote loopback code
Fdl	Sends the code in FDL
inband	Sends the code inband

CES Configuration

The CSM card is configured on both the CBR and ATM side. Configuration of the ATM side of the CSM may be performed using the following menus.

-
- Step 1** When you log into the Cisco 8110 and type ? at the prompt, the Root Menu is displayed. Any portion of the word **configuration** and press RETURN. Then type ? and press RETURN. The Configuration Menu is displayed.
- Step 2** Type **ces** at the prompt and press RETURN. Then type ? and press RETURN to display the **CES Configuration menu**.

Figure 14-11 CES Configuration Menu

```
Cisco 8110::host:configuration:ces$ ?
    show>          new          delete          cas
    oam_alarm_gen  partial_fill  buf_max_size   cdv_rx_t
    loss_integ_time  enable      disable        activity_timeout
    shaping_class  remote_addr  first_interval  retry_limit
    restart        clear        up             top
    exit           ?
```

SHOW This command displays CES configuration parameters as shown in the sample screen in **Figure 14-12**.

PCR and CDV computations are implemented for CES connections.

The PCR computation complies with af-vtoa-0078.000 par. 5.1.

The CDV depends on the number of active connections. As the CBR traffic is already shaped as required, no policing is needed to be performed by these connections. These computed parameters may be used by the user to configure the PVCs in the Network switches.

Class 0 is assigned as a default class of highest priority for CBR connections. Other connections will use class 31 as default. This will assure that when there is a contention on the network port (traffic coming from ethernet and native ATM LIM) the CBR traffic will always be serviced.

Figure 14-12 CES show submenu

```
Cisco 8110::host:configuration:ces:show$ ?
service      config      up          top
exit         ?
```

Figure 14-13 DSO Status Display

SERVICE This command is used to select the status of each service. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage:  service  <limid 1..3>
```

lim 1...3 selects LIM

**Note**

The If index presented is the one that should be used in commands that use the If index as a parameter (e.g..Delete, CAS etc.)

Figure 14-14 Service status display

```
Cisco 8110::Cisco 8110_b~ co ce sh ser 1
CES Services for LIM1
-----
IfIndex Port Channels ConnType Vpi Vci CbrType Admin Oper
   385   1 00000002 pvc     0 100 SDT   Up    Up
   512   1 00000070 pvc     0 101 SDT   Up    Up
```

**Note**

To see CES services of other LIMs, reference Figures 14-17, 14-18 and 14-19.

CONFIG This command is used to display the configuration. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage:  config  <ifindex>
```

<ifindex> Interface Index of a service

Figure 14-15 Service status display for LIM 3

```
Cisco 8110::Cisco 8110_b~ co ce sh ser 3
CES Services for LIM3
-----
IfIndex Port Channels ConnType Vpi Vci CbrType Admin Oper
   14    1 ffffffff pvc   3 2579 UDT   Up    Unkown
   259   3 00000780 pvc   3 100 SDT   Up    Unknown
   257   2 0000e080 pvc   3 101 SDT   Up    Unknown
```

Figure 14-16 shows details of service configuration CBR type UDT and its computed values for service 14.

Figure 14-16 CES Configuration Display for Service 14

```
Cisco 8110::Cisco 8110_b~ co ce sh con 14
CES Configuration for service14
```

```
-----
Limid      : 3
PortID     : 1
Channels   : All
ConnType   : pvc
Vpi        : 3
Vci        : 234
CBR Type   : SDT
Admin Status : Up
Oper Status : Unknown
Clock Mode : adaptive
CAS        : Basic
Partial Fill : 0
Max Buf Size : 400
CDV Receive : 200
CDV Traansmit : 15
PCR        : 4107
Cell Loss Int : 2500
OAM Alarm Gen : Disable
```

Figure 14-17 shows details of service configuration CBR type UDT and its computed values for service 256.

Figure 14-17 CES Configuration Display for Service 256

```
Cisco 8110::Cisco 8110_b~ co ce sh con 256
CES Configuration for service256
```

```
-----
Limid      : 3
PortID     : 3
Channels   : 7,8,9,10
ConnType   : pvc
Vpi        : 3
Vci        : 234
CBR Type   : SDT
Admin Status : Up
Oper Status : Unknown
Clock Mode : adaptive
CAS        : Basic
Partial Fill : 0
Max Buf Size : 400
CDV Receive : 200
CDV Traansmit : 15
PCR        : 697
Cell Loss Int : 2500
OAM Alarm Gen : Disable
```

Figure 14-18 shows details of service configuration CBR type UDT and its computed values for service 257.

