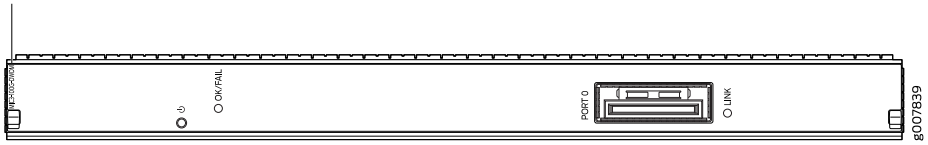
100-Gigabit DWDM OTN MIC with CFP2-ACO

MIC3-100G-DWDM



Software release	• Junos OS Release 15.1F5 and 15.1F6, Junos OS Release 17.1R1 and later For information about which MPCs support this MIC, see "MIC/MPC Compatibility" on page 26. For information about which MICs are supported on MX Series routers, see "MICs Supported by MX Series Routers" on page 18.

Description	• One 100-Gigabit DWDM OTN port
	• Power requirements (including transceiver) at different temperatures:
	  ◦ 55º C: 1.90 A @ 48 V (91 W)
	  ◦ 25º C: 1.73 A @ 48 V (83 W)
	• Weight: 2.3 lb (1.04 kg)
	• Model number: MIC3-100G-DWDM
	• Name in the CLI: **1X100GE DWDM CFP2-ACO**

Hardware features	• Dual-wide MIC that installs into two MIC slots
	• Supports CFP2 analog coherent optics (CFP2-ACO)
	• Transparent transport of a 100-Gigabit Ethernet signal with OTU4V framing
	• ITU-standard OTN performance monitoring and alarm management
	• Dual-polarization quadrature phase shift keying (DP-QPSK) modulation
	• Supports three types of forward error correction (FEC):
	  ◦ Soft-decision FEC (SD-FEC)
	  ◦ High-gain FEC (HG-FEC)
	  ◦ G.709 FEC (GFEC)
	• 100 channels on C-band ITU grid with 50-GHz spacing
	• Latency:
	  ◦ SD-FEC: 14 µs (TX + RX)
	  ◦ HG-FEC: 22 µs (TX + RX)
	  ◦ GFEC: 6 µs (TX + RX)
	• Interoperable with the CFP-100GBASE-ZR transceiver supported on the 100-Gigabit Ethernet MIC with CFP (MIC3-3D-1X100GE-CFP) on MX Series routers and the 100-Gigabit Ethernet PIC with CFP (P1-PTX-2-100GE-CFP) on PTX Series routers.
	• Interoperable with the 100-Gigabit DWDM OTN PIC with CFP2 (PTX-5-100G-WDM) on PTX Series routers when the 100-Gigabit DWDM OTN MIC is configured to use SD-FEC or GFEC.
	NOTE: The 1-port 100-Gigabit DWDM OTN MIC is not directly interoperable with the 2-port 100-Gigabit DWDM OTN PIC (P1-PTX-2-100G-WDM), but they can both operate over the same DWDM line system.

Software features	NOTE: For information about configuring the MIC, see Configuring OTN Interfaces on MIC3-100G-DWDM MIC. For information about upgrading the firmware on the PIC, see Upgrading Firmware on the 100-Gigabit DWDM OTN MIC (MIC3-100G-DWDM) .
	• Compliant with ITU G.709 and G.798
	• Provides a transport interface and state model (GR-1093)
	• Performance monitoring features such as alarms, threshold-crossing alarms, OTU/ODU error seconds and FEC and bit error rate (BER) statistics
	• SNMP management of the MIC based on *RFC 3591, Managed Objects for the Optical Interface Type*, including the following:
	  ◦ Set functionality
	  ◦ Black Link MIB
	  ◦ IFOTN MIB
	  ◦ Optics MIB
	  ◦ FRU MIB
	• Pre-FEC BER monitoring provides interrupt-driven, BER-based detection of link signal degradation for MPLS fast reroute.
	• User-configurable optics options:
	  ◦ Transmit (TX) laser enable and disable
	  ◦ TX output power
	  ◦ Wavelength
	  ◦ Receive (RX) LOS warning or alarm thresholds
	  ◦ Threshold crossing alarms (TCAs)
	User-configurable card options:
	  ◦ FEC mode (SD-FEC, HG-FEC, or GFEC)
	  ◦ TCAs

Cables and connectors	TIP: You can use the Hardware Compatibility Tool to find information about the pluggable transceivers supported on your Juniper Networks device. The list of supported transceivers for the MX Series is located at https://pathfinder.juniper.net/hct/category/#catKey=100001&modelType;=All&pf;=MX+Series. NOTE: When inserting the C form-factor pluggable 2 (CFP2) transceiver, ensure that the transceiver sits tightly in the port. You hear a distinct click sound when the latch locks into the corresponding port. The latch must be fully engaged in the corresponding port for the CFP2 transceiver to function properly. Failing to do so can result in loss of connection. To verify that the CFP2 transceiver module is inserted properly, give a gentle pull by grasping the sides of the module. The module should sit tightly.
LEDs	**OK/FAIL** LED, one bicolor: • Off—MIC is powered off. • Green—MIC is initialized and online, functioning normally. • Amber—MIC is coming online, or is in fault state. **LINK** LED, one bicolor per port: • Off—Port is offline. • Solid green—Link is up. • Red—Port failure is detected. NOTE: The port is labeled **Port 0**.

