



Troubleshooting Transponder Line Card Problems

This chapter describes how to troubleshoot transponder line card problems. This chapter includes the following sections:

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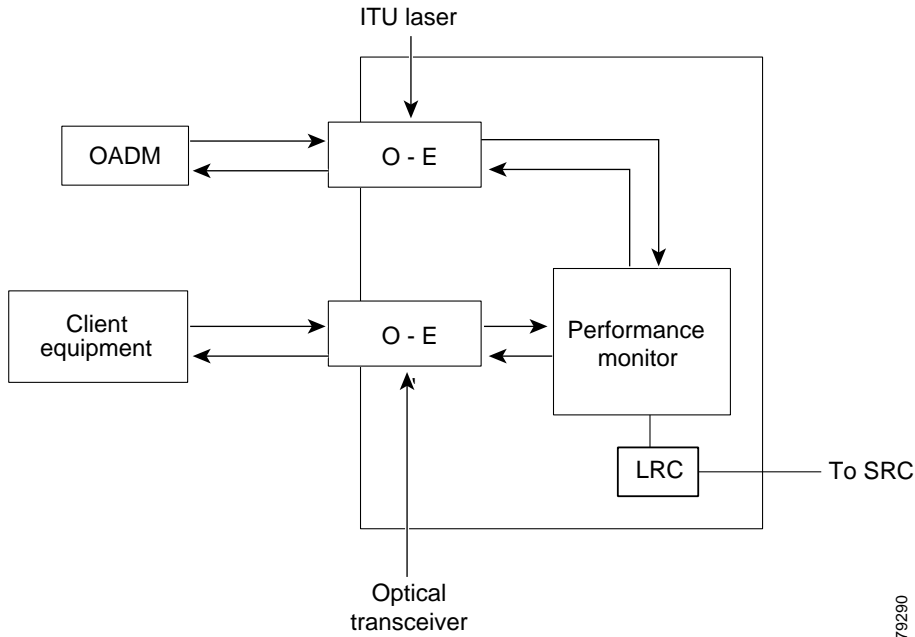
3.1 Overview

The protocol-transparent and bit-rate transparent transponder line card converts a client signal into an ITU wavelength, or channel. The transponder line cards have tunable lasers and you can configure the line cards to work in two different wavelengths.

The Cisco ONS 15530 supports four types of client interface transponder line cards: SM (single mode) unprotected, SM splitter protected, MM (multimode) unprotected, and MM splitter protected. Both types of SM transponder line cards accept SM client signals on the 1310-nm wavelength through an SC connector and support client signal clock rates ranging from 16 Mbps to 2.5 Gbps. Both types of MM transponder line cards accept SM and MM client signals on the 1310-nm wavelength through an SC connector and support client signal clock rates ranging from 16 Mbps to 622 Mbps.

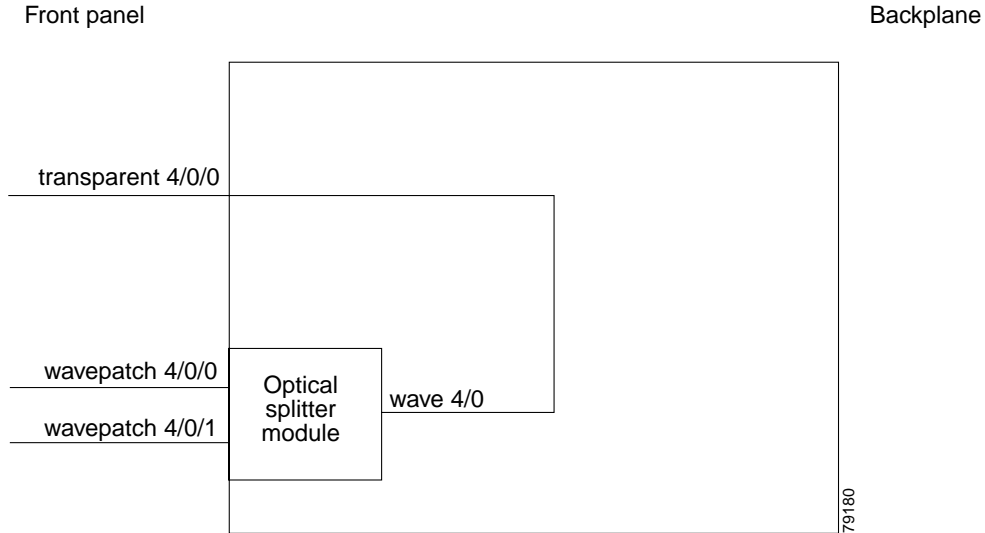
[Figure 3-1](#) and [Figure 3-2](#) show the architecture and the interfaces of the transponder line card.

