Voice over ATM Switched Virtual Circuits on the Cisco MC3810

This document describes voice over Asynchronous Transfer Mode (VoATM) switched virtual circuits (SVCs) for the Cisco MC3810 multiservice access concentrator.

This document includes the following sections:

Feature Overview

VoATM SVCs allow the Cisco MC3810 to transfer voice data dynamically and as needed—without tying up the resources required for static, manually provisioned permanent virtual circuits (PVCs). An SVC connection is initiated for each call, and each request includes bandwidth and quality-of-service (QoS) information required for the connection. SVCs are ideal for networks that are highly interconnected, where scalability is essential, and in situations where traffic is sporadic. In addition, service providers often offer more advantageous, usage-based pricing options for SVCs.

VoATM using SVCs on the Cisco MC3810 includes all of the voice features that the Cisco MC3810 supports for PVCs and for Frame Relay transport. Like other Cisco voice implementations, VoATM using SVCs is based on dial peers and uses ATM Adaptation Layer 5 (AAL5).

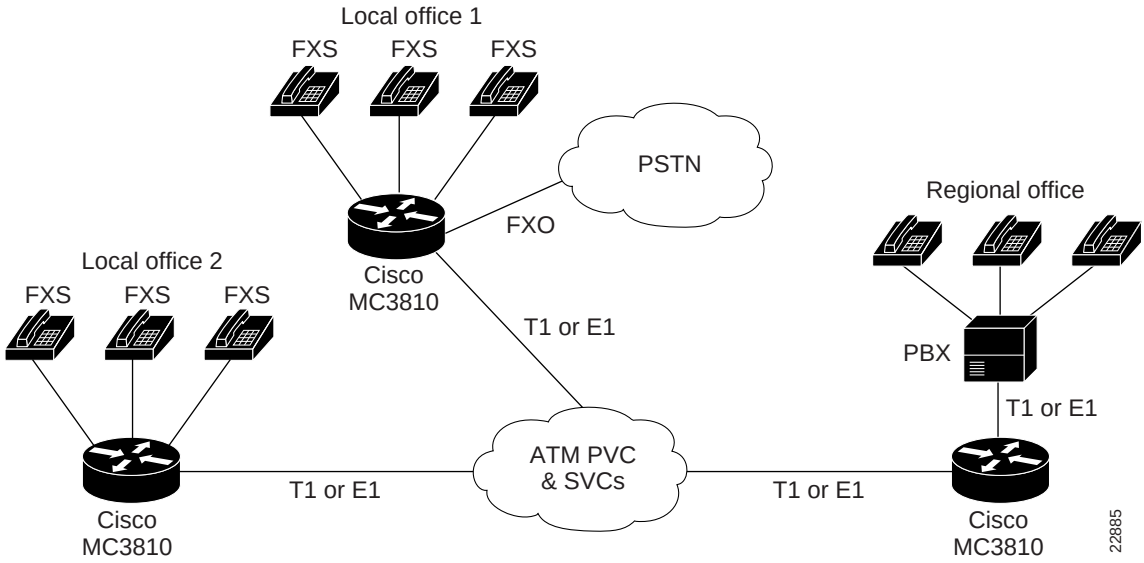
ATM SVC service operates much like X.25 SVC service, although ATM allows much higher throughput. It requires a signaling protocol between a router or a multiservice access concentrator and an ATM switch. The ATM signaling software provides a method of dynamically establishing, maintaining, and clearing ATM connections at the User-Network Interface (UNI). In UNI, the router serves as the user and the ATM switch is considered the network. The router does not perform call-level routing. Instead, the ATM switch does the ATM call routing, and the router directs packets through the resulting circuit.

VoATM SVCs include the following features:

- User-to-Network Interface (UNI) 3.1 signaling procedures, including support for the following types of information elements:
  - Traffic descriptor
  - Broadband bearer capability
  - ATM addressing information
- The implementation adheres to the required features of ATM Forum User-Network Interface (UNI) signaling specification, version 4.0, simultaneously supporting permanent virtual circuits (PVCs) and SVCs.
- Network Service Access Point (NSAP) addressing for private networks
- Interim Local Management Interface (ILMI)
- 24 simultaneous voice calls per Cisco MC3810 system
- Support for tandem switching

Note The Cisco MC3810, in addition to supporting video and voice over ATM SVCs, also supports data over ATM SVCs. *Wide-Area Networking Configuration Guide* and *Wide-Area Networking Command Reference* provide more information about the commands and configuration steps required for this capability.

Figure 1 Application for Voice over ATM Using SVCs



Benefits

The Cisco MC3810 multiservice access concentrator formerly supported only non-dial permanent virtual circuits (PVCs) for ATM traffic.

SVCs offer the following benefits:

- Dynamic resource allocation is more efficient and flexible than in nailed-up PVC connections.
- Many service providers offer favorable pricing for ATM SVC service.
- Interface requirements are determined by total bandwidth needs rather than by the number of different remote connections.
- SVCs support flat network topologies where each endpoint is separated by one hop only, offering the following advantages:
  - Simplifies design and management challenges.
  - Improves voice quality because there is only one compression cycle—in contrast to schemes where voice is compressed, decompressed, and compressed again.
  - Reduces delays over designs with multiple hops.

Restrictions

The following features are not supported.

- Direct E.164 ATM addressing
- Available Bit Rate (ABR) service
- Leaf-initiated joins (LIJs)
- ATM anycast, communication between one sender and the nearest of several receivers in a group
- Generic Identifier Transport (GIT), which uses an information element to carry identifiers between two users
- Switched Virtual Path service, which is the grouping of SVCs to define a path (usually within a single application) where the switch directs calls as appropriate
- Proxy signaling, where, for example, IP traffic is identified by class or precedence and an IP router rather than the source host signals an ATM layer

Related Features and Technologies

The Cisco MC3810 also supports data over ATM SVCs. *Wide-Area Networking Configuration Guide* and *Wide-Area Networking Command Reference* provide more information about the commands and configuration steps required for this capability.

Related Documents

For information about Cisco IOS configuration for voice applications, consult the following Cisco IOS Release 12.0 documents:

- *Voice, Video, and Home Applications Configuration Guide*
- *Voice, Video, and Home Applications Command Reference*

For information about Cisco IOS configuration for ATM, consult the following Cisco IOS Release 12.0 documents:

- *Wide-Area Networking Configuration Guide*
- *Wide-Area Networking Command Reference*

For information about IOS configuration that is unique to the Cisco MC3810, consult the following Cisco documents:

- *Cisco MC3810 Multiservice Access Concentrator Software Configuration Guide*
- *Cisco MC3810 Multiservice Access Concentrator Software Command Reference*

Supported Platforms

This feature is supported on the Cisco MC3810 multiservice access concentrator.

Supported Standards, MIBs, and RFCs

No MIBs are supported by this feature.

Other Standards

- ATM Forum document af-uni-0010.002, ATM User-Network Interface Specification V3.1 (1994), including support for the following types of information elements:
  - Traffic Descriptor
  - Broadband Bearer Capability
  - ATM Addressing Information
- ATM Forum document af-sig-0061.000, ATM UNI Signaling Specification V4.0 (1996) with the exceptions noted in “Restrictions” on page 3
- ITU recommendation Q.2931
- ITU-T X.213 and OSI Network Service Access Point (NSAP) addressing
- ATM Forum document af-ilmi-0065.000, Integrated Local Management Interface (1996)

Prerequisites

- Cisco IOS Software Release 12.0(5)XK or 12.0(7)T or a later release
- A configured ATM network

Configuration Tasks

Perform the following tasks to configure VoATM SVCs service:

- Set up clock sources, T1/E1 controller settings, and serial interfaces.
- Configure the ATM interface, including signaling and management PVCs.
- Set up voice POTS and ATM dial peers.

