

Features

- **1.5 Gbps Bi-directional Transceiver**
 - Compliant with Serial ATA Gen1 Revision 1.0a Specification
- **Low Power Operation**
 - 75 mW per Channel Nominal
- **Key Blocks Include**
 - Integrated OOB Processor
 - K28.5 COMMA Detection
 - Digital Clock and Data Recovery (CDR) with Digital Equalization
 - Spread Spectrum Clocking
 - Optional 8B/10B Encoder and Decoder
- **Parallel I/O**
 - Synchronous 8-bit/10-bit Parallel Interface @ 150 MHz
- **Serial I/O**
 - Programmable Pre-emphasis
 - Support for Spread Spectrum Clocking
 - Integrated 100Ω Matched Differential Termination
 - AC and DC Coupling Support
- **Test Features**
 - Far-end and Near-end Loopback Support
 