

interface fastethernet

To select a particular Fast Ethernet interface for configuration, use the **interface fastethernet** command in global configuration mode.

Cisco 4500 and 4700 Series

```
interface fastethernet number
```

Cisco 7200 Series

```
interface fastethernet slot/port
```

Cisco 7500 Series

```
interface fastethernet slot/port-adapter/port
```

| Syntax Description | | |
|---------------------|--|--|
| <i>number</i> | | Port, connector, or interface card number. On a Cisco 4500 or 4700 series routers, specifies the network interface module (NIM) or network processor module (NPM) number. The numbers are assigned at the factory at the time of installation or when added to a system. |
| <i>slot</i> | | Number of the slot being configured. Refer to the appropriate hardware manual for slot and port information. |
| <i>port</i> | | Number of the port being configured. Refer to the appropriate hardware manual for slot and port information. |
| <i>port-adapter</i> | | Number of the port adapter being configured. Refer to the appropriate hardware manual for information about port adapter compatibility. |

Defaults No FastEthernet interface will be configured.

Command Modes Global configuration

| Command History | Release | Modification |
|-----------------|---------|---|
| | 11.2 | This command was introduced. |
| | 11.3 | The default encapsulation type was changed to ARPA. |

Usage Guidelines This command does not have a **no** form.

Examples The following example configures Fast Ethernet interface 0 for standard ARPA encapsulation (the default setting) on a Cisco 4500 or 4700 series router:

```
Router(config)# interface fastethernet 0
```

Related Commands

Command

Description

show interfaces fastethernet Displays information about the Fast Ethernet interfaces.

interface gigabitethernet

To configure a Gigabit Ethernet interface and enter interface configuration mode, use the **interface gigabitethernet** *slot/port* command in global configuration mode.

interface gigabitethernet *slot/port*

To configure a Gigabit Ethernet interface and enter interface configuration mode on a Cisco 7200 VXR router used as a router shelf in an AS5800 Universal Access Server, use the **interface gigabitethernet** *router-shelf/slot/port* command in global configuration mode.

interface gigabitethernet *router-shelf/slot/port*

| Syntax Description | | |
|--------------------|---------------------|---|
| | <i>router-shelf</i> | Router shelf in a Cisco AS5800 Universal Access Server. |
| | <i>slot</i> | Slot number of the interface. |
| | <i>port</i> | Port number on the interface. |

Defaults No Gigabit Ethernet interface is created.

Command Modes Global configuration

| Command History | Release | Modification |
|-----------------|-----------|--|
| | 11.1 CC | This command was introduced. |
| | 12.1(3a)E | Support for the Cisco 7200-I/O-GE+E controller was introduced. |
| | 12.1(5)T | This command was integrated into Cisco IOS Release 12.1(5)T. |

Usage Guidelines Many features are enabled on a per-interface basis. The **interface gigabitethernet** global configuration command modifies the operation of the Gigabit Ethernet interface on the Cisco 7200-I/O-GE+E.

Examples This example illustrates the command syntax for creating a Gigabit Ethernet interface:

```
Router(config)# interface gigabitethernet 0/0
Router(config-if)#
```

| Related Commands | Command | Description |
|------------------|---|--|
| | show interfaces gigabitethernet | Checks the status and configuration settings of the Gigabit Ethernet interface of the Cisco 7200-I/O-GE+E. |

interface group-async

To create a group interface that will serve as master to which asynchronous interfaces can be associated as members, use the **interface group-async** command in global configuration mode. To restore the default, use the **no** form of this command.

```
interface group-async unit-number
```

```
no interface group-async unit-number
```

Syntax Description

| | |
|--------------------|---|
| <i>unit-number</i> | Number of the asynchronous group interface being created. |
|--------------------|---|

Defaults

No interfaces are designated as group masters.

Command Modes

Global configuration

Command History

| Release | Modification |
|---------|------------------------------|
| 11.0 | This command was introduced. |

Usage Guidelines

Using the **interface group-async** command, you create a single asynchronous interface to which other interfaces are associated as members using the **group-range** command. This one-to-many configuration allows you to configure all associated member interfaces by entering one command on the group master interface, rather than entering this command on each individual interface. You can create multiple group masters on a device; however, each member interface can be associated only with one group.

