

## Hotwire™ DSLAM Client-to-ISP Layer 2 Network Troubleshooting Guidelines

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### The Hotwire Network

This document describes how to troubleshoot the Hotwire network. Use this document to:

- Obtain a basic understanding of the configuration of a generic network.
- Understand how to isolate and resolve problems with the Hotwire network.

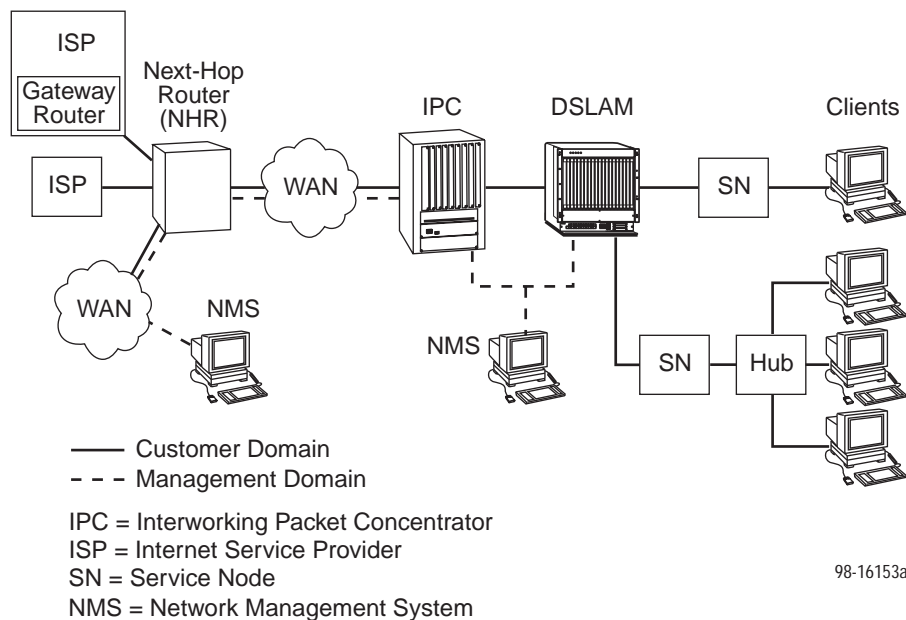
This document is intended for administrators and operators who maintain the networks that support Hotwire operations. A basic understanding of internetworking protocols and their features is assumed. Specifically, you should have familiarity with Network Management Systems (NMSs), and the following internetworking concepts:

- TCP/IP applications
- IP and subnet addressing
- IP routing (also referred to as IP forwarding)
- Bridging

To provide a practical aid in the isolation and resolution of Layer 2 network difficulties, these troubleshooting guidelines provide information on troubleshooting a generic network containing the devices found in most networks. The document addresses potential problems that may occur in each network segment:

- Client-to-Service Node (SN) Segment
- Client-to-DSLAM Segment
- Client-to-IPC Segment
- Client-to-Router Segment
- MCC Card-to-Router (or NMS) Segment

The illustration below shows the generic network addressed by this document.



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It is assumed that you have already installed the Hotwire 8600 or 8810 DSLAM and the MCC card. If you have not done so, refer to the appropriate Hotwire Digital Subscriber Link Access Multiplexer (DSLAM) Installation Guide for instructions, and the *Hotwire Management Communications Controller (MCC) Card Installation Instructions* for MCC installation and cabling information. It is also assumed that you have completed the initial startup and configuration procedures in the *Hotwire DSLAM for 8310 MVL and 8510 DSL Cards Startup Instructions* and that you are familiar with the terms and procedures found in the documents listed in *Product-Related Documents*, page 17.

**NOTE:**

This document is intended for use with the appropriate DSL Card User's Guide, MCC User's Guide and/or Network Configuration Guide. Those documents provide detailed information about specific cards installed in the DSLAM. See *Product-Related Documents*, page 17.

