ISDN PRI-SLT

The Asynchronous Line Monitoring feature feature allows you to release the ISDN PRI signaling time slot for Redundant Link Manager (RLM) configurations, and for Signaling System 7 (SS7) applications in integrated Signaling Link Terminal (SLT) configurations. This feature supports the use of DS0 time slots for SS7 links, and allows the coexistence of SS7 links and PRI voice and data bearer channels on the same T1 or E1 controller span.

Feature Specifications for Asynchronous Line Monitoring feature

Feature History	
Release	**Modification**
12.2(8)B	This feature was introduced.
12.2(15)T	This feature was integrated into Cisco IOS Release 12.2(15)T.
Supported Platforms	
Cisco AS5300; Cisco AS5350; Cisco AS5400; Cisco AS5800; Cisco AS5850	

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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Information About Asynchronous Line Monitoring feature

To configure the Asynchronous Line Monitoring feature feature, you need to understand the following concepts:

ISDN Assumptions About the Location of the PRI D Channel

ISDN PRI is designed to carry large numbers of incoming ISDN calls at large central site locations. ISDN PRI has 23 B channels running at 64 kbps each and a shared 64-kbps D channel that carries signaling traffic. ISDN PRI is often referred to as “23 B + D” (North America and Japan) or “30 B + D” (Europe and the rest of the world).

Figure 1 shows how many B channels and D channels are assigned to the ISDN media types.

Figure 1 BRI and PRI Channel Assignments

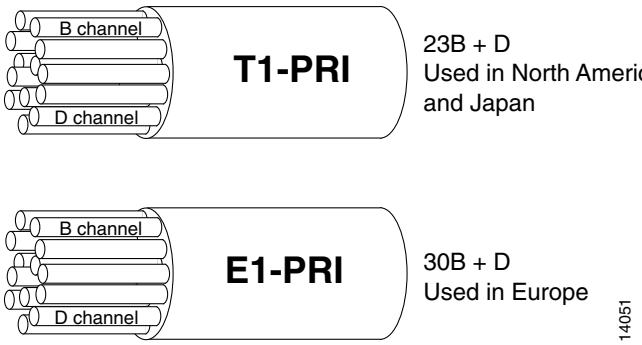
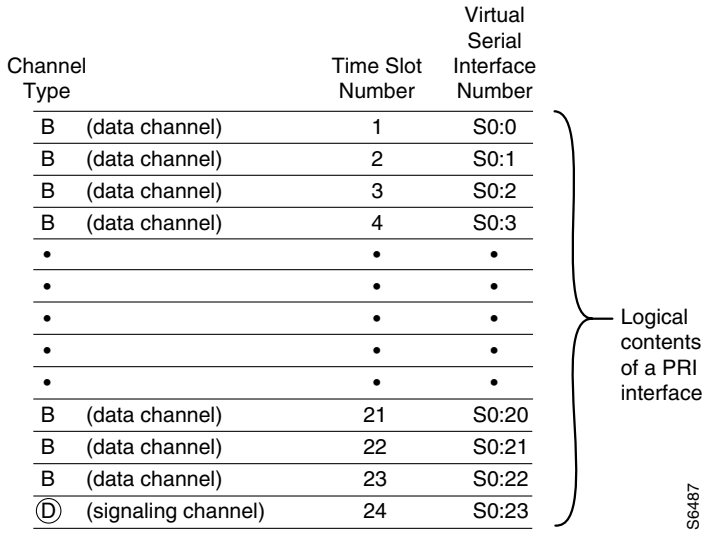


Figure 2 shows the logical contents of a Cisco ISDN PRI interface used in a standard T1 network configuration.

Figure 2 Logical Relationship of ISDN PRI Components for T1



The software assumed that the 24th (or 16th for E1) slot in the controller is reserved for D-channel signaling. However, in environments that require SS7-enabled Voice over IP (VoIP) configurations, some applications needed to share all time slots in a PRI group but were not allowed to use the 24th (or 16th) time slot. The Asynchronous Line Monitoring feature Cisco IOS Release 12.2(8)B feature, and specifically, the **rlm-group** subkeyword introduced in the **pri-group timeslots** controller configuration command as part of this feature, *releases* the signaling time slots, thereby supporting SS7 applications in VoIP configurations.