These tasks do not represent all of the configuration tasks required to set up your ATM network. For more information, refer to the *Cisco MC3810 Multiservice Access Concentrator Software Configuration Guide* and to the examples shown in the "Configuration Examples" section on page 20.

Configuring Network Clocks and Controller Settings

Because voice communications require a continuous and tightly meshed data stream to avoid loss of information, and PSTNs provide a variety of clocks, you must synchronize source and destination devices to a single master clock. In the example that follows, the clock source is derived from a device attached to T1 controller 0; then the clock source is distributed to the devices attached to the local Cisco MC3810 serial ports and to T1 controller 1. Base clock source decisions on the network configuration, and set up a hierarchy of clock sources, so that backup clock sources are available. For details, see Chapter 4, "Configuring Synchronized Clocking," in *Cisco MC3810 Multiservice Access Concentrator Software Configuration Guide.*

This configuration task also includes the basic steps required for ATM support over T1/E1 controller 0.

Step	Command	Purpose
1	`Router# configure terminal`	Enter global configuration mode.
2	`Router(config)# controller {T1 | E1} 0`	Enter controller configuration mode for controller T1/E1 0. ATM traffic is supported on controller T1/E1 0 only.
3	`Router(config-controller)# clock source line`	Configure controller T1/E1 0 to obtain the Cisco MC3810 clock source from an attached network device. This is the default setting.
4	`Router(config-controller)# no shutdown`	Activate the controller.
5	`Router(config)# controller {T1 | E1} 1`	Enter controller configuration mode for controller T1/E1 1.
6	`Router(config-controller)# clock source internal`	Configure controller T1/E1 1 to obtain its clocking from the internal network clock Phase-Lock-Loop (PLL). In this way, controller T1/E1 1 obtains clocking from the T1/E1 0 controller source—the switch.
7	`Router(config-controller)# no shutdown`	Activate the controller.
8	`Router(config-controller)# exit`	Exit controller configuration mode.

9	`Router(config)# framing esf`
	or
	`Router(config)# framing crc4`
		Set the framing to Extended Superframe (ESF) format, required for ATM on T1. This setting is automatic for T1 when the ATM mode is set.
		Set the framing to CRC4, required for ATM on E1. This setting is automatic for E1 when the ATM mode is set.

Step	Command	Purpose
10	`Router(config)# linecode b8zs` or	Set the line coding to binary zero 0 substitution (B8ZS), required for ATM on T1. This setting is automatic for T1 when the ATM mode is set.
	`Router(config)# linecode hdb3`	Set the line coding to HDB3, required for ATM on E1. This setting is automatic for E1 when the ATM mode is set.
11	`Router(config)# mode atm`	Configure the controller for ATM traffic. This allows the controller to support ATM encapsulation and create virtual ATM interface 0 for SVCs and PVCs. Controller framing is automatically set to extended superframe (ESF) on T1 and to CRC4 on E1. The line coding is automatically set to B8ZS on T1 and to HDB3 on E1. Channel groups, channel-associated signaling (CAS) groups, common channel signaling (CCS) groups or clear channels are not allowed on the trunk because ATM traffic occupies all the DS0s.
12	`Router(config)# network-clock base rate {56k | 64k}`	Set the network clock base-rate for the serial ports. The default is 56 kbps. **Note** At this point, you can also configure network protocol settings such as IP hosts. For more information, see the Cisco IOS Release 12.0 network protocol configuration and command reference guides.

Verifying Network Clocks and Controller Settings

To verify the configuration of network clock sources and controller settings, follow the steps below.

Step 1 Enter the privileged EXEC **show network-clocks** command to see the status of clock source settings.

```
Router# show network-clocks

Priority 1 clock source(inactive config): T1 0
Priority 1 clock source(active config) : T1 0
```

Step 2 Enter the privileged EXEC **show controllers t1** or **show controllers e1** command to see the status of T1/E1 controllers.

```
router# show controller t1 1
T1 1 is up.
  Applique type is Channelized T1
  Cablelength is long gain36 0db
  No alarms detected.
  Slot 4 CSU Serial #07789650 Model TEB HWVersion 4.70 RX level = 0DB
  Framing is ESF, Line Code is B8ZS, Clock Source is Internal.
  Data in current interval (819 seconds elapsed):
     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 Unavail Secs
  Data in Interval 1:
     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 Unavail Secs
  Data in Interval 2:
     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 Unavail Secs
```

```
  .
  .
  .
  Data in Interval 96:
     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 Unavail Secs
  Total Data (last 24 hours)
     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 Unavail Secs

!
Router# show controllers E1 1
E1 1 is up.
  Applique type is Channelized E1 - balanced
  No alarms detected.
  Slot 4 Serial #06868949 Model TEB HWVersion 3.80
  Framing is CRC4, Line Code is HDB3, Clock Source is Internal.
  Data in current interval (292 seconds elapsed):
     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 Unavail Secs
    .
    .
    .
  Total Data (last 66 15 minute intervals):
     9 Line Code Violations, 0 Path Code Violations,
     1 Slip Secs, 0 Fr Loss Secs, 4 Line Err Secs, 0 Degraded Mins,
     5 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Se
```

Configuring ATM Interfaces

In this section, the ATM interface is set up, including PVCs to carry signaling for SVCs. In addition, an NSAP address for an ATM SVC is specified. For additional information, see *Cisco MC3810 Multiservice Access Concentrator Software Configuration Guide* and *Cisco MC3810 Multiservice Access Concentrator Software Command Reference*.

You can also configure PVCs for voice communications. *Wide-Area Networking Configuration Guide* and *Wide-Area Networking Command Reference* provide additional information about this and other aspects of ATM configuration.

Step	Command	Purpose
1	`Router# configure terminal`	Enter global configuration mode.
2	`Router(config)# interface atm0`	Enter interface configuration mode for ATM 0—the only ATM interface that supports voice over SVCs.
3	`Router(config-if)# ip address ip-address mask`	Assign the IP address and subnet mask to the interface.

