

52 Managing ISDN Ports

The WAN Switching Module for the Basic Rate Interface (WSM-BRI) supports 1 or 2 Universal Serial Ports (USP) and 1 or 2 ISDN Basic Rate Interfaces (BRI). The USPs can support Frame Relay or Point-to-Point Protocol (PPP). The BRI interface can support only PPP.

The Universal Serial Port on a WSM-BRI board is operationally identical to the USPs found on the 4- or 8-port WSM-S board. The ISDN BRI port is an RJ-45 connector. The BRI port can be configured either as a “U” interface for the North American market or as an “S/T” interface for international markets. The WSM-BRI board also supports hardware data compression via the STAC 9705 Data Compression Coprocessor.

The ISDN BRI interface supports switched connections, usually through a central office switch. Connections can be established when data is available for a remote peer, referred to as “demand” mode, or when a primary circuit is inactive, referred to as “backup” mode.

Overview of ISDN

Integrated Services Digital Network (ISDN) is a switched network that incorporates a digital connection to the central office (the local loop), instead of the current telephone network’s analog connection. Because the worldwide telephone network is becoming increasingly digital in the trunks between switching centers, the incorporation of ISDN allows for end-to-end switched digital connections. In general, there are three main goals for ISDN:

- provide end-to-end digital connectivity
- support a wide range of services, both voice and non-voice
- access the ISDN by a limited set of standard user-to-network interfaces

Basic Rate Interface (BRI) Versus Primary Rate Interface (PRI)

There are two methods defined for accessing ISDN. The Basic Rate Access (BRA) method, commonly known as the Basic Rate Interface (BRI), was intended for residential subscribers and small offices. The Primary Rate Access (PRA) method, commonly known as the Primary Rate Interface (PRI), was intended for users with greater data-transfer capacity requirements, such as offices with a digital PBX. The OmniSwitch WSM-BRI board supports only the BRI interface. Future products may be introduced that include support for PRI interfaces.

The WSM-BRI interface terminates at an ISDN-capable switch in the central telephone office. In order to perform properly, the WSM-BRI board must know to which type of telephone switch it is being connected. You must provide your OmniSwitch with this information during configuration of the WSM-BRI board. Also, depending upon the type of telephone switch you will be accessing, you may need to obtain from the telephone company a Service Profile Identification (SPID). The SPID is used in North America for DMS100, ATT 5ESS and Nation ISDN 1switch types.

“U”, “S/T”, and “R” Interfaces

The ISDN specification defines a limited set of user-to-network interfaces, including reference points for the BRI access method. The following are the main BRI reference points:

U Interface. The U interface is a two-wire (single pair) interface that supports full-duplex data transfer from the phone switch. Only a single device can be connected to a U interface. This device is called a Network Termination 1 (NT1) which converts the U interface to the S/T interface (described below). The U interface is used in North America. Elsewhere in the world, telephone companies supply the NT1 service, allowing customers the use of S/T interfaces.

S/T Interface. The S/T interface is a four-wire, bus interface on which multiple (up to eight) ISDN access devices can be attached to gain shared access to ISDN's data channels. The S/T interface is the most commonly-used interface in Europe.

R Interface. The R interface is a general reference point at which non-ISDN devices can gain access to an ISDN network through a device called a Terminal Adapter (TA). A Terminal Adapter typically converts various standard interfaces, such as RS232 and V.35, to the S/T bus.

The “B,” “D,” and “H” Channels

ISDN supports three types of data channels: the “B” channel, the “D” channel and the “H” channel. The line encoding and framing structure for each type of channel varies among the U, S/T, and R interfaces and for different access methods. A brief description of the three channels follows:

B Channel. The B channel is used for the transfer of information, which can be any type of data that the endpoints agree on, such as digitized voice, digitized video or packet data. The B channel operates at 64 kbps on both BRI and PRI interfaces, but is commonly rate-adapted to 56 kbps in North America to accommodate switching system limitations. A single BRI interface consists of one D channel operating at 16 kbps and two B channels operating at 64 kbps (or 56 kbps in North America).