Examples

The following example defines asynchronous group master interface 0:

```
Router(config)# interface group-async 0
```

Related Commands

| Command | Description |
|--------------------|---|
| group-range | Creates a list of member asynchronous interfaces (associated with a group interface). |
| member | Alters the configuration of an asynchronous interface that is a member of a group. |

interface port-channel

To specify a Fast EtherChannel and enter interface configuration mode, use the **interface port-channel** command in global configuration mode.

interface port-channel *channel-number*

| Syntax Description | |
|--------------------|--|
| | <i>channel-number</i> Channel number assigned to this port-channel interface. Range is 1 to 4. |

| Defaults | |
|----------|------------------------------------|
| | No Fast EtherChannel is specified. |

| Command Modes | |
|---------------|----------------------|
| | Global configuration |

| Command History | Release | Modification |
|-----------------|----------|--|
| | 11.1 CA | This command was introduced. |
| | 12.1(5)T | This command was integrated into 12.1(5)T. |

| Usage Guidelines | |
|------------------|--|
| | The Fast EtherChannel feature allows multiple Fast Ethernet point-to-point links to be bundled into one logical link to provide bidirectional bandwidth of up to 800 Mbps. Fast EthernetChannel can be configured between Cisco 7000 (with RSP7000 and RSP7000CI) and Cisco 7500 series routers or between a Cisco 7000 (with RSP7000 and RSP7000CI) or Cisco 7500 series router and a Catalyst 5000 switch. |

You can configure the port-channel interface as you would do to any Fast Ethernet interface.

After you create a port-channel interface, you assign Fast Ethernet interfaces (up to four) to it. For information on how to assign a Fast Ethernet interface to a port-channel interface, refer to the **channel-group** interface configuration command.



Caution

The port-channel interface is the routed interface. Do not enable Layer 3 addresses on the physical Fast Ethernet interfaces. Do not assign bridge groups on the physical Fast Ethernet interfaces because it creates loops. Also, you must disable spanning tree.



Caution

With Release 11.1(20)CC, the Fast EtherChannel supports Cisco Express Forwarding (CEF) and Distributed Cisco Express Forwarding (dCEF). We recommend that you clear all explicit **ip route-cache distributed** commands from the Fast Ethernet interfaces before enabling dCEF on the port-channel interface. Clearing the route cache gives the port-channel interface proper control of its physical Fast Ethernet links. When you enable CEF/dCEF globally, all interfaces that support CEF/dCEF are enabled. When CEF/dCEF is enabled on the port-channel interface, it is automatically enabled on each of the Fast Ethernet interfaces in the channel group. However, if you have previously disabled CEF/dCEF on the Fast Ethernet interface, CEF/dCEF is not automatically enabled. In this case, you must enable CEF/dCEF on the Fast Ethernet interface.

As you work with the **interface port-channel** command, consider the following points:

- If you configure the Inter-Switch Link (ISL) protocol, you must assign the IP address to the subinterface (for example, **interface port-channel 1.1**—an IP address per VLAN) and you must specify the encapsulation with the VLAN number under that subinterface (for example, **encapsulation isl 100**) for ISL to work.
- Currently, if you want to use the Cisco Discovery Protocol (CDP), you must configure it only on the port-channel interface and not on the physical Fast Ethernet interface.
- If you do not assign a static MAC address on the port-channel interface, the Cisco IOS software automatically assigns a MAC address. If you assign a static MAC address and then later remove it, Cisco IOS software automatically assigns a MAC address.

This command does not have a **no** form.

Examples

The following example creates a port-channel interface with a channel group number of 1 and adds three Fast Ethernet interfaces to port-channel 1:

```
Router(config)# interface port-channel 1
Router(config-if)# ip address 10.1.1.10 255.255.255.0
Router(config)# interface fastethernet 1/0/0
Router(config-if)# channel-group 1
Router(config)# interface fastethernet 4/0/0
Router(config-if)# channel-group 1
Router(config)# interface fastethernet 5/0/0
Router(config-if)# channel-group 1
```

Related Commands

| Command | Description |
|-------------------------------------|---|
| channel-group | Defines the timeslots that belong to each T1 or E1 circuit. |
| show interfaces port-channel | Displays the information about the Fast EtherChannel on Cisco 7500 series routers and Cisco 7000 series routers with the RSP7000 and RSP7000CI. |

interface pos

To specify the Packet OC-3 interface on the Packet-over-SONET (POS) interface processor and enter interface configuration mode, use the **interface pos** command in global configuration mode.