Step	Command	Purpose
4	`Router(config-if)# atm voice aesa {default | esi-address}`	This command sets the unique ATM end-station address (AESA) for an ATM interface that is using SVC mode for voice. The **default** keyword automatically creates an NSAP address for the interface, based on a prefix from the ATM switch (26 hexadecimal characters), the MAC address (12 hexadecimal characters) as the ESI (end station identifier), and a selector byte (two hexadecimal characters). The *esi-address* option requires that you enter 12 hexadecimal characters as the ESI. The ATM switch provides the prefix and the voice selector byte provides the remaining characters. You can view the assigned address using the **show atm video-voice address** command.
5	`Router(config-if)# pvc [name] vpi/vci ilmi`	Create an ATM permanent virtual circuit (PVC) for ILMI management purposes and enter PVC configuration mode. The optional *name* is a unique label that can be up to 16 characters long. *name* identifies to the processor the virtual path identifier-virtual channel identifier (VPI-VCI) pair to use for a particular packet. The ATM network VPI of this PVC is an 8-bit field in the header of the ATM cell. The *vpi* value is unique only on a single link, not throughout the ATM network, because it has local significance only. The *vpi* value must match that of the switch. Valid values are from 0 to 255, but the value is usually 0 for ILMI communications. If not specified, the *vpi* value is set to 0. You cannot set both *vpi* and *vci* to 0; if one is 0, the other cannot be 0. For ILMI communications this value is typically 16. The VCI is a 16-bit field in the header of the ATM cell. The VCI value is unique only on a single link—not throughout the ATM network—because it has local significance only. To set up communication with the ILMI, enter a value of **ilmi** for ATM adaptation layer encapsulation; the associated *vpi* and *vci* values are ordinarily 0 and 16, respectively. **Note** Typically, the low values 0 to 31 are reserved for specific traffic (for example, F4 OAM, SVC signaling, ILMI, and so on) and you should not use them for other PVCs.
6	`Router(config-if-atm-pvc)# pvc [name] vpi/vci qsaal`	See the explanations in Step 5 for the *name*, *vpi*, and *vci* values. To enable the signaling for setup and tear-down of SVCs, specify the Q.SAAL (Signaling ATM Adaptation Layer) encapsulation; the associated *vpi* and *vci* values are ordinarily 0 and 5, respectively. You cannot create this PVC on a subinterface.
7	`#Router(config-if-atm-pvc)# exit`	Exit PVC interface configuration mode.

Step	Command	Purpose
8	Router(config-if)# **interface atm 0** [.*subinterface-number* {**multipoint** | **point-to-point**}]	Optionally, you can create and configure a subinterface. This is useful when you wish to configure an extra parameter on the ATM interface. For example, you can specify one IP address on the main interface, as shown in Step 3; then you can configure a second IP address on a subinterface. *subinterface-number* is a value in the range from 1 to 4294967293. Enter the **multipoint** keyword when your network is fully meshed and you want to communicate with multiple routers. The **point-to-point** keyword configures the subinterface for communication with one router, as in a hard-wired connection. There is no default for this parameter.

Verifying ATM Interface Configuration

To verify ATM interface configuration, follow the steps below:

Step 1 Enter the privileged EXEC **show atm vc** command to see how SVCs and PVCs are set up, as in the following example:

```
Router# show atm vc
VCD /                                            Peak  Avg/Min Burst
Interface   Name       VPI   VCI  Type   Encaps   SC   Kbps   Kbps   Cells  Sts
0           1          0     5    PVC    SAAL     UBR       0                UP
0           2          0     16   PVC    ILMI     UBR       0                UP
0           379        0     60   SVC    SNAP     UBR       0                UP
0           986        0     84   SVC    SNAP     UBR       0                UP
0           14         0     133  SVC    VOICE    VBR      64     16    10    UP
0           15         0     134  SVC    VOICE    VBR      64     16    10    UP
0           16         0     135  SVC    VOICE    VBR      64     16    10    UP
0           17         0     136  SVC    VOICE    VBR      64     16    10    UP
0           18         0     137  SVC    VOICE    VBR      64     16    10    UP
0           19         0     138  SVC    VOICE    VBR      64     16    10    UP
0           20         0     139  SVC    VOICE    VBR      64     16    10    UP
0           21         0     140  SVC    VOICE    VBR      64     16    10    UP
0           22         0     141  SVC    VOICE    VBR      64     16    10    UP
0           23         0     142  SVC    VOICE    VBR      64     16    10    UP
0           24         0     143  SVC    VOICE    VBR      64     16    10    UP
0           25         0     144  SVC    VOICE    VBR      64     16    10    UP
0           26         0     145  SVC    VOICE    VBR      64     16    10    UP
0           27         0     146  SVC    VOICE    VBR      64     16    10    UP
0           28         0     147  SVC    VOICE    VBR      64     16    10    UP
```

Step 2 Enter the **show atm svc** command with or without the VPI/VCI specified. The following example shows information for a specific SVC:

```
Router# show atm svc 0/134

ATM0: VCD: 5, VPI: 0, VCI: 134
VBR, PeakRate: 64000
AAL5, etype: 0x0, Flags 0x440, VCmode: 0xE000
OAM frequency: 0 second(s), OAM retry frequency: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Disabled
OAM VC state: Not Managed
ILMI VC state: Not Managed
InARP DISABLED
```

```
InPkts: 4, OutPkts: 4, InBytes: 432, OutBytes: 432
InPRoc: 4, OutPRoc: 4, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
OAM cells received: 0
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI:0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI:0
OAM cells sent: 0
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutRDI: 0
OAM cell drops: 0
Status: UP
TTL: 3
interface = ATM0, call locally initiated, call reference = 5558610
vcnum = 5, vpi = 0, vci = 134, state = Active(U10), point-to-point call
Retry count: Current = 0
timer currently inactive, timer value = 00:00:00
Remote Atm Nsap address:47.00918100000000400B0A2501.0060837B4743.00,
VCowner:Static Map
```

Step 3 To see the PVCs that are set up for ILMI management and Q.SAAL signaling, enter the **show atm pvc** command with the VPI/VCI specified, as in the following example:

```
Router# show atm pvc 0/5
ATM0: VCD: 2, VPI: 0, VCI: 5, Connection Name: SAAL
UBR, PeakRate: 56
AAL5-SAAL, etype:0x4, Flags: 0x26, VCmode: 0x0
OAM frequency: 0 second(s), OAM retry frequency: 1 second(s), OAM retry frequenc
y: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Disabled
OAM VC state: Not Managed
ILMI VC state: Not Managed
InARP DISABLED
InPkts: 2044, OutPkts: 2064, InBytes: 20412, OutBytes: 20580
InPRoc: 2044, OutPRoc: 2064, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
OAM cells received: 0
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 0
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
OAM cell drops: 0
Compress: Disabled
Status: INACTIVE, State: NOT_IN_SERVICE
!
Router# show atm pvc 0/16
ATM0: VCD: 1, VPI: 0, VCI: 16, Connection Name: ILMI
UBR, PeakRate: 56
AAL5-ILMI, etype:0x0, Flags: 0x27, VCmode: 0x0
OAM frequency: 0 second(s), OAM retry frequency: 1 second(s), OAM retry frequenc
y: 1 second(s)
OAM up retry count: 3, OAM down retry count: 5
OAM Loopback status: OAM Disabled
OAM VC state: Not Managed
ILMI VC state: Not Managed
InARP DISABLED
InPkts: 398, OutPkts: 421, InBytes: 30493, OutBytes: 27227
InPRoc: 398, OutPRoc: 421, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
OAM cells received: 0
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
OAM cells sent: 0
F5 OutEndloop: 0, F5 OutSegloop: 0, F5 OutRDI: 0
F4 OutEndloop: 0, F4 OutSegloop: 0, F4 OutRDI: 0
```

```
OAM cell drops: 0
Compress: Disabled
Status: INACTIVE, State: NOT_IN_SERVICE
```