Figure 14-18 CES Configuration Display for Service 257

```

Cisco 8110::Cisco 8110_b~ co ce sh con 257
CES Configuration for service257
-----
Limid       : 3
PortID     : 2
Channels   : 7,13,14,15
ConnType   : pvc
Vpi        : 3
Vci        : 234
CBR Type   : SDT
Admin Status : Up
Oper Status : Unknown
Clock Mode  : adaptive
CAS         : Basic
Partial Fill : 0
Max Buf Size : 400
CDV Receive : 200
CDV Traansmit : 15
PCR         : 683
Cell Loss Int : 2500
OAM Alarm Gen : Disable

```

NEW This command is used for assigning some of the time slots into one of the connections by selecting lim, port, channel. The connection is added to the VC table. The command will cause an interface to be created automatically. At the prompt, type the command and press RETURN. The following prompt is displayed:

```

Usage: new <limid 1..3> <port 1..4> <channels 1..31 n-m,1,all>
      (pvc|active_svc|passive_svc) <vpi/sel 0..255> {<vci 1..65535>}

```

<limid 1..3>	selects LIM
<port 1..4>	selects port
<channels 1..31>	selects channel
<n-m, 1, all>	Time-slot to be assigned
pvc active_svc passive _svc	select connection type
vpi 0..255	virtual path identifier
vci 1..65535	virtual channel identifier

Example:

```

Usage: new <limid 3> <port 1> <channels 2-3, 4, 6-7, 8>
      <n-m,1,all> <vpi 0> <vci 233>

```

<limid 1..3>	selects LIM
<port 1..4>	selects port
<channels 1..31>	selects channel
<n-m, 1, all>	Time-slot to be assigned

vpi 0..255 virtual path identifier
vci 1..65535 virtual channel identifier

DELETE This command is used to erase the connection. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: delete <ifindex>

<ifindex> Interface index of a service

CAS This command is used to determine whether channel associated signaling should be transferred across the connection. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: cas <ifindex> (enable|disable)

<ifindex> Interface index of a service
enable Enable CAS in service
disable Disable CAS in service

PARTIAL_FILL This command is used to determine how many of the available bytes in each cell are used before they are deemed 'full' and ready for transmission across the network in order to regulate the transmission quality. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: partial_fill <ifindex> <0..47>

<ifindex> Interface Index of a service
<0..47> selects number of cells for transmission of loopback codes
 Default = 0, no partial fill

BUF_MAX_SIZE This command is used to determine the amount of buffer space allocated for the incoming cells. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: buf_max_size <ifindex> <10us 1..65535>

<ifindex> Selects either ethernet or IP service
<10us 1..65535> range in 10 Usec units. Must be twice as large as CDV-RX-T.

CDV_RX_T This command is used to set cell delay variation of incoming cells over a specific time span. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: cdv_rx_t <ifindex> <10us 1..65535>

<ifindex> Interface Index of a service
<10us 1..65535> range in 10 uSec units. Minimum value depends on partial fill and number of frames in this service

LOSS_INTEG_TIME This command is used to determine loss integration time . At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: loss_integ_time <ifindex> <1msec 1000..65535>

<ifindex> Interface Index of a service
<1msec 1000..65535> range in 1msec units

ENABLE This command is used to enable transfer of data. Data cannot be transferred until configured and enabled with this command. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: enable <ifindex>

<ifindex> Interface Index of a service

DISABLE This command is used to disable a connection. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: disable <ifindex>

<ifindex> Interface Index of a service

ACTIVITY TIMEOUT This command defines how much time will pass before a retry is attempted. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: activity_timeout <ifindex> < 1..3600>

<ifindex> Interface Index of a service

1..3600 Enter the number of seconds

SHAPING CLASS This command defines the shaping class for CES. At the prompt, type the command and press RETURN. The following prompt is displayed:

Usage: shaping_class <ifindex> <0..32>

<ifindex> Interface Index of a service
0..32 Select a shaping class value

REMOTE ADDR This command defines the ATM address of the remote device. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage:  remote_addr <ifindex> <remote address>
```

<ifindex> Interface Index of a service
remote address Address format
 is:47.0005.80.ffe100.0000.f21a.3641{.00.40.0d.50.0b.32}.40

FIRST INTERVAL This command defines the first interval timeout. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage:  first_interval <ifindex> < 1..3600>
```

<ifindex> Interface Index of a service
1..3600 enter the number of seconds

RETRY LIMIT This command defines how many attempts(retry)will be made. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage:  retry_limit <ifindex> < 0..65535>
```

<ifindex> Interface Index of a service
0..65535 enter the number of retries

RESTART This command restarts the retry procedure. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage:  restart <ifindex>
```

<ifindex> Interface Index of a service

CLEARs This command clears the relevant parameters. At the prompt, type the command and press RETURN. The following prompt is displayed:

```
Usage:  clear (current|total|history) <limid 1..3>
```

current Selects current data files
total Selects total data files
history Selects history data files
<limid 1..3> LIM selection

History

To view the History data display proceed as follows:

-
- Step 1** When you log into the Cisco 8110 and type ? at the prompt, the Root Menu is displayed.
- Step 2** Type any portion of the word **statistics** and press RETURN. Then type ? and press RETURN. The History Menu is displayed.

Figure 14-19 The History sub menu

```
Cisco 8110::host:history$ ?
shaper          ces          vc          lim
  aps          svc>        up          top
  exit          ?
```

- Step 3** Type **lim** and press RETURN. Type ? and press RETURN to display the following prompt
- ```
Usage: lim <1..3> <1..96>
```

```
<1..3> LIM selection
<1..96> select an interval to view. from 96, 15 minute intervals
```

*Figure 14-20 CSM History Report*

```
Cisco 8110::host$ his lim 1 1
Monitored Seconds : 0

Port : 1

 : ESs : SESs : CVs : UASs : SEFSs
Line : 0 : - : 0 : - : -
Far End Line : 0 : - : - : - : -

Port : 2

 : ESs : SESs : CVs : UASs : SEFSs
Line : 0 : - : 0 : - : -
Far End Line : 0 : - : - : - : -

Port : 3

 : ESs : SESs : CVs : UASs : SEFSs
Line : 0 : - : 0 : - : -
Far End Line : 0 : - : - : - : -
```

# Statistics

To view statistics for LIM T1/E1, proceed as follows:

- 
- Step 1** When you log into the Cisco 8110 and type ? at the prompt, the Root Menu is displayed.

**Step 2** Type any portion of the word **statistics** and press RETURN. Then type **?** and press RETURN. The Statistics Menu is displayed.

**Step 3** Type **lim** and press RETURN. Type **?** and press RETURN to display the following screen

*Figure 14-21 CSM Statistics display*

```

Monitored Seconds : 0

Port : 1

 : ESs : SESs : CVs : UASs : SEFSs
Line : 0 : - : 0 : - : -

Port : 2

 Line : 0 : - : 0 : - : -

Port : 3

 Line : 0 : - : 0 : - : -

Port : 4

 Line : 0 : - : 0 : - : -

```



**Note** If no LIM number is specified, all LIM statistics will be displayed. Selected LIM statistics, can be shown if the LIM number is added to the LIM command (see Figure 14-20)

## CES Configuration Procedures

Following is a description of the Cisco 8110 CES optional configuration, including commands for the most used operations.

Default configuration depends on the selected line type and CES mode.

### Factory default

The CSM7810 Factory default configuration is as follows:

- Line Type T1
- Line code B8ZS
- Framing format ESF
- CES mode UDT
- Clock recovery scheme adaptive
- UDT alarms monitor LOS only
- Trunk Conditioning mode set all signaling bits to 0, then to 1

## E1 default

When the CSM7810 is changed to E1 the default configuration is as follows:

- Line Type E1
- Line code HDB3
- Framing format E1 with CRC
- CES mode UDT
- Clock recovery scheme adaptive for UDT, looped timing for SDT
- UDT alarms monitor LOS only
- Trunk Conditioning mode none

## Services default

The services default configuration is as follows:

- No CAS
- Partial fill 0. Send complete cells, no dummy fill.

## Port configuration

The first step in using the CES option should be to set up the TDM ports operating mode.

