



## IBM Network Media Translation Commands

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Use the commands in this chapter to configure and monitor Qualified Logical Link Control (QLLC) or Synchronous Logical Data Link Control (SDLLC) connections. SDLLC is a Cisco IOS software feature that provides translation between Synchronous Data Link Control (SDLC) and Logical Link Control, type 2 (LLC2). For QLLC conversion or SDLLC parameter configuration information and examples, refer to the “Configuring IBM Network Media Translation” chapter in the *Cisco IOS Bridging and IBM Networking Configuration Guide*.

# qlc accept-all-calls

To enable the router to accept a call from any remote X.25 device, use the **qlc accept-all-calls** interface configuration command. To cancel the request, use the **no** form of this command.

**qlc accept-all-calls**

**no qlc accept-all-calls**

**Syntax Description** This command has no arguments or keywords.

**Defaults** Disabled

**Command Modes** Interface configuration

## Command History

Release	Modification
11.2 F	This command was introduced.

## Usage Guidelines

This command allows QLLC to accept all inbound X.25 calls, provided that the QLLC Call User Data (CUD) is in the call packet and the destination X.121 address in the call packet matches the serial interface's configured destination X.121 address or subaddress. When using this command, the source X.121 address does not need to be configured via an **x25 map qlc** command for the call to be accepted.

This command is applicable to QLLC support for DLSw+, APPN, and DSPU. It is not applicable to QLLC support for SRB and RSRB.

## Examples

The following example enables QLLC connectivity for DLSw+ and allows QLLC to accept all inbound X.25 calls. Every X.25 connection request for X.121 address 0308 with QLLC CUD is directed to DLSw+. The first SVC to be established will be mapped to virtual MAC address 4000.0B0B.0001. If a call comes in with an X.121 address of 0308, the call will be forwarded to MAC address 4001.1161.1234.

```
interface serial 0
 encapsulation x25
 x25 address 0308
 qlc accept-all-calls
 qlc dlsw vmac 4000.0B0B.0001 500 partner 4001.1161.1234
```

## Related Commands

Command	Description
<b>x25 map qlc</b>	Specifies the X.121 address of the remote X.25 device with which communication is planned using QLLC conversion.

# qllc largest-packet

To indicate the maximum size of the Systems Network Architecture (SNA) packet that can be sent or received on an X.25 interface configured for QLLC conversion, use the **qllc largest-packet** interface configuration command. To restore the default largest packet size, use the **no** form of this command.

**qllc largest-packet** *virtual-mac-addr max-size*

**no qllc largest-packet** *virtual-mac-addr max-size*

## Syntax Description

<i>virtual-mac-addr</i>	Virtual Media Access Control (MAC) address associated with the remote X.25 device, as defined using the <b>x25 map qllc</b> or <b>x25 pvc qllc</b> interface configuration commands. This address is written as a dotted triple of four-digit hexadecimal numbers.
<i>max-size</i>	Maximum size, in bytes, of the SNA packet that can be sent or received on the X.25 interface configured for QLLC conversion. This value agrees with the value configured in the remote SNA device. The valid range is 0 to 1024.

## Defaults

Maximum size is 265 bytes.

## Command Modes

Interface configuration

## Command History

Release	Modification
10.3	This command was introduced.

## Usage Guidelines

SNA packets that are larger than the largest value allowed on the X.25 connection and are received on the LLC2 interface are segmented before being sent on the X.25 interface. When a segmented packet is received on the X.25 interface, it is passed immediately to the LLC2 interface, and no effort is made to wait for the segment to be completed.

When the remote X.25 device has a limit on the maximum total length of recombined X.25 segments it will support, you can use the **qllc largest-packet** command to ensure the length is not exceeded. For example, a device whose maximum SNA packet size is limited to 265 bytes might not be able to handle a series of X.25 packets that it has to recombine to make a 4, 8, or 17 KM SNA packet, such as one often encounters in an LLC2 environment.

You use the **qllc largest-packet** command in conjunction with the **x25 map qllc** and **qllc srb** commands.



### Note

Do not configure the maximum SNA packet size on an X.25 interface to be larger than the maximum SNA packet size allowed on the LLC2 interface.

Consult your IBM documentation to set the maximum packet size on the remote X.25 device.

**Examples**

In the following example, the maximum packet size that has been established for the virtual circuit is used as the maximum packet size that can be sent or received on the X.25 interface:

```
interface serial 0
 encapsulation x25
 x25 address 31102120100
 x25 map qlc 0100.0000.0001 31104150101
 qlc srb 0100.0000.0001 201 100
 !
 qlc partner 0100.0000.0001 4000.0101.0132
 qlc xid 0100.0000.0001 01720001
 qlc largest-packet 0100.0000.0001 521
```

**Related Commands**

Command	Description
<b>qlc srb</b>	Enables QLLC conversion on a serial interface configured for X.25 communication.
<b>x25 map qlc</b>	Specifies the X.121 address of the remote X.25 device with which communication is planned using QLLC conversion.
<b>x25 pvc qlc</b>	Associates a virtual MAC address with a PVC for communication using QLLC conversion.

# qllc npsi-poll

To enable a connection between a PU 2 on the LAN side and a front-end processor (FEP) running NPSI on the X.25 side, use the **qllc npsi-poll** interface configuration command. To disable this capability, use the **no** form of this command.

```
qllc npsi-poll virtual-mac-addr
```

```
no qllc npsi-poll virtual-mac-addr
```

<b>Syntax Description</b>	<i>virtual-mac-addr</i> MAC address associated with the remote X.25 device, as defined using the <b>x25 map qllc</b> or <b>x25 pvc qllc</b> interface configuration commands. This address is written as a dotted triple of four-digit hexadecimal numbers.
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<b>Defaults</b>	Disabled
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<b>Command Modes</b>	Interface configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.1	This command was introduced.