Step 4 To view information about the ATM interface, enter the privileged EXEC **show atm interface** command and specify ATM 0, as in the following example:

```
Router# show interface atm 0
ATM0 is up, line protocol is up
  Hardware is PQUICC Atom1
  Internet address is 9.1.1.6/8
  MTU 1500 bytes, sub MTU 1500, BW 1536 Kbit, DLY 20000 usec,
     reliability 255/255, txload 22/255, rxload 11/255
  NSAP address: 47.0091810000000002F26D4901.000011116666.06
  Encapsulation ATM
  292553397 packets input, -386762809 bytes
  164906758 packets output, 1937663833 bytes
  0 OAM cells input, 0 OAM cells output, loopback not set
  Keepalive not supported
  Encapsulation(s):, PVC mode
  1024 maximum active VCs, 28 current VCCs
  VC idle disconnect time: 300 seconds
  Signalling vc = 1, vpi = 0, vci = 5
  UNI Version = 4.0, Link Side = user
  Last input 00:00:00, output 2d05h, output hang never
  Last clearing of "show interface" counters never
  Input queue: -1902/75/0 (size/max/drops); Total output drops: 205
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 67000 bits/sec, 273 packets/sec
  5 minute output rate 136000 bits/sec, 548 packets/sec
     76766014 packets input, 936995443 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     367264676 packets output, 3261882795 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Step 5 Enter the privileged EXEC **show atm video-voice address** command to see information about the ATM interface address, which is particularly helpful because the address is assigned automatically with the **atm voice aesa** command. The following display also confirms that the ILMI status is confirmed—the ILMI PVC is set up to allow SVC management:

```
Router# show atm video-voice address
nsap address                                       type         ilmi status
47.0091810000000002F26D4901.00107B4832E1.FE   VOICE_AAL5   Confirmed
47.0091810000000002F26D4901.00107B4832E1.C8   VIDEO_AAL1   Confirmed
```

Configuring Voice Ports and Voice Dial Peers

In this section, the voice ports and voice dial peers are set up to support the local and the remote parties.

Step	Command	Purpose
1	`Router# configure terminal`	Enter global configuration mode.
2	`Router(config)# voice-port` *port/slot*	Specify a voice port and enter voice-port configuration mode. *port* specifies the slot number on the Cisco MC3810. If the analog voice module (AVM) or the digital voice module (DVM) is installed, the slot number is 1. If the multiflex trunk (MFT) is installed, the slot number is 0. *slot* specifies the voice port number. The valid entries depend on the hardware configuration, as follows: • Analog: 1 to 6 • Digital T1: 1 to 24 • Digital E1: 1 to 15 and 17 to 31
3	`Router(config-voiceport) codec g726r32` or see Step 6.	(Fax only, Optional) If you are configuring a dial peer for faxes over ATM SVCs, the default codec setting for the voice port does not function properly with the typical fax rate of 9.600 bps. Therefore, you can either change the codec or change the fax rate. The codec must support a minimum of 22 kbps. To change the codec from the default **g729ar8** codec (8 kbps), enter the voice-port **codec** command to specify one of the following compression modes: • **g726r32**—Specifies G.726 32K ADCPM compression. • **g711alaw**—Specifies G.711 64K PCM A-Law compression. • **g711ulaw**—Specifies G.711 64K PCM U-Law compression.
4	`Router(config-voiceport) exit`	Exit voice-port configuration mode.
5	`Router(config)# dial-peer voice` *tag* `voatm`	Define a voice ATM dial peer for the remote system and enter dial-peer configuration mode. Voice dial peers are persistent and exist until they are specifically removed with the **no** form of the **dial-peer voice** command. The tag value identifies the dial peer and must be unique on the Cisco MC3810. Do not duplicate a specific tag number. Valid values are from 1 to 10000.
6	`Router(config-dialpeer)# fax rate 4800`	(Fax only, Optional) If you are configuring a dial peer for faxes over ATM SVCs, the default codec setting for the voice port does not function properly unless the fax rate is slowed from the typical speed of 9.600 bps. Therefore, you can either change the codec (see Step 3) or change the fax rate to 4,800 bps or 2,400 bps.

Step	Command	Purpose
7	Router(config-dialpeer)# **destination-pattern** *string* [**T**]	Configure the dial peer's destination pattern to allow the system to reconcile dialed digits with the peer's NSAP address. The string is a series of digits that specify the E.164 or private dialing plan telephone number. Valid entries are the digits 0 through 9 and the letters A through D. The plus symbol (+) is not valid. You can enter the following special characters: • The star character (*) and the pound sign (#) that appear on standard touch-tone dial pads can appear in any dial string but not as leading characters (for example, *650). • The period (.) acts as a wildcard character. • Use the comma (,) only in prefixes to insert a one-second pause. • Use the timer (T) character to configure variable-length dial plans.
8	Router(config-dialpeer)# **session target ATM0** {**svc nsap** *address* | **pvc** [*vpi/vci* | *name*]}	Configure the ATM session target for the dial peer. Specify ATM 0 as the interface. When you use SVCs, the system reconciles dialed digits with the remote ATM interface's voice NSAP address. **Note** If you are using PVCs for voice, you can specify a PVC defined on the ATM interface as a session target, by using a name or a VPI/VCI combination. For additional information, see *Voice, Video, and Home Applications Configuration Guide* for Cisco IOS Release 12.0.
9	Router(config-dialpeer)# **exit**	Exit dial-peer configuration mode for this particular dial peer.
10	Router(config)# **dial-peer voice** *tag* **pots**	Define a local voice ATM dial peer. The tag value identifies the dial peer and must be unique on the Cisco MC3810. Do not duplicate a specific tag number. Valid values are from 1 to 10000.
11	Router(config-dialpeer)# **destination-pattern** *string*	Configure the dial peer's destination pattern. See Step 7 for more information.
12	Router(config-dialpeer)# **port** *slot/port*	Specify the voice port where the voice equipment is connected.

Verifying Voice Ports and Voice Dial Peers

Step 1 To verify voice-port configuration, enter the privileged EXEC **show voice port** command; you can either specify a voice port, or issue the command without arguments to display information about all voice ports. The following text shows example output:

```
Router# show voice port 1/1

Voice-port1/1 Slot is 1, Port is 1
 Type of VoicePort is E&M
 Operation State is UP
 Administrative State is UP
 No Interface Down Failure
 Description is not set
 Noise Regeneration is enabled
 Non Linear Processing is enabled
```

```
Music On Hold Threshold is Set to -38 dBm
In Gain is Set to 0 dB
Out Attenuation is Set to 0 dB
Echo Cancellation is enabled
Echo Cancel Coverage is set to 8 ms
Connection Mode is normal
Connection Number is not set
Initial Time Out is set to 10 s
Interdigit Time Out is set to 10 s
Call-Disconnect Time Out is set to 0 s
Coder Type is g729ar8
Companding Type is u-law
Voice Activity Detection is disabled
Ringing Time Out is 180 s
Wait Release Time Out is 30 s
Nominal Playout Delay is 80 milliseconds
Maximum Playout Delay is 160 milliseconds
Rx  A bit no conditioning set
Rx  B bit no conditioning set
Rx  C bit no conditioning set
Rx  D bit no conditioning set
Tx  A bit no conditioning set
Tx  B bit no conditioning set
Tx  C bit no conditioning set
Tx  D bit no conditioning set
Tx Busyout ABCD bits = 1010 Default pattern
Rx Seize ABCD bits = 1111 Default pattern
Rx Idle ABCD bits = 0000 Default pattern
Tx Seize ABCD bits = 1111 Default pattern
Tx Idle ABCD bits = 0000 Default pattern
Ignored Rx ABCD bits =  BCD
Region Tone is set for US

