CHAPTER 17

FC_MR-4 Operation

The FC_MR-4 is a 1.0625- or 2.125-Gbps Fibre Channel/Fiber Connectivity (FICON) card that integrates non-SONET framed protocols into a SONET time-division multiplexing (TDM) platform through virtually concatenated payloads. This chapter provides information about the FC_MR-4 card. For installation and step-by-step circuit configuration procedures, refer to the *Cisco ONS 15454 Procedure Guide*.

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.

Chapter topics include:

17.1 FC_MR-4 Card Description

Warning **Class 1 (CDRH) and Class 1M (IEC) laser products.**

Warning **Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard.**

Warning **Use of controls, adjustments, or performing procedures other than those specified may result in hazardous radiation exposure.**

Warning **High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag.**

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.**

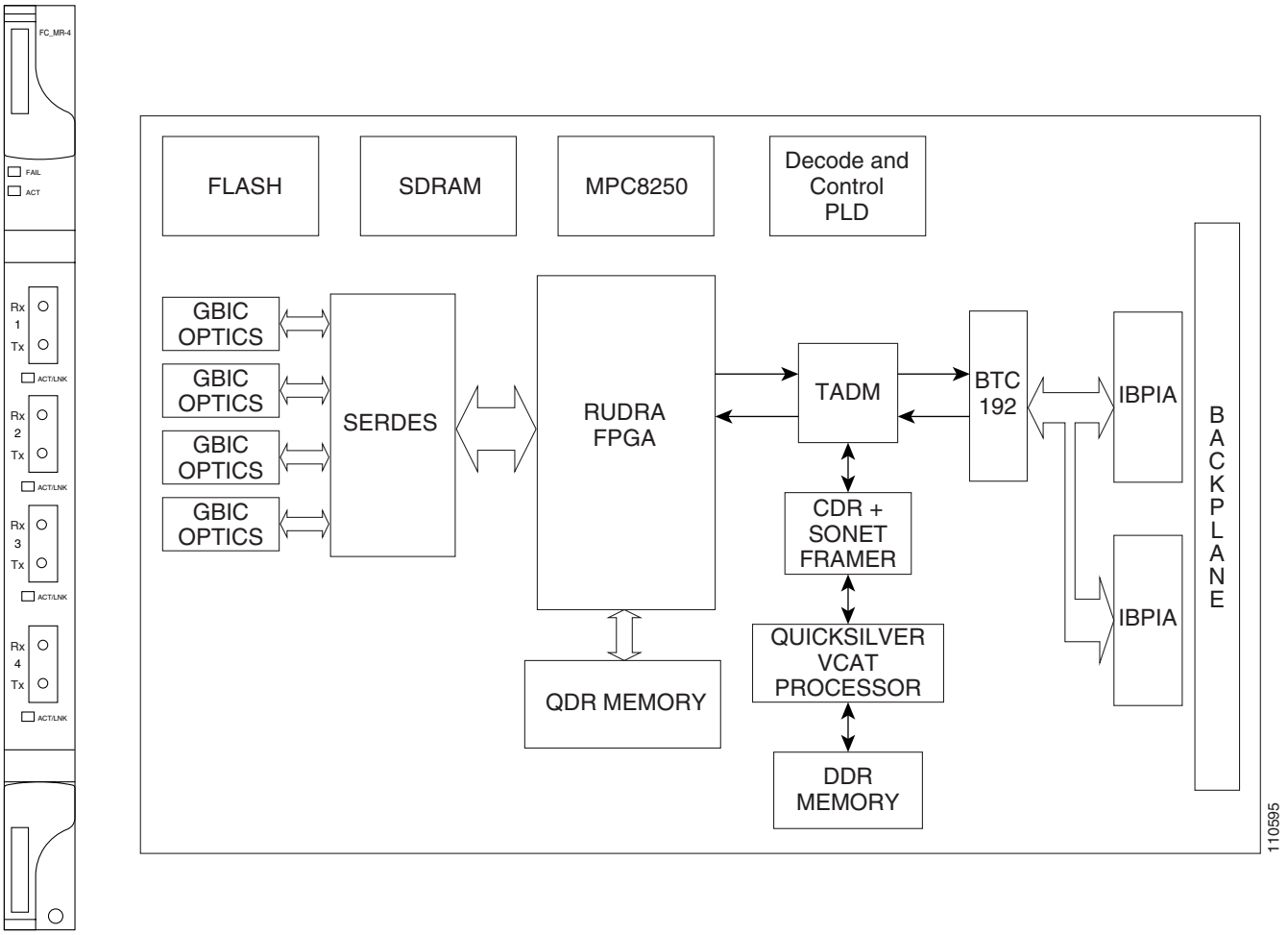
The FC_MR-4 (Fibre Channel 4-port) card uses pluggable Gigabit Interface Converters (GBICs) to transport non-SONET/SDH-framed, block-coded protocols over SONET/SDH in virtually concatenated or contiguously concatenated payloads. The FC_MR-4 can transport Fibre Channel over SONET/SDH using Fibre-Channel client interfaces and allows transport of one of the following at a time:

- Two contiguously concatenated (CCAT) STS-24c/VC4-8c circuits
- One STS-48c/VC4-16c CCAT
- Two virtually concatenated (VCAT) circuits (STC3c-8V/VC4-8v) compliant with ITU-T G.7041 GFP-T and Telcordia GR-253-CORE
- One STS-24c/VC4-8c CCAT and one STS-24c/VC4-8c VCAT

In Software Release 4.6, only two of the four ports can be active at one time.

