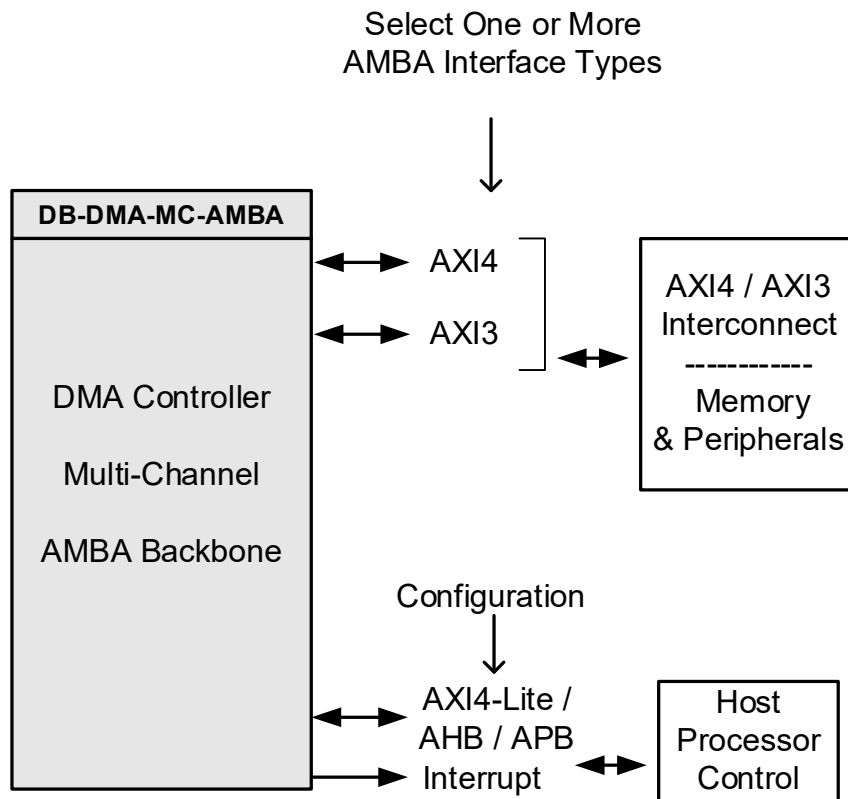


### General Description

The Digital Blocks DB-DMAC-MC-AXI Verilog RTL IP Core is a Multi-Channel DMA Controller supporting 1 – 32 independent data transfers. The Direct Memory Access (DMA) Controller IP Core contains 1 - 32 DMA Controller Engines (i.e. DMA Channels), with user selectable AMBA AXI4 / AXI3 Master Read/Write interconnects. The DB-DMAC-MC-AXI excels at high data throughput on both small and large data sets. Standard IP releases of number of DMA Controller Engines are 1, 2, 4, 8, 16, and 32.

Figure 1 depicts the DMA Controller IP Core. The individual internal DMA Controller Engines are geared to perform high-bandwidth data transfers among memory and peripherals via the AXI4 / AXI3 interconnects.



**Figure 1: DB-DMA-MC-AXI – DMA Controller - Multi-Channel**

## Features

- 1 - 32 Multi-Channel High Performance DMA Controller Engines:
  - High-Speed Finite State Machine Control
  - High Throughput to/from Memory via AMBA AXI4 / AXI3 on both small and large data sets
  - Dual-Port, Single-Clock FIFO, user parameterized in Depth x Width.
  - Optional Dual-Port, Dual-Clock FIFO design
- Supports following DMA transfers:
  - Memory-to-Memory
  - Memory-to-Peripheral
  - Peripheral-to-Memory
  - Peripheral-to-Peripheral
- Up to 32 DMA transfers in parallel
- Sideband DMA Request/Grant triggering transfers as an option for peripherals
- Scatter Gather List (SGL):
  - processing of linked-list Descriptor nodes
  - supports non-contiguous data block transfers to a contiguous segment of memory and vice versa
- Variety of User DMA Transfer Control:
  - Link-List Processor for Autonomous & Chained Block Transfers (SGL)
  - CPU Software or external Hardware initiated transfers
- Targets PCIe or CPU DMA Controller in Linux environment as well as applications with unique peripheral data transfer requirements
- Arbiter – High & Low Priority Round Robin Arbitration
- Individual Interface Data Widths: 8 / 16 / 32 / 64 / 128 / 256 / 512 / 1024.
- Programmable Data Burst Capability: 1, 4, 8, 16 on AXI3 and up to 256 on AXI4
- AXI4 Quality of Service (QoS) programming per DMA Channel (Option)
- AXI4-Stream to AXI Memory Map Conversion – external Digital Blocks IP to connect-in AXI4-Stream Interface (Please Contact Digital Blocks for more information) (Option)
- Interrupt Controller – Signaling DMA Status - Transfer Done & Diagnostics
- Fully-synchronous, synthesizable Verilog RTL core, with rising-edge clocking, no gated clocks, and no internal tri-states, for easy integration into FPGA or ASIC design flows.

## Verification Method

The DB-DMAC-MC-AXI DMA Controller IP Core contains a test suite that programs the Controller and sources and receives with checking data transfers.

The DB-DMAC-MC-AXI DMA Controller IP Core has been implemented in a variety of Digital Blocks IP, including the 2D Graphics Hardware Accelerator, and Low Latency / High-Speed Networking RTP/TCP/UDP/IP Protocol Stack Processor.

The DB-DMAC-MC-AXI DMA Controller IP Core has been implemented in customer unique applications.

## Customer Evaluation

Digital Blocks offers a variety of methods for prospective customers to evaluate the DB-DMAC-MC-AXI DMA Controller IP Core. Please contact Digital Blocks for additional information.

## Deliverables

The DB-DMAC-MC-AXI is available in synthesizable RTL Verilog or a technology-specific netlist for FPGAs, along with Synopsys Design Constraints, a simulation test bench with expected results, datasheet, and user manual.

## Ordering Information

Please contact Digital Blocks for additional technical, pricing, evaluation, and support information.

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