Analog Info Follows:
Currently processing Voice
Maintenance Mode Set to None (not in mtc mode)
Number of signaling protocol errors are 0
Impedance is set to 600r Ohm

Voice card specific Info Follows:
Signal Type is immediate
Operation Type is 2-wire
E&M Type is 1
Dial Type is dtmf
In Seizure is active
Out Seizure is active
Digit Duration Timing is set to 100 ms
InterDigit Duration Timing is set to 100 ms
Pulse Rate Timing is set to 10 pulses/second
InterDigit Pulse Duration Timing is set to 500 ms
Clear Wait Duration Timing is set to 400 ms
Wink Wait Duration Timing is set to 200 ms
Wink Duration Timing is set to 200 ms
Delay Start Timing is set to 150 ms
Delay Duration Timing is set to 140 ms
Dial Pulse Min. Delay is set to 140 ms
Auto Cut-through is disabled
Percent Break of Pulse is 61 percent
Dialout Delay for immediate start is 300 ms
```

Step 2 To verify voice dial-peer configuration, enter the privileged EXEC **show dial-peer voice** command. The following text is sample output from the **show dial-peer voice** command:

```
Router# show dial-peer voice

VoiceEncapPeer1
        tag = 1, destination-pattern = '4002',preference = 0,
        Admin state is up, Operation state is up
        type = pots, prefix = '',       fwd-digits = 0,
        session-target = '', voice-port = 1/1
VoiceOverATMPeer2
        tag = 2, destination-pattern = '4001',preference = 0,
        Admin state is up, Operation state is up
        type = voatm, session-target = 'ATM0'
        nsap '47.0091810000000050E201B101.00107B09C6ED.FE',
VoiceEncapPeer3
        tag = 3, destination-pattern = '4003',preference = 0,
        Admin state is up, Operation state is up
        type = pots, prefix = '',       fwd-digits = 0,
        session-target = '', voice-port = 1/1
```

Step 3 You can also enter a dial-plan number in order to learn more about a voice dial peer with the **show dialplan number** *dial string* command, as shown in the following example:

```
router# show dialplan number 5558809
Macro Exp.: 3388809

VoiceEncapPeer9
        information type = voice,
        tag = 9, destination-pattern = '5558809',
        answer-address = '', preference=0,
        group = 9, Admin state is up, Operation state is up,
        incoming called-number = '', connections/maximum = 0/unlimited,
        application associated:
        type = pots, prefix = '',
        session-target = '', voice-port = '1/9',
        direct-inward-dial = disabled,
        register E.164 number with GK = TRUE
        Connect Time = 0, Charged Units = 0,
        Successful Calls = 0, Failed Calls = 0,
        Accepted Calls = 0, Refused Calls = 0,
        Last Disconnect Cause is "",
        Last Disconnect Text is "",
        Last Setup Time = 0.
Matched: 5558809   Digits: 7
Target:
```

Troubleshooting Voice over ATM SVCs

When problems occur with voice over ATM SVCs, follow the steps below to look first for simpler problems before progressing to more complex possible issues. For general information about troubleshooting and voice QoS, see Cisco IOS Release 12.0 *Voice, Video, and Home Applications Configuration Guide*. Please see if any additional steps should be mentioned here.

Step 1 Make sure that the ATM interface, serial ports, and controllers are set to **no shutdown**.

Step 2 On both Cisco MC3810 multiservice access concentrators, make sure that ILMI and Q.SAAL PVCs are set up in order to allow SVC communications. The privileged EXEC **show atm pvc** command displays information about configured PVCs, including the ILMI and Q.SAAL PVCs.

```
Router# show atm pvc
 VCD /                                        Peak  Avg/Min Burst
Interface   Name       VPI   VCI  Type   Encaps   SC   Kbps   Kbps   Cells  Sts
0           1           0     5   PVC    SAAL     UBR        56                UP
0           2           0    16   PVC    ILMI     UBR        56                UP
```

Step 3 Ensure that NSAP addresses are set up and confirmed as operational under the ATM interfaces of the Cisco MC3810 multiservice access concentrators on both sides of the communication. Enter the privileged EXEC **show atm video-voice address** or **show atm ilmi-status** command, which are illustrated below. **show atm ilmi-status** provides more details about the ILMI PVC than does **show atm video-voice address**:

```
router# show atm video-voice address
nsap address                                    type         ilmi status
47.0091810000000002F26D4901.00107B4832E1.FE   VOICE_AAL5   Confirmed

router# show atm ilmi-status

Interface : ATM0 Interface Type : Private UNI (User-side)
ILMI VCC : (0, 16) ILMI Keepalive : Enabled (5 Sec 4 Retries)
ILMI State:       UpAndNormal
Peer IP Addr:     10.1.1.11       Peer IF Name:     ATM1/0/0
Peer MaxVPIbits:  8               Peer MaxVCIbits:  14
Active Prefix(s) :
47.0091.8100.0000.0002.f26d.4901
End-System Registered Address(s) :
47.0091.8100.0000.0002.f26d.4901.0000.1111.5555.05(Confirmed)
47.0091.8100.0000.0002.f26d.4901.0010.7b48.32e1.fe(Confirmed)
47.0091.8100.0000.0002.f26d.4901.0010.7b48.32e1.c8(Confirmed)
```

Step 4 Check the voice ports for busyout status by issuing the **show voice busyout** command. If the **busyout-monitor interface** or **busyout forced** command has been issued, one or more voice ports may be busied out, either due to a serial interface failure or because the voice port has been forced into a busyout state.

```
router# show voice busyout
If following network interfaces are down, voice port will be put into busyout
state Serial0
The following voice ports are in busyout state 1/10
```

Enter **show interfaces serial** to check the specified serial interface, or enter **show voice port** to check the voice-port status. The **no** form of the **busyout forced** command restores the voice port.

Step 5 Check for clocking problems. Enter the privileged EXEC command **show controllers t1** or **show controllers e1** command to check for slip errors, as shown in the following excerpt from the command output:

```
.
.
.
Data in current interval (819 seconds elapsed):
    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 Unavail Secs
 Data in Interval 1:
    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 Unavail Secs
 Data in Interval 2:
    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 Unavail Secs
 Data in Interval 3:
    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 Unavail Secs
  .
  .
  .
```

A few slip errors may not indicate a problem with clocking. However, if there are numerous errors, especially incrementing numbers of errors, you should check the following possibilities:

- The network clocks are not set to the same clock rate. Enter the **show network-clocks** command on the devices to ensure that these clock rates match.
- The Cisco MC3810 multiservice access concentrators may not be using the same clock source. For example, if there are two back-to-back Cisco MC3810 multiservice access concentrators and one is using an internal clock source, the other must use the line clock source in order to obtain clocking from the same device. Enter the privileged EXEC commands **show network-clocks** and **show controllers t1** or **show controllers e1** to see the clock source settings. For additional guidance, see Chapter 4, "Configuring Synchronized Clocking," in *Cisco MC3810 Multiservice Access Concentrator Software Configuration Guide.*

Step 6 Check the functionality of the Service-Specific Connection-Oriented Protocol (SSCOP). Enter the privileged EXEC **show sscop** command. See the following excerpt from the command output:

```
router# show sscop
SSCOP details for interface ATM0
   Current State = Data Transfer Ready
```

Interpretation of the command output requires familiarity with SSCOP, so unless you understand the protocol, just use the command to ensure that the protocol is in a state of readiness, as shown above. If you need to make changes, see the Cisco IOS Release 12.0 documents, *Wide-Area Networking Configuration Guide* and *Wide-Area Networking Command Reference*.

Note If you plan to adjust SSCOP parameters, you may wish to complete the rest of the troubleshooting steps before taking this route.

Step 7 Enter the **show dial-peer voice** command on the local and remote concentrators to verify that each has been configured properly to communicate with the other, as shown in the following example:

```
Router1# show dial-peer voice
VoiceEncapPeer33
        tag = 1, destination-pattern = '5558810',preference = 0,
        Admin state is up, Operation state is up
        type = pots, prefix = '',       fwd-digits = 0,
        session-target = '', voice-port = 1/1
VoiceOverATMPeer333
        tag = 2, destination-pattern = '559...',preference = 0,
        Admin state is up, Operation state is up
        type = voatm, session-target = 'ATM0'
        nsap '47.0091810000000002F26D4901.567856785678.56',

Router2# show dial-peer voice
VoiceEncapPeer44
        tag = 20, destination-pattern = '5559810',preference = 0,
        Admin state is up, Operation state is up
        type = pots, prefix = '',       fwd-digits = 0,
        session-target = '', voice-port = 1/1
VoiceOverATMPeer444
        tag = 10, destination-pattern = '5558...',preference = 0,
        Admin state is up, Operation state is up
        type = voatm, session-target = 'ATM0'
        nsap '47.0091810000000002F26D4901.100110011001.01',
```

Step 8 Enter the privileged EXEC **show call history voice record** command to see information about current and recent voice calls, allowing analysis of possible problems:

```
router# show call history voice record
ConnectionId=[0x9CE20881 0x224855C1 0x0 0x1C9B84C7]
Media=TELE, TxDuration= 301962 ms
CallingNumber=6668808
SetupTime=47995411 x 10ms
ConnectTime=47995671 x 10ms
DisconectTime=48025867 x 10ms
DisconnectText=local onhook

ConnectionId=[0x9CE20881 0x224855C1 0x0 0x1C9B84C7]
Media=ATM, LowerIfName=ATM0, VPI=0, VCI=299
CalledNumber=5559808
SetupTime=47995483 x 10ms
ConnectTime=47995671 x 10ms
DisconectTime=48025867 x 10ms
DisconnectText=remote onhook

ConnectionId=[0x9CE20881 0x224855C2 0x0 0x1C9B84CB]
Media=TELE, TxDuration= 301950 ms
CallingNumber=5558803
SetupTime=47995412 x 10ms
ConnectTime=47995682 x 10ms
DisconectTime=48025877 x 10ms
DisconnectText=local onhook
```

Monitoring and Maintaining Voice over ATM SVCs

Command	Purpose
Router# **show network-clocks**	Displays clock settings.
Router# **show controllers t1/e1**	Displays information about controller configuration and errors.
Router# **show interfaces serial**	Displays information about serial interface configuration and shows whether serial ports are operational.
Router# **show atm vc**	Displays information about all configured PVCs and SVCs.
Router# **show interface atm0**	Displays information about ATM interface configuration.
Router# **show controllers atm**	Displays ATM controller information, including queue, memory, and buffer statistics.
Router# **show atm video-voice address**	Displays NSAP addresses configured on the ATM interface along with their status.
Router# **show atm ilmi-status**	Displays detailed information about the ILMI PVC and functions.
Router# **show sscop**	Displays technical information about SSCOP status and readiness.
Router# **show voice busyout**	Displays information about voice ports that may be busied out.
Router# **show voice port**	Displays information about configured voice ports.
Router# **show voice dial-peer**	Displays information about configured voice dial peers.
Router# **show call history voice record**	Displays detailed information about calls in progress and recent calls.

Configuration Examples

This example shows the configurations of two Cisco MC3810 multiservice access concentrators that each have voice dial peers connecting over ATM SVCs. For additional information, see the *Cisco MC3810 Multiservice Access Concentrator Software Configuration Guide* and the *Cisco MC3810 Multiservice Access Concentrator Software Command Reference*.

Figure 2 Sample Configuration: Two Cisco MC3810s using ATM SVCs for Voice

Initially, the network clocks are set up on MC3810A and MC3810B.

```
hostname MC3810A
!
network-clock base-rate 64k
ip subnet-zero
ip wccp version 2
ip host keyer-ultra 223.255.254.254
!
appletalk routing
ipx routing 1111.0045.0005
```

```
hostname MC3810B
!
network-clock base-rate 64k
ip subnet-zero
ip wccp version 2
ip host keyer-ultra 223.255.254.254
!
appletalk routing
ipx routing 1111.0045.0002
```

The following configuration sets the T1 0 controllers, which are for ATM service. ESF framing and B8ZS are required for ATM. The default clock source is line, and the default for the T1 1 controller automatically becomes internal.

```
controller T1 0
 framing esf
 linecode b8zs
 mode atm
```

```
controller T1 0
 framing esf
 linecode b8zs
 mode atm
```

The following configuration shows how the T1 1 controllers are set up for channel-associated signaling (CAS) through the **mode cas** command. A voice group is created on each controller to specify all of the DS0s for CAS and to set up E&M immediate-start signaling for the voice ports.

```
controller T1 1
 framing esf
 clock source internal
 linecode b8zs
 mode cas
 voice-group 1 timeslots 1-24 type
e&m-immediate-start
```

```
controller T1 1
 framing esf
 clock source internal
 linecode b8zs
 mode cas
 voice-group 1 timeslots 1-24 type
e&m-immediate-start
```

The following commands show how to configure the ATM interface and set up PVCs to supply Q.SAAL signaling and ILMI management for SVC communications. Note that you can also specify the voice NSAP address by using the **atm voice aesa** command with an ESI value.

```
interface ATM0
 ip address 9.1.1.5 255.0.0.0
 no ip directed-broadcast
 no ip route-cache
 atm pvc 1 0 5 qsaal
 atm pvc 2 0 16 ilmi
 atm ilmi-keepalive
 atm voice aesa default
```

```
interface ATM0
 ip address 9.1.1.6 255.0.0.0
 no ip directed-broadcast
 no ip route-cache
 atm pvc 1 0 5 qsaal
 atm pvc 2 0 16 ilmi
 atm ilmi-keepalive
 atm voice aesa default
```

The following commands specify the voice ports corresponding to the DS0s. Not all are shown.

```
voice-port 1/1
 !
voice-port 1/2
 !
voice-port 1/3
 timeouts call-disconnect 0
!
.
.
.
voice-port 1/24
```

```
voice-port 1/1
 !
voice-port 1/2
 !
voice-port 1/3
!
.
.
.
voice-port 1/24
```

The following commands specify the local voice dial peers (all 24 are not shown) and the ATM dial peers.

