



Overview

The Open Core Protocol (OCP) establishes the first *openly licensed, core-centric protocol* to meet contemporary system-level integration challenges. OCP comprehensively defines an efficient, bus-independent, configurable and highly scalable interface for on-chip subsystem communications. With broad industry support and collaboration, OCP International Partnership (OCP-IP) now offers the 2.2 version specification that further extends capabilities in increasingly important areas such as very high performance multithreading, synchronization primitives and single-request/multiple-data transactions. OCP data transfer models range from simple request-grant handshaking through pipelined request-response to complex out-of-order operations.

Legacy IP cores are readily adapted to OCP, while new implementations may take full advantage of advanced features: designers select only those features and signals encompassing a core's specific data, control and test configuration. Core definition using OCP encapsulates a complete system integration description enabling *core and test bench reuse without rework*. Not only does OCP provide clear delineation of design responsibilities for core authors and System-on-Chip (SoC) integrators, but also institutes a key partitioning formalism for verification engineers and automation software.

Highlights

The OCP promotes IP core reusability and reduces design time, design risk and manufacturing costs for SoC designs. It focuses exclusively on IP core interfacing without pre-empting interconnect topology or other application-specific integration choices.

- Enables IP core creation to be independent of system architecture and application domain
- Describes all inter-core communications
- Optimizes die area by configuring into the OCP interface only those features needed by the core
- Specified timing categories assure core interoperability
- Facilitates rapid, plug-and-play IP integration

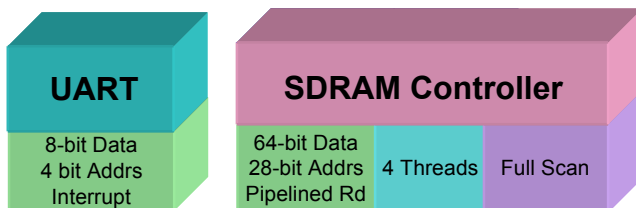
Advantages

- The *de facto* open standard with industry wide support
- Eliminates the ongoing task of interface protocol (re)definition, verification, documentation and support
- Readily adapts to support new core capabilities
- Testbench portability simplifies (re)verification
- Limits test suite modifications for core enhancements
- Interfaces to any bus structure or on-chip network
- Delivers industry-standard flexibility and reuse
- Point-to-point protocol can directly interface two cores

Capabilities

The OCP captures all core characteristics without restricting system arbitration, address map, etc.

- Small set of mandatory signals, with a wide range of optional signals
- Synchronous, unidirectional signaling allows simplified implementation, integration and timing analysis
- Configurable address and data word width
- Structured method for inclusion of sideband signals: high-level flow control, interrupts, power control, device configuration registers, test modes, etc.
- Transfers may be *pipelined* to any depth for increased throughput
- Optional burst transfers for higher efficiency
- Multiple concurrent transfers use *thread identifiers* for out-of-order completion
- *Connection identifiers* provide end-to-end traffic identification for differential quality of service, etc.
- Synchronization primitives include atomic test-set, lazy synchronization, non-posted write commands
- Cache coherence extensions
- Power management



Complete spectrum of core signaling can be handled by a single protocol – the OCP

The Open Core Protocol Specification is available at:
www.ocpip.org