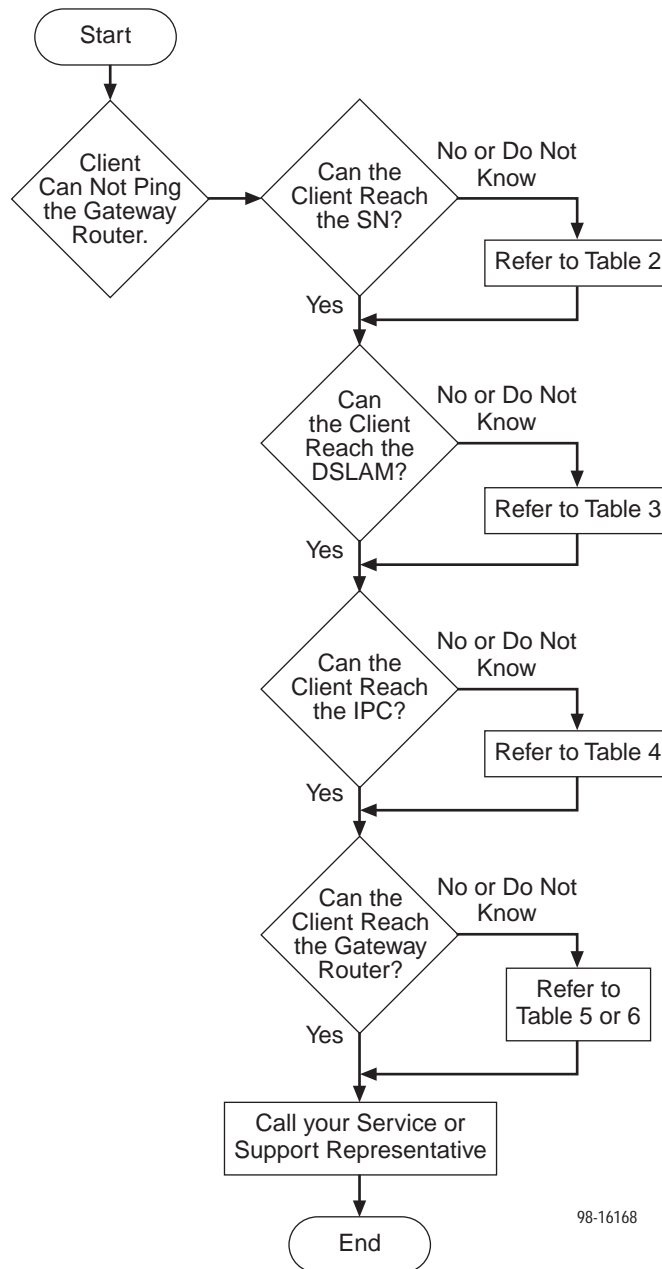
The Hotwire Layer 2 network includes the following components. For proper functionality, each component must use the listed (or higher) version of firmware.

**Table 1. Firmware Version Numbers**

<b>Component</b>	<b>Firmware Version Number</b>
MCC Card	03.01.12
DSL Cards 8510 RADSL 8310 MVL	01.01.12 01.01.12
Endpoints 5620 RTU 6310 MVL	01.01.02 01.01.04
IPC	3.2.4

This version of the Network Troubleshooting Guidelines assumes that Asynchronous Transfer Mode (ATM) is used on the link between the IPC and the next-hop router (NHR).

The flow chart below provides an overview of troubleshooting procedures using this document.



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## High-Level Troubleshooting

The following high-level procedures help you isolate problems to a particular segment of the network.

- For static clients, make sure the client can Ping its own IP address. This confirms the IP address was successfully accepted by the client computer.
- Make sure the client's default gateway is the same as the IP address for the Bridge Virtual Interface (BVI) on the appropriate ISP router.
- An Address Resolution Protocol (ARP) table may have invalid entries if a recent configuration change took place anywhere on the network and not enough time has passed for the entry to expire. Check the ARP tables on the client, DSLAM, and router.
- Make sure a default route is configured on the MCC card (screen A-E-A).

The tables in the following sections, each pertaining to a specific network segment, provide suggestions for resolving network problems.

