Configuring 2-Port ISDN BRI Voice Interface Cards for the Cisco 1751 and Cisco 1760 Routers

This document describes the software configuration of dual-port ISDN Basic Rate Interface (BRI) voice interface cards (VICs) for the Cisco 1751 and Cisco 1760 routers.

The information in this document applies to the following Cisco VICs:

- VIC-2BRI (NT/TE)
- VIC2-2BRI (NT/TE)

This document contains the following sections:

Overview of ISDN BRI VICs

ISDN BRI VICs provide digital connectivity for voice-over-IP (VoIP) networks using the European Telecommunications Standards Institute (ETSI) Net3 switch type. BRI VICs present an ISDN S/T physical interface that connects to a network termination (NT) or terminal equipment (TE) device. With ISDN BRI VICs, you can connect a Cisco 1751 or Cisco 1760 router to a private branch exchange (PBX) network in NT or TE mode, or to a public switched telephone network (PSTN) in TE mode.

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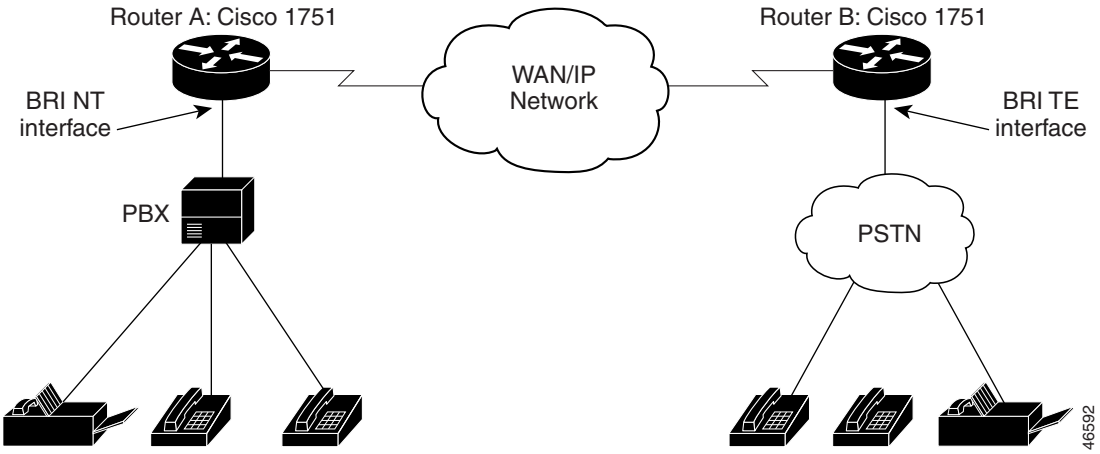
Each of the two BRI ports can operate in NT mode as the clock source or can operate in TE mode as a clock slave.

- When a VIC port operates in NT mode, it sources a clock to the BRI interface (a PBX trunk card, for example) which is operating in TE mode.
- When a VIC port operates in TE mode, it receives a clock from the BRI interface (a PBX line card, for example) which is operating in NT mode.

Figure 1 Example of Network Using Voice Interfaces



Configuring the Voice Interface

Configuring the VIC for your router requires using the Cisco IOS command-line interface (CLI). The following sections describe the procedures for enabling and configuring the voice interface:

- Configuring the BRI Layer 1
- Configuring the ISDN Protocol
- Turning the Line Power On and Off
- TDM Clock Configuration

Configuring the BRI Layer 1

At the BRI Layer 1, you can configure each port of the VIC to operate in NT (clock source) or TE (clock slave) mode by using the Cisco IOS **isdn layer1-emulate** command in interface configuration mode:

isdn layer1-emulate {network | user}

where **network** enables the VIC to operate in the NT mode, and **user** enables it to operate in the TE mode. The default setting for each port is the TE mode.

Configuring the ISDN Protocol

You can configure the Layer 2 protocol to operate in either NT or TE mode. Use the **isdn protocol-emulate** command in interface configuration mode:

isdn protocol-emulate {network | user}

where **network** enables the ISDN Layer 2 to operate in the NT mode, and **user** enables it to operate in the TE mode. The default setting is the TE mode.

Note The configurations of Layer 1 and Layer 2 are independent of each other. For example, you can set the Layer 1 operating mode to NT and set the Layer 2 mode to TE.

Turning the Line Power On and Off

To control the line power (phantom power only) being supplied to a connected device, use the **line_power** command in interface configuration mode:

line_power

no line_power

These commanda are valid only for a BRI port operating in NT mode. If a port is equipped with hardware to supply line power, using the **line_power** command activates line power provision from that port.

TDM Clock Configuration

For information on how to configure the time-division multiplexing (TDM) clock on the ISDN BRI VICs, refer to the following configuration note:

- *Clock Configuration for Cisco 1751/1760 Routers*

Note If the VIC loses its external clock source—for example, when the ISDN line is down—the internal clock source takes over until the external clock is functioning again.