D Channel. The D channel operates at 16 kbps on BRI (64 kbps on PRI) and is used for carrying common-channel signaling. The D channel is used both to establish and maintain circuit-switched calls on the B channels. The D channel can also be used to carry low-speed packet-switched data (the OmniSwitch does *not* support such usage).

H Channel. The H channel, supported *only* on PRI interfaces, is used to transfer information at higher bit rates by aggregating B channels. The four implementations of the H channel are: H0 (384 kbps, 6 B channels), H10 (1472 kbps, 23 B channels), H11 (1536 kbps, 24 B channels), and H12 (1920 kbps, 30 B channels). The use of the H channel is *not* supported by the OmniSwitch because this channel requires a PRI interface.

The ISDN Submenu

The WAN menu contains a submenu, **ISDN**, containing commands specific to WSM-BRI ISDN ports.

To switch to, and to display, the **ISDN** menu, enter the following commands:

```
ISDN
?
```

A screen similar to the following displays:

Command	ISDN Menu
isdnm	Modify an existing ISDN port's configuration
isdnd	Delete an existing ISDN configuration entry
isdnv	View an existing ISDN configuration entry
isdns	Status for the ISDN configuration entry
Main	File
Interface	Security
	Summary
	System
	VLAN
	Services
	Networking
	Help

Switch Configuration

This section describes how to configure the ISDN ports on WSM-BRI boards. You use the **isdnm** command to modify the configuration of an ISDN port. You must select the correct type of telephone switch to which you will be making your ISDN calls, as well as supply signalling calling addresses (phone numbers) and SPIDS, if required. Configuration is described in the next section, *Modifying an ISDN Configuration Entry* on page 52-4.

The other commands on the ISDN submenu are described in the remaining sections of this chapter.

Modifying an ISDN Configuration Entry

The **isdnm** command is used to modify the parameters for a selected ISDN port. These parameters are typically provided by the telephone carrier or other service provider at the time the ISDN line is installed.

1. To modify a specific port, for example in Slot 4, Port 1, enter the following command:

```
isdnm 4/1
```

A screen similar to the following displays:

```
1)  Switch Type ..... ETSI
    {5(ES)S, (D)MS100, (NI)1, (ET)SI}
2)  B1 Signalling Calling Address. .... 8185551212
    {Phone Number}
3)  B1 Service Profile Identifier (SPID) ..... 123456789
    {9-20 Numeric characters}
4)  B2 Signalling Calling Address. .... 7145551212
    {Phone Number}
5)  B2 Service Profile Identifier (SPID) ..... 123456789
    {9-20 Numeric characters}
```

```
(save/quit/cancel)
```

```
:
```

The fields on this screen have the following meanings:

Switch Type

Specifies the type of switch to which this ISDN port is to be connected. The options are: AT&T 5ESS (**5ESS**), Northern Telecom DMS100 (**DMS100**), National ISDN-1 Bellcore (**NI1**), and Euro-ISDN ETS 300/British Telecom NET3 (**ETSI**).

B1/B2 Signalling Calling Address

The number assigned to this channel by the carrier. If only one address is supplied by the carrier, assign it to channel B1, and leave channel B2 empty.

B1/B2 Service Profile Identifier (SPID)

The Service Profile Identifier assigned to this channel by the carrier. Normally, this value contains the calling address surrounded by some digits. If only one address is supplied by the carrier, assign it to channel B1, and leave channel B2 empty.

Important Note

When changing the **Switch Type** or adding/deleting **SPIDs**, reboot the switch to implement the changes.

Deleting an ISDN Configuration Entry

The **isdnd** command is used to delete one or more ISDN configuration entries. Deleting the configuration entry is equivalent to returning the ISDN port to its default settings. Although you cannot delete a physical ISDN port from the switch, you can remove the configuration entry that was recorded for a port.