Cisco 7000 and Cisco 7500 Series Routers with VIPs

```
interface pos slot/port-adapter/port
```

Cisco 7200 Series Routers

```
interface pos slot/port
```

| Syntax Description | slot | Specifies the backplane slot number. |
|--------------------|---------------------|---|
| | <i>port</i> | On Cisco 7000 series and Cisco 7500 series routers, specifies the ports on a VIP card. The value must be 0. |
| | <i>port-adapter</i> | Port adapter number on the interface. The value must be 0. |

Defaults No POS interface is specified.

Command Modes Global configuration

| Command History | Release | Modification |
|-----------------|---------|------------------------------|
| | 11.2 | This command was introduced. |

Usage Guidelines This command does not have a **no** form.

Examples The following example specifies the single Packet OC-3 interface on the POS OC-3 port adapter in slot 2:

```
Router(config)# interface pos 2/0
```

interface range

To execute commands on multiple subinterfaces at the same time, use the **interface range** command in global configuration command mode.

```
interface range {fastethernet interfacenumber - interfacenumber | gigabitethernet
interfacenumber - interfacenumber | loopback number | tunnel number | port-channel number
| vlan number | macro word}
```

Syntax Description

| | |
|--|---|
| fastethernet | Fastethernet interface. Range is 1 to 6. |
| gigabitethernet | Gigabitethernet interface. Range is 1 to 6. |
| loopback | Loopback interface. Range is 0 to 2147483647. |
| tunnel | Tunnel interface. Range is 0 to 2147483647. |
| port-channel | Port-channel interface. Range is 1 to 256. |
| vlan | Catalyst virtual LAN (VLAN). Range is 1 to 4094. |
| macro | Specifies a macro keyword. |
| <i>interfacenumber - interfacenumber</i> | Lowest to highest numbers in the range. A hyphen must separate the lowest and highest numbers. For example, 1 - 34. |
| <i>number</i> | Interface number. Loopback, port-channel, tunnel, and vlan are each assigned a single interface number such as "5." |
| <i>word</i> | Previously defined keyword, up to 32 characters long. |

Defaults

No default behavior or values

Command Modes

Global configuration

Command History

| Release | Modification |
|------------------|---|
| 12.0(7)XE | This command was introduced. |
| 12.1(5)T | This command was integrated into Cisco IOS Release 12.1(5)T. |
| 12.2(2)DD | This command was expanded to support subinterface ranges. |
| 12.2(4)B | This command was integrated into Cisco IOS Release 12.2(4)B. |
| 12.2(8)T | This modified command was integrated into Cisco IOS Release 12.2(8)T. |
| 12.2(18.10.02)SX | This command was integrated into Cisco IOS Release 12.2(18.10.02)SX |

Usage Guidelines

Configuration Changes

All configuration changes made to a range of subinterfaces are saved to NVRAM, but the range itself does not get saved to NVRAM. Use the **define interface-range** command to create and save a range.

You can enter the range in two ways:

- Specifying up to five interface ranges

- Specifying a previously defined macro

You can specify either the interfaces or the name of a range macro. A range must consist of the same interface type, and the interfaces within a range cannot span slots.

You cannot specify both an interface range and a macro keyword in the same command. After creating a macro, the CLI does not allow you to enter additional ranges. Likewise, if you have already entered an interface range, the CLI does not allow you to enter a macro.

The spaces around the dash in the **interface range** command syntax are required. For example, using a Catalyst 6500 router, the command **interface range fastethernet 1 - 6** is valid; the command **interface range fastethernet 1-6** is not valid.

VLAN Ranges

When you define a Catalyst Vlan, valid values are from 1 to 4094. The last VLAN number cannot exceed 4094.

You cannot use the **interface range** command to create switch virtual interfaces (SVIs). You must create SVIs with individual **interface VLAN** commands. You can use the **interface range** command on existing VLAN SVIs. To display VLAN SVIs, enter the **show running-config** command. VLANs not displayed cannot be used in the **interface range** command.

The commands entered under the **interface range** command are applied to all existing VLAN SVIs.