Figure 3-1 Transponder Line Card Architecture



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Figure 3-2 Transponder Line Card Interfaces



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3.2 Initial Troubleshooting Checklist

Follow this initial checklist before proceeding with the troubleshooting procedures:

- Ensure encapsulation is set correctly.

- Enable monitoring if needed or supported.
- Ensure transparent, wave, and wavepatch interfaces are administratively up.
- Ensure proper cable (SM/MM) is connected according to the transponder type/traffic type.
- Ensure trunk receive power level is within valid range (-8 to -28 dBm).
- Ensure client receive power is within valid range (-5 dBm to -28/-32 dBm for SM/MM respectively).
- Check that Tx and Rx LEDs (client side and trunk side) are working as expected.
- Ensure optical threshold parameters do not force loss-of-light condition.
- Check that all error counters on the interfaces are clean.
- Ensure optical patches are properly configured according to the channel/wavelength.
- Check that laser frequency is properly programmed and **show patch** command output does not list a mismatch.
- Issue a **show facility-alarm status** command to display the alarms on the interfaces.
- Issue the **show hardware linecard** command to verify the transponder line card functional image.
- Ensure that all optical connectors are clean. Refer to the [Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections](#) document.

3.3 Troubleshooting Transponder Line Card Problems

This section contains troubleshooting procedures for transponder line card problems.

3.3.1 Transponder Line Card Not in show hardware Command Output

Symptom Transponder line card line is not listed in the **show hardware** command output.

[Table 3-1](#) describes the potential causes of the symptom and the solutions.

Table 3-1 Transponder Line Card Not in show hardware Command Output

Possible Problem	Solution
Transponder line card not seated properly.	Reseat the transponder line card.
Incompatible software.	Verify the software supports the hardware being used.
Bad transponder line card.	Replace the transponder line card.

3.3.2 Wave Interface Is Down and Shows Loss of Light

Symptom The wave interface is down and shows Loss of Light.

[Table 3-2](#) describes the potential causes of the symptom and the solutions.

Table 3-2 Wave Interface Is Down and Shows Loss of Light

Possible Problem	Solution
Incorrect cable connection or wrong cable being used.	Issue a show interfaces wave command to ensure the laser frequency is as desired and verify that no mismatch is present in the show patch command output.
Optical connectors are dirty.	Refer to the Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections document.
Incoming power level is low.	Use a power meter to check the power level from the OADM module to the wave interface of the transponder line card. Adjust attenuation as needed.

3.3.3 Transparent Interface Is Down and Shows Loss of Light

Symptom The transparent interface is down and shows Loss of Light.

Table 3-3 describes the potential causes of the symptom and the solutions.

Table 3-3 Transparent Interface Down and Shows Loss of Light

Possible Problem	Solution
Incorrect cable connection or wrong cable being used.	Issue a show interfaces transparent command to ensure the laser frequency is as desired and verify that no mismatch is present in the show patch command output. Verify that the correct cable type (SM/MM) is being used.
Optical connectors are dirty.	Refer to the Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections document.
Incoming power level is low.	Use a power meter to check the receive power level to the transparent interface of the transponder line card. Adjust attenuation as needed.

3.3.4 Active and Standby Wavepatch Interfaces Down Due to Loss of Light

Symptom The active and standby wavepatch interfaces are down due to Loss of Light.

Table 3-4 describes the potential causes of the symptom and the solutions.

Table 3-4 Wavepatch Interfaces Down Due to Loss of Light

Possible Problem	Solution
Incorrect cable connection or wrong cable being used.	Issue a show interfaces wave command to ensure the laser frequency is as desired and verify that no mismatch is present in the show patch command output.
Optical connectors are dirty.	Refer to the Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections document.
Incoming power level is low.	Use a power meter to check the power level from the client to the transponder line card.

3.3.5 Wave Interface Shows Loss of Lock

Symptom The wave interface shows Loss of Lock.

[Table 3-5](#) describes the potential causes of the symptom and the solutions.

Table 3-5 Wave Interface Shows Loss of Lock

Possible Problem	Solution
Incorrect protocol.	Issue a show interfaces wave command to verify that the correct protocol is configured and monitoring is enabled if needed.
Remote client reporting errors.	Issue a show interfaces transparent command on the remote system to verify that the remote client interface is not reporting errors.
Optical connectors are dirty.	Refer to the Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections document.