<b>Usage Guidelines</b>	<p>The <b>qllc npsi-poll</b> command is necessary only when the upstream device is a FEP running NPSI and the downstream device is a PU 2.</p> <p>This command is necessary because in a Token Ring or RSRB environment the LAN attached devices start up by sending a null exchange ID packet upstream. If the Cisco IOS software forwards this null XID to an X.25-attached FEP, the FEP responds as if it were connecting to an PU2.1 device, and breaks the connection when the PU 2 next sends an XID Format 0 Type 2. The <b>qllc npsi-poll</b> command intercepts any null XID packet that the software receives on the LAN interface, and returns a null XID response to the downstream device. It continues to allow XID Format 3 and XID Format 0 packets through the X.25 device.</p>
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<b>Examples</b>	<p>The following example facilitates a connection between a FEP running NPSI and a downstream PU 2.0:</p> <pre>qllc npsi-poll 0100.0000.0001</pre>
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Related Commands	Command	Description
	<b>qlc srb</b>	Enables QLLC conversion on a serial interface configured for X.25 communication.
	<b>sdlc qlc-prtnr</b>	Establishes correspondence between an SDLC and QLLC connection.
	<b>x25 map qlc</b>	Specifies the X.121 address of the remote X.25 device with which communication is planned using QLLC conversion.
	<b>x25 pvc qlc</b>	Associates a virtual MAC address with a PVC for communication using QLLC conversion.

# qllc partner

To enable a router configured for QLLC conversion to open a connection to the local Token Ring device on behalf of the remote X.25 device when an incoming call is received, use the **qllc partner** interface configuration command. To disable this capability, use the **no** form of this command.

**qllc partner** *virtual-mac-addr mac-addr*

**no qllc partner** *virtual-mac-addr mac-addr*

Syntax Description	virtual-mac-addr	MAC address associated with the remote X.25 device, as defined using the <b>x25 map qllc</b> or <b>x25 pvc qllc</b> interface configuration commands. This address is written as a dotted triple of four-digit hexadecimal numbers.
	mac-addr	48-bit MAC address of the Token Ring host that will communicate with the remote X.25 device.

**Defaults** Disabled

**Command Modes** Interface configuration

Command History	Release	Modification
	10.3	This command was introduced.

**Usage Guidelines** When the Cisco IOS software receives an incoming call from the designated X.121 address, it opens an LLC2 connection with the device at the given MAC address. Both the MAC address of the Token Ring device and the virtual MAC address for the remote X.25 device with which it is to communicate are required in order for the software to initiate connections with the Token Ring device. This allows the Token Ring host to be permanently ready to accept a connection rather than requiring operator action at the host to initiate the connection with the X.25 device.

You must issue the **qllc partner** command for each remote X.25 device that will communicate with the local Token Ring host through this interface.

You use the **qllc partner** command in conjunction with the **x25 map qllc** and **qllc srb** commands.

**Examples** In the following example, the **qllc partner** command is used to associate the virtual MAC address 0100.0000.0001, as defined in the previous **x25 map qllc** entry, with the MAC address of the Token Ring host that will communicate with the remote X.25 device:

```
interface serial 0
  encapsulation x25
  x25 address 31102120100
  x25 map qllc 0100.0000.0001 31104150101
  qllc srb 0100.0000.0001 201 100
  qllc partner 0100.0000.0001 4000.0101.0132
  qllc xid 0100.0000.0001 01720001
```

Related Commands	Command	Description
	<b>qllc srb</b>	Enables QLLC conversion on a serial interface configured for X.25 communication.
	<b>sdlc qllc-prtnr</b>	Establishes correspondence between an SDLC and QLLC connection.
	<b>x25 map qllc</b>	Specifies the X.121 address of the remote X.25 device with which communication is planned using QLLC conversion.
	<b>x25 pvc qllc</b>	Associates a virtual MAC address with a PVC for communication using QLLC conversion.

# qllc sap

To associate a service access point (SAP) value other than the default SAP value with a serial interface configured for X.25 communication and QLLC conversion, use the **qllc sap** interface configuration command. To return this SAP value to its default state, use the **no** form of this command.

```
qllc sap virtual-mac-addr ssap dsap
```

```
no qllc sap virtual-mac-addr ssap dsap
```

## Syntax Description

<i>virtual-mac-addr</i>	MAC address associated with the remote X.25 device, as defined using the <b>x25 map qllc</b> or <b>x25 pvc qllc</b> interface configuration commands. This address is written as a dotted triple of four-digit hexadecimal numbers.
<i>ssap</i>	Source SAP value. It can be a decimal number in the range 2 to 254. The default is 4.
<i>dsap</i>	Destination SAP value. It can be a decimal number in the range 2 to 254. The default is 4.

## Defaults

The default source SAP value is 4.

The default destination SAP value is 4.

## Command Modes

Interface configuration

## Command History

Release	Modification
10.3	This command was introduced.

## Usage Guidelines

A SAP can be viewed as a port through which a higher-layer application can communicate with its counterpart (peer) operating on another system. While the standard SAP value for IBM devices is 4, other values are allowed.

You use the **qllc sap** command in conjunction with the **x25 map qllc** and **qllc srb** interface configuration commands.

## Examples

In the following example, source SAP and destination SAP values of 2 are specified for the remote X.25 device at the X.121 address 31370054065:

```
interface serial 0
  x25 map qllc 31370054065 4000.0122.0001
  qllc srb 9 100
  qllc sap 4000.0122.0001 02 02
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>qlc srb</b>	Enables QLLC conversion on a serial interface configured for X.25 communication.
<b>x25 map qlc</b>	Specifies the X.121 address of the remote X.25 device with which communication is planned using QLLC conversion.
<b>x25 pvc qlc</b>	Associates a virtual MAC address with a PVC for communication using QLLC conversion.

# qllc srb

To enable QLLC conversion on a serial interface configured for X.25 communication, use the **qllc srb** interface configuration command. To disable QLLC conversion on the interface, use the **no** form of this command.