Examples

The following example shows how to use the **interface range** command to configure a fastethernet range:

```
Router(config)# interface range fastethernet5/1 - 4
Router(config-if-range)#
```

The following example shows how to set a vlan:

```
Cisco-65K(config)#interface range vlan 123
Cisco-65K(config-if-range)#
```

The following example configures the Fast Ethernet subinterfaces within the range from 5/1.1 to 5/1.4 and applies the following VLAN IDs to those subinterfaces:

```
Fast Ethernet5/1.1 = VLAN ID 301 (vlan-id)
Fast Ethernet5/1.2 = VLAN ID 302 (vlan-id = 301 + 2 - 1 = 302)
Fast Ethernet5/1.3 = VLAN ID 303 (vlan-id = 301 + 3 - 1 = 303)
Fast Ethernet5/1.4 = VLAN ID 304 (vlan-id = 301 + 4 - 1 = 304)
```

```
Router(config)# interface range fastethernet5/1 - 4
Router(config-if)# encapsulation dot1q 301
Router(config-if)# no shutdown
Router(config-if)#
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/1.1, changed state to up
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/1.2, changed state to up
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/1.3, changed state to up
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/1.4, changed state to up
*Oct 6 08:24:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/1.1,
changed state to up
*Oct 6 08:24:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/1.2,
changed state to up
```

```
*Oct 6 08:24:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/1.3,
changed state to up
*Oct 6 08:24:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/1.4,
changed state to up
```

The following example shows how to execute a range macro:

```
Router(config)# interface range macro macro1
```

The following example shows how to set a gigabitethernet range:

```
Router(config)# interface range gigabitethernet1/1 - 6
Router(config-if-range)#
```

The following example shows how to use the loopback interface:

```
Router(config)# interface range loopback 34567
Router(config-if-range)#
```

The following example shows how to use the tunnel interface:

```
Router(config)# interface range tunnel 55555
Router(config-if-range)#
```

The following example shows how to use the port-channel interface:

```
Router(config)# interface range port-channel 343
Router(config-if-range)#
```

Related Commands

| Command | Description |
|-------------------------------|---|
| define interface range | Defines an interface range macro. |
| encapsulation dot1q | Applies a unique VLAN ID to each subinterface within the range. |
| interface vlan | Configures a VLAN interface. |

interface vg-anylan

To specify the interface on a 100VG-AnyLAN port adapter and enter interface configuration mode on Cisco 7200 series routers and Cisco 7500 series routers, use the **interface vg-anylan** command in global configuration mode.

Cisco 7200 Series Routers

```
interface vg-anylan slot/port
```

Cisco 7500 Series Routers with VIPs

```
interface vg-anylan slot/port-adapter/port
```

| Syntax Description | slot | Number of the slot being configured. Refer to the appropriate hardware manual for slot and port information. |
|--------------------|--------------|---|
| | port | Number of the port being configured. Refer to the appropriate hardware manual for slot and port information. |
| | port-adapter | Number of the port adapter being configured. Refer to the appropriate hardware manual for information about port adapter compatibility. |

Defaults

No interfaces are specified.

Command Modes

Global configuration

Command History

| Release | Modification |
|---------|------------------------------|
| 11.3 | This command was introduced. |

Usage Guidelines

The 100VG-AnyLAN port adapter provides a single interface port that is compatible with and specified by IEEE 802.12. The 100VG-AnyLAN port adapter provides 100 Mbps over Category 3 or Category 5 unshielded twisted-pair (UTP) cable with RJ-45 terminators, and supports IEEE 802.3 Ethernet packets.

You configure the 100VG-AnyLAN port adapter as you would any Ethernet or Fast Ethernet interface. The 100VG-AnyLAN port adapter can be monitored with the IEEE 802.12 Interface MIB.

This command does not have a **no** form.

Examples

The following example specifies the 100VG-AnyLAN port adapter in the first port adapter in slot 1:

```
Router(config)# interface vg-anylan 1/0/0
```

Related Commands

| Command | Description |
|----------------------------------|--|
| framing | Selects the frame type for the T1 or E1 data line. |
| show interfaces vg-anylan | Displays the information about the 100VG-AnyLAN port adapter on Cisco 7200 series routers and Cisco 7500 series routers. |

international bit

To set the E3 international bit in the G.751 frame used by the PA-E3 port adapter, use the **international bit** command in interface configuration mode. To return to the default international bit, use the **no** form of this command.

international bit {0 | 1} {0 | 1}

no international bit

| Syntax Description | 0 | Sets either of the two required E3 international bits in the G.751 frame to 0. This is the default. |
|--------------------|---|---|
| | 1 | Sets either of the two required E3 international bits in the G.751 frame to 1. |

Defaults The default value for each bit is 0.