1. To delete a specific ISDN entry, for example, for a board in slot/port 2/2, you would enter the following command:

```
isdnd 2/2
```

A screen similar to the following displays:

```
This will delete Slot 2, Port 2.  
Continue ? {(Y)es, (N)o} : N
```

2. To delete this entry, enter **y** and press **<Enter>**. To abort the deletion, press **<Enter>** to accept the default answer of “No.” The system prompt will then reappear.

Important Note

After deleting an ISDN configuration entry, you should reboot the switch to implement any configuration changes you make using the **isdnm** command.

Viewing an ISDN Configuration Entry

The **isdnv** command is used to view the configuration of existing ISDN configuration entries. You can either view a configuration summary for all ISDN ports on a specified slot, or display the configuration for a single ISDN port.

To view configuration information on all ISDN ports on a specific slot, for example, slot 4, enter the following command:

```
isdnv 4
```

A screen similar to the following displays:

```
View ISDN Configuration for Slot: 4, Port: 2.
1)  Switch Type ..... ETSI
2)  B1 Signalling Calling Address. ....
3)  B1 Service Profile Identifier (SPID) .....
4)  B2 Signalling Calling Address. ....
5)  B2 Service Profile Identifier (SPID) .....

View ISDN Configuration for Slot: 4, Port: 4.
1)  Switch Type ..... ETSI
2)  B1 Signalling Calling Address. ....
3)  B1 Service Profile Identifier (SPID) .....
4)  B2 Signalling Calling Address. ....
5)  B2 Service Profile Identifier (SPID) .....
```

To view information on a specific ISDN port and slot, for example, slot 4, port 4, enter the following command:

```
isdnv 4/4
```

A screen similar to the following displays:

```
View ISDN Configuration for Slot: 4, Port: 4.
1)  Switch Type ..... ETSI
2)  B1 Signalling Calling Address. ....
3)  B1 Service Profile Identifier (SPID) .....
4)  B2 Signalling Calling Address. ....
5)  B2 Service Profile Identifier (SPID) .....
```

The fields on this screen are the same as those produced by the **isdnm** command:

Switch Type

Specifies the type of switch to which this ISDN port is to be connected. The options are: AT&T 5ESS (**5ESS**), Northern Telecom DMS100 (**DMS100**), National ISDN-1 Bellcore (**NI1**), and Euro-ISDN ETS 300/British Telecom NET3 (**ETSI**).

B1/B2 Signalling Calling Address

The number assigned to this channel by the carrier. If only one address is supplied by the carrier, it should be assigned to channel B1, and channel B2 should be left empty.

B1/B2 Service Profile Identifier (SPID)

The Service Profile Identifier assigned to this channel by the carrier. Normally, this value contains the calling address surrounded by some digits. If only one address is supplied by the carrier, it should be assigned to channel B1, and channel B2 should be left empty.

Displaying ISDN Configuration Entry Status

The **isdns** command is used to view the operational status of existing ISDN configuration entries. You can select to view the status of all ISDN ports, or select to display the status of a single ISDN port.

Displaying Status of All ISDN Ports

To view status information of the ISDN channels on all ISDN ports, enter the following command:

```
isdns
```

A screen similar to the following displays:

Slot/Port	Type	Oper Status	Call Address	Call Setup Time
=====	=====	=====	=====	=====
5/2(B1)	BRI-U	ACTIVE	7145555555	00:00:00 01/70
5/2(B2)	BRI-U	IDLE	7145555555	00:00:00 01/70
5/4(B1)	BRI-U	ACTIVE	7145555555	00:00:00 01/70
5/4(B2)	BRI-U	ACTIVE	7145555555	00:00:00 01/70

The fields on this screen have the following meanings:

Slot/Port

Identifies the ISDN port and slot numbers and the “B” channel number (in parentheses).

Type

Identifies the type of ISDN port (BRI-U or BRI-S/T). See *Overview of ISDN* on page 52-1.

Operational Status

Identifies the operational status of this port. The possible entries in the table are **Active**, meaning the call is currently in progress, or **Idle**, meaning the interface is currently idle.

