

Troubleshooting LAN Media Problems

This chapter focuses on troubleshooting LAN media-related problems. The network media covered here are Ethernet, Token Ring, and Fiber Distributed Data Interface (FDDI). This chapter is by no means comprehensive. Instead, it offers solutions to the problems most commonly encountered when using the particular media.

For more detailed information on troubleshooting media problems, refer to the “References and Recommended Reading” appendix for a list of resources.

Each section in this chapter describes troubleshooting information for a specific media type.

- Troubleshooting Ethernet
- Troubleshooting Token Ring
- Troubleshooting FDDI

Troubleshooting Ethernet

This section provides troubleshooting procedures for common Ethernet media problems.

Table 4-1 outlines problems commonly encountered on Ethernet networks and offers general guidelines for solving those problems.

Table 4-1 Media Problems: Ethernet

Media Problem	Suggested Actions
Excessive noise	<p>Step 1 Use the show interfaces ethernet EXEC command to determine the status of the router’s Ethernet interfaces. The presence of many CRC errors but not many collisions is an indication of excessive noise.</p> <p>Step 2 Check cables to determine whether any are damaged.</p> <p>Step 3 Look for badly spaced taps causing reflections.</p> <p>Step 4 If you are using 100BaseTX, make sure you are using category 5 cabling and not another type, such as category 3.</p>
Excessive collisions	<p>Step 1 Use the show interfaces ethernet command to check the rate of collisions. The total number of collisions with respect to the total number of output packets should be around 0.1 percent or less.</p> <p>Step 2 Use a TDR¹ to find any unterminated Ethernet cables.</p> <p>Step 3 Look for a jabbering transceiver attached to a host. (This might require host-by-host inspection or the use of a protocol analyzer.)</p>
Excessive runt frames	<p>In a shared Ethernet environment, runt frames are almost always caused by collisions. If the collision rate is high, refer to the problem “Excessive collisions” earlier in this table.</p> <p>If runt frames occur when collisions are not high or in a switched Ethernet environment, then they are the result of underruns or bad software on a network interface card.</p> <p>Use a protocol analyzer to try to determine the source address of the runt frames.</p>
Late collisions ²	<p>Step 1 Use a protocol analyzer to check for late collisions. Late collisions should never occur in a properly designed Ethernet network. They usually occur when Ethernet cables are too long or when there are too many repeaters in the network.</p> <p>Step 2 Check the diameter of the network and make sure it is within specification.</p>
No link integrity on 10BaseT, 100BaseT4, or 100BaseTX	<p>Step 1 Make sure you are not using 100BaseT4 when only two pairs of wire are available. 100BaseT4 requires four pairs.</p> <p>Step 2 Check for 10BaseT, 100BaseT4, or 100BaseTX mismatch (for example, a card different than the port on a hub).</p> <p>Step 3 Determine whether there is cross connect (for example, be sure straight-through cables are not being used between a station and the hub).</p> <p>Step 4 Check for excessive noise (see the problem “Excessive noise” earlier in this table).</p>

1. TDR=time domain reflectometer

2. A late collision is a collision that occurs beyond the first 64 bytes of an Ethernet frame.

Troubleshooting Token Ring

This section provides troubleshooting procedures for common Token Ring media problems.

Table 4-2 outlines problems commonly encountered on Token Ring networks and offers general guidelines for solving those problems.

Table 4-2 Media Problems: Token Ring

Media Problem	Suggested Actions
Nonfunctional Token Ring	<p>Step 1 Use the show interfaces token command to determine the status of the router's Token Ring interfaces.</p> <p>Step 2 If the status line indicates that the interface and line protocol are not up, check the cable from the router to the MAU.¹ Make sure that the cable is in good condition. If it is not, replace it.</p> <p>Step 3 If you are performing a new installation, make sure that the MAU has been properly initialized. For information on initializing your MAU, refer to the manufacturer's documentation.</p>
Ring speed mismatch	<p>Step 1 Check the ring speed specification on all nodes attached to the Token Ring backbone. The ring speed configured for all stations must be the same (either 4 Mbps or 16 Mbps.) Use the show running-config privileged EXEC command to determine which speed is specified on the router.</p> <p>Step 2 If necessary, modify ring speed specifications for clients, servers, and routers. On routers, use the ring-speed interface configuration command to change the ring speed. Change jumpers as needed for modular router platforms that do not support software speed configuration. For more information about ring speed specifications, refer to the hardware installation and maintenance manual for your system.</p>

