C H A P T E R **3**

Card Protection

This chapter explains the Cisco ONS 15600 SDH card protection configurations.

Chapter topics include:

3.1 Optical Port Protection

When you set up protection for ONS 15600 SDH cards, you must choose between maximum protection and maximum port availability. The highest protection reduces the number of available ports; the highest port availability reduces the protection. Table 3-1 contrasts port protection with an unprotected scheme.

Table 3-1   Port Protection Types

| Type	Ports	Description
1+1	Any optical	Pairs a working optical port with a protect optical port. Protect ports must match the line rate of the working ports. For example, Port 1 of an STM-16 card can only be protected by another STM-16 port. Ports do not need to be in adjoining slots. For maximum protection, provision the ports/cards in Slots 1 to 4 as working and the ports/cards in Slots 11 to 14 as protect.
Unprotected	Any	Unprotected ports can cause traffic loss if a port fails or incurs a signal error. However, because no ports are reserved for protection, unprotected schemes maximize the service available for use on the ONS 15600 SDH. **Note** If you want to protect traffic you should implement either a subnetwork connection protection ring (SNCP) or a multiplex-section shared protection ring (MS-SPRing) protection scheme.

Note Because there are no electrical cards in the ONS 15600 SDH, 1:1 and 1:N protection is not provided.

Figure 3-1 shows an example of the ONS 15600 SDH in a maximum, 1+1 protected configuration.

Figure 3-1   ***ONS 15600 SDH in a 1+1 Protected Configuration***
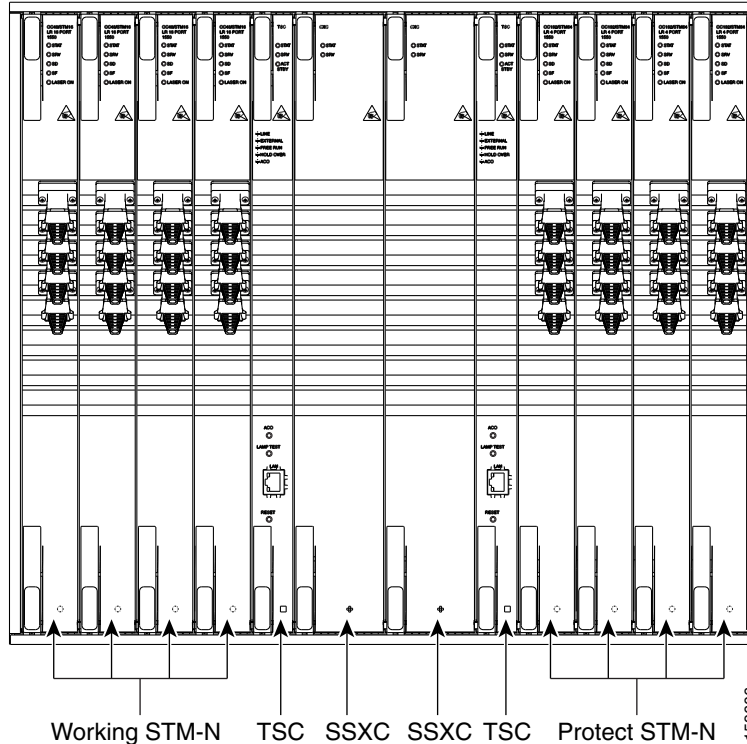
With 1+1 protection, any port can be assigned to protect the traffic of a corresponding working port. A working port must be paired with a protect port of the same type, for example, an STM-16 port must be paired with another STM-16 port.

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

For more information about protection schemes and how to create and modify them with Cisco Transport Controller (CTC), refer to the *Cisco ONS 15600 SDH Procedure Guide*.

3.2 Unprotected Ports

Unprotected ports are not included in a protection scheme; therefore, a port failure or a signal error can result in data loss if no path level protection (SNCP) exists. Because no bandwidth lies in reserve for protection, unprotected schemes maximize the available ONS 15600 SDH bandwidth. Figure 3-2 shows the ONS 15600 SDH in an unprotected configuration. All ports are in a working state.

Figure 3-2   *ONS 15600 SDH in an Unprotected Configuration*

Working STM-N   TSC   SSXC   SSXC   TSC   Working STM-N
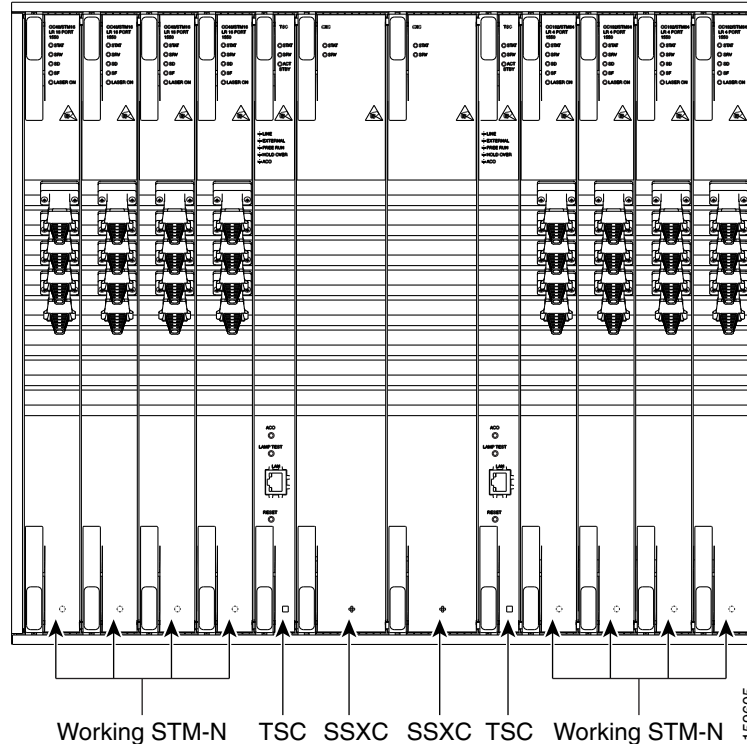
3.3 External Switching Commands

The external switching commands on the ONS 15600 SDH are Manual, Force, Lockout, and Lock-on.

A Manual switch will switch traffic if the path has no errors or an error rate less than the signal degrade (SD) threshold. A Force switch will switch traffic even if the path has an SD or signal fail (SF) condition; however, a Force switch will not override an SF condition on a 1+1 protection scheme. A Force switch has a higher priority than a Manual switch.

Lockouts prevent traffic from switching to the protect port under any circumstance, thus they can only be applied to protect cards. Lockouts have the highest priority. Another way to inhibit protection switching in a 1+1 configuration is to apply a lock- on to the working port. A working port with a lock-on applied cannot switch traffic to the protect port in the protection group (pair).