PM5441 DIGI-60G
High-Capacity 6x10G/40G Multi-Service OTN Processor

Summary

The PM5441 DIGI-60G is part of Microchip'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.

Key Technologies and Features

Integrated ODU0/ODUflex Framing, Mapping and Switching

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

Industry-Leading 9.45 dB Gain Swizzle Enhanced FEC

- High-performance and low-latency Forward Error Correction (FEC) algorithm delivers 9.45 dB 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

- On-board 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

Lowers Service Provider CAPEX and OPEX for Metro 100G Deployments

- Universal line card solution simplifies service provider network deployment and inventory management

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 configrable interface types to 10G, 40G or 100G optical modules. Any-Service configurable to support:

- 10G: OTU2, 10GE LAN, FC-800, FC-1200, 5G/10G GDPS, CPRI up to 9.8G, OC-192/STM-64
- 40G: OTU3, 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
- Microchip's industry-leading "Swizzle" EFEC with 9.45dB coding gain for OTU3 and OTU4

OTN Subsystem

- OTU4, OTU3, OTU2, ODU4, ODU3, ODU2,ODU1, ODU0 and ODUflex processing
- ODTUjk multiplexing
- Channelized to support ODU0/ODUflex
- Integrated hardware support for hitless adjustment of ODUflex
- 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

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
- Flexible packet mapping of Ethernet, IP and MPLS from Interlaken into ODUk channels
- 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)
- Supports frame sizes of 64 bytes to 9.6 Kbytes
- Comprehensive per-port Ethernet statistics and performance monitoring
- Transmit and receive of IEEE 802.3ah Link OAM, LACP and management VLAN messages.
- G.8261 Synchronous Ethernet (SyncE) and IEEE 1588v2 PTP Timing over packet support
- Integrated on-chip central packet buffer

Interlaken System Interfaces

- Configurable Interlaken up to 24 lanes
- Configurable Multi-rate, Multi-reach SERDES supporting 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 OIF compatible OTN-over-Packet Fabric Protocol (OPF)

Support Interfaces

- PCIe for microprocessor access
- 155.52 MHz Reference Clock 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

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