3.3.6 Transparent Interface Shows Loss of Lock

Symptom The transparent interface shows Loss of Lock.

[Table 3-6](#) describes the potential causes of the symptom and the solutions.

Table 3-6 Wave Interface Shows Loss of Lock

Possible Problem	Solution
Incorrect protocol.	Issue a show interfaces transparent command to verify that the correct protocol is configured and monitoring is enabled if needed.
Optical connectors are dirty.	Refer to the Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections document.

3.3.7 Interface Shows Loss of Sync

Symptom The wave or transparent interface shows Loss of Sync.

[Table 3-7](#) describes the potential causes of the symptom and the solutions.

Table 3-7 Interface Shows Loss of Sync

Possible Problem	Solution
Incorrect protocol.	Issue a show interfaces command to verify that the correct protocol is configured and monitoring is enabled if needed.
Remote client reporting errors.	Issue a show interfaces transparent command on the remote system to verify that the remote client interface is not reporting errors.
Optical connectors are dirty.	Refer to the Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections document.

3.3.8 Interface Shows Loss of Frame

Symptom The wave or transparent interface shows Loss of Frame.

[Table 3-8](#) describes the potential causes of the symptom and the solutions.

Table 3-8 Interface Shows Loss of Frame

Possible Problem	Solution
Incorrect protocol.	Issue a show interfaces command to verify that the correct protocol is configured and monitoring is enabled if needed.
Excessive attenuation.	Use a power meter to ensure that the receive power level is within specifications for that interface. Reduce the attenuation as needed.
Overload (high receive power).	Use a power meter to ensure that the receive power level is within specifications for that interface. Attenuate the receive path as needed.
Optical connectors are dirty.	Refer to the Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections document.

3.3.9 Active and Standby Wavepatch Interfaces Down Due to Low Alarm

Symptom The active and standby wavepatch interfaces are down due to low alarm.

[Table 3-9](#) describes the potential causes of the symptom and the solutions.

Table 3-9 Active and Standby Wavepatch Interfaces Down Due to Low Alarm

Possible Problem	Solution
Excessive attenuation.	Use a power meter to ensure that the receive power level is within specifications for that interface.
Optical connectors are dirty.	Refer to the Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections document.
Optical threshold exceeded.	Issue a show interfaces wavepatch command to verify that the receive power is within the threshold range.

3.3.10 Unable to Configure Protocol Encapsulation or Clock Rate

Symptom The CLI (command-line interface) rejects the protocol encapsulation or clock rate for the transparent interface.

[Table 3-10](#) describes the potential cause of the symptom and the solution.

Table 3-10 *Unable to Configure Protocol Encapsulation or Clock Rate*

Possible Problem	Solution
Incorrect transponder line card.	Verify that you have the correct type of transponder line card, either SM or MM. If not, replace it with the correct transponder line card.

3.4 Troubleshooting Transponder Line Card Problems Using Loopbacks

This section describes how to use software loopbacks to perform fault isolation on the client and trunk interfaces of the transponder line cards.