```
qllc srb virtual-mac-addr srn trn
```

```
no qllc srb srn trn
```

## Syntax Description

<i>virtual-mac-addr</i>	MAC address associated with the remote X.25 device, as defined using the <b>x25 map qlc</b> or <b>x25 pvc qlc</b> interface configuration commands. It can be 1 to 15 digits long.
<i>srn</i>	Source ring number. This value defines a virtual ring for all of the remote X.25 devices attached to the QLLC interface.
<i>trn</i>	Target ring number. It must be a virtual ring group that has been defined with the <b>source-bridge sdllc-local-ack</b> global configuration command.

## Defaults

QLLC conversion is not enabled.

## Command Modes

Interface configuration

## Command History

Release	Modification
10.3	This command was introduced.

## Usage Guidelines

Any number of QLLC conversion connections using the same X.25 serial interface can share a common source ring. However, this source ring must be a unique hexadecimal ring number within the source-bridged network.

If the router has only one Token Ring interface and is bridging from the remote X.25 devices to this interface, then *trn* is the number of the ring on that Token Ring interface. If the router has several Token Ring interfaces and interconnects them by means of the **source-bridge sdllc-local-ack** command, then *trn* is the number of that virtual ring group, as assigned using the **source-bridge sdllc-local-ack**

Use the **qllc srb** command to associate the ring number and bridge number that have been assigned to the interface with a virtual ring group of which the interface will be a part. The serial interface appears to be a ring, or source ring number, on a source-route bridge network, and ties in to the virtual ring group, or target ring number. The target ring number provides access to other real rings that have been designated using the **source-bridge** global configuration command. Note that you can configure QLLC conversion on a router containing no Token Ring interface cards, such as a router connecting a serial-attached device to an X.25 public data network (PDN).

The **qlc srb** command automatically turns on the LLC2 process with default values. To change any of the LLC2 parameters (described in the “LLC2 and SDLC Commands” chapter), apply their values to the serial interface that has been configured for QLLC conversion. This is done on the serial interface, even though LLC2 does not technically run on the serial interface, but on the virtual ring associated with the serial interface.

You use the **qlc srb** command in conjunction with the **x25 map qlc** command.

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### Examples

In the following example, the **qlc srb** command is used to define a virtual ring number of 201 for the remote X.25 device, and an actual or virtual ring number of 100 for the Token Ring interface:

```
interface serial 0
 encapsulation x25
 x25 address 31102120100
 x25 map qlc 0100.0000.0001 31104150101
 qlc srb 0100.0000.0001 201 100
```

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### Related Commands

Command	Description
<b>source-bridge</b>	Configures an interface for SRB.
<b>source-bridge sdllc-local-ack</b>	Activates local acknowledgment for SDLLC sessions on a particular interface.
<b>x25 map qlc</b>	Specifies the X.121 address of the remote X.25 device with which communication is planned using QLLC conversion.
<b>x25 pvc qlc</b>	Associates a virtual MAC address with a PVC for communication using QLLC conversion.

# qllc xid

To associate an exchange ID (XID) value with the remote X.25 device that communicates through the Cisco IOS software using QLLC conversion, use the **qllc xid** interface configuration command. To disable XID processing for this address, use the **no** form of this command.

```
qllc xid virtual-mac-addr xid
```

```
no qllc xid virtual-mac-addr xid
```

Syntax Description	virtual-mac-addr	MAC address associated with the remote X.25 device, as defined using the <b>x25 map qllc</b> or <b>x25 pvc qllc</b> interface configuration command. This address is written as a dotted triple of four-digit hexadecimal numbers.
	xid	Combined XID IDBLK and XID IDNUM you are associating with the X.25 device at this X.121 address. This hexadecimal value must be four bytes (eight digits) in length.

**Defaults** XID processing is not enabled.

**Command Modes** Interface configuration

Command History	Release	Modification
	10.3	This command was introduced.

**Usage Guidelines** Most QLLC installations do not need the **qllc xid** configuration command. It is only needed if the remote X.25 device is not configured to send its own XID. This is only possible for a device that is attached via a permanent virtual circuit (PVC). Even so, most devices that are connected via X.25 will send their own XIDs. Use the **qllc xid** command when the Token Ring host requires login validation for security purposes and the remote X.25 device does not send an XID. The XID value is used to reply to XID requests received on the Token Ring (LLC2) side of the connection. XID requests and responses are usually exchanged before sessions are started. The XID response to the XID request from the Token Ring host will contain the information you configure using the **qllc xid** command. The host will check the XID response it receives with the IDBLK and IDNUM parameters (configured in VTAM). If they match, the Token Ring host will initiate a session with the router. If they do not match, the host will not initiate a session with the router.

You use the **qllc xid** command in conjunction with the **x25 map qllc** and the **qllc srb** commands.

**Examples**

In the following example, the X.25 device at X.121 address 31104150101 must use an XID IDBLK of 017 and XID IDNUM of 20001 to access the Token Ring host whose MAC address is associated with the remote X.25 device, as applied using the **sdllc partner** command:

```
interface serial 0
 encapsulation x25
 x25 address 31102120100
 x25 map qlc 0100.0000.0001 31104150101
 qlc srb 0100.0000.0001 201 100
 !
 qlc partner 0100.0000.0001 4000.0101.0132
 qlc xid 0100.0000.0001 01720001
```

**Related Commands**

Command	Description
<b>qlc srb</b>	Enables QLLC conversion on a serial interface configured for X.25 communication.
<b>sdllc partner</b>	Enables device-initiated connections for SDLLC. Must be specified for the serial interface that links to the serial line device.
<b>x25 map qlc</b>	Specifies the X.121 address of the remote X.25 device with which communication is planned using QLLC conversion.
<b>x25 pvc qlc</b>	Associates a virtual MAC address with a PVC for communication using QLLC conversion.

# sdlc partner

To enable device-initiated connections for SDLLC, use the **sdlc partner** interface configuration command. This command must be specified for the serial interface that links to the serial line device. To cancel the original instruction, use the **no** form of this command.

**sdlc partner** *mac-address* *sdlc-address*

**no sdlc partner** *mac-address* *sdlc-address*

Syntax Description		
	<i>mac-address</i>	MAC address of the Token Ring host.
	<i>sdlc-address</i>	SDLC address of the serial device that will communicate with the Token Ring host.

Defaults	
	Disabled

Command Modes	
	Interface configuration

Command History	Release	Modification
	10.0	This command was introduced.

**Usage Guidelines** Both the MAC address of the Token Ring host and the SDLC serial line address are required to initiate connections with the Token Ring host.

The Token Ring host and the serial device communicate with each other through the Cisco IOS software. Although the device is said to initiate connections, the software actually initiates connections with the Token Ring host on behalf of the serial device. As part of Cisco's SDLLC implementation, the serial device "thinks" that it is communicating with a host also on a serial line. It is actually the software that does all the frame and protocol conversions between serial and Token Ring devices.

There are two conditions under which the Cisco IOS software will attempt to initiate a connection to a host on behalf of a serial device:

- When the serial device attached to the router is powered on. In this case, the router attached to the serial line detects a change in interface signals and initiates a connection with the Token Ring hosts by exchanging explorer and XID packets.
- When a previously shut down serial interface is brought back on-line. When the **no shutdown** command is issued, the software will detect a change in the serial line state from down to up and initiate a session with the Token Ring host by exchanging explorer and XID packets.

The Cisco IOS software will continue trying once a minute to initiate a connection whenever one of these two conditions is met, until the host responds to its requests. When you no longer want the software to initiate connections with a host, use the **no sdlc partner** command.

**Note**

For device-initiated sessions, the host will check the IDBLK and IDNUM parameters of the serial device it receives in the XID packet against the information configured on the host. If the information in the XID packet does not match with what is configured on the host, the host will drop the session. Therefore, for device-initiated connections, always specify the correct IDBLK and IDNUM parameters on the router serial interfaces with the **sdllc xid** command.

**Examples**

In the following example, a serial device at SDLC address C2 wants to initiate a connection with a Token Ring host at MAC address 4000.0122.0001. The router initiates the connection on behalf of a serial device:

```
! sample global command
source-bridge ring-group 100
!
interface serial 0
! router initiates connections with Token Ring host at MAC address
! 4000.0122.0001 on behalf of serial device c2
sdllc partner 4000.0122.0001 c2
```

**Related Commands**

Command	Description
<b>sdllc xid</b>	Specifies an XID value appropriate for the designated SDLC station associated with this serial interface.

# sdllc ring-largest-frame

To indicate the largest I-frame size that can be sent to or received from the LLC2 primary station, use the **sdllc ring-largest-frame** interface configuration command. To return to the default, use the **no** form of this command.

**sdllc ring-largest-frame** *value*

**no sdllc ring-largest-frame** *value*

<b>Syntax Description</b>	<i>value</i>	Frame size in bytes. Possible values include 516, 1500, 2052, 4472, 8144, 11407, and 17800. The default is 516 bytes.
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<b>Defaults</b>	516 bytes
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<b>Command Modes</b>	Interface configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

**Usage Guidelines**

Possible values for the *value* argument match those that are possible for the **if size** of the various **source-bridge remote-peer** commands. You must ensure that your remote peer connection can support this largest frame size. Possible values for the *value* argument include 516, 1500, 2052, 4472, 8144, 11407, and 17800.

Faster screen updates to 3278-style terminals often can be obtained by allowing the Token Ring FEP to send as large a frame as possible and by allowing the Cisco IOS software to segment the frame into multiple SDLC I-frames.

**Examples**

In the following example, the software can send or receive a frame as large as 11407 bytes from the LLC2 primary station. Any frames larger will be fragmented by the software.

```
! sample global command
source-bridge ring-group 100
!
interface serial 3
! largest frame sent or received on serial 3 is 11407 bytes
sdllc ring-largest-frame 11407
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>source-bridge remote-peer interface</b>	Specifies a point-to-point direct encapsulation connection.
	<b>source-bridge remote-peer tcp</b>	Identifies the IP address of a peer in the ring group with which to exchange source-bridge traffic using TCP.

# sdllc sap

To associate a SAP value other than the default SAP value with a serial interface configured for SDLLC, use the **sdllc sap** interface configuration command. To return this SAP value to its default state, use the **no** form of this command.

```
sdllc sap sdlc-address ssap dsap
```

```
no sdllc sap sdlc-address ssap dsap
```

## Syntax Description

<i>sdlc-address</i>	MAC address associated with the remote SDLC device.
<i>ssap</i>	Source SAP value. It must be in the range 1 to 254. The default is 4.
<i>dsap</i>	Destination SAP value. It must be in the range 1 to 254. The default is 4.

## Defaults

The default source SAP value for IBM SNA devices is 4.

The default destination SAP value for IBM SNA devices is 4.

## Command Modes

Interface configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

You use the **sdllc sap** command in conjunction with the **sdllc traddr** interface configuration commands. A SAP can be viewed as a port through which a higher-layer application can communicate with its counterpart (peer) operating on another system. While the standard SAP value for IBM SNA devices is 4, and NetBIOS devices is xF0, other values are allowed.

## Examples

In the following example, source SAP and destination SAP values of 2 are specified for the remote SDLC device at the SDLC address C1 02 02:

```
interface serial 0
  sdllc sap c1 02 02
```

## Related Commands

Command	Description
<b>sdllc traddr</b>	Enables SDLLC media translation on a serial interface. The address specified is a MAC address to be assigned to the serial station.

## sdllc sdlc-largest-frame

To indicate the largest information frame (I-frame) size that can be sent or received by the designated SDLC station, use the **sdllc sdlc-largest-frame** interface configuration command. To return to the default value, use the **no** form of this command.

**sdllc sdlc-largest-frame** *address value*

**no sdllc sdlc-largest-frame** *address value*

Syntax Description	<i>address</i>	Address of the SDLC station that will communicate with the Token Ring host.
	<i>value</i>	Largest frame size that can be sent or received by this SDLC station. The default is 265 bytes.

<b>Defaults</b>	265 bytes
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<b>Command Modes</b>	Interface configuration
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Command History	Release	Modification
	10.0	This command was introduced.