Command Modes Interface configuration

| Command History | Release | Modification |
|-----------------|---------|------------------------------|
| | 11.1 CA | This command was introduced. |

Usage Guidelines The **international bit** command sets bits 6 and 8, respectively, of set II in the E3 frame. To verify the international bit configured on the interface, use the **show controllers serial EXEC** command.

Examples The following example sets the international bit to 1 1 on the PA-E3 port adapter in slot 1, port adapter slot 0, interface 0:

```
Router(config)# interface serial 1/0/0
Router(config-if)# international bit 1 1
```

| Related Commands | Command | Description |
|------------------|---------------------------------|---|
| | national bit (interface) | Sets the E3 national bit in the G.751 frame used by the PA-E3 port adapter. |
| | show controllers serial | Displays information that is specific to the interface hardware. |

invert data

To invert the data stream, use the **invert data** command in interface configuration mode. This command applies only to the Cisco 7000 series routers with the RSP7000 and RSP7000CI, Cisco 7200 series routers, and Cisco 7500 series routers. To disable inverting the data stream, use the **no** form of this command.

invert data

no invert data

Syntax Description This command has no arguments or keywords.

Defaults Data is not inverted.

Command Modes Interface configuration

| Command History | Release | Modification |
|-----------------|---------|--|
| | 11.1 CA | This command was introduced. |
| | 11.2 P | This command was integrated into Cisco IOS Release 11.2 P. |

Usage Guidelines

T1 Line Without B8ZS Encoding

If the interface on the PA-8T and PA-4T+ synchronous serial port adapters and the PA-T3 and PA-2T3 synchronous serial port adapters is used to drive a dedicated T1 line that does not have B8ZS encoding (a method to avoid 15 zeros), the data stream must be inverted (both transmitting and receiving data) either in the connecting CSU/DSU or in the interface.

Inverting is a method of avoiding excessive zeroes that is superseded by the use of B8ZS encryption. This option could be needed for use with legacy equipment that supports this option. By inverting the High-Level Data Link Control (HDLC) data stream, the HDLC zero insertion algorithm becomes a ones insertion algorithm that satisfies the T1 requirements. Be careful not to invert data both on the interface and on the CSU/DSU because two data inversions will cancel each other out.

AMI Line Coding

If the interface on the CT3IP uses alternate mark inversion (AMI) line coding, you must also invert the data on the T1 channel. For more information, see the **t1 linecode** controller configuration command.

Examples The following example inverts data on serial interface 3/1/0:

```
Router(config)# interface serial 3/1/0
Router(config-if)# invert data
```

Related Commands

| Command | Description |
|--------------------|---|
| t1 linecode | Specifies the type of linecoding used by the T1 channels on the CT3IP in Cisco 7500 series routers. |

invert rxclock

To configure UIO serial port 0 or 1 on the Cisco MC3810 when the cable connected is DCE type, use the **invert rxclock** command in interface configuration mode. The command inverts the phase of the RX clock on the UIO serial interface, which does not use the T1/E1 interface. To disable the phase inversion, use the **no** form of this command.

invert rxclock

no invert rxclock

Syntax Description This command has no arguments or keywords.

Defaults The receive clock signal is not inverted.

Command Modes Interface configuration

| Release | Modification |
|----------------|------------------------------|
| 11.3 MA | This command was introduced. |

Examples The following example inverts the clock signal on serial interface 1:

```
Router(config)# interface serial 1  
Router(config-if)# invert rxclock
```

invert txclock

To invert the transmit (TX) clock signal, use the **invert txclock** command in interface configuration mode. To return the TX clock signal to its initial state, use the **no** form of this command.

invert txclock

no invert txclock

Syntax Description This command has no arguments or keywords.

Defaults Transmit clock signal is not inverted.

Command Modes Interface configuration

Command History

| Release | Modification |
|---------|---|
| 10.0 | This command was introduced. |
| 11.3 | The invert-transmit-clock command was replaced by the invert txclock command. |

Usage Guidelines

Delays between the serial clock transmit external (SCTE) clock and data transmission indicate that the transmit clock signal might not be appropriate for the interface rate and length of cable being used. Different ends of the wire can have variances that differ slightly. The **invert txclock** command compensates for these variances. This command replaces the **invert-transmit-clock** command.

