# Cisco DSL Router Configuration and Troubleshooting Guide – RFC1483 Bridging with IRB Troubleshooting

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## Contents

## Introduction

There are many reasons why your Digital Subscriber Line (DSL) connection might not function properly. This document isolates the cause of the failure and repairs it. The first troubleshooting step is to determine which layer of your Asynchronous Digital Subscriber Line (ADSL) service is failing. There are three layers in which the failure can occur.

- Layer 1 DSL physical connectivity to your ISP Digital Subscriber Line Access Multiplexer (DSLAM)
- Layer 2.1 ATM connectivity
- Layer 2.2 Point–to–Point Protocol over ATM (PPPoA), Point–to–Point Protocol over Ethernet (PPPoE), RFC1483 Bridging, or RFC1483 Routing
- Layer 3 IP

The easiest way to determine which layer you should begin to troubleshoot is to issue the command **show ip interface brief**. The output of this command differs slightly based on your configuration.

```
827-ESC#show ip interface brief
Interface     IP-Address     OK?     Method  Status      Protocol
ATM0          unassigned     YES     manual  up          up
ATM0.1        unassigned     YES     unset   up          up
```

```
       Ethernet0    10.10.10.1    YES    manual  up         up
```

If the statuses of ATM0 and ATM0.1 are up and the protocol is up, begin to troubleshoot at Layer 2.

If the ATM interfaces are down, or if they keep coming up and then going down (they do not stay up and up), begin to troubleshoot at Layer 1.

# Prerequisites

## Requirements

There are no specific requirements for this document.

## Components Used

This document is not restricted to specific software and hardware versions.

## Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

# Layer 1 Issues

## Is the carrier detect (CD) light on the front panel of the Cisco DSL Router on or off?

If the CD light is on, go to the Layer 2 Issues section of this document.

If the CD light is off, continue with the next question.

## Is your ISP using a DSLAM that supports the Alcatel chipset?

Verify this information with your ISP.

## Is the DSL port on the back of the Cisco DSL Router plugged into the DSL wall jack?

If the DSL port is not plugged into the DSL wall jack, connect the port to the wall with a 4−pin or 6−pin RJ−11 cable. This is a standard telephone cable.

## Is the ATM interface in an administratively down state?

In order to determine if the ATM0 interface is administratively down, issue this command in enable mode on the router:

```
Router#show interface atm 0
ATM0 is administratively down, line protocol is down
<... snipped ...>
```

If the ATM0 interface status is administratively down, issue the **no shutdown** command under the ATM0 interface.

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface atm 0
Router(config-if)#no shut
Router(config-if)#end
Router#write memory
```

## Is the cable pinout correct?

If the ATM0 interface status is down and down, the router does not see a carrier on the ADSL line. This generally indicates one of two issues:

- The active pins on the DSL wall jack are incorrect.
- Your ISP has not turned up ADSL service on this wall jack.

**Cisco DSL Router xDSL Port Pinouts**

The RJ–11 connector provides an xDSL connection to external media via a standard RJ–11 6–pin modular jack.

| Pin | Description |
|-----|-------------|
| 3 | XDSL_Tip |
| 4 | XDSL_Ring |

In order to determine if the ATM0 interface is down and down, issue the **show interface atm 0** command from enable mode of the router:

```
Router#show interface atm 0
ATM0 is down, line protocol is down
<... snipped ...>
```

If the ATM interface is down and down not administratively down check the pinout of your DSL wall jack. The DSL Router uses a standard RJ–11 (4–pin or 6–pin) cable in order to provide the ADSL connection to the wall jack. The center pair of pins on the RJ–11 cable is used to carry the ADSL signal (pins 3 and 4 on a 6–pin cable, or pins 2 and 3 on a 4– pin cable).

If you are sure you have the right pins on the wall jack and the ATM0 interface is still down and down, replace the RJ–11 cable between the ADSL port and your wall jack. If the interface is still down and down after you replace the RJ–11 cable, contact your ISP and have the ISP verify that ADSL service has been enabled on the wall jack you use.

If you are not sure what pins on your wall jack are active, ask your ISP.

## Do you have the correct power supply for the Cisco 827?

If you have verified that your ADSL cable is good and that you have the correct pinouts, the next step is to make sure you have the correct power supply for the 827.

**Note:** The 827 does not use the same power supply as other 800 series routers.

In order to determine if you have the correct power supply, on the back of the power adapter look for **Output +12V 0.1A, −12V 0.1A, +5V 3A, −24V 0.12A, and −71V 0.12A**. If your power supply is missing the +12V and −12V feeds, then it is for a different Cisco 800 Series Router and will not work on the 827. Note that if you use the wrong power supply, the Cisco 827 powers up but is unable to train up (connect) to the ISP

DSLAM.

## Is the DSL operating–mode correct?

If everything up to this point in the Layer 1 troubleshooting procedure is correct, the next step is to make sure you have the correct DSL operating mode. Cisco recommends using **dsl operating–mode auto** if you are not sure what DMT technology your ISP uses. The commands to configure operating–mode autodetection are:

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface atm 0
Router(config-if)#dsl operating-mode auto
Router(config-if)#end
Router#write memory
```