<b>Usage Guidelines</b>	Most SDLC devices are limited to frames of 265 bytes. I-frames received from the Token Ring station that are larger than this size will be properly fragmented.
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<b>Examples</b>	In the following example, the Cisco IOS software can send or receive a frame as large as 265 bytes (the default) from the SDLC station at address C6. Any frames larger will be fragmented by the software.
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```
! sample global command
source-bridge ring-group 100
!
interface serial 4
! largest frame sent or received on serial 4 is 265 bytes
sdllc sdlc-largest-frame c6 265
```

# sdllc traddr

To enable SDLLC media translation on a serial interface, use the **sdllc traddr** interface configuration command. The address specified is a MAC address to be assigned to the serial station. To disable SDLLC media translation on the interface, use the **no** form of this command.

**sdllc traddr** *xxxx.xxxx.xx00 lr bn tr*

**no sdllc traddr** *xxxx.xxxx.xx00 lr bn tr*

## Syntax Description

<i>xxxx.xxxx.xx00</i>	MAC address to be assigned to the serial interface.
<i>lr</i>	SDLLC virtual ring number.
<i>bn</i>	SDLLC bridge number.
<i>tr</i>	SDLLC target ring number.

## Defaults

Disabled

## Command Modes

Interface configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

Every control unit hooked off the serial line requires a virtual Token Ring address (VTRA). This usually is assigned by the system administrator as a locally administered MAC address (unique across the network).

When you enable SDLLC Media Translation by specifying the **sdllc traddr** command on a serial interface, you must specify a VTRA for each serial station attached to the serial line. The last two hexadecimal digits (that is, the last byte) of the VTRA *must* be 00. The Cisco IOS software uses this byte to represent the SDLC address of a station on the serial link.



### Note

Addresses in the range *xxxx.xxxx.xx00* to *xxxx.xxxx.xxFF* are reserved for use by the Cisco IOS software. You must adhere to this addressing requirement. If you do not follow this addressing requirement, there may be a conflict between the VTRA and the addresses reserved by the software for the SDLC link.

The variables *lr*, *bn*, and *tr* represent the SDLLC virtual ring number, bridge number, and target ring number, respectively, that you assign to the interface. In design, the serial interface appears to be a ring, *lr*, on a source-route bridged network, and ties in through the bridge, *bn*, to the virtual ring-group, *tr*. This provides access to other, real rings through remote source-route bridging **source-bridge remote-peer** commands. Note that SDLLC can be configured on a router containing no Token Ring interface cards.

The **sdllc traddr** command automatically turns on the LLC2 process with default values. To change any of the LLC2 parameters, specify their values on the serial interface that is being enabled for SDLLC. This is done on the serial interface, even though LLC2 does not technically run on the serial interface, but on the SDLLC virtual ring associated with the serial interface. LLC2 commands can be configured after specifying the **sdllc traddr** command.

### Examples

In the following example, SDLLC media translation is enabled off the serial 0 interface to a serial station at MAC address 0110.2222.3300. The SDLLC virtual ring number is 8, the bridge number is 1, and the target ring number is 100.

```
! global command to apply commands to the ring group
source-bridge ring-group 100
! remote peer at IP address 131.108.1.1 belongs to ring group 100 and uses
! tcp as the transport
source-bridge remote-peer 100 tcp 131.108.1.1
source-bridge remote-peer 100 tcp 131.108.2.2
!
interface serial 0
 encapsulation sdlc-primary
! establish address of SDLC station off serial-0 as c1
sdllc address c1
! enable SDLLC media translation to serial station 0110.2222.3300
! on virtual ring 8, bridge 1, to target ring 100
sdllc traddr 0110.2222.3300 8 1 100
```

### Related Commands

Command	Description
<b>sdllc sap</b>	Associates a SAP value other than the default SAP value with a serial interface configured for SDLLC.
<b>source-bridge remote-peer interface</b>	Specifies a point-to-point direct encapsulation connection.
<b>source-bridge remote-peer tcp</b>	Identifies the IP address of a peer in the ring group with which to exchange source-bridge traffic using TCP.

# sdllc xid

To specify an XID value appropriate for the designated SDLC station associated with this serial interface, use the **sdllc xid** interface configuration command. To disable XID processing for this address, use the **no** form of this command.

```
sdllc xid address xxxxxxxx
```

```
no sdllc xid address xxxxxxxx
```

## Syntax Description

<i>address</i>	Address of the SDLC station associated with this interface.
<i>xxxxxxx</i>	XID the Cisco IOS software will use to respond to XID requests received on the Token Ring (LLC2) side of the connection. This value must be 4 bytes (8 digits) in length and is specified with hexadecimal digits.

## Defaults

Disabled

## Command Modes

Interface configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

XID requests and responses are usually exchanged before sessions are started. Be sure that the XID value configured on the router matches the IDBLK and IDNUM parameters configured on the host. The XID response to an XID request from the Token Ring host will contain the information you configured in the **sdllc xid** command. The host will check the XID response it receives with the IDBLK and IDNUM parameters (that are configured in virtual telecommunications access method (VTAM)). If they match, the Token Ring host will initiate a session with the router. If they do not match, the host will not initiate a session.

## Examples

The following example specifies an XID value of 01720002 at address C2:

```
! sample global command
source-bridge ring-group 100
!
interface serial 0
! sdllc exchange identification value of 01720002 at address c2
sdllc xid c2 01720002
```

## Related Commands

Command	Description
<b>sdllc partner</b>	Enables device-initiated connections for SDLLC. Must be specified for the serial interface that links to the serial line device.

# show qllc

To display the current state of any QLLC connections, use the **show qllc** privileged EXEC command.

**show qllc**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

Release	Modification
10.3	This command was introduced.

**Examples** The following is sample output from the **show qllc** command.

