

# Mil1394 AS5643 Link Layer Controller IP Core

## = IP Core for 1394 AS5643

### Applications

- Vehicle System - Remote Node
- Vehicle System - Vehicle Management Computer
- Avionic Mission Systems

### Benefits

- Increased performance with hardware-based AS5643 offload
- Additional diagnostics and programmable operation features
- Leverage proven technology for standard interface implementation
- Hardware offload moves strict AS5643 timing from software to hardware

### Features

- AS5643-compliant interface with hardware-based STOF offload
- Hardware DMA engines with message label mapped buffers
- STOF transmitter and receiver hardware functions
- Supports S100/S200/S400 data rates
- Configurable number of nodes and ports in a single FPGA
- AXI-based host interface for embedded or PCIe-based processors

### Overview

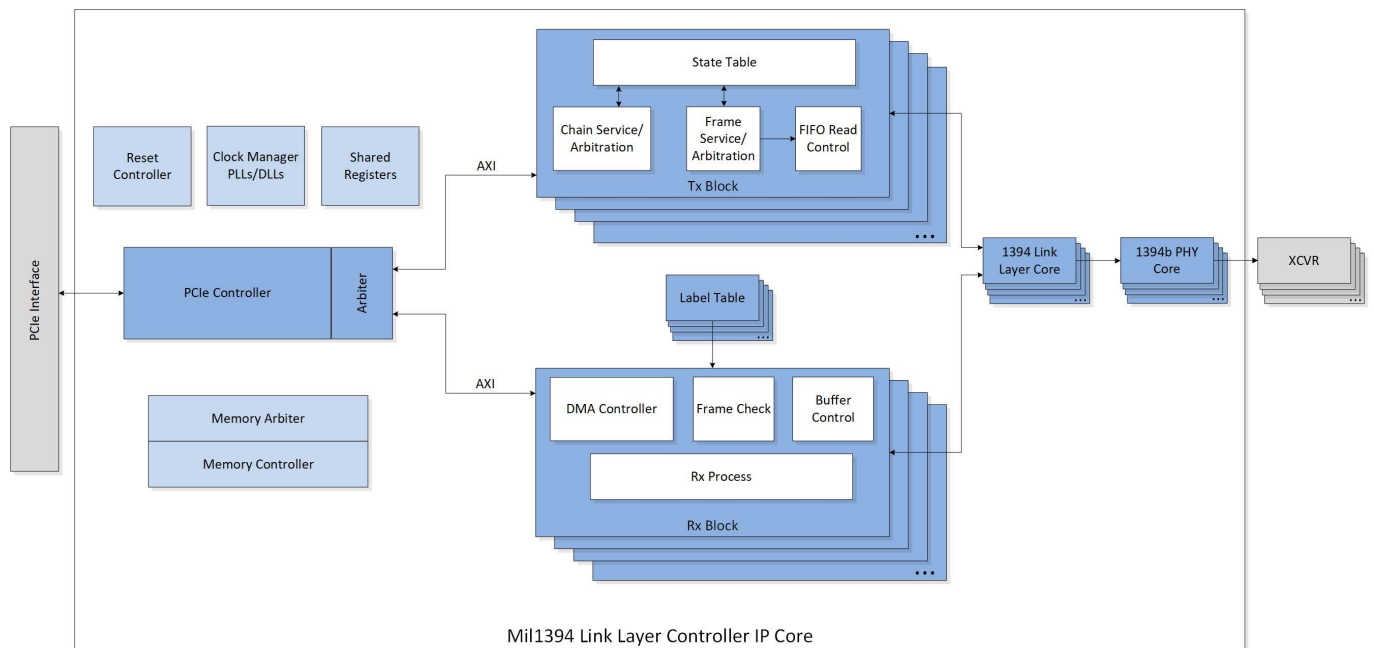
The New Wave Design and Verification (New Wave DV) Mil1394 AS5643 Link Layer Controller IP Core (Offload Engine) provides a complete hardware IP solution for the 1394 AS5643 protocol.