## Is the circuit tested/provisioned correctly?

Obtain this information from your ISP or telephone company.

# Layer 2 Issues

## Do you have the correct PVC values (VPI/VCI)?

Complete these steps in order to determine whether you have the correct virtual path identifier/virtual circuit identifier (VPI/VCI) values configured on the router.

1. Verify your version of Cisco IOS® software.

    **Important:** This does not work with Cisco IOS Software Release 12.1(1)XB.

    ```
    Router#show version

    !--- Used to determine your Cisco IOS Software release.


    Cisco Internetwork Operating System Software
    IOS (tm) C820 Software (C820-OSY656I-M), Version 12.1(3)XG3,
    EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)
    !--- The two lines immediately preceding appear on one line on the router.
    TAC:Home:SW:IOS:Specials for info
    Copyright (c) 1986-2000 by cisco Systems, Inc.
    Compiled Wed 20-Dec-00 16:44 by detang
    Image text-base: 0x80013170, data-base: 0x80725044
    <... snipped ...>
    ```

2. Configure the router for **debug** logging.

    ```
    Router#configure terminal
    Enter configuration commands, one per line. End with CNTL/Z.
    Router(config)#logging console
    Router(config)#logging buffer
    Router(config)#service timestamp debug datetime msec
    Router(config)#service timestamp log datetime msec
    Router(config)#end
    Router#write memory
    Building configuration...
    [OK]
    Router#terminal monitor
    ```

3. Enable debugging on the router.

```
Router#debug atm events
ATM events debugging is on
Router#
2d18h:
2d18h: RX interrupt: conid = 0, rxBd = 0x80C7EF74 length=52
2d18h: Data Cell received on vpi = 8 vci = 35

!--- Your VPI/VCI.

2d18h:
2d18h: RX interrupt: conid = 0, rxBd = 0x80C7EEC0 length=52
2d18h: Data Cell received on vpi = 8 vci = 35
2d18h:
2d18h: RX interrupt: conid = 0, rxBd = 0x80C7EECC length=52
2d18h: Data Cell received on vpi = 8 vci = 35
2d18h:
2d18h: RX interrupt: conid = 0, rxBd = 0x80C7EED8 length=52
2d18h: Data Cell received on vpi = 8 vci = 35
```

4. Make sure you have **debug ATM events** running on the Cisco DSL Router, and then go to a working Internet connection and begin to ping the IP address your ISP statically assigned to you.

It does not matter whether you have configured this IP address on the Cisco DSL Router. What is important is that your ATM interface is up/up and that you ping the IP address your ISP gave you. If you do not see the expected output after the ping test, contact your ISP for support.

5. Disable debugging on the router.

<< wait 60 seconds >>

```
Router#undebug all

!--- Used to turn off the debug events.


All possible debugging has been turned off.
```

Verify your VPI/VCI values, and then make the necessary changes to your configuration.

If you do not see output during the 60 seconds of debugging, contact your ISP.

## Can you ping the default gateway?

In a bridged environment, pinging the default gateway is a good test of connectivity. In general, if you can ping to your default gateway, you know that Layer 1 and Layer 2 services are functioning properly. Issue the **ping** command:

```
Router#ping 192.168.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 44/44/48 ms
Router#

OR

Router#ping 192.168.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 44/44/48 ms
```

```
Router#
```

A successful ping takes one of two forms. The first form shows an 80 percent success rate. The first ping packet that is sent is lost (.!!!!). This is a successful ping the first packet is lost while a Layer 2 to Layer 3 binding is created via address resolution protocol (ARP). The second form of the ping is a 100 percent success rate, which is indicated by five exclamation points.