### **NOTE:**

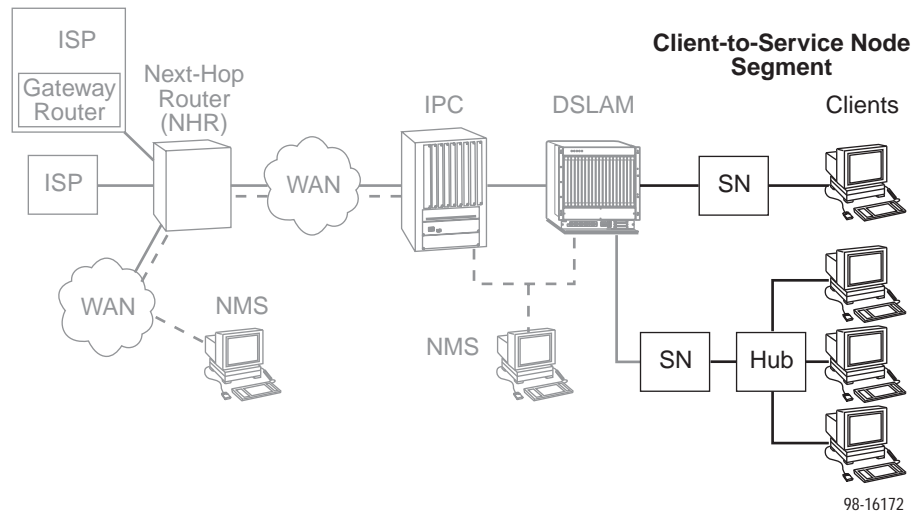
Tables in this document often refer to DSLAM system screens. The letters in parentheses, for example, (B-F), are the letters entered at the DSLAM to display the screen. You can enter Ctrl-? in any screen to display help information.

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# Segment-By-Segment Troubleshooting

## Client Cannot Ping the Gateway Router

When the client cannot Ping the gateway router, specific fault-isolation procedures begin with the first network segment, client-to-service node (SN).



## Client Cannot Reach Service Node Modem

**Table 2. Client-to-Service Node Segment**

Checklist Type	Solution
<b>Layer 1 – Physical</b>	Make sure the <b>PWR</b> LED on the front of the SN is lit. Use only the power adapter purchased with the unit.
	To verify connection to the client, make sure the <b>ETHERNET</b> LED on the front of the SN is lit.
	If there is one, make sure the <b>LINK</b> LED on the Network Interface Card (NIC) is lit.
	Make sure there is a physical connection between the SN and the NIC.
	If there is a hub, check its cables and LEDs.
	Make sure the correct type of cable is being used between the client and the SN. A crossover cable should be used if the client is not connected to a LAN hub.
	Make sure the NIC and drivers are correctly installed.
	Make sure the correct SN firmware is being used (refer to Table 1).
<b>Layer 2 – Network</b>	<p>If static addressing is used, make sure the client has its correct IP address and subnet mask by entering the following:</p> <ul style="list-style-type: none"> <li>■ for Windows 95: <b>winipcfg</b>,</li> <li>■ for Windows NT: <b>ipconfig/all</b>. (For others, use help or see the appropriate manual.)</li> </ul> <p>Restart the client after a static IP address has been added or changed.</p> <p>Make sure the client can Ping its own IP address. This confirms the IP address was successfully accepted by the computer.</p> <p>Check the PC's default gateway to make sure it is functioning properly.</p> <p>If dynamic addressing is being used and the client cannot get an IP address from the Dynamic Host Configuration Protocol (DHCP) server, statically configure an IP address and then verify that the client can Ping the DHCP server. After the client reaches the server, remove the IP address and return the system to dynamic (DHCP) addressing.</p>
	Make sure there are 32 or fewer DHCP users active on the port at any given time. Only 32 users are entered into the host table.

If the problem persists after the above items are checked, the client-to-service node segment of the network is functional.