Alarms, Errors, and Events	NOTE: For OTN alarms, see Table 24 on page 176. Chassis and MIC: • MIC (FRU) inserted or removed • MIC (FRU) Administrative State: In Service, Out Of Service • MIC (FRU) Operational State: Unequipped, Init, Normal, Mismatch, Fault, Upgrade • Mismatch equipment • Temperature alarm
	Port (interface): • Interface Administrative State: In Service, Out Of Service, Service MA, Out of Service MA • Interface Operational State: Init, Normal, Fault, Degraded
	Optical channel transport unit (OTU) TCAs: • OTU-TCA-BBE—15-minute background block error TCA • OTU-TCA-ES—15-minute far-end errored seconds TCA • OTU-TCA-SES—15-minute severely errored seconds TCA • OTU-TCA-UAS—15-minute unavailable seconds TCA Optical channel data unit (ODU) TCAs: • ODU-TCA-BBE—15-minute background block error TCA • ODU-TCA-ES—15-minute far-end errored seconds TCA • ODU-TCA-SES—15-minute severely errored seconds TCA • ODU-TCA-UAS—15-minute unavailable seconds TCA TIP: You can view OTU and ODU TCAs by using the **show interfaces transport pm otn** operational-mode CLI command.
	TIP: You can view optics-related status by using the **show interfaces transport pm optics** and **show interfaces diagnostics optics** operational-mode CLI commands.

	Network lane receive-related status:
	
	• Chromatic dispersion:
	  • Current chromatic dispersion
	  • Minimum over PM interval
	  • Maximum over PM interval
	  • Average over PM interval
	• Differential group delay:
	  • Current differential group dela y
	  • Minimum over PM interval
	  • Maximum over PM interval
	  • Average over PM interval
	• Q^2-factor:
	  • Current Q^2-factor
	  • Minimum over PM interval
	  • Maximum over PM interval
	  • Average over PM interval
	• Carrier frequency offset
	  • Current carrier frequency offse t
	  • Minimum over PM interval
	  • Maximum over PM interval
	  • Average over PM interval
	• Signal-to-noise ratio (SNR)+

Table 24: OTN Alarms and Defects

Category	Alarm	Description	Link Status
OTN	LOS	Loss of signal	Link down
	LOF	Loss of frame	Link down
	LOM	Loss of multiframe	Link down
OTN FEC	FEC Degrade (OTU-FEC-DEG)	Forward error correction degraded	Link down if signal degrade or backward FRR thresholds are met
	FEC Excessive (OTU-FEC-EXE)	There are uncorrected words and there are errors in the frame header	Possible link down
OTN OTU	OTU-AIS	Alarm indication signal or all ones signal	Link down
	OTU-BDI	Backward defect identification	Link down
	OTU-IAE	Incoming alignment error	Warning
	OTU-TTIM	Destination access point identifier (DAPI), source access point identifier (SAPI), or both mismatch from expected to received	Can cause the link to be down if **otu-ttim-act-enable** is configured at the **[edit interfaces *interface-name* otn-options]**hierarchy level
	OTU-BIAE	Backward incoming alignment error	Warning
	OTU-TSF	OTU trail signal fail	Warning
	OTU-SSF	OTU server signal fail	Warning

Table 24: OTN Alarms and Defects (continued)

Category	Alarm	Description	Link Status
OTN ODU+	ODU-AIS	Alarm indication signal or all ones signal	Link down
	ODU-OCI	Open connection error	Link down
	ODU-LCK	ODU lock triggers for path monitoring and TCM+ levels 1 through 6	Link down
	ODU-BDI	Backward defect indication	Link down
	ODU-TTIM	DAPI or SAPI mismatch from expected to+ received	Can cause the link to be down if+ **odu-ttim-act-enable** is configured at+ the **[edit interfaces *interface-name+* otn-options]** hierarchy level
	ODU-IAE	Incoming alignment error	Warning
	ODU-LTC	Loss of tandem connection	Warning
	ODU-CSF	Client signal failure	Warning
	ODU-TSF	Trail signal fail	Warning
	ODU-SSF	Server signal fail	Warning
	ODU-PTIM	Payload type mismatch	Link down