Media Problem	Suggested Actions
Relay open in MAU	<p>Step 1 If an “open lobe fault” message appears on the console at system power-on, check the cable connection to the MAU.</p> <p>Step 2 Use the clear interface privileged EXEC command to reset the Token Ring interface and reinsert the router into the ring.</p> <p>For all Token Ring cards except the CTR and access routers, you must use the clear interface command to reinitialize the Token Ring interface if the interface is down.</p> <p>Step 3 Use the show interfaces token EXEC command to verify that the interface and line protocol are up.</p> <p>Step 4 If the interface is operational, but the “open lobe fault” message persists and the router still cannot connect to the ring, connect the router to a different MAU port.</p> <p>Step 5 If the message continues to appear, disconnect all devices from the MAU and reset the MAU’s relay with the tool provided by the MAU vendor.</p> <p>Step 6 Reattach the router and determine whether it can connect to the ring. If resetting the relay does not solve the problem, try replacing the MAU with one that is known to be operational.</p> <p>Step 7 If the router still cannot connect to the ring, check internal cable connections of the router Token Ring cards. Ensure that cables associated with the respective port numbers and applique numbers are correctly wired and that they are not swapped.</p> <p>Step 8 If the router still cannot connect to the ring, replace the cables that connect the router to the MAU with working cables.</p> <p>Step 9 Use the clear interface command to reset the interface and reinsert the router into the ring. Use the show interfaces token command to verify that the interface and line protocol are up.</p> <p>Step 10 Alternatively, you can connect the router to a spare MAU to which no stations are connected. If the router can attach to the ring, replace the original MAU.</p>
Duplicate MAC ² address	<p>This problem can arise when routers are using locally administered MAC addresses.</p> <p>Step 1 Use a network analyzer to check the Duplicate Address test frames from a booting station. If the station gets a response, then there is another station already configured with the MAC address of the booting station.</p> <p>Step 2 If there are two stations with the same MAC addresses, change the MAC address of one of the stations and reinitialize the node.</p>
Congested ring	<p>Step 1 Insert the router during an off-peak period.</p> <p>Step 2 If insertion is successful during off-peak periods, but unsuccessful during peak load, segment your internetwork to distribute traffic.</p>
RPS ³ conflict	<p>Step 1 Use the no lnm rps interface configuration command to disable the RPS function on the router that you are trying to insert into the ring.</p> <p>Step 2 Try to insert the router into the ring.</p> <p>Step 3 If you can insert the router with RPS disabled, there is a conflict between RPS implementations. Contact your technical support representative for more information.</p>

1. MAU=Multistation Access Unit
 2. MAC = Media Access Control
 3. RPS=Ring Parameter Server

Troubleshooting FDDI

This section provides troubleshooting procedures for common FDDI media problems.

Table 4-3 outlines problems commonly encountered on FDDI networks and offers general guidelines for solving those problems.

Table 4-3 Media Problems: FDDI

Media Problem	Suggested Actions
Nonfunctional FDDI ring	<p>Step 1 Use the show interfaces fddi EXEC command to determine the status of the router's FDDI interfaces.</p> <p>Step 2 If the show interfaces fddi command indicates that the interface and line protocol are up, use the ping command between routers to test connectivity.</p> <p>Step 3 If the interface and line protocol are up, make sure the MAC addresses of upstream and downstream neighbors are as expected.</p> <p>Step 4 If all zeros appear in either of the address fields for these neighbors, there is probably a physical connection problem.</p> <p>In this case (or if the status line does <i>not</i> indicate that the interface and line protocol are up), check patch-panel connections or use an OTDR¹ or light meter to check connectivity between neighbors. Ensure that signal strength is within specification.</p>
Upstream neighbor has failed and bypass switch is installed	<p>Bypass switches can cause signal degradation because they do not repeat signals as a normal transceiver does.</p> <p>Step 1 Check upstream neighbor to determine if it is operational.</p> <p>Step 2 If the node is down and a bypass switch is in place, resolve any problems found in the upstream neighbor.</p>

1. OTDR=optical time-domain reflectometer