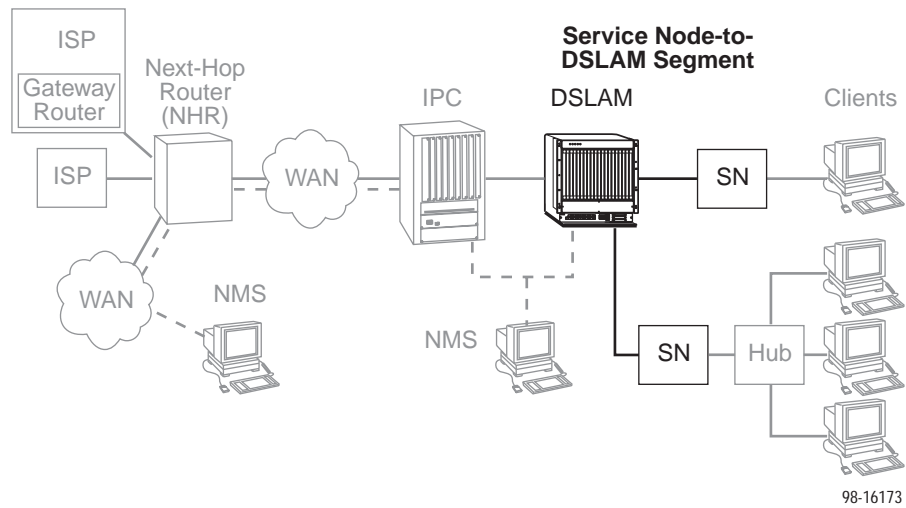
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## Client Cannot Reach DSLAM

This section examines the Service Node-to-DSLAM segment of the network.

### NOTE:

On the DSLAM, verify that the DSL link is up and that there is a MAC address for the client (screen B-E-B). If the MAC address appears, and all items in the previous section have been examined, it is safe to assume that this network segment is functioning. Skip this section and go to *Client Cannot Reach IPC*, on page 10. If a MAC address does not appear, check the items in Table 3.



**Table 3. Service Node-to-DSLAM**

Checklist Type	Solution
<b>Layer 1 – Physical</b>	<p>On either the SN and AN, if the <b>ALM</b> LED is on, power the system off and then on again. Conduct a self-test from screen D-A. Go to screen D-B to learn more about the cause of the alarm.</p>
	<p>Perform a SN self-test at the DSLAM (screen D-D) to test memory and start up parameters.</p>
	<p>If the <b>PWR</b>, <b>ALM</b>, <b>LINE</b> and <b>TST</b> LEDs remain lit, make sure the correct power adapter is being used and that the correct firmware is on the SN (screen B-F and Table 1). Make sure the correct port is selected.</p> <p>Go to screen B-A-C to view the system log.</p>
	<p>Make sure the <b>LINE</b> LED on the SN is lit. This verifies a DSL connection to the DSLAM.</p>
	<p>On the AN, make sure the <b>LINE STATUS</b> is up.</p>
	<p>Make sure the CO splitter is connected correctly. The DSL line goes to the 50-pin amphenol jack on the DSLAM and the other line goes to the PSTN switch in the central office.</p>
	<p>Make sure the 50-pin amphenol jack is firmly attached to the correct interface on the DSLAM. For the 20-slot chassis, the ports are labeled 1–6, 7–12, and 13–18.</p>
	<p>Make sure the loop characteristics are within MVL/RADSL specifications.</p>
<b>Layer 2 – Network</b>	<p>On the DSLAM, if using static IP addressing, make sure the address is correctly configured (screen A-E-D).</p>
	<p>On the DSLAM, make sure all configured ports are in use (screen B-B-A). If ports are not in use, properly configure them.</p>
	<p>On the DSLAM, check the status of the port (screen A-C-B). If the status is not <b>active</b>, restart the port.</p>
	<p>If dynamic addressing is being used and the clients cannot get an IP address from the DHCP server, statically configure an IP address and then verify that the client can Ping the DHCP server. After the client reaches the server, remove the IP address and return the system to dynamic (DHCP) addressing.</p>
	<p>An ARP table may have invalid entries if a recent configuration change took place anywhere on the network and enough time has not passed for the entry to expire. Check the ARP tables on the client, DSLAM, and router.</p>
	<p>To ensure connection between the DSLAM and the SN, perform a packet echo test (screen D-C). Make sure the number of packets sent is the same as the number of packets received. If fewer packets are being received than sent, the SN may not be functioning correctly.</p>
	<p>If the DSLAM fails to connect to the SN, attempt to connect upstream and downstream at lower speeds or configure the card to rate adaptive mode (screen A-B-B). When a speed is changed the port must be restarted (screen A-C-B) for the change to take effect.</p>

