



Card Protection



Note

The terms “Unidirectional Path Switched Ring” and “UPSR” may appear in Cisco literature. These terms do not refer to using Cisco ONS 15xxx products in a unidirectional path switched ring configuration. Rather, these terms, as well as “Path Protected Mesh Network” and “PPMN,” refer generally to Cisco’s path protection feature, which may be used in any topological network configuration. Cisco does not recommend using its path protection feature in any particular topological network configuration.

This chapter explains the Cisco ONS 15327 card protection configurations. To provision card protection, refer to the *Cisco ONS 15327 Procedure Guide*. Chapter topics include:

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3.1 ONS 15327 Protection Groups

When you set up 1+1 optical protection for ONS 15327 cards, you must choose between maximum protection and maximum slot availability. The highest protection reduces the number of available card slots; the highest slot availability reduces the protection. [Table 3-1](#) shows the protection types that can be set up for ONS 15327 cards.

A 1:1 (electrical) XTC protection group is preprovisioned on the ONS 15327. The name of the protection group is XTCPROTGRP and it cannot be edited or deleted. Therefore, you only need to create protection for optical cards.

Table 3-1 Card Protection Group Types

Type	Cards	Description
1:1	XTC	Default electrical circuits protection (cannot be changed).

Table 3-1 Card Protection Group Types (continued)

Type	Cards	Description
1+1	Any optical	Pairs a working optical port with a protect optical port. Protect ports must match the working ports. For example, Port 1 of an OC-3 card can only be protected by Port 1 of another OC-3 card. Cards do not need to be in adjoining slots.
Unprotected	Any	Unprotected cards can cause signal loss if a card fails or incurs a signal error. However, because no card slots are reserved for protection, unprotected schemes maximize the service available for use on the ONS 15327. Unprotected is the default protection type for optical cards.

3.2 Optical Card Protection

With 1+1 port-to-port protection, ports on the protect card are assigned to protect the corresponding ports on the working card. The working and protect cards do not need to be installed side by side in the node. A working card must be paired with a protect card of the same type, for example, an OC-3 card should be paired with another OC-3 card. The protection takes place on the port level, so any port on the protect card can be assigned to protect the corresponding port on the working card.

For example, on a four-port card, you can assign one port as a protection port on the protect card (protecting the corresponding port on the working card) and leave three ports unprotected. Conversely, you can assign three ports as protection ports and leave one port unprotected.

1+1 span protection can be either revertive or nonrevertive. With nonrevertive 1+1 protection, when a failure occurs and the signal switches from the working card to the protect card, the signal stays switched to the protect card until it is manually switched back. Revertive 1+1 protection automatically switches the signal back to the working card when the working card comes back online.

For more information, refer to the *Cisco ONS 15327 Procedure Guide*.



Note

The OC3-4 card can be provisioned for path protection and 1+1 using two ports on the same card.

3.3 Unprotected Cards

Unprotected optical cards are not included in a protection scheme; therefore, a card failure or a signal error results in lost data. Because no bandwidth lies in reserve for protection, unprotected schemes maximize the available ONS 15327 bandwidth.

3.4 Automatic Protection Switching

Unidirectional switching allows traffic on the transmit and receive fibers to switch independently. With bidirectional switching, transmit and receive lines switch together.

With nonrevertive 1+1 protection, automatic protection switching (APS) switches a signal after a failure from the working card to the protect card and the signal stays switched to the protect card until it is manually switched back. Revertive switching automatically switches the signal back to the working card when the working card comes back online. 1+1 protection is unidirectional and nonrevertive by default; revertive switching is easily provisioned using CTC.

3.5 External Switching Commands

The external switching commands on the ONS 15327 are Manual, Force, and Lock out. A Manual switch will switch traffic if the path has an error rate less than the signal degrade. A Force switch will switch traffic even if the path has signal degrade (SD) or signal fail (SF) conditions; however, a Force switch will not override an SF on a 1+1 protection channel. A Force switch has a higher priority than a Manual switch. Lockouts can only be applied to protect cards (in 1+1 configurations) and prevent traffic from switching to the protect port under any circumstance. Lockouts have the highest priority.

**Note**

Force and Manual switches do not apply to 1:1 protection groups; these ports have a single Switch command.