Configuration Example

Note Before you configure a port on the VIC, verify that the BRI interface is shut down and that the cable to the connected device is properly installed for the operating mode of the interface that you plan to configure.

To configure each BRI interface, follow these steps, beginning in privileged EXEC mode:

	Command	Purpose
Step 1	router# **configure terminal**	Enters the global configuration mode.
Step 2	router(config)# **isdn switch-type {basic-net3 | basic-qsig}**	Specifies the ISDN switch type.
Step 3	router(config)# **tdm clock bri-auto**	Configures automatic TDM selection for the BRI VIC.
	or	
	router(config)# **tdm clock bri** <*slot/port*> **export**	Configures the BRI port that exports the TDM clock.
	and/or	
	router(config)# **tdm clock bri** <*slot/port*> **import {T1 | E1 | atm | bri | onboard}** <*slot/port*>	Configures the BRI port(s) that import(s) the TDM clock.
Step 4	router(config)# **interface bri** *0/0*	Changes to interface configuration mode for port 0 in slot 0.
Step 5	router(config-if)# **no ip address**	Specifies that there is no IP address for this interface.
Step 6	router(config-if)# **shutdown**	Shuts down the interface.
	router(config-if)# **isdn layer1-emulate {user | network}**	Configures the Layer 1 port mode and clock settings: • Enter **user** to configure the port as TE and to function as a clock slave. This is the default. • Enter **network** to configure the port as NT and to function as a clock master.
	router(config-if)# **no shutdown**	Activates the interface after the port configuration.
Step 7	router(config-if)# **line-power**	(Optional only for NT-configured ports.) Turns on the power supplied from the port to a TE device.
Step 8	router(config-if)# **isdn protocol-emulate {user | network}**	Configures the Layer 2 port protocol emulation: • Enter **user** to configure the port as TE so that the PBX is the master. This is the default. • Enter **network** to configure the port as NT so that the PBX is the slave.
Step 9	router(config-if)# **end**	Exits configuration mode.

Debugging Commands

Use the following commands to debug your configuration:

- **debug bri**
- **debug isdn q921**
- **debug isdn q931**
- **debug isdn events**
- **show isdn status bri**
- **show controller bri**
- **show interfaces bri**

For more information about these commands, see the Cisco IOS documentation.

Related Documentation

The document is to be used with the following documents:

- *Cisco Interface Cards Hardware Installation Guide*
- *Cisco 1751 Router Hardware Installation Guide*
- *Cisco 1751 Router Software Configuration Guide*
- *Cisco 1760 Modular Access Router Hardware Installation Guide*
- *Quick Start Guide for Installing Your Cisco 1760 Modular Access Router*

Obtaining Documentation

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Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

http://www.cisco.com/univercd/home/home.htm

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Obtaining Technical Assistance

Cisco provides Cisco.com, which includes the Cisco Technical Assistance Center (TAC) Website, as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from the Cisco TAC website. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC website, including TAC tools and utilities.

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The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC website and the Cisco TAC Escalation Center. The avenue of support that you choose depends on the priority of the problem and the conditions stated in service contracts, when applicable.

We categorize Cisco TAC inquiries according to urgency:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
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Cisco TAC Website

You can use the Cisco TAC website to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC website, go to this URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC website. Some services on the Cisco TAC website require a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

http://tools.cisco.com/RPF/register/register.do

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC website, you can open a case online at this URL:

http://www.cisco.com/en/US/support/index.html

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC website so that you can describe the situation in your own words and attach any necessary files.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

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  http://www.cisco.com/en/US/products/products_catalog_links_launch.html

- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary, Internetworking Technology Handbook, Internetworking Troubleshooting Guide,* and the *Internetworking Design Guide.* For current Cisco Press titles and other information, go to Cisco Press online at this URL:

  http://www.ciscopress.com

- *Packet* magazine is the Cisco monthly periodical that provides industry professionals with the latest information about the field of networking. You can access *Packet* magazine at this URL:

  http://www.cisco.com/en/US/about/ac123/ac114/about_cisco_packet_magazine.html

- *iQ Magazine* is the Cisco monthly periodical that provides business leaders and decision makers with the latest information about the networking industry. You can access *iQ Magazine* at this URL:

  http://business.cisco.com/prod/tree.taf%3fasset_id=44699&public_view=true&kbns=1.html

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in the design, development, and operation of public and private internets and intranets. You can access the *Internet Protocol Journal* at this URL:

  http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html

- Training—Cisco offers world-class networking training, with current offerings in network training listed at this URL:

  http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html

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This document is to be used in conjunction with the documents listed in the "Related Documentation" section.