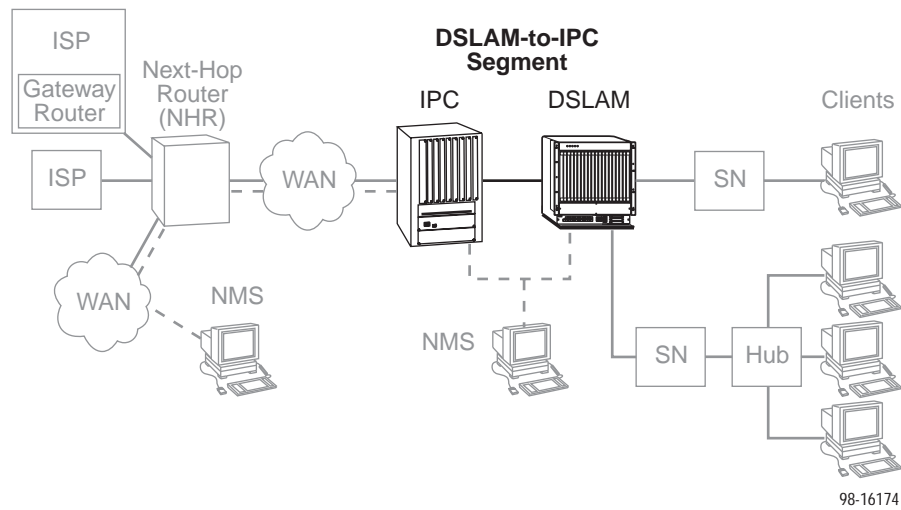
If the problem persists after the above items are checked, the client-to-DSLAM segment of the network is functional.

## Client Cannot Reach IPC

This section examines the DSLAM-to-IPC segment of the network.

### NOTE:

On the IPC, verify that there is a MAC address for the client (enter the **macinfo** command). If the correct MAC address appears on the IPC, and all the items in the previous section have been examined, it is safe to assume that this segment of the network is functioning properly. Skip this section and go to *Client Cannot Reach Router*, on page 12. If a MAC address does not appear, check the items in Table 4.

