

PM5441 DIGI 60G

High-Capacity 6x10G / 40G Multi-Service OTN Processor

The PM5441 DIGI 60G is part of Microsemi's 3rd generation Metro OTN processing solution for Wavelength Division Multiplexing (WDM) Platforms, Reconfigurable Optical Add-Drop Multiplexers (ROADMs), and Packet Optical Transport Platforms (P-OTP/PE-OTNs). The PM5441 DIGI 60G is a high-capacity, channelized, single-chip solution that provides a high level of flexibility and feature-integration to enable Metro OTN switching and transport deployments. The DIGI 60G enables power and cost efficient 6x10G / 40G line cards for OTN switching systems, and Transponder/ Muxponder/ADM cards with integrated ODU0/ODUflex support for OTN transport systems.

The DIGI 60G provides a rich set of framing, mapping, multiplexing and switching resources for a variety of rates and protocols including OTN, SONET/SDH, Ethernet and Fiber Channel. It can be leveraged easily across multiple applications and multiple equipment platform types to reduce OEM development cost and accelerate time to market. It can also leverage hardware and software from the DIGI 120G, which is a higher capacity device from the same product family.

The DIGI 60G delivers the following key technologies and capabilities:

Integrated ODU0/ODUflex Framing, Mapping and Switching:

Supports up to 48x ODU0/ODUflex channels to enable efficient scaling and transport of packet bandwidth without affecting service

Industry-leading 9.45dB Gain Swizzle Enhanced FEC:

High performance and low latency Forward Error Correction (FEC) algorithm delivers 9.45dB of coding gain for 40G OTN links

OIF Compliant OTN-Over-Packet Fabric Protocol:

Enables OEMs to deliver high-capacity OTN/Hybrid/Packet switching line cards using off-the-shelf or proprietary switch fabric solutions

Carrier Ethernet Transport:

Onboard Ethernet MACs provide support for Timing over Packet (IEEE 1588v2/PTP), Synchronous Ethernet (SyncE) and Ethernet Link OAM (IEEE 802.3ah) on every port

Highlights

Unprecedented service delivery and network deployment flexibility:

- Supports the widest range of multi-service client mappings into OTN
- Delivers industry-leading 9.45dB "Swizzle" 40G/100G EFEC Multi-stage OTN multiplexing enables compatibility and interoperability between network nodes
- Enables full SNCP-based protection switching for ring, point-to-point, or meshed network topologies

Universal line card solution simplifies service provider network deployment and inventory management, providing OPEX and CAPEX savings.

Optimized power and footprint for OEMs:

- Connects directly to a wide range of 10G, 40G, and 100G optical module types including XFP, SFP+ (limiting), QSFP and 40G/100G MSAs
- Generates all client protocols and device interface rates from internal PLLs with a single external reference clock
- Delivers a single-chip "platform" solution for multiple line card applications across multiple system platforms
- Provides glueless interconnect to many off-the-shelf NPs and switch fabrics

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Line/Client Interfaces

Multi-rate SERDES for configurable interface types to 10G, 40G, or 100G optical modules

Any-Service configurable to support:

- 10G: OTU2/1e/2e/1f/2f, 10GE LAN, FC-800, FC-1200, 5G/10G GDPS, CPRI up to 9.8G, OC-192/STM-64
- 40G: OTU3/3e1/3e2, 40GE, OC-768/STM-256

Comprehensive per-port ingress and egress client performance monitoring

Forward Error Correction (FEC)

Industry compatible ITU-T 10G and 40G FECs

Microsemi's industry-leading "Swizzle" EFEC with 9.45dB coding gain for OTU3 and OTU4

Dedicated FEC statistics interface for comprehensive statistics gathering and performance monitoring for use in EDC and amplifier tuning

OTN Subsystem

OTU4, OTU3/3e1/3e2, OTU2/1e/2e/1f/2f, ODU4, ODU3, ODU2, ODU1, ODU0 and ODUflex processing

Up to two stages of ODTUjk multiplexing

Channelized to support up to 48 ODU0/ODUflex

Integrated hardware support for hitless adjustment of ODUflex

ODUk delay measurement for testing latency across a network

Fully flexible OTU, ODU and OPU overhead insertion (OH) and extraction over an optional dedicated OH interface

ODUk Tandem Connection Monitoring (TCM)

Integrated on-chip ODUk switch

Optional Ring Control Port (RCP) for dedicated reporting of alarms and defects

OTN Mapping Subsystem

Maps a variety of client protocols over OTN:

- AMP, BMP, GMP, and GFP-F, as per G.709
- ODUflex(CBR) and ODUflex(GFP)
- 10GE mapping into OTN, compliant with ITU G.Sup43 6.2, 7.1, 7.2 and 7.3

Flexible packet mapping of Ethernet, IP, and MPLS from Interlaken into ODUk channels

Microsemi's OTN Phase Signaling Algorithm (OPSA) for rate encoding and adaptation of transparent client data streams over OTN

Ethernet Subsystem

Integrated IEEE 802.3 compatible physical coding sub-layer (PCS) and media access controllers (MAC) for 10GE, 40GE, and 100GE.

Supports frame sizes of 64 bytes to 9.6 Kbytes.

Comprehensive per-port Ethernet statistics and performance monitoring

Integrated 10GE and 40GE Transcoders.

Transmit and receive of IEEE 802.3ah Link OAM, LACP and Management VLAN messages.

Firmware-based, hardware assisted G.8261 Synchronous Ethernet (SyncE) and IEEE 1588v2 PTP Timing over packet support

Integrated on-chip central packet buffer.

Interlaken System Interfaces

Configurable Single or Dual Interlaken up to 24 lanes

Configurable Multi-rate, Multi-reach SERDES supporting 3.125 Gbps to 12.5 Gbps

Each Interlaken can be configured to support ODUk traffic only, Data Packet traffic only, or simultaneous mixed ODUk and Data Packet traffic.

Supports in-band or out-band flow control.

Supports OIF compatible OTN-over-Packet Fabric Protocol (OPF)

Support Interfaces

PCIe for microprocessor access

155.52 MHz Reference Clock Interface

Optional:

- IRIG/TOD/1PPS Interface for PTP/1588v2 synchronization
- Programmable Recovered Clock Interface
- Ring Control Port
- OTN Overhead Insert/Extract Interface
- Management Ethernet Port for PTP, SyncE and Link OAM
- FEC Statistics Interface

Applications

Multi-service 6x10G / 40G client and hybrid cards for P-OTP/PE-OTNs

Packet to OTN Interworking cards for P-OTP/PE-OTNs

High capacity 10G / 40G Transponder, Muxponder and ADM cards for WDM/ROADMs

Compact Metro WDM/ROADM platforms

Channelized OTN Line Cards for Routers