

# MSC7104 GPON: Integrated GPON ONT System-on-Chip

## Overview

The MSC7104 GPON is a System-on-Chip (SoC) solution for broadband passive optical network termination (ONT) applications. It integrates a GPON TC/MAC, Gigabit Ethernet (GbE) TC/MACs and a clock and data recovery (CDR) unit to a core built on Power Architecture® technology.

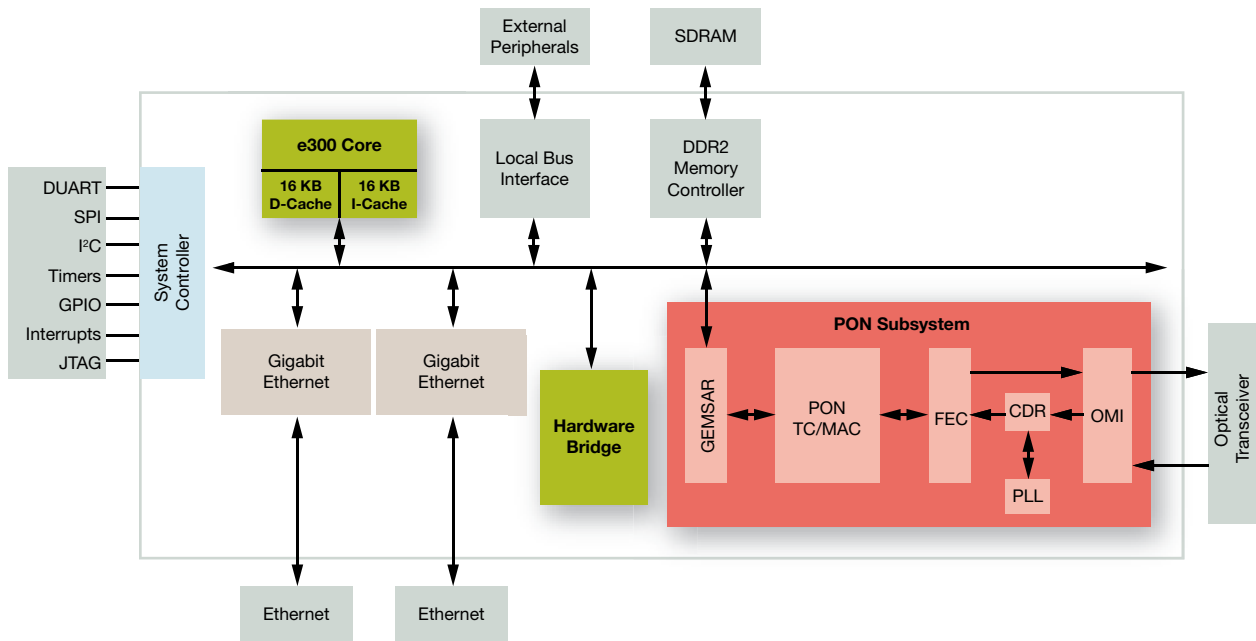
The MSC7104 GPON provides a highly integrated solution designed to minimize ONT costs through silicon integration and a reduction of external components. The MSC7104 GPON SoC device is based on Freescale's e300 processor platform built on Power Architecture technology, which provides the foundation for the company's

PowerQUICC® II Pro communications processor family. The MSC7104 GPON device's e300 core operates at 266 MHz and includes a 16 KB instruction cache and a 16 KB data cache. The SoC integrates a DDR2 memory controller, a PowerQUICC II-compatible local bus controller, two 10/100/1000 Ethernet controllers, a dual universal asynchronous receiver/transmitter (DUART), I<sup>2</sup>C, a serial peripheral interface (SPI), an interrupt controller and parallel general-purpose input/outputs (GPIOs).

The PON subsystem is based on a GPON layer termination device as specified in ITU-T G.984. The PON subsystem integrates the TC/MAC function as well as the CDR

function; it further supports Advanced Encryption Standard (AES), Forward Error Correction (FEC) and dynamic bandwidth reporting per the FSAN requirements. A hardware bridge ensures that a high-throughput data path is available with minimum intervention required by the e300 core. Further, the PON subsystem leverages Freescale's leadership in B-PON products and mixed-signal technology. Built on third-generation Freescale PON technology, the MSC7104 is a cost-reduced version of the groundbreaking MSC7120 device that has been deployed in large volumes worldwide. It features proven interoperability with many of the world's top carriers.

## MSC7104 GPON Block Diagram



## MSC7104 GPON Features

### PON Subsystem

- Integrated CDR
- Support for GPON mode per ITU-T G.984.1, 984.2, 984.3 and 984.4 standards
- Down/upstream rate: up to 2.4 Gbps/1.2 Gbps
- Upstream traffic scheduler
- Support for up to 38 allocation IDs and 39 port IDs
- 64-entry IP group address filter for in-line video distribution support

### Hardware Bridge

- Filters and forwards packets between the e300 and two GbE TC/MACs with no processor overhead
- Video packets switched in hardware with no processor overhead

### e300 Power Architecture Core Processor

- 32-bit, high-performance, superscalar processor core
- 511 Dhrystone 2.1 MIPS at 280 MHz (1.92 DMIPS/MHz) with 16 KB I/D-caches
- Load/store, system register and branch processor units and two integer units
- Dynamic power management

### DDR2 Memory Controller

- 32-bit data interface, up to 280 MHz data rate
- Page mode support for up to four simultaneous open pages

### Dual 10/100/1000 Ethernet TC/MAC Controllers

- Two 10/100/10000 Ethernet interfaces with GMII, RGMII, MII and FIFO8 physical interfaces
- Each TC/MAC supports eight priority transmit/receive rings, transmit scheduler/receive filter
- L2, L3 and L4 filing, VLAN tag insertion and extraction

### Local Bus Controller

- 26-bit address bus and 16-bit/8-bit data bus and data operating up to 66 MHz
- 8-bit and 16-bit port sizes controlled by on-chip memory controller

### Peripherals, Miscellaneous I/Os

- DUART
- I<sup>2</sup>C and SPI interfaces
- TDM port available for DSP functions
- JTAG test access port
- Up to 48 parallel GPIOs

### Technology

- 90 nm, 1.0V core and 1.8/2.5V I/O
- 456 TEPBGAI1, 35 mm x 35 mm, 1.27 mm pitch

### Software and Systems Enablement Support

#### e300 Power Architecture Software and Support

- Linux<sup>®</sup> operating system, standard TCP/IP stack ported
- Drivers for bridge, LAN and PON

#### Systems Enablement

- Reference design kit, debug environment
- ONT Management and Configuration Interface software reference stack from OpenCon Systems

### Learn More:

For current information about Freescale products and documentation, please visit [www.freescale.com/PON](http://www.freescale.com/PON).



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