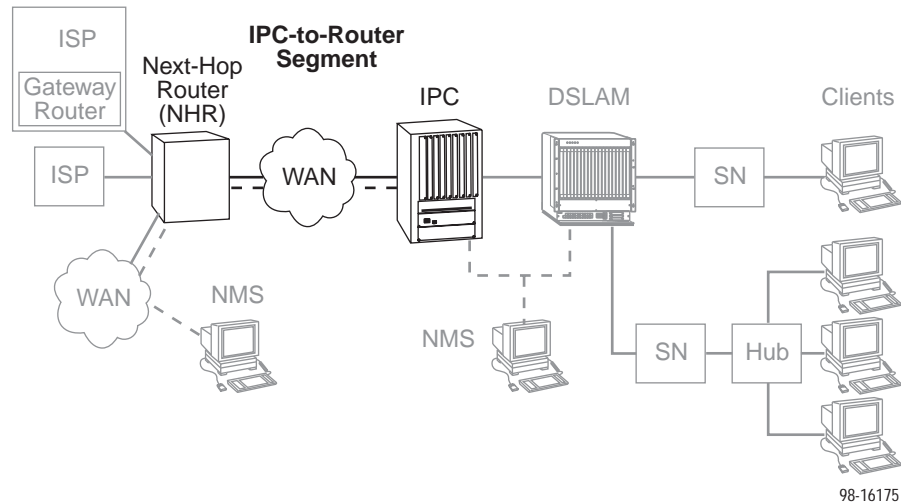


**Table 4. DSLAM-to-IPC Segment**

Checklist Type	Solution
Layer 1 – Physical	If the DSL card shows an alarm, go to screen D-B to determine the cause. An Ethernet alarm usually means no connection to the IPC. Check the cable and make sure the correct type is being used.
	On DSLAM, make sure the Ethernet cable is plugged into the port number that corresponds to the slot number of the card.
Layer 2 – Network	If applicable, verify that the desired mode (tagged or untagged) is selected (screen A-E-A). Reset the card if a change is made.
	If tagged mode is enabled on the DSLAM, make sure a card VLAN is configured (Card VLAN screen). For each connection, the VLAN number must be the same as the group number on the IPC.
	If tagged mode is enabled on the DSLAM, make sure a card VLAN is entered (screen A-E-B). If tagged mode is disabled, <b>Card VLAN</b> should be <b>none</b> .
	If tagged mode is enabled on the DSLAM, make sure the appropriate VLAN is active on the correct port (screen A-E-C). An asterisk (*) indicates the active VLAN. If tagged mode is disabled, <b>none</b> should be active on each port.
	On the IPC, the mpm.cmd file must contain these lines: <b>group_mobility=1</b> <b>move_from_def=1</b> If necessary, add the lines and reboot the IPC.
	On the IPC, make sure that all modules are supported by their respective image (.img) files. Type <b>Is</b> to view filenames.
	On the IPC, enter <b>gp</b> to make sure the group is configured correctly.
	If tagged mode is enabled, make sure the IPC Ethernet port is part of a 802.1q (VLAN) group. To view VLAN groups, enter <b>viqgp</b> .

## Client Cannot Reach Router

Table 5 examines the IPC-to-Router segment of the network on the IPC end of the segment.



**Table 5. IPC-to-Router Segment, IPC Checklist (1 of 2)**

Checklist Type	Solution
<b>Layer 1 – Physical</b>	On the IPC, make sure the cables are firmly attached to the WAN interface.
	If no CSU/DSUs are being used, either the router or the IPC must provide network clocking. Network clocking is usually provided by the device connected to the DCE cables.
	If no CDU/DSUs exist between IPC and Router, make sure transmission lines are active by looking for appropriate LEDs.
	If there is no connection between the router and IPC, invert the clocking on one or both DSU/CSUs.

**Table 5. IPC-to-Router Segment, IPC Checklist (2 of 2)**

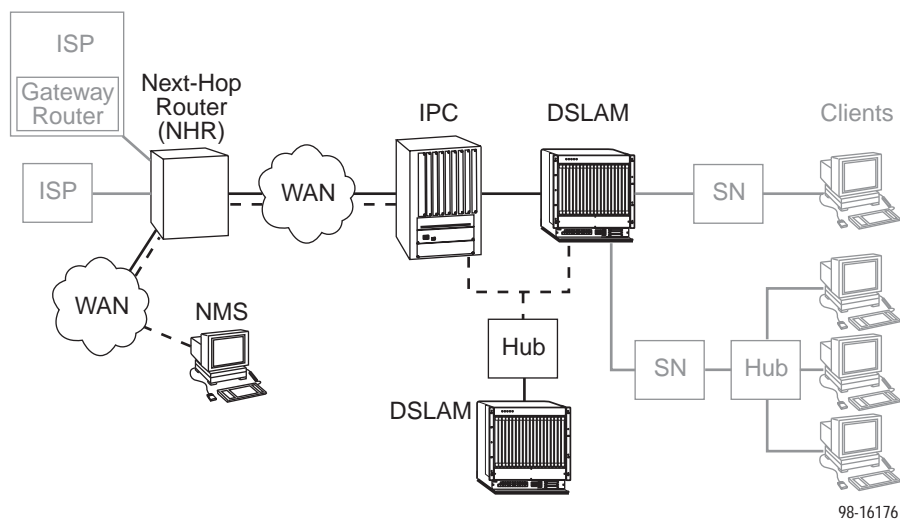
Checklist Type	Solution
<b>Layer 2 – Network</b>	On the IPC, set payload scramble to false. To turn PLScramble on or off on the IPC, type <b>map slot/port</b> (where slot/port is that of the ATM card) and set 10=1 to false.
	On the IPC (if using SONET), make sure that the line characteristics are correct. Type <b>map slot/port</b> and select the <b>Phy Media</b> option.
	On the IPC, enter <b>vas</b> to make sure a service is configured.
	On the IPC, make sure encapsulation is the same as on the router (RFC1483).
	On the IPC, enter <b>vvc</b> to make sure vpi and vci are configured correctly.
	On the IPC, enter <b>vcs</b> to view ATM connection statistics.
	On the IPC, enter <b>vcrs</b> and <b>vcts</b> to view transmitted and received cells.

Table 6 examines the IPC-to-Router segment of the network from the router end of the segment.