Figure 17-1 shows the FC_MR-4 faceplate and block diagram.

Figure 17-1 FC_MR-4 Faceplate and Block Diagram



17.1.1 FC_MR-4 Card-Level Indicators

Table 17-1 describes the two card-level LEDs on the FC_MR-4 card.

Table 17-1 FC_MR-4 Card-Level Indicators

Card-Level Indicators	Description
Red FAIL LED	The red FAIL LED indicates that the card's processor is not ready. Replace the card if the red FAIL LED persists.
Green ACT LED	If the ACT LED is green, the card is operational and ready to carry traffic.
Amber ACT LED	If the ACT LED is amber, the card is rebooting.

17.1.2 FC_MR-4 Port-Level Indicators

Each FC_MR-4 port has a corresponding ACT/LNK LED. The ACT/LNK LED is solid green if the port is available to carry traffic, is provisioned as in-service, and in the active mode. The ACT/LNK LED is flashing green if the port is carrying traffic. The ACT/LNK LED is steady amber if the port is not enabled and the link is connected, or if the port is enabled and the link is connected but there is a SONET transport error. The ACT/LNK LED is unlit if there is no link.

You can find the status of the card ports using the LCD screen on the ONS 15454 fan-tray assembly. Use the LCD to view the status of any port or card slot; the screen displays the number and severity of alarms for a given port or slot. Refer to the *Cisco ONS 15454 Troubleshooting Guide* for a complete description of the alarm messages.

17.1.3 FC_MR-4 Compatibility

The FC_MR-4 cards can be installed in Slots 5, 6, 12, and 13 when used with XCVT cards. The FC_MR-4 cards can be installed in Slots 1 to 6 and 12 to 17 when used with XC10G cards. The card can be provisioned as part of any valid ONS 15454 network topology, such as path protection (CCAT circuits only), bidirectional line switched ring (BLSR), unprotected, or linear network topologies.

17.1.4 FC_MR-4 Card Specifications

The FC_MR-4 card has the following specifications:

- Environmental
  - Operating temperature

    C-Temp (15454-E100T): –5 to +55 degrees Celsius (23 to 131 degrees Fahrenheit)
  - Operating humidity: 5 to 95%, noncondensing
  - Power consumption: 60 W, 1.35 A, 221.93 BTU/hr
- Dimensions
  - Height: 321.3 mm (12.650 in.)
  - Width: 18.2 mm (0.716 in.)
  - Depth: 228.6 mm (9.000 in.)
  - Card weight: 1.17 kg (2.59 lb)
- Compliance
  - For compliance information, refer to the *Cisco Optical Transport Products Safety and Compliance Information*.

17.2 FC_MR-4 Application

The FC_MR-4 card reliably transports carrier-class, private-line Fibre Channel/FICON transport service. Each FC_MR-4 card can support up to two 1-Gbps circuits or a single 2-Gbps circuit. A 1-Gbps circuit is mapped to an STS-24c/VC4-8c (STS-3c-8v) and 2-Gbps circuits are mapped to an STS-48c/VC4-24c.

The FC_MR-4 card incorporates features optimized for carrier-class applications such as:

- Carrier-class Fibre Channel/FICON
- 50 ms of failover via SONET/SDH protection as specified in Telcordia GR-253CORE
- Hitless software upgrades
- Remote Fibre Channel/FICON circuit bandwidth upgrades via integrated Cisco Transport Controller (CTC)
- Multiple management options through CTC, Cisco Transport Manager (CTM), TL1 (for SONET only), and Simple Network Management Protocol (SNMP)

The FC_MR-4 payloads can be transported over the following protected circuit types, in addition to unprotected circuits:

- Path Protection (CCAT circuits only)
- Path-protected mesh network (PPMN)
- BLSR
- Protection channel access (PCA)

The FC_MR-4 card supports high-order virtual concatenation (VCAT). See the "10.14 Virtual Concatenated Circuits" section on page 10-27.

The FC_MR-4 uses pluggable GBICs for client interfaces and is compatible with the following GBIC types:

- ONS-GX-2FC-SML= (2Gb FC 1310nm Single mode with SC connectors)
- ONS-GX-2FC-MMI= (2Gb FC 850nm Multi mode with SC connectors)