Systems that use long cables or cables that are not transmitting the TxC signal (transmit echoed clock line, also known as TXCE or SCTE clock) can experience high error rates when operating at the higher transmission speeds. For example, if a PA-8T synchronous serial port adapter is reporting a high number of error packets, a phase shift might be the problem. Inverting the clock might correct this shift.

When a PA-8T or PA-4T+ port adapter interface is DTE, the **invert txclock** command inverts the TxC signal it received from the remote DCE. When the PA-8T or PA-4T+ port adapter interface is DCE, this command changes the signal back to its original phase.

Examples

The following example inverts the clock signal on serial interface 3/0:

```
Router(config)# interface serial 3/0
Router(config-if)# invert txclock
```

keepalive

To enable keepalive packets and to specify the number of times that the Cisco IOS software tries to send keepalive packets without a response before bringing down the interface, or before bringing the tunnel protocol down for a specific interface, use the **keepalive** command in interface configuration mode. When the keepalive feature is enabled, a keepalive packet is sent at the specified time interval to keep the interface active. To turn off keepalive packets entirely, use the **no** form of this command.

keepalive [*period* [*retries*]]

no keepalive [*period* [*retries*]]

Syntax Description

| | |
|----------------|--|
| <i>period</i> | (Optional) Integer value in seconds greater than 0. The default is 10 seconds. |
| <i>retries</i> | (Optional) Specifies the number of times that the device will continue to send keepalive packets without response before bringing the interface down. Integer value greater than 1 and less than 255. If omitted, the value that was previously set is used; if no value had been specified previously, the default of 5 is used. If using this command with a tunnel interface, specifies the number of times that the device will continue to send keepalive packets without response before bringing the tunnel interface protocol down. |

Defaults

seconds: 10 seconds
retries: 5

Command Modes

Interface configuration

Command History

| Release | Modification |
|-----------|--|
| 10.0 | This command was introduced. |
| 12.2(8)T | The <i>retries</i> argument was added and made available on tunnel interfaces. |
| 12.2(13)T | The default value for the <i>retries</i> argument was increased to 5. |

Usage Guidelines

Keepalive Time Interval

You can configure the keepalive time interval, which is the frequency at which the Cisco IOS software sends messages to itself (Ethernet and Token Ring) or to the other end (serial and tunnel), to ensure that a network interface is alive. The interval is adjustable in 1-second increments down to 1 second. An interface is declared down after three update intervals have passed without receiving a keepalive packet unless the retry value is set higher.



Note

Ethernet interface drivers on some access platforms use keepalive time as the interval to test for network connectivity. By default, Ethernet link failure detection occurs between 1 and 9 seconds. Keepalive packets are still transmitted on the interface during this time.

Setting the keepalive timer to a low value is very useful for rapidly detecting Ethernet interface failures (transceiver cable disconnecting, cable not terminated, and so on).

Line Failure

A typical serial line failure involves losing Carrier Detect (CD) signal. Because this sort of failure is typically noticed within a few milliseconds, adjusting the keepalive timer for quicker routing recovery is generally not useful.

Keepalive Packets with Tunnel Interfaces

GRE keepalive packets may be sent from both sides of a tunnel, or from just one side. If they are sent from both sides, the period and retry parameters can be different at each side of the link. If you configure keepalives on only one side of the tunnel, the tunnel interface on the sending side might perceive the tunnel interface on the receiving side to be down because the sending interface is not receiving keepalives. From the receiving side of the tunnel, the link appears normal because no keepalives were enabled on the second side of the link.

Dropped Packets

Keepalive packets are treated as ordinary packets, so it is possible that they will be dropped. To reduce the chance that dropped keepalive packets will cause the tunnel interface to be taken down, increase the number of retries.



Note

When adjusting the keepalive timer for a very low bandwidth serial interface, large datagrams can delay the smaller keepalive packets long enough to cause the line protocol to go down. You may need to experiment to determine the best values to use for the timeout and the number of retry attempts.

GRE Tunnels with IPsec

When using GRE with IPsec, the keepalives are encrypted like any other traffic. As with user data packets, if the IKE and IPsec security associations are not already active on the GRE tunnel, the first GRE keepalive packet will trigger IKE/IPsec initialization.