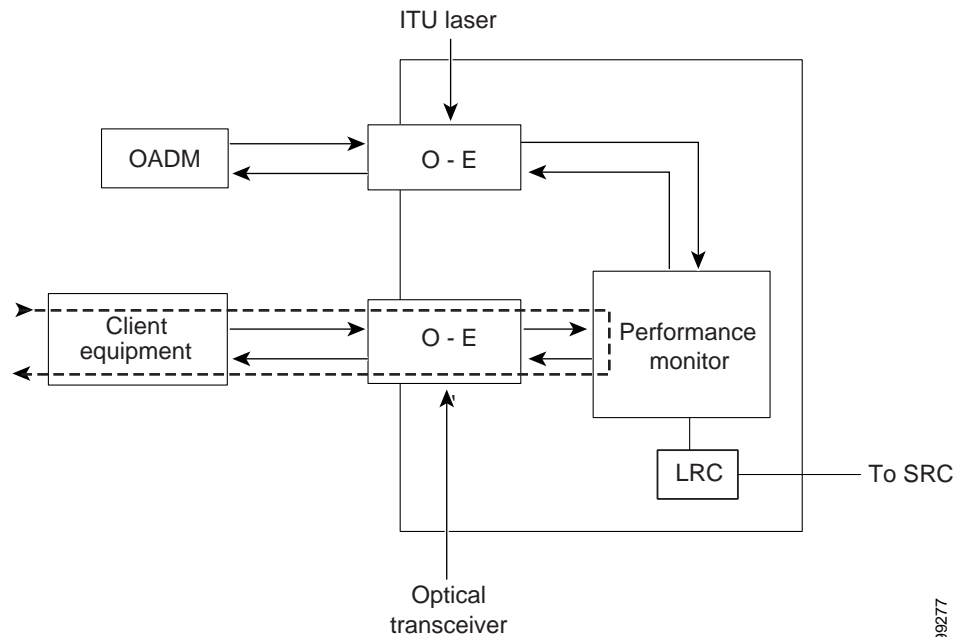


Note

Client and trunk loopbacks cannot be performed at the same time.

3.4.1 Client Signal Loopbacks

The client signal loopback verifies the continuity of the client signal path (see [Figure 3-3](#)).

Figure 3-3 *Client Signal Loopback Example*

Symptom Client signal loopback fails.

[Table 3-11](#) describes the potential causes of the symptom and the solutions.

Table 3-11 Client Signal Loopback Fails

Possible Problem	Solution
Protocol not configured correctly.	Issue a show interfaces wave command to check the configured encapsulation. Issue a encapsulation command to correct the protocol encapsulation.
Client Tx/Rx power is insufficient.	Use a power meter to measure the power levels. Ensure that the Tx and Rx power levels are within specification.

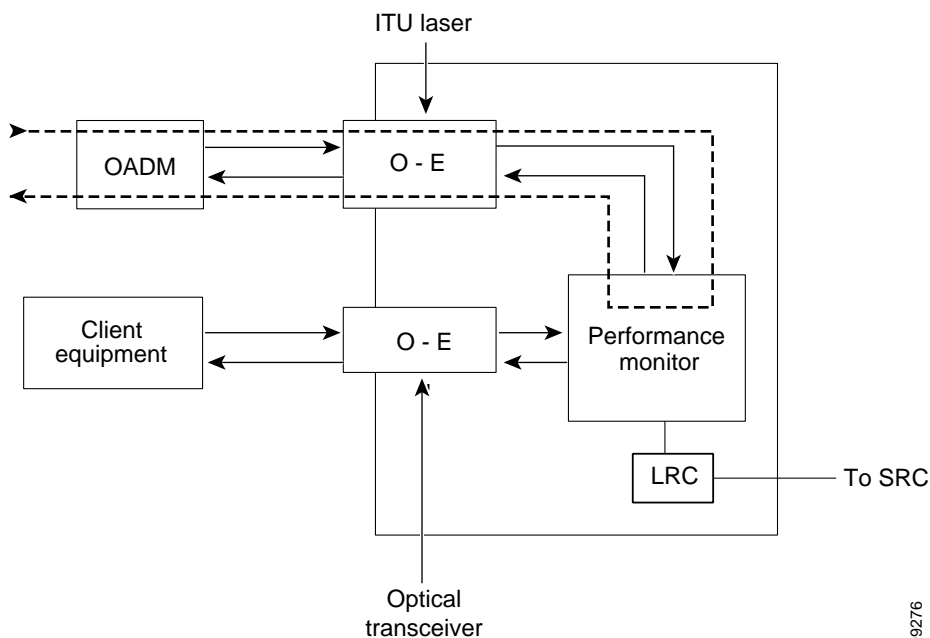
Procedure: Create a Client Signal Loopback

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- Step 1 Issue a **loopback** command on the transparent interface.
 - Step 2 Check that the traffic is reaching the client equipment.
 - Step 3 If the signal does not reach the client equipment, call Cisco technical support.
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3.4.2 Trunk Loopbacks

The trunk loopback on a transponder line card verifies the configuration of the wave interface (see [Figure 3-4](#)).

Figure 3-4 Trunk Loopback Example



Symptom The trunk loopback fails.

Table 3-12 describes the potential causes of the symptom and the solutions.

Table 3-12 Trunk Loopback Fails

Possible Problem	Solution
Incorrect encapsulation.	Issue a show interface transparent command to check the configured encapsulation. Issue a encapsulation command to correct the protocol encapsulation.
Trunk power level is out of range.	Use a power meter to measure the power levels. Ensure that the Tx and Rx power levels are within specification.

Procedure: Create a Trunk Loopback

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- Step 1** Issue a **loopback** command on the transparent interface.
 - Step 2** Check that the traffic is reaching the trunk.
 - Step 3** If the signal does not reach the trunk, call Cisco technical support.
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