```
Router# show qllc

QLLC Connections:
Serial2: 1000.5a35.3a4f->1000.5a59.04f9. SAPs 4 4. Rings Src 200, Tgt 100.
State Connect
Remote DTE 1002. QLLC Protocol State NORMAL lci 1 (PVC)
```

In the display, the first two lines of the **show qllc** command show that there is a QLLC session between a Token Ring device and an X.25 remote device. The X.25 device has a virtual MAC address of 100.5a35.3a4f with a SAP of 04. It is using a PVC with logical channel number 1. The Token Ring device has a MAC address of 1000.5a59.04f9 with a SAP of 04. The state of the QLLC session is CONNECTED.

Table 43 describes the fields shown in the display.

**Table 43** *show qllc Field Descriptions*

Field	Description
Serial2	Serial interface for the X.25 link.
1000.5a35.3a4f	Virtual MAC address for the X.25 attached device.
1000.5a59.04f9	MAC address of the Token Ring attached device with which the X.25 attached device is communicating. This device might be on a local Token Ring or attached via source-route bridging (SRB) or remote source-route bridging (RSRB).
SAPs 4 4	Source SAP value at the virtual MAC address and destination SAP value at the Token Ring station.
Rings Src 200	Ring number for the source virtual ring defined by the <b>qllc srb</b> command.
Tgt 100	Ring number for the target virtual ring defined by the <b>source-bridge ring-group</b> command.

**Table 43** *show qlc Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
State	<p>State of the QLLC-LLC2 conversion. This can be any of the following:</p> <ul style="list-style-type: none"> <li>• DISCONNECT—No connection exists.</li> <li>• NET DISC WAIT—X.25 device is disconnecting. The QLLC conversion is waiting for the Token Ring device to disconnect.</li> <li>• QLLC DISC WAIT—The Token Ring device is disconnecting. The QLLC conversion is waiting for the X.25 device to disconnect.</li> <li>• QLLC PRI WAIT—Connection is being established. The Token Ring device is ready to complete the connection, and the Cisco IOS software is establishing the QLLC connection with the X.25 device.</li> <li>• NET CONTACT REPLY WAIT—Remote X.25 device is a FEP, and has made contact with the Cisco IOS software. The software is attempting to reach Token Ring device.</li> <li>• QLLC SEC WAIT—Connection is being established.</li> <li>• NET UP WAIT—Connection is being established. QLLC connection to X.25 device has been established; awaiting completion on the connection to the Token Ring attached device.</li> <li>• CONNECT—Connections from the software to X.25 and Token Ring devices are established. Data can flow end to end.</li> </ul>
Remote DTE 1002	X.121 address of X.25 connected device.
QLLC Protocol State	<p>State of the QLLC protocol between the software and the X.25 attached device. These states are different from the state of the underlying X.25 virtual circuit. The following are possible values:</p> <ul style="list-style-type: none"> <li>• ADM—Asynchronous Disconnected Mode.</li> <li>• SETUP—Cisco IOS software has initiated QLLC connection, awaiting confirmation from the X.25 device.</li> <li>• RESET—Cisco IOS software has initiated QLLC Reset, awaiting confirmation from the X.25 device.</li> <li>• DISCONNECTING—Cisco IOS software has initiated QLLC Disconnect, awaiting confirmation from the X.25 device.</li> <li>• NORMAL—QLLC connection has been completed. SNA data can be sent and received.</li> </ul>
Ici 1 (PVC)	Logical channel number used on the X.25 interface.

# show sdlc local-ack

To display the current state of any current local acknowledgment connections, and any configured passthrough rings, use the **show sdlc local-ack** privileged EXEC command.

**show sdlc local-ack**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	10.0	This command was introduced.

**Examples** The following is sample output from the **show sdlc local-ack** command:

```
Router# show sdlc local-ack

local 1000.5a59.04f9, lsap 04, remote 4000.2222.4444, dsap 04
llc2 = 1798136, local act state = connected
Passthrough Rings: 4 7
```

In the display, the first two lines of the **show sdlc local-ack** command show that there is a local acknowledgment session between two Token Ring devices. The device on the local ring has a MAC address of 1000.5a59.04f9 with a SAP of 04. The remote device has a MAC address of 4000.2222.4444 with a SAP of 04. The state of the local acknowledgment session is connected.

The passthrough rings display is independent of the rest of the **show sdlc local-ack** command. The passthrough rings display indicates that there are two rings, 4 and 7, configured for passthrough. This means that stations on these rings will not have their sessions locally acknowledged but will instead have their acknowledgments end-to-end.

Table 44 describes significant fields shown in the display.

**Table 44** *show sdlc local-ack Field Descriptions*

Field	Description
local	MAC address of the local Token Ring station with which the router has the LLC2 session.
lsap	Local SAP value of the Token Ring station with which the router has the LLC2 session.
remote	MAC address of the remote Token Ring station on whose behalf the router is providing acknowledgments. The remote Token Ring station is separated from the router via the TCP backbone.
dsap	Destination SAP value of the remote Token Ring station on whose behalf the router is providing acknowledgments.
llc2	Pointer to an internal data structure used by technical support staff for debugging.

**Table 44** *show sdllc local-ack Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
local-ack state:	Current state. Possible values are as follows: <ul style="list-style-type: none"><li>• disconnected—No session between the two end hosts.</li><li>• connected—Full data transfer possible between the two end hosts.</li><li>• awaiting connect—This router is waiting for the other end to confirm a session establishment with the remote host.</li></ul>
Passthrough Rings	Ring number of the start ring and destination ring for the two IBM machines when you do not have local acknowledgment for LLC2 configured for your routers using RSRB.

# source-bridge qlc-local-ack

To enable or disable QLLC local acknowledgment for all QLLC conversion connections, use the **source-bridge qlc-local-ack** global configuration command. To disable this capability, use the **no** form of this command.

**source-bridge qlc-local-ack**

**no source-bridge qlc-local-ack**

## Syntax Description

This command has no arguments or keywords.

## Defaults

QLLC local acknowledgment is disabled.

## Command Modes

Global configuration

## Command History

Release	Modification
10.3	This command was introduced.

## Usage Guidelines

In a remote source-route bridged topology, QLLC local acknowledgment is used to configure the QLLC conversion router (connecting the remote X.25 devices) to exchange local acknowledgment information with the Token Ring router (on the Token Ring side of the cloud). This Token Ring device has been configured for LLC2 local acknowledgment using the **source-bridge remote-peer tcp local-ack** command.

You only have to issue the **source-bridge qlc-local-ack** command on the QLLC conversion router. When this command is issued, all of the QLLC conversion sessions are locally acknowledged at the Token Ring interface of the Token Ring router with which it is communicating using QLLC conversion.

## Examples

The following configuration indicates that the local router (131.108.2.2) QLLC conversion sessions will be locally acknowledged at the remote router:

```
source-bridge ring-group 100
source-bridge remote-peer 100 tcp 131.108.1.1 local-ack
source-bridge remote-peer 100 tcp 131.108.2.2
source-bridge qlc-local-ack
```

## Related Commands

Command	Description
<b>source-bridge remote-peer tcp</b>	Identifies the IP address of a peer in the ring group with which to exchange source-bridge traffic using TCP.
<b>source-bridge sdllc-local-ack</b>	Activates local acknowledgment for SDLLC sessions on a particular interface.

# source-bridge remote-peer interface

When specifying a point-to-point direct encapsulation connection, use the **source-bridge remote-peer interface** global configuration command. To disable previous interface assignments, use the **no** form of this command.

**source-bridge remote-peer** *ring-group* **interface** *interface-name* [*mac-address*] [**If** *size*]

**no source-bridge remote-peer** *ring-group* **interface** *interface-name*

## Syntax Description

<i>ring-group</i>	Ring group number. This ring group number must match the number you have specified with the <b>source-bridge ring-group</b> command. The valid range is 1 to 4095.
<i>interface-name</i>	Name of the serial interface over which to send source-route bridged traffic.
<i>mac-address</i>	(Optional) MAC address for the interface you specify using the <i>interface-name</i> argument. This argument is required for nonserial interfaces. You can obtain the value of this MAC address by using the <b>show interfaces</b> command, and then scanning the display for the interface specified by <i>interface-name</i> .
<b>If</b> <i>size</i>	(Optional) Maximum size frame to be sent to this remote peer. The Cisco IOS software negotiates all transit routes down to this size or lower. This argument is useful in preventing timeouts in end hosts by reducing the amount of data they have to send in a fixed interval. The legal values for this argument are 516, 1500, 2052, 4472, 8144, 11407, and 17800 bytes.

## Defaults

No point-to-point direct encapsulation connection is specified.

## Command Modes

Global configuration

## Command History

Release	Modification
10.0	This command was introduced.

## Usage Guidelines

Use this command to identify the interface over which to send source-route bridged traffic to another router/bridge in the ring group. A serial interface does not require that you include a MAC-level address; all other types of interfaces do require MAC addresses.

It is possible to mix all types of transport methods within the same ring group.



### Note

The two peers using the serial-transport method will only function correctly if there are routers at the end of the serial line that have been configured to use the serial transport. The peers must also belong to the same ring group.

**Examples**

The following example shows how to send source-route bridged traffic over serial interface 0 and Ethernet interface 0:

```
! send source-route bridged traffic over serial 0
source-bridge remote-peer 5 interface serial 0
! specify MAC address for source-route bridged traffic on Ethernet 0
source-bridge remote-peer 5 interface ethernet 0 0000.0c00.1234
```

**Related Commands**

Command	Description
<b>show interfaces</b>	Displays statistics for the interfaces configured on a router or access server.
<b>source-bridge remote-peer tcp</b>	Identifies the IP address of a peer in the ring group with which to exchange source-bridge traffic using TCP.

# source-bridge sdllc-local-ack

To activate local acknowledgment for SDLLC sessions on a particular interface, use the **source-bridge sdllc-local-ack** global configuration command. To deactivate local acknowledgment for SDLLC sessions, use the **no** form of this command.

**source-bridge sdllc-local-ack**

**no source-bridge sdllc-local-ack**

**Syntax Description** This command has no arguments or keywords.

**Defaults** Disabled

**Command Modes** Global configuration

Command History	Release	Modification
	10.0	This command was introduced.

**Usage Guidelines** This command must be issued only on a router with a serial interface. Once the command is issued, *all* SDLLC sessions between the two devices will be locally acknowledged. You cannot selectively choose which SDLLC sessions are to be locally acknowledged and which are not. Also, local acknowledgment is not supported when the LLC2 station is attached to Ethernet rather than to Token Ring.



**Note**

You must use the TCP encapsulation option if you use local acknowledgment for SDLLC.

**Examples** The following example activates local acknowledgment for SDLLC sessions:

```
source-bridge ring-group 100
source-bridge remote-peer 100 tcp 131.108.1.1 local-ack
source-bridge remote-peer 100 tcp 131.108.2.2
source-bridge sdllc-local-ack
```

## x25 map qlc

To specify the X.121 address of the remote X.25 device with which you plan to communicate using QLLC conversion, use the **x25 map qlc** command in interface configuration mode. To disable QLLC conversion to this X.121 address, use the **no** form of this command.