ISDN Commands Supported by Asynchronous Line Monitoring feature

The following ISDN commands are supported on the D-channel interface to configure ISDN data in SS7-enabled VoIP environments. Refer to the *Cisco IOS Dial Technologies Command Reference*, for full command syntax and usage guidelines.

isdn answer
isdn bchan-number-order
isdn block-progress
isdn busy
isdn caller
isdn disconnect-cause
isdn early-tdm-connection
isdn guard-timer
isdn incoming progress
isdn incoming-voice
isdn k
isdn map
isdn outgoing-voice info-transfer-capability
isdn progress-instead-of-alerting
isdn reject
isdn send-alerting
isdn sending-complete
isdn send-status-enquiry
isdn service
isdn skip-analog-callerid-check
isdn t203
isdn t300S
isdn t303
isdn t306

isdn max-restart-tries	**isdn t307**
isdn n200	**isdn t309**
isdn negotiate-bchan	**isdn t309-enable**
isdn network-failure-cause	**isdn t310**
isdn not-end-to-end	**isdn t321**

The D-Channel Interface and Cisco SS7 Interconnect for Voice Gateways

A new interface, D-channel, is introduced with the Asynchronous Line Monitoring feature feature for use specifically in VoIP applications, such as an SS7 Interconnect Voice Gateway that requires release of ISDN signaling time slots for RLM configurations.

A Cisco SLT is a key component of the Cisco SS7 Interconnect for Voice Gateways feature. In the Cisco SS7 Interconnect for Voice Gateways environment, the D channel will be on Ethernet, and the time slots on an E1 and T1 controller can be shared by other applications such as SS7.

How to Configure Asynchronous Line Monitoring feature

This section contains the following tasks. Each task is identified as either required or optional.

- Release the PRI Signaling Time Slot, page 622 (required)
- Verify Asynchronous Line Monitoring feature, page 624 (optional)

Release the PRI Signaling Time Slot

To release the ISDN PRI signaling time slot for environments that require SS7-enabled VoIP applications to share all available time slots in a PRI group, use the following commands:

SUMMARY STEPS

1. **enable**
2. **configure** {**terminal** | **memory** | **network**}
3. **controller** {**t1** | **e1**} *controller-number*
4. **pri-group timeslots** *timeslot-range* [**nfas_d** {**backup** | **none** | **primary** {**nfas_int** *number* | **nfas_group** *number* | **rlm-group** *number*}} | **service**]
5. **channel-group** *channel-number* **timeslots** *range* [**speed** {**48** | **56** | **64**}]
6. **exit**
7. **interface Dchannel** *interface-number*
8. **isdn** *command parameter* (use the commands listed in ISDN Commands Supported by Asynchronous Line Monitoring feature, page 621 to configure the ISDN interface)
9. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables higher privilege levels, such as privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**controller** {**t1** | **e1**} *controller-number* **Example:** `Router(config)# controller t1 1`	Configures a T1 or E1 controller and enters controller configuration mode.
Step 4	**pri-group timeslots** *timeslot-range* [**nfas_d** {**backup** | **none** | **primary** {**nfas_int** *number* | **nfas_group** *number* | **rlm-group** *number*}} | **service**] **Example:** `Router(config-controller)# pri-group timeslots 1-3 nfas_d primary nfas_int 0 nfas_group 0 rlm-group 1`	Specifies an ISDN PRI group on a channelized T1 or E1 controller. The **nfas_d** keyword has the following options: • **backup**—The D-channel time slot is used as the Non-Facility Associated Signaling (NFAS) D-channel backup. • **none**—The D-channel time slot is used as an additional B channel. • **primary**—The D-channel time slot is used as the NFAS D primary. The **primary** keyword requires further interface and group configuration: – **nfas_int** *number*—Specify the provisioned NFAS interface as a value; value is a number from 0 to 8. – **nfas_group** *number*—Specify the NFAS group number. – **rlm-group** *number*—Specify the RLM group and release the ISDN PRI signaling channel.
Step 5	**channel-group** *channel-number* **timeslots** *range* [**speed** {**48** | **56** | **64**}] **Example:** `Router(config-controller)# channel-group 23 timeslots 24`	Defines the time slot or range of time slots that belong to each T1 or E1 circuit.
Step 6	**exit** **Example:** `Router(config-controller)# exit`	Returns to global configuration mode.

	Command or Action	Purpose
Step 7	**interface Dchannel** *interface-number* **Example:** `Router(config)# interface Dchannel 1`	Configures the D-channel interface and enters interface configuration mode.
Step 8	**isdn** *command parameter* **Example:** `Router(config-if)# isdn T309 4000`	Configures ISDN parameters on the interface.
Step 9	**exit** **Example:** `Router(config-if)# exit`	Returns to global configuration mode.

Verify Asynchronous Line Monitoring feature

To verify that the Asynchronous Line Monitoring feature feature is working, perform the following optional steps:

SUMMARY STEPS

1. **enable**
2. **show isdn status**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables higher privilege levels, such as privileged EXEC mode. • Enter your password if prompted.
Step 2	**show isdn status** **Example:** `Router# show isdn status`	(Optional) Displays status of the ISDN interface. • Look for the report about D-channel and RLM group status.