### Selecting E1 or T1 operation

The CES may be set to E1 or T1 operation. To change the line type of a CSM installed in slot 1, to E1, perform the following operation:

- Configure CES line type (from route menu):

```
configuration: dsx1$ line_type 1 e1
```

To perform this operation no services should be configured. The E1 configuration will be according to the default configuration.

### Selecting line code

In T1 the line code can be selected to be B8ZS or AMI, in E1 the code is always HDB3. To change the line code of port 1, of a CSM installed in slot 3, to AMI, perform the following operation:

- Configure T1 port line code (from route menu):

```
configuration dsx1 csm line_code 3 1 ami
```

### Selecting framing format

In T1 the framing can be selected to be ESF or SF, in E1 it can be selected to be FAS, MFAS with and without CRC. To change the framing format of port 4, of a CSM installed in slot 1 and operating in E1 mode, to CRC + MFAS, perform the following operation:

- Configure E1 port framing format (from route menu):

```
configuration dsx1 csm e1_framing 1 4 crc_mf
```

E1 modes supporting CAS can not be configured if the CES mode is UDT.

## Selecting CES mode

CES mode can be set to UDT or SDT. To configure SDT mode in port 1 of a CSM installed in slot 3 perform the following operation:

- Configure SDT mode to SDT (from route menu):

```
configuration dsx1 csm dt_mode 3 1 sdt
```

To perform this operation no services should be configured. The SDT configuration will be according to the default configuration.

## Selecting CES clock recovery scheme

CES clock recovery scheme can be set to Adaptive, Loop timed or Internal. To configure Internal mode in port 4 of a CSM installed in slot 1 perform the following operation:

- Configure SDT mode to SDT (from route menu):

```
configuration dsx1 csm clock_recovery 1 4 internal
```

## Selecting UDT alarms handling

UDT alarms monitoring can be selected to handle only LOS, to handle LOS and monitor all alarms or to perform consequent actions for all the alarms. To configure LOS only handling in port 2 of a CSM installed in slot 3 perform the following operation:

- Configure UDT alarms monitoring to LOS only (from route menu):

```
configuration dsx1 csm udt_alarms 3 2 los
```

## Service configuration

Once the port and CES mode have been selected, services can be configured depending on the selected mode and framing format.

To configure a service, the service should be defined and then associated to a VC. Once the VC and the Service have been enabled, information starts flowing.

Each Service will be assigned an ID that will be used to refer to that service.

## Setting a UDT service

In the following example we will describe how to set a UDT service associated to port 2 of a CSM7810 installed in slot 1, that uses VC with VPI = 0, VCI = 100.

- Set the service (from route menu):

```
configuration ces new 1 2 all 0 100
```



- Verify that service ID number:



Note

---

“all” is the only option for the number of channels in UDT mode

---

```
configuration ces show service 1
```

- Enable the Service (assume the ID is 5) (from route menu):

```
configuration ces enable 5
```

- Set the associated VC (from route menu):

```
configuration vc new 0 100 ces1
```

- Enable the associated VC (from route menu):

```
configuration: vc$ enable 0 100
```

## Setting a SDT service

In the following example we will describe how to set a SDT service associated to port 4 of a CSM7810 installed in slot 1, that uses VC with VPI = 0, VCI = 101. The service will carry channels 5 to 8 with CAS.

- Set the service (from route menu):

```
configuration ces new 1 4 5-8 0 101
```

- Verify that service ID number (from route menu):

```
configuration ces show service 1
```

- Enable the Service (assume the ID is 385 - from route menu):

```
configuration ces enable 385
```

- Enable the CAS (from route menu):

```
configuration ces cas 385 enable
```

- Set the associated VC (from route menu):

```
configuration vc new 0 101 ces1
```

- Enable the associated VC (from route menu):

```
configuration vc enable 0 101
```

## Deleting a service

In the following example we will delete the service that was configured in the previous paragraph.

- Delete the VC (from route menu):

```
configuration vc delete 0 100
```

- Delete the Service (from route menu):

```
configuration ces delete 385
```

## Selecting CSM7810 as timing source

Any port of the CSM7810 can be used as the Cisco 8110 timing source. To configure port 2 of the CSM7810 installed in slot 3 as the Cisco 8110 primary timing source, perform the following operation:

- Select the CSM7810 as the primary timing source (from route menu):

```
configuration tim primary lim3
```

- Select the port as timing source (from route menu):

```
configuration dsx1 csm clock_source 3 2
```