Call Address

Identifies the current or last phone number that was called on this ISDN channel.

Call Setup Time

Identifies the value of “sysUpTime” (the time of day recorded by the switch) and the date (in *dd/yy* format) when the last call was established on this channel.

Displaying Status of a Specific ISDN Slot

To view status information on all ISDN channels on a specific ISDN slot, for example, slot 4, enter the following command:

```
isdns 4
```

A screen similar to the following displays:

```
Status for ISDN D channel on slot: 4, Port: 1:  
LAPD OperStatus: Layer 1: Active, Layer 2 DataLink: Established.
```

```
The number of incoming calls ..... 0  
The number of incoming calls which were actually connected ... 0  
The number of outgoing calls ..... 0  
The number of outgoing calls which were actually connected ... 0
```

	Oper Status	Peer Address	Call Origin	Call SetupTime
	=====	=====	=====	=====
B1	Idle	7144509154	Incoming	0:00:00 01/70
B2	Conn	7144509156	Outgoing	0:00:00 01/70

```
Status for ISDN D channel on slot: 4, Port: 2:  
LAPD OperStatus: Layer 1: Active, Layer 2 DataLink: Established.
```

```
The number of incoming calls ..... 0  
The number of incoming calls which were actually connected ... 0  
The number of outgoing calls ..... 0  
The number of outgoing calls which were actually connected ... 0
```

	Oper Status	Peer Address	Call Origin	Call Setup Time
	=====	=====	=====	=====
B1	Idle	7144509154	Incoming	0:00:00 01/70
B2	Conn	7144509156	Outgoing	0:00:00 01/70

The fields on this screen have the following meanings:

The number of incoming calls

Indicates the number of incoming calls received on this interface.

The number of incoming calls which were actually connected

Indicates the number of incoming calls which were actually connected on this interface. The difference between the previous field and this one is the number of calls that were refused.

The number of outgoing calls

Indicates the number of outgoing calls made on this interface.

The number of outgoing calls which were actually connected

Indicates the number of outgoing calls which were actually connected on this interface. The difference between the value of the previous entry and this one is the number of calls that failed.

Oper Status

Indicates the current call control state for this interface. The possible entries are:

- Idle** means the B Channel is idle: no call or call attempt is in progress.
- Connecting** means a connection attempt (outgoing call) is being made.
- Connected** means an incoming call is currently in the process of validation.
- Active** means a call is currently active.

Peer Address

Indicates the ISDN address to which the current or last call is or was connected. In some cases, the format of this information cannot be predicted since it largely depends on the type of switch or PBX to which the device is connected. The switch software supports the display of IA5 ASCII digits and the pound key (0-9 and #), but no space characters.

Call Origin

Indicates whether this call was answered on this channel (denoted as “**Incoming**”) or was originated by this channel (denoted as “**Outgoing**”).

Call Setup Time

Indicates the value of “sysUpTime” (the time of day recorded by the switch) when the ISDN setup message for the current or last call was sent or received. If, since system start-up, there has been no call on this interface, this field will display all zeros.

Displaying Status of a Specific ISDN Port

To view status information of the ISDN channels on a specific ISDN port, for example port 4, slot 1, enter the following command:

```
isdns 4/1
```

A screen similar to the following displays:

```
Status for ISDN D channel on slot: 4, Port: 1:
LAPD OperStatus: Layer 1: Active, Layer 2 DataLink: Established.

The number of incoming calls ..... 0
The number of incoming calls which were actually connected . . . 0
The number of outgoing calls ..... 0
The number of outgoing calls which were actually connected . . . 0

      Oper   Peer      Call      Call
      Status Address   Origin   SetupTime
      =====
B1   Idle    7144509154   Incoming 0:00:00 01/70
B2   Conn    7144509156   Outgoing  0:00:00 01/70
```

The fields on this screen were described earlier in this section (see *Displaying Status of a Specific ISDN Slot* on page 52-8).