The Offload Engine provides hardware-based AS5643 message label filtering, hardware mapping of AS5643 message label to host memory, and complete offload of Mil1394 message handling including: Asynchronous Transmit, Isochronous Receive, STOF receive/transmit handling, STOF regulated transmit functions, Self ID operations, vertical parity, and CRC generation/checking.

The host interface to the core can be AXI or PCIe. The core is built for dropping into an FPGA and providing the complete design from processor interface to Mil1394 network interface.

This core is targeted towards applications in aerospace and has been used on a wide range of parts at varying operating rates. The core comes with test-benches and example code, making design integration a straightforward task.

Evaluation versions of the Offload Engine are available and New Wave DV has a set of standard form factor boards featuring FPGAs, 1394b connectors and transformers, and off-the-shelf reference designs for quick evaluation of the IP core.



# Mil1394 AS5643 Link Layer Controller IP Core

= \ ' IP Core for 1394b AS5643

## Functional Description

The AS5643 Offload Engine Link Layer Controller IP Core is specifically optimized for AS5643 applications. Vehicle System Networks (flight controls) require deterministic behavior to ensure timely dissemination, processing and response of all information to ensure deterministic behavior and meet safety of flight and vehicle performance requirements. Often referred to as a Network Interface Controller (NIC), the IP Core provides an interface from the host to the 1394b network following the AS5643 specification.

The Offload Engine moves AS5643's strict timing requirements through hardware-based STOF message timing, in addition to providing ASM offload, to ensure multiple transmitted messages are sent at the correct offset times. For receive, the AS5643 Offload Engine provides ASM packet Message-ID-based filtering designed to efficiently place each message directly into host designated memory location.

The Offload Engine manages the low-level details of the ASM protocol such as packet formatting, the creation, checking, and discarding of ASM headers and trailers, and vertical parity generation/checking. It also adds 1394 headers and trailers and performs Cyclic Redundancy Check (CRC) generation and checking. For populating the Node ID in the ASM header for a transmit message, the Offload Engine automatically fetches the Node ID from the Link block.

## Our Commitment

New Wave DV is committed to providing the latest innovations in technology, architectures, and techniques to keep our customers one step ahead of the rest. Our products, complete with the Development Framework, are intended to offer our customers an entirely unique out-of-the-box experience.

## Technical Specifications

**Core is delivered in netlist format including constraint files.**

### SUPPORTED DEVICES

AMD (Xilinx): Virtex, Kintex, Artix, Zynq FPGAs  
Intel (Altera): Stratix, Arria, Cyclone FPGAs  
Microchip (Microsemi): SmartFusion2, Iglou2 FPGAs

### SUPPORTED RATES

S100/S200/S400

### OPERATING FREQUENCIES

S100: 12.288Mhz  
S200: 24.576MHz  
S400: 49.152MHz

## Mil1394 AS5643 Host Adapter Cards

In addition to the Mil1394 AS5643 Link Layer Controller IP Core, New Wave DV provides standard form factor 1394b interface cards that incorporate the 1394b AS5643 interface core along with high performance DMA engines and software drivers. Available in PMC/XMC/PCle form factors, New Wave DV Mil1394 cards provide up to 30 ports in a single card.

## Complete Product Support Program

Our customers can attest to our exceptional support. New Wave DV provides an industry-standard warranty on its products, but it is the human factor that makes our support so valuable to our customers. Our team takes the time and effort to ensure a positive customer experience.

## Ordering Information

700-FW400-00-A0 (Altera), M0 (Microsemi), X0 (Xilinx): 1394b AS5643 IP Core, S100/S200/S400 rate support

700-FW400-10-A0 (Altera), M0 (Microsemi), X0 (Xilinx): 1394b AS5643 IP Core, includes PHY and Link Layer cores, S200/S400 rate support

Other product configurations are available. Please contact us.

### FOR MORE INFORMATION

www.newwavedv.com  
info@newwavedv.com  
Phone +1 952-224-9201

New Wave DV  
10260 Viking Drive, Ste 250  
Eden Prairie, MN 55344 USA