Default Behaviors

If you enter only the **keepalive** command with no arguments, defaults for both arguments are used.

If you enter only the **keepalive** command and the timeout parameter, the default number of retries (3) is used.

If you enter the **no keepalive** command, keepalive packets are disabled on the interface.

Examples

The following example sets the keepalive interval to 3 seconds:

```
Router(config)# interface ethernet 0
Router(config-if)# keepalive 3
```

The following example sets the keepalive interval to 3 seconds and the retry value to 7:

```
Router(config)# interface tunnel 1
Router(config-if)# keepalive 3 7
```

lbo

To set a cable length longer than 655 feet for a DS-1 link, use the **lbo** command in interface configuration mode on the interface for a T1 link. To delete the **lbo long** value, use the **no** form of this command.

```
lbo {long {gain26 | gain36} {-15db | -22.5db | -7.5db | 0db} | short {133 | 266 | 399 | 533 | 655}}
no lbo
```

Syntax Description

| | |
|----------------|--|
| gain26 | Specifies the decibel pulse gain at 26 decibels. This is the default pulse gain. |
| gain36 | Specifies the decibel pulse gain at 36 decibels. |
| -15db | Specifies the decibel pulse rate at -15 decibels. |
| -22.5db | Specifies the decibel pulse rate at -22.5 decibels. |
| -7.5db | Specifies the decibel pulse rate at -7.5 decibels. |
| 0db | Specifies the decibel pulse rate at 0 decibels. This is the default. |
| 133 | Specifies a cable length from 0 to 133 feet. |
| 266 | Specifies a cable length from 133 to 266 feet. |
| 399 | Specifies a cable length from 266 to 399 feet. |
| 533 | Specifies a cable length from 399 to 533 feet. |
| 655 | Specifies a cable length from 533 to 655 feet. |

Defaults

gain26 and **0db**

Command Modes

Interface configuration

Command History

| Release | Modification |
|------------|---|
| 11.3 MA | This command was introduced as a Cisco MC3810 controller configuration command. |
| 12.0(5)XE | The command was introduced as an ATM interface command. |
| 12.0(7)XE1 | Support for Cisco 7100 series routers was added. |
| 12.1(5)T | This command was integrated into Cisco IOS Release 12.1(5)T. |

Usage Guidelines

This command is supported on T1 links only.

Each T1 port can operate in long-haul or short-haul mode. In long haul mode, the user must specify the gain and the line build out. In short-haul mode, the user must specify the cable length in feet.

The transmit attenuation value is best obtained by experimentation. If the signal received by the far-end equipment is too strong, reduce the transmit level by entering additional attenuation.

Examples

On Cisco 7100 or 7200 series routers, the following example specifies a pulse gain of 36 decibels and a decibel pulse rate of -7.5 decibels:

```
Router(config)# interface atm 1/2  
Router(config-if)# lbo long gain36 -7.5db
```

linecode

To select the line-code type for T1 or E1 lines, use the **linecode** command in controller configuration mode.

```
linecode { ami | b8zs | hdb3 }
```

Syntax Description

| | |
|-------------|---|
| ami | Specifies alternate mark inversion (AMI) as the line-code type. Valid for T1 or E1 controllers. This is the default for T1 lines. |
| b8zs | Specifies B8ZS as the line-code type. Valid for T1 controller only. |
| hdb3 | Specifies high-density bipolar 3 (hdb3) as the line-code type. Valid for E1 controller only. This is the default for E1 lines. |

Defaults

AMI is the default for T1 lines.

High-density bipolar 3 is the default for E1 lines.

Command Modes

Controller configuration

Command History

| Release | Modification |
|---------|------------------------------|
| 10.3 | This command was introduced. |

Usage Guidelines

Use this command in configurations in which the router or access server must communicate with T1 fractional data lines. The T1 service provider determines which line-code type, either **ami** or **b8zs**, is required for your T1 circuit. Likewise, the E1 service provider determines which line-code type, either **ami** or **hdb3**, is required for your E1 circuit.

This command does not have a **no** form.