If your success rate is 80–100 percent, try to ping a valid Internet address (198.133.219.25 is www.cisco.com). If you can ping the default gateway from the router but you cannot ping another Internet address, make sure you have only one static default route in the configuration (for example, IP route 0.0.0.0 0.0.0.0 192.168.1.1).

For the previous example, if you already have a correct static default route and cannot ping Internet addresses, contact your ISP in order to resolve the routing issue.

If the ping test fails (a ping success rate of 0 percent), you see output similar to this. In this case, continue with the troubleshooting steps in this document.

```
Router#ping 192.168.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
Router#
```

## Is the bridge port in a forwarding state?

For your Cisco DSL Router to forward packets to your ISP, your bridged interface must be in a forwarding state. If your bridged interface is in a blocking state, there is a loop in your network that you have to remove before you are able to pass traffic. The most common cause of a loop in an ADSL network is to have two bridged ADSL circuits to the same ISP.

```
Router#show spanning-tree

Bridge group 1 is executing the ieee compatible Spanning Tree protocol

Bridge Identifier has priority 32768, address 0000.0c5d.3694
Configured hello time 2, max age 20, forward delay 15
We are the root of the spanning tree
Topology change flag not set, detected flag not set
Number of topology changes 7 last change occurred 00:03:45 ago from ATM0.1
Times: hold 1, topology change 35, notification 2
hello 2, max age 20, forward delay 15
Timers: hello 0, topology change 0, notification 0, aging 300

Port 3 (ATM0) of Bridge group 1 is forwarding
Port path cost 1562, Port priority 128, Port Identifier 128.3.
Designated root has priority 32768, address 0000.0c5d.3694
Designated bridge has priority 32768, address 0000.0c5d.3694
Designated port id is 128.3, designated path cost 0
Timers: message age 0, forward delay 0, hold 0
Number of transitions to forwarding state: 4
BPDU: sent 49843, received 0
Router#
```

## Is there an entry in the bridge table?

When you are sure that your bridged interface is forwarding, you need to determine if you have the Layer 2 media access control (MAC) address of your ISP's gateway router. Use the **show bridge** command to check for the Layer 2 address. This command lists all the Layer 2 entries for a specific bridge group.

```
Router#show bridge

Total of 300 station blocks, 299 free
Codes: P - permanent, S - self

Bridge Group 1:
Address          Action      Interface    Age    RX count    TX count
0010.7bb9.bd1a   forward     ATM0         0      10          9

Router#
```

In this case, you probably see only a single entry in the bridge table. That entry should include the MAC address of your default gateway. In order to verify whether you have the correct MAC address in your bridge table, issue the command **show arp**. This command generally has four or more entries:

- Bridge Group Virtual Interface (BVI)
- Ethernet interface
- Default gateway (connected to the BVI)
- PC

You need to know the entry for your default gateway.

```
Router#show arp
Protocol  Address           Age (min)   Hardware Addr    Type    Interface
Internet  192.168.1.2       -           0000.0c11.4e4c   ARPA    BVI1
Internet  192.168.1.1       10          0010.7bb9.db1a   ARPA    BVI1
Internet  10.1.1.1          108         0030.80c5.a665   ARPA    Ethernet0
Internet  10.1.1.2          -           0030.96f8.45b8   ARPA    Ethernet0
Router#
```

If the MAC address in the **show bridge** output matches a MAC address in the **show arp** output and the corresponding interface is the BVI, your Layer 2 network is working properly.

If there is not a MAC address match, ping your default gateway and issue the commands again. If there still is not a match, contact your ISP to verify your network settings.

# Contact Cisco Technical Support

If you need additional assistance implementing RFC1483 bridging with IRB, contact the Cisco Technical Assistance Center (TAC).

- Open a case online (registered customers only)
- Call Cisco Technical Support

# Related Information

- **RFC1483 Bridging with IRB Implementation Options**
- **Cisco DSL Router Configuration and Troubleshooting Guide**
- **Cisco ADSL Technology Support**
- **Technical Support & Documentation – Cisco Systems**

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