SATA RAID Core
DATASHEET

The IntelliProp SATA RAID Intellectual Property Core (IPR-RD100CF) is a hardware design block written in HDL that performs RAID 0 and RAID 1 operations to provide either higher performance access to disks or uninterrupted data access even with disk failure.

Overview

RAID can improve reliability and availability of storage so that important data is not lost in the event of hardware failure. RAID can also divide and replicate data among multiple hard disks providing higher system storage performance. These goals can be achieved in one of three ways:

- **Striping** (RAID 0) splits the data across multiple disks for greater performance.
- **Mirroring** (RAID 1) allows for the writing of identical data to more than one disk for data backup.
- **Error Correction** (RAID 5) provides for redundant data to be stored to allow problems to be detected and possibly fixed during operation. This provides high reliability and availability of data.

The IntelliProp RAID IP Core introduces very little latency to issue commands and to transfer data between the SATA storage devices and the backend data interface. The RAID IP Core is designed to exist within a customer's larger design to provide RAID performance availability and reliability advantages.

Applications

RAID allows multiple hard disk drives into a single logical unit to provide one or more of the following characteristics:

- Protection against data loss.
- Provision of real-time data recovery with uninterrupted data access during both drive failure or data recovery.
- Increased system uptime and network availability.
- Multiple drives working in parallel to increase system performance.

Features

- Hardware-only RAID; Firmware is not needed
- Can work for 2^n number of drives
- Supports RAID Levels 0 and 1
- Supports 3GHz speed
- Achieves up to 2x performance with minimum 2 drives
- Low gate count
- Support concatenation mode
- Available for integration within ASIC or popular FPGAs
- Fully compliant with SATA GEN2 industry specification
- Automatic speed negotiation supporting GEN1 and GEN2 SATA speeds
- SATA Host interfaces of the RAID Controller utilize IntelliProp's proven SATA Logic Cores.
- SATA Host interfaces are compliant to the industry SATA specification

IntelliProp Inc.

IPR-RD100CF
RAID Core

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Demonstration

Please contact IntelliProp for a demonstration or evaluation of the RAID Core.

Support

Please contact IntelliProp for further information on supported vendors and devices.

Block Diagram

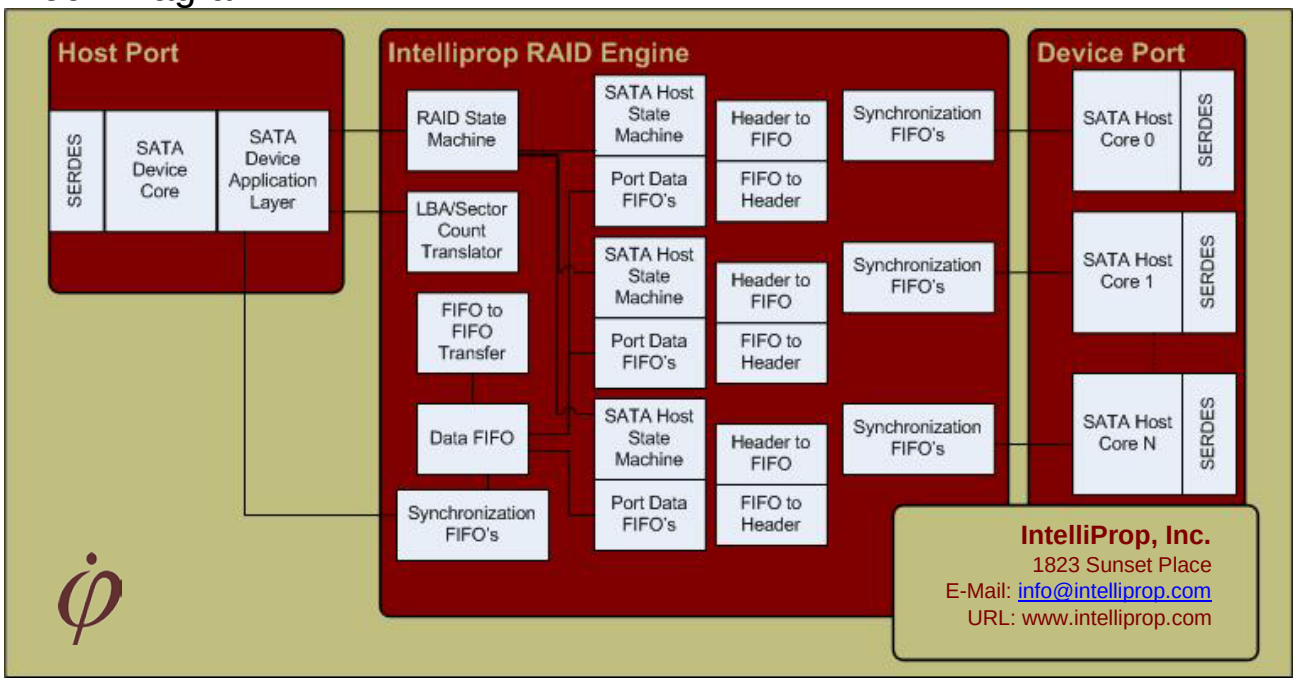

Figure 1. SATA RAID Core

SATA Hardware RAID Core Architectural Overview

The hierarchy of the RAID design can be divided into 2 main blocks:

- SATA Cores
- RAID Engine

The SATA interface to each drive is implemented with the IntelliProp SATA core configured as a SATA host.

The RAID Engine consists of an LBA/Sector Count translator, a data router (FIFO to FIFO XFER) and a RAID State Machine. Additionally, for each drive connection, there is an ATA Host State Machine and a DATA FIFO. The RAID engine implements a hardware LBA and sector count translator to convert incoming requests to the appropriate LBA's and Sector Counts to each drive. The FIFO to FIFO XFER block routes data in the proper order between the host interface and the data FIFO's of each device connection. The RAID state machine interprets incoming requests and initiates traffic via the ATA Host State Machines. The ATA Host State Machines generate SATA application level functionality and interface to the SATA cores. All data is routed through the bi-directional data FIFO's.