Examples

The following example specifies B8ZS as the line-code type:

```
Router(config-controller)# linecode b8zs
```

line-termination

To set the line termination on an E1 controller, use the **line-termination** command in controller configuration mode. To return to the default line termination, use the **no** form of this command.

line-termination {75-ohm | 120-ohm}

no line-termination

| Syntax Description | 75-ohm | 120-ohm |
|--------------------|--|--|
| | Specifies 75-ohm unbalanced termination. | Specifies 120-ohm balanced termination. This is the default. |

Defaults 120-ohms

Command Modes Controller configuration

| Command History | Release | Modification |
|-----------------|-----------|------------------------------|
| | 11.3(2)AA | This command was introduced. |

Usage Guidelines This command applies only to E1 controllers. To determine the line termination setting for the controller, use the **show controllers e1** command.

Examples In the following example, the line termination is set to 75 ohms for the E1 port located in shelf 6, slot 0, port 0:

```
Router# configure terminal
Router(config)# controller e1 6/0/0
Router(config-controller)# line-termination 75-ohm
Router(config-controller)# exit
Router(config)# exit
```

| Related Commands | Command | Description |
|------------------|----------------------------|---|
| | show controllers e1 | Displays information about the E1 links supported by the NPM (Cisco 4000) or MIP (Cisco 7500 series). |

link-test

To reenable the link-test function on a port on an Ethernet hub of a Cisco 2505 or Cisco 2507 router, use the **link-test** command in hub configuration mode. Use the **no** form of this command to disable this feature if a pre-10BaseT twisted-pair device not implementing link test is connected to the hub port.

link-test

no link-test

Syntax Description This command has no arguments or keywords.

Defaults Enabled

Command Modes Hub configuration

| Command History | Release | Modification |
|-----------------|---------|------------------------------|
| | 10.3 | This command was introduced. |

Usage Guidelines This command applies to a port on an Ethernet hub only. Disable this feature if a 10BaseT twisted-pair device at the other end of the hub does not implement the link test function.

Examples The following example disables the link test function on hub 0, ports 1 through 3:

```
Router(config)# hub ethernet 0 1 3
Router(config-hub)# no link-test
```

| Related Commands | Command | Description |
|------------------|------------|--|
| | hub | Enables and configures a port on an Ethernet hub of a Cisco 2505 or Cisco 2507 router. |

local-lnm

To enable Lanoptics Hub Networking Management of a PCbus Token Ring interface, use the **local-lnm** command in interface configuration mode. To disable Lanoptics Hub Networking Management, use the **no** form of this command.

local-lnm

no local-lnm

Syntax Description This command has no arguments or keywords.

Defaults Management is not enabled.

Command Modes Interface configuration

| Command History | Release | Modification |
|-----------------|---------|------------------------------|
| | 10.3 | This command was introduced. |

Usage Guidelines The Token Ring interface on the AccessPro PC card can be managed by a remote LAN manager over the PCbus interface. At present, the Lanoptics Hub Networking Management software running on an IBM compatible PC is supported.

Examples The following example enables Lanoptics Hub Networking Management:

```
Router(config-if)# local-lnm
```

logging event

To enable notification of interface, subinterface, and Frame Relay data link connection identifier (DLCI) data link status changes, use the **logging event** command in interface configuration mode. To disable notification, use the **no** form of this command.

logging event { **dlci-status-change** | **link-status** | **subif-link-status** }

no logging event { **dlci-status-change** | **link-status** | **subif-link-status** }

Syntax Description

| | |
|---------------------------|---|
| dlci-status-change | Enables notification of Frame Relay DLCI status changes. Note This option is supported only when the encapsulation on the interface is Frame Relay. |
| link-status | Enables notification of interface data link status changes. |
| subif-link-status | Enables notification of subinterface data link status changes. |

Defaults

For system images, notification of interface, subinterface, and Frame Relay DLCI data link status changes is enabled by default.

For boot images, notification of Frame Relay subinterface and DLCI data link status changes is disabled by default. Notification of interface data link status changes is enabled by default.

Command Modes

Interface configuration

Command History

| Release | Modification |
|---------|------------------------------|
| 12.0 | This command was introduced. |

Examples

The following example shows how to enable notification of subinterface link status changes:

```
Router(config-if)# logging event subif-link-status
```

The following are examples of Frame Relay DLCI and subinterface status change notification messages filtered by the **logging event** command:

```
00:16:22: %FR-5-DLCICHANGE: Inteface Serial3/0/0:1 - DLCI 105 state changed to INACTIVE
00:16:22: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0/0:1.5, changed state to down
```