**Table 6. IPC-to-Router Segment, Router Checklist**

Checklist Type	Solution
<b>Layer 2 – Network</b>	On the router, make sure that the defined line characteristics agree with the characteristics defined on the IPC.
	Make sure a virtual circuit is configured under the respective ATM subinterface. The PVC number should correspond to the PVC number on the IPC.
	Make sure a bridge-group number is configured under the respective ATM subinterface and that the BVI number is the same as the bridge-group number.
	Make sure encapsulation on the router is the same as on the IPC (RFC1483).
	Make sure the client's default gateway is the same as the IP address for BVI on the appropriate ISP router.
	If a Ping from the client is not successful, issue a <b>show ARP-cache</b> command on the router to make sure the correct MAC address and client IP address appear.

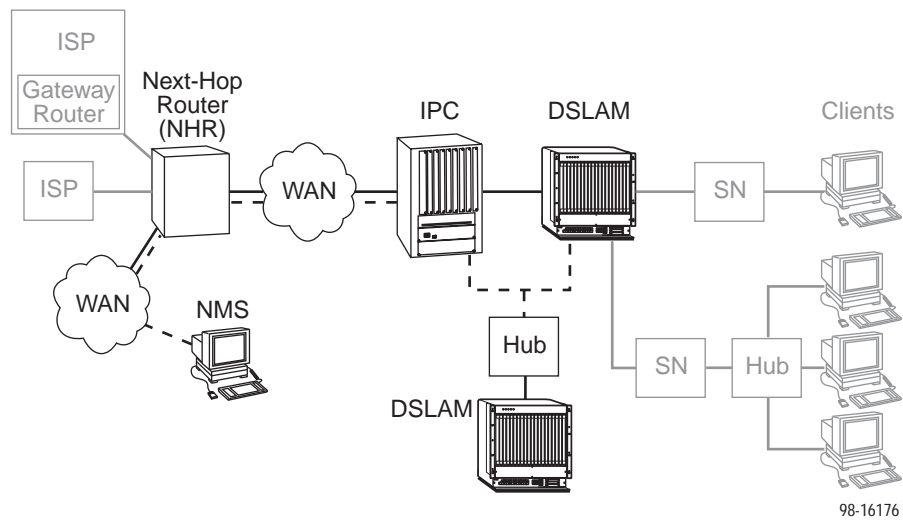
## MCC Card Cannot Ping Next-Hop Router



**Table 7. MCC Card-to-Next-Hop Router Segment**

Checklist Type	Solution
<b>Layer 1 – Physical</b>	If the <b>alarm</b> LED on the MCC is lit, go to screen D-B to determine the cause(s). A major alarm such as Ethernet usually means there is no Ethernet connection between the MCC port on the DSLAM and the IPC. Check the cable and make sure the pinouts are correct.
	If a Hotwire 8600 chassis (three slots) is being used, make sure the MCC Ethernet cable is plugged into the port labeled MCC, the Ethernet port labeled 1 is not used, and the daisy dial is set to 1 (on the base unit). The 3-slot chassis can be daisy-chained for user expandability.
	If hubs are used, make sure the cabling is correct.
	To view the MCC card self-test results, go to screen D-A. The screen shows faults in the card's processor, memory, and interfaces.
	Go to the system log (screen B-A-C) and check system failures.
	Check all cabling to make sure there is a link between the MCC card and the IPC.
<b>Layer 2 – Network</b>	Make sure a default route is configured on the MCC card (screen A-E-A).
	Make sure the MCC Ethernet port is part of a virtual port, not a 802.1q (VLAN) group.
	Make sure the correct IP address is configured (screen A-C-B). Enter <b>e1a</b> for the Ethernet interface and view or edit the IP address. Reset the card if changes are made. The MCC address can only be configured statically.

## MCC Cannot Ping NMS Server



**Table 8. MCC Card-to-Network Management System (NMS) Segment**

Checklist Type	Solution
<b>Layer 1 – Physical</b>	Make sure a link is up between the NMS and DSLAM. A Cat 5 cable must be plugged into the MCC port on the DSLAM and the NMS device.
	Make sure the NMS is functional.
<b>Layer 2 – Network</b>	On the NMS, make sure the IP address is correctly configured.
	If the NMS is on a different subnetwork, make sure its IP address is known to the router through either dynamic or static routing protocols.
	On the MCC card (screen A-F-B) make sure the NMS IP address for traps is correctly configured. If SNMP security is enabled, go to screen A-F-A and make sure the server IP address is correctly configured.

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## Performance Issues – Viewing Network Statistics

The previous sections of this document examined connectivity issues, i.e., the inability to Ping the router. Table 9 presents information on viewing DSLAM statistics screens to examine performance issues.

**Table 9. Examining Performance Issues**

To . . .	Go To . . .
<b>View Statistics</b>	<p>Any statistics screen. These screens give information related to the number of packets transmitted and received on an interface as well as any packet failures. See the appropriate DSL or MCC User's Guide for details on the Statistics screens.</p> <ul style="list-style-type: none"><li>■ To view Ethernet statistics, go to screen B-B-B.</li><li>■ To view HDLC statistics, go to screen B-B-C.</li><li>■ To view the DSL Link performance summary, go to screen B-B-D and choose a port.</li><li>■ To view how many packets are on the link, view DSL performance statistics on screen B-B-E and choose a port.</li><li>■ To view error statistics, go to screen B-B-F and choose a port.</li><li>■ To view transmit statistics, go to screen B-B-G and choose a port.</li><li>■ To view system log, go to screen B-A-C.</li></ul>
<b>Examine Slow Performance</b>	<p>Screen B-B-B. Slow performance could result from errors seen on this screen.</p> <p>Make sure the DSLAM and IPC are both operating at either full or half-duplex mode. On the DSLAM, go to screen A-B-A. On the IPC, enter <b>10/100cfg</b>. If operating at full-duplex, a hub should not be used.</p>
<b>Examine Collisions</b>	<p>Screen B-B-B. Minimal collisions are acceptable if packets are not being discarded. Excessive collisions could result from forcing too much data over a single Ethernet.</p>

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## Product-Related Documents

<b>Document Number</b>	<b>Document Title</b>
5020-A2-GN10	<i>Hotwire 5020 POTS Splitter Central Office Installation Instructions</i>
5030-A2-GN10	<i>Hotwire 5030 POTS Splitter Customer Premises Installation Instructions</i>
5038-A2-GN10	<i>Hotwire 5038 Distributed POTS Splitter Customer Premises Installation Instructions</i>
5038-A2-GN11	<i>Hotwire 5038 MVL POTS Filter Customer Premises Installation Instructions</i>
5620-A2-GN10	<i>Hotwire 5620 RTU Customer Premises Installation Instructions</i>
6020-A2-GZ40	<i>Hotwire 6020 MVL POTS Splitter Central Office Installation Instructions</i>
6310-A2-GN10	<i>Hotwire 6310 MVL Modem Customer Premises Installation Instructions</i>
7700-A2-GB23	<i>OpenLane DCE Manager for HP OpenView for Windows User's Guide</i>
7800-A2-GB26	<i>OpenLane DCE Manager User's Guide</i>
8000-A2-GB25	<i>Hotwire 8100/8200 Interworking Packet Concentrator (IPC) Network Configuration Guide</i>
8000-A2-GB26	<i>Hotwire DSLAM for 8310 MVL and 8510 DSL Cards User's Guide</i>
8000-A2-GB27	<i>Hotwire DSLAM for 8310 MVL and 8510 DSL Cards Network Configuration Guide</i>
8000-A2-GB90	<i>Hotwire 8100/8200 Interworking Packet Concentrator (IPC) User's Guide</i>
8000-A2-GN11	<i>Hotwire Management Communications Controller (MCC) Card Installation Instructions</i>
8000-A2-GS40	<i>Hotwire DSLAM Configuration for 8310 MVL and 8510 DSL Cards Startup Instructions</i>
8600-A2-GN20	<i>Hotwire 8600 Digital Subscriber Line Access Multiplexer (DSLAM) Installation Guide</i>
8800-A2-GN21	<i>Hotwire 8800 Digital Subscriber Line Access Multiplexer (DSLAM) Installation Guide</i>

Contact your sales or service representative to order additional product documentation.

Most Paradyne documents are also available on the World Wide Web at:

<http://www.paradyne.com>

Select *Service & Support* → *Technical Manuals*



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