```
.
.
.
dial-peer voice 2 pots
 destination-pattern 5558802
 port 1/2
!
dial-peer voice 3 pots
 destination-pattern 5558803
 port 1/3
!
dial-peer voice 4 pots
 destination-pattern 5558804
 port 1/4
!
dial-peer voice 5 pots
destination-pattern 5558805
 port 1/5
.
.
.
dial-peer voice 102 voatm
 destination-pattern 5559...
 session target ATM0 svc nsap
47.0091810000000002F26D4901.00107B09C645.FE
```

```
.
.
.
dial-peer voice 2 pots
 destination-pattern 5559802
 port 1/2
!
dial-peer voice 3 pots
 destination-pattern 5559803
 port 1/3
!
dial-peer voice 4 pots
 destination-pattern 5559804
 port 1/4
!
dial-peer voice 5 pots
 destination-pattern 5559805
 port 1/5
.
.
.
dial-peer voice 202 voatm
 destination-pattern 5558...
 session target ATM0 svc nsap
47.0091810000000002F26D4901.00107B4832E1.FE
```

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.0 command reference publications.

- **atm scramble-enable**
- **atm voice aesa**
- **serial restart-delay**
- **session target**
- **show atm video-voice address**

In Cisco IOS Release 12.0(1)T or later, you can search and filter the output for **show** and **more** commands. This functionality is useful when you need to sort through large amounts of output, or if you want to exclude output that you do not need to see.

To use this functionality, enter a **show** or **more** command followed by the "pipe" character (|), one of the keywords **begin**, **include**, or **exclude**, and an expression that you want to search or filter on:

command **|** {**begin** | **include** | **exclude**} *regular-expression*

Following is an example of the **show atm vc** command in which you want the command output to begin with the first line where the expression "PeakRate" appears:

show atm vc | begin PeakRate

For more information on the search and filter functionality, refer to the Cisco IOS Release 12.0(1)T feature module titled *CLI String Search*.

atm scramble-enable

Scrambling improves data reliability on E1links by randomizing the ATM cell payload frames to avoid continuous non-variable bit patterns and improve the efficiency of ATM's cell delineation algorithms. The **no** form disables scrambling.

atm scramble-enable

no atm scramble-enable

Syntax Description

This command has no arguments or keywords.

Defaults

By default, payload scrambling is off.

Command Mode

Interface configuration

Command History

Release	Modification
12.0(5)XK and 12.0(7)T	This command was introduced for ATM interface configuration on the Cisco MC3810.

Usage Guidelines

Enable scrambling on E1 links only. On T1 links, the default B8ZS line encoding normally ensures sufficient reliability.

The scrambling setting must match that of the far end.

Example

On a Cisco MC3810, the following example shows how to set the ATM0 E1 link to scramble payload:

```
interface atm0
 atm scramble-enable
```

atm voice aesa

Enter the **atm voice aesa** ATM interface configuration command to set the unique ATM end-station address (AESA) for an ATM voice interface using SVC mode. The **no** form of this command removes any configured address for the interface.

atm voice aesa [**default** | *esi-address*]

no atm voice aesa

Syntax Description

default	The **default** keyword automatically creates an NSAP address for the interface, based on a prefix from the ATM switch (26 hexadecimal characters), the MAC address (12 hexadecimal characters) as the ESI (end station identifier), and a selector byte (two hexadecimal characters).
esi-address	Enter 12 hexadecimal characters as the end-station identifier (ESI). The ATM switch provides the prefix (26 hexadecimal characters) and the voice selector byte provides the remaining two hexadecimal characters.

Defaults

The **default** keyword is the default.

Command Mode

Interface configuration

Command History

Release	Modification
12.0(5)XK and 12.0(7)T	This command was introduced for ATM interface configuration on the Cisco MC3810.

Usage Guidelines

You cannot specify the ATM interface NSAP address in its entirety. The system creates either all of it or part of it, depending upon how you use this command.

Examples

On a Cisco MC3810, the following example shows the ATM interface NSAP address set automatically:

```
interface atm0
 atm video aesa default
```

On a Cisco MC3810, the following example shows the ATM interface NSAP address set to a specific ESI value:

```
interface atm0/1
 atm video aesa 444444444444
```

Related Command

Command	Description
show atm video-voice address	Allows you to review the address assigned to an ATM interface.

serial restart-delay

To set the amount of time that the router waits before trying to bring up a serial interface when it goes down, enter the **serial restart-delay** interface configuration command. The **no** form of the command set the delay to the default.

serial restart-delay *count*

no serial restart-delay

Syntax Description

count	*count* is a value from 0 to 900 in seconds. This is the frequency at which the hardware is reset.

Default

The default value is 0.

Command Mode

Interface configuration

Command History

Release	Modification
12.0(5)XK and 12.0(7)T	This command was introduced for serial interface configuration on the Cisco MC3810.

Usage Guidelines

The router resets the hardware each time the serial restart timer expires. This command is often used with the dial backup feature and with the **pulse-time** command, which sets the amount of time to wait before redialing when a DTR dialed device fails to connect.

When the *count* value is set to 0, the hardware is not reset when it goes down. In this way, if the interface is used to answer a call, it does not cause DTR to drop, which might cause communications device to disconnect.

Example

On Cisco MC3810 interface Serial 0, this example shows the restart delay set to 1 second:

```
interface Serial0
 serial restart-delay 1
```

Related Commands

Command	Description
pulse-time *seconds*	Enables pulsing DTR signal intervals on the serial interfaces.
show interface serial	Displays details serial interface configuration.

session target

To configure an ATM network-specific address for a permanent virtual connection (PVC) or switch virtual connection (SVC) dial peer, enter the ATM form of the **session target** dial-peer configuration command. The **no** form of the command disables the feature.

session target atm *interface* {**svc nsap** *nsap-address* | **pvc** {*name* | *vpi/vci* | *vci*}

no session target

Syntax Description

interface	Specifies the ATM interface number on the Cisco MC3810. The only valid number is 0.
nsap-address	For SVC communications, a 40-digit hexadecimal number for the session target network service access point (NSAP) address
name	The name of the session target ATM PVC
vpi/vci	The ATM network virtual path identifier (VPI) and virtual channel identifier (VCI) of this PVC
vci	The ATM network virtual channel identifier (VCI) of this PVC

Default

Enabled with no IP address or domain name defined.

Command Mode

Dial-peer configuration

Command History

Release	Modification
11.3(1) T	This command was introduced.
11.3(1) MA	Support was added for VoFR, VoATM, and VoHDLC dial peers on the Cisco MC3810.
12.0(3)XG and 12.0(4)T	The *cid* option was added for Frame Relay dial peers.
12.0(5)XK and 12.0(7)T	Support was added for voice and video ATM SVCs on the Cisco MC3810.

Usage Guidelines

Enter the ATM-specific version of this command to specify an ATM PVC or SVC for voice or video communications.

With SVCs and a dial map, dialed digits are reconciled with the remote ATM interface's voice NSAP address,

Example

The following example shows how an ATM voice dial peer is configured for SVC communications:

```
dial-peer voice 10 voatm
 destination-pattern 555
 session target ATM0 svc nsap 47.0091810000000002F26D4901.444444444444.01
```

Related Commands

Command	Description
dial-peer voice	Sets up a voice dial peer for a local or remote dial peer.
show dial-peer voice	Displays details about configured voice dial peers.

show atm video-voice address

To display the network service access point (NSAP) address for the ATM interface, enter the **show atm video-voice address** privileged EXEC command.

show atm video-voice address

Syntax Description

There are no keywords or arguments.

Default

No default behavior or values

Command History

Release	Modification
12.0(5)XK and 12.0(7)T	This command was introduced for the Cisco MC3810.

Usage Guidelines

Enter this command to review ATM interface NSAP addresses that have been assigned using the **atm video aesa** or **atm voice aesa** command and to insure that ATM management is confirmed for those addresses.

Example

On a Cisco MC3810, the following example shows how to see information about ATM interface NSAP addresses:

```
router# show atm video-voice address
nsap address                                    type         ilmi status
47.0091810000000002F26D4901.00107B4832E1.FE   VOICE_AAL5   Confirmed
47.0091810000000002F26D4901.00107B4832E1.C8   VIDEO_AAL1   Confirmed
```

Table 1 describes the fields in the command output.

Table 1 show atm video-voice address Fields

Field	Description
ilmi status	Indicates whether an ILMI PVC is set up and operational to manage SVC communications.
nsap address	ATM interface NSAP address.
type	Interface ATM encapsulation type.

Related Command

Command	Description
show atm ilmi-status	Provides details about the status of ILMI management.

Glossary

AAL—ATM Adaptation Layer. Service-dependent sublayer of the data link layer. The AAL accepts data from different applications and presents it to the ATM layer in the form of 48-byte ATM payload segments. AALs consist of two sublayers: convergence sublayer (CS) and segmentation and reassembly (SAR). AALs differ on the basis of the source-destination timing used, whether they use constant bit rate (CBR) or variable bit rate (VBR), and whether they are used for connection-oriented or connectionless mode data transfer. At present, the four types of AAL recommended by the ITU-T are AAL1, AAL2, AAL3/4, and AAL5.

AAL1—ATM adaptation layer 1. One of four AALs recommended by the ITU-T. AAL1 is used for connection-oriented, delay-sensitive services requiring constant bit rates, such as uncompressed video and other isochronous traffic.

AAL5—ATM adaptation layer 5. One of four AALs recommended by the ITU-T. AAL5 supports connection-oriented VBR services and is used predominantly for the transfer of classical IP over ATM and LANE traffic. AAL5 uses simple and efficient AAL (SEAL) and is the least complex of the current AAL recommendations. It offers low bandwidth overhead and simpler processing requirements in exchange for reduced bandwidth capacity and error-recovery capability.

ABR—available bit rate. QoS class defined by the ATM Forum for ATM networks. ABR is used for connections that do not require timing relationships between source and destination. ABR provides no guarantees in terms of cell loss or delay, providing only best-effort service. Traffic sources adjust their transmission rate in response to information they receive describing the status of the network and its capability to successfully deliver data.

AESA—ATM End System Address

ATM—Asynchronous Transfer Mode. International standard for cell relay in which multiple service types (such as voice, video, or data) are conveyed in fixed-length (53-byte) cells. Fixed-length cells allow cell processing to occur in hardware, thereby reducing transit delays. ATM is designed to take advantage of high-speed transmission media such as E3, SONET, and T3.

CAS—channel-associated signaling

CBR—constant bit rate. QoS class defined by the ATM Forum for ATM networks. CBR is used for connections that depend on precise clocking to ensure undistorted delivery.

CCS—common-channel signaling

CES—circuit emulation service. Enables users to multiplex or concentrate multiple circuit emulation streams for voice and video with packet data on a single high-speed ATM link without a separate ATM access multiplexer**.**

E1—European digital carrier facility used for transmitting data through the telephone hierarchy. The transmission rate for E1 is 2.048 megabits per second (Mbps).

E3—Wide-area digital transmission scheme used predominantly in Europe that carries data at a rate of 34.368 Mbps. E3 lines can be leased for private use from common carriers.

ESI—end station identifier

ILMI—Interim Local Management Interface. Specification developed by the ATM Forum for incorporating network-management capabilities into the ATM User-Network Interface (UNI).

ISDN—Integrated Services Digital Network. Communication protocol, offered by telephone companies, that permits telephone networks to carry data, voice, and other source traffic.

NM—Network module

POTS—Plain Old Telephone Service. Basic telephone service supplying standard single-line telephones, telephone lines, and access to the public switched telephone network.

PVC—permanent virtual circuit. Virtual circuit that is permanently established. PVCs save bandwidth associated with circuit establishment and tear down in situations where certain virtual circuits must exist all the time. In ATM terminology, called a permanent virtual connection.

QoS—quality of service. Measure of performance for a transmission system that reflects its transmission quality and service availability.

SAR—segmentation and reassembly. One of the two sublayers of the AAL CPCS, responsible for dividing (at the source) and reassembling (at the destination) the PDUs passed from the CS. The SAR sublayer takes the PDUs processed by the CS and, after dividing them into 48-byte pieces of payload data, passes them to the ATM layer for further processing.

SONET—Synchronous Optical Network. High-speed (up to 2.5 Gbps) synchronous network specification developed by Bellcore and designed to run on optical fiber. STS-1 is the basic building block of SONET.

SSCS—service specific convergence sublayer. One of the two sublayers of any AAL. SSCS, which is service dependent, offers assured data transmission. The SSCS can be null as well, in classical IP over ATM or LAN emulation implementations.

SVC—switched virtual circuit. Virtual circuit that is dynamically established on demand and is torn down when transmission is complete. SVCs are used in situations where data transmission is sporadic. Called a switched virtual connection in ATM terminology.

T3—Digital WAN carrier facility. T3 transmits DS-3-formatted data at 44.736 Mbps through the telephone switching network.

UBR—unspecified bit rate. Quality of Service (QoS) class defined by the ATM Forum for ATM networks. UBR allows any amount of data up to a specified maximum to be sent across the network, but there are no guarantees in terms of cell loss rate and delay.

UNI—User-Network Interface. ATM Forum specification that defines an interoperability standard for the interface between ATM-based products (a router or an ATM switch) located in a private network and the ATM switches located within the public carrier networks. Also used to describe similar connections in Frame Relay networks.

VBR—variable bit rate. QoS class defined by the ATM Forum for ATM networks. VBR is subdivided into a real time (RT) class and non-real time (NRT) class. VBR (RT) is used for connections in which there is a fixed timing relationship between samples. VBR (NRT) is used for connections in which there is no fixed timing relationship between samples, but that still need a guaranteed QoS.

VC—virtual circuit. Logical circuit created to ensure reliable communication between two network devices. A virtual circuit is defined by a VPI/VCI pair, and can be either permanent (PVC) or switched (SVC). Virtual circuits are used in Frame Relay and X.25. In ATM, a virtual circuit is called a virtual channel.

VCI—virtual channel identifier. 16-bit field in the header of an ATM cell. The VCI, together with the virtual path identifier (VPI), is used to identify the next destination of a cell as it passes through a series of ATM switches on its way to its destination. ATM switches use the VPI/VCI fields to identify the next network virtual channel link (VCL) that a cell needs to transit on its way to its final destination.

VCL—virtual channel link. Connection between two ATM devices. A VCC is made up of one or more VCLs.

VPI—virtual path identifier. 8-bit field in the header of an ATM cell. The VPI, together with the VCI, is used to identify the next destination of a cell as it passes through a series of ATM switches on its way to its destination. ATM switches use the VPI/VCI fields to identify the next VCL that a cell needs to transit on its way to its final destination.