Troubleshooting Tips

Use the commands described in Table 1 to troubleshoot the Asynchronous Line Monitoring feature feature.

Table 1 Asynchronous Line Monitoring feature Verification and Troubleshooting Commands

Command	Report
debug isdn event	ISDN events occurring on the user (local router) side of the ISDN interface.
debug isdn q921	Data link layer (ISDN Layer 2) access procedures taking place at the router on the D channel.
debug isdn q931	Information about call setup and teardown of network (ISDN Layer 3) connections between the user (local router) side and the network.

Configuration Examples for Asynchronous Line Monitoring feature

This section provides the following configuration examples to match the configuration tasks in the previous sections:

- SS7-Enabled VoIP PRI Shared T1 Configuration Example, page 625
- Verify Asynchronous Line Monitoring feature Example, page 625

SS7-Enabled VoIP PRI Shared T1 Configuration Example

The following example shows how to release the ISDN PRI signaling time slot for RLM configurations on a shared T1 link:

```
controller T1 1
 pri-group time slots 1-3 nfas_d primary nfas_int 0 nfas_group 0 rlm-group 0
 channel group 23 timeslot 24
 exit

! New Dchannel interface is created for configuration of ISDN parameters:
interface Dchannel1
 isdn T309 4000
 exit
```

Verify Asynchronous Line Monitoring feature Example

The following example output from the **show isdn status** EXEC command includes a report about D-channel and RLM group status:

```
Router# show isdn status

Global ISDN Switchtype = primary-ni
ISDN Dchannel0 interface   rlm-group = 1
    Transport Link Status:
    ACTIVE
    dsl 0, interface ISDN Switchtype = primary-ni : Primary D channel of nfas group 0
    Layer 1 Status:
```

```
    DEACTIVATED
    Layer 2 Status:
    TEI = 0, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
    Layer 3 Status:
    0 Active Layer 3 Call(s)
    Active dsl 0 CCBs = 0
    The Free Channel Mask:  0x80000000
    Number of L2 Discards = 0, L2 Session ID = 43
ISDN Dchannel1 interface
    Transport Link Status :  Not Applicable
    dsl 1, interface ISDN Switchtype = primary-ni : Group member of nfas group 0
    Layer 1 Status:
    DEACTIVATED
    Layer 2 Status: Not Applicable
    Layer 3 Status:
    0 Active Layer 3 Call(s)
    Active dsl 1 CCBs = 0
    The Free Channel Mask:  0x80000000
    Number of L2 Discards = 0, L2 Session ID = 0
ISDN Serial2:15 interface
    dsl 2, interface ISDN Switchtype = primary-ni : Primary D channel of nfas group 1
    Layer 1 Status:
    DEACTIVATED
    Layer 2 Status:
    TEI = 0, Ces = 1, SAPI = 0, State = TEI_ASSIGNED
    Layer 3 Status:
    0 Active Layer 3 Call(s)
    Active dsl 2 CCBs = 0
    The Free Channel Mask:  0x0
    Number of L2 Discards = 0, L2 Session ID = 0
ISDN Serial3:15 interface
    dsl 3, interface ISDN Switchtype = primary-ni : Group member of nfas group 1
    Layer 1 Status:
    ACTIVATING
    Layer 2 Status: Not Applicable
    Layer 3 Status:
    0 Active Layer 3 Call(s)
    Active dsl 3 CCBs = 0
    The Free Channel Mask:  0x0
    Number of L2 Discards = 0, L2 Session ID = 0
    Total Allocated ISDN CCBs = 0
```

Additional References

For additional information related to Asynchronous Line Monitoring feature, refer to the following references:

Related Documents

Related Topic	Document Title
Dial ISDN commands	*Cisco IOS Dial Technologies Command Reference*
ISDN PRI	*Cisco IOS Dial Technologies Configuration Guide*; refer to "Configuring ISDN PRI" in the "Signaling Configuration" part

Standards

Standards	Title
None	—

MIBs

MIBs	MIBs Link
None	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

http://tools.cisco.com/ITDIT/MIBS/servlet/index

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

http://www.cisco.com/register

RFCs

RFCs	Title
None	—

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/techsupport

Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS Dial Technologies Command Reference* at http://www.cisco.com/en/US/docs/ios/dial/command/reference/dia_book.html. For information about all Cisco IOS commands, go to the Command Lookup Tool at http://tools.cisco.com/Support/CLILookup or to the *Cisco IOS Master Commands List*.

New Command

- interface Dchannel

Modified Commands

- pri-group timeslots
- show isdn