```
x25 map qlc virtual-mac-addr x121-addr [cud cud-value] [x25-map-options]
```

```
no x25 map qlc virtual-mac-addr x121-addr [cud cud-value] [x25-map-options]
```

### Syntax Description

<i>virtual-mac-addr</i>	Virtual MAC address.
<i>x121-addr</i>	X.121 address of the remote X.25 device you are associating with this virtual MAC address. It can be from 1 to 15 digits long.
<b>cud</b> <i>cud-value</i>	(Optional) Override of the standard Call User Data (CUD) value for outbound switched virtual circuits (SVCs). The value can range from 1 to 4 hex bytes.
<i>x25-map-options</i>	(Optional) Additional functionality that can be specified for originated calls. Can be any of the options listed in Table 45.

### Defaults

No association is made.

### Command Modes

Interface configuration

### Command History

Release	Modification
10.3	This command was introduced.

### Usage Guidelines

The central notion that binds the QLLC conversion interface to the X.25 and SRB facilities is the X.25 address map. For each remote client an X.121 address is associated with a virtual MAC address. The rest of the configuration is specified by using the virtual Token Ring address to refer to the connection.

When a Token Ring device wishes to open communications with another device, it will send the request to the address it knows, which is the MAC address. The Cisco IOS software accepts this connection request and must transform it into a known X.121 address. The *x25 map qlc* command matches the MAC address with the X.121 address.

You must enter a mapping for each X.25 device with which the router will exchange traffic.

All QLLC conversion commands use the *virtual-mac-addr* parameter that you define with the **x25 map qlc** command to refer to the connection.

You use the **x25 map qlc** command in conjunction with the **qlc srb** command.

Table 45 shows the possible values for the *x25-map-options* argument.

**Table 45** *x.25 map qlc Options*

Option	Description
<b>compress</b>	Specifies that X.25 payload compression be used for mapping the traffic to this host. Each virtual circuit established for compressed traffic uses a significant amount of memory (for a table of learned data patterns) and for computation (for compression and decompression of all data). Cisco recommends that compression be used with careful consideration to its impact on overall performance.
<b>method</b> { <b>cisco</b>   <b>ietf</b>   <b>snap</b>   <b>multi</b> }	Specifies the encapsulation method. The choices are as follows: <ul style="list-style-type: none"> <li>• <b>cisco</b>—Cisco’s proprietary encapsulation; not available if more than one protocol is to be carried.</li> <li>• <b>ietf</b>—Default RFC 1356 operation: protocol identification of single-protocol virtual circuits and protocol identification within multiprotocol virtual circuits uses the standard encoding, which is compatible with RFC 877. Multiprotocol virtual circuits are used only if needed.</li> <li>• <b>snap</b>—RFC 1356 operation where IP is identified with SNAP rather than the standard IETF method (the standard method is compatible with RFC 877).</li> <li>• <b>multi</b>—Forces a map that specifies a single protocol to set up a multiprotocol virtual circuit when a call is originated; also forces a single-protocol PVC to use multiprotocol data identification methods for all datagrams sent and received.</li> </ul>
<b>no-incoming</b>	Use the map only to originate calls.
<b>no-outgoing</b>	Do not originate calls when using the map.
<b>idle</b> <i>minutes</i>	Specifies an idle timeout for calls other than the interface default; 0 minutes disables the idle timeout.
<b>reverse</b>	Specifies reverse charging for outgoing calls.
<b>accept-reverse</b>	Causes the Cisco IOS software to accept incoming reverse-charged calls. If this option is not present, the Cisco IOS software clears reverse-charged calls unless the interface accepts all reverse-charged calls.
<b>broadcast</b>	Causes the Cisco IOS software to direct any broadcasts sent through this interface to the specified X.121 address. This option also simplifies the configuration of OSPF; see the “Usage Guidelines” section for more detail.
<b>cug</b> <i>group-number</i>	Specifies a closed user group number (from 1 to 99) for the mapping in an outgoing call.
<b>nvc</b> <i>count</i>	Sets the maximum number of virtual circuits for this map or host. The default <i>count</i> is the <b>x25 nvc</b> setting of the interface. A maximum number of eight virtual circuits can be configured for each map. Compressed TCP may use only 1 virtual circuit.
<b>packetsize</b> <i>in-size</i> <i>out-size</i>	Proposes maximum input packet size ( <i>in-size</i> ) and maximum output packet size ( <i>out-size</i> ) for an outgoing call. Both values typically are the same and must be one of the following values: 16, 32, 64, 128, 256, 512, 1024, 2048, or 4096.

Table 45 x.25 map qllc Options (continued)

Option	Description
<b>window-size</b> <i>in-size out-size</i>	Proposes the packet count for input window ( <i>in-size</i> ) and output window ( <i>out-size</i> ) for an outgoing call. Both values typically are the same, must be in the range 1 to 127, and must be less than the value set by the <b>x25 modulo</b> command.
<b>throughput</b> <i>in out</i>	Sets the requested throughput class values for input ( <i>in</i> ) and output ( <i>out</i> ) throughput across the network for an outgoing call. Values for <i>in</i> and <i>out</i> are in bits per second (bps) and range from 75 to 48000 bps.
<b>transit-delay</b> <i>milliseconds</i>	Specifies the transit delay value in milliseconds (0 to 65534) for an outgoing call, for networks that support transit delay.
<b>nuid</b> <i>username password</i>	Specifies that a network user ID (NUID) facility be sent in the outgoing call with the specified Terminal Access Controller Access Control System (TACACS) username and password (in a format defined by Cisco). This option should be used only when connecting to another Cisco router. The combined length of the username and password should not exceed 127 characters.
<b>nudata</b> <i>string</i>	Specifies the network user identification in a format determined by the network administrator (as allowed by the standards). This option is provided for connecting to non-Cisco equipment that requires an NUID facility. The string should not exceed 130 characters and must be enclosed in quotation marks (“ ”) if there are any spaces present.
<b>roa</b> <i>name</i>	Specifies the name defined by the <b>x25 roa</b> command for a list of transit Recognized Operating Agencies (ROAs) to use in outgoing Call Request packets.
<b>passive</b>	Specifies that the X.25 interface should send compressed outgoing TCP datagrams only if they were already compressed when they were received. This option is available only for compressed TCP maps.

**Examples**

In the following example, the **x25 map qllc** command is used to associate the remote X.25 device at X.121 address 31104150101 with the virtual MAC address 0100.000.0001:

```
interface serial 0
 encapsulation x25
 x25 address 31102120100
 x25 map qllc 0100.0000.0001 31104150101
 qllc srb 0100.0000.0001 201 100
```

**Related Commands**

Command	Description
<b>qllc accept-all-calls</b>	Enables the router to accept a call from any remote X.25 device.
<b>qllc srb</b>	Enables QLLC conversion on a serial interface configured for X.25 communication.

## x25 pvc qllc

To associate a virtual MAC address with a PVC for communication using QLLC conversion, use the **x25 pvc qllc** interface configuration command. To remove the association, use the **no** form of this command.

```
x25 pvc circuit qllc x121-address [x25-map-options]
```

```
no x25 pvc circuit qllc x121-address [x25-map-options]
```

### Syntax Description

<i>circuit</i>	PVC you are associating with the virtual MAC address. This must be lower than any number assigned to switched virtual circuits.
<i>x121-address</i>	X.121 address.
<i>x25-map-options</i>	(Optional) Additional functionality that can be specified for originated calls. Can be any of the options listed in Table 45.

### Defaults

No association is made.

### Command Modes

Interface configuration

### Command History

Release	Modification
11.0	This command was introduced.

### Usage Guidelines

When a Token Ring device wishes to communicate with another device, it will send the request to the address it knows, which is the MAC address. The Cisco IOS software accepts this connection request and transforms it into the known X.121 address and virtual circuit. You must use the **x25 map qlc** command to specify the required protocol-to-X.121 address mapping before you use the **x25 pvc qlc** command. The **x25 map qlc** command associates the MAC address with address with the X.121 address, and the **x25 pvc qlc** command further associates that address with a known PVC.

You use the **x25 pvc** command in conjunction with the **x25 map qlc** and **qlc srb** commands.

### Examples

In the following example, the **x25 pvc qlc** command associates the virtual MAC address 0100.0000.0001, as defined in the previous **x25 map qlc** command entry, with PVC 3:

```
interface serial 0
  encapsulation x25
  x25 address 31102120100
  x25 map qlc 0100.0000.0001 31104150101
  x25 pvc 3 qlc 0100.0000.0001
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>qlc srb</b>	Enables QLLC conversion on a serial interface configured for X.25 communication.
<b>x25 map qlc</b>	Specifies the X.121 address of the remote X.25 device with which communication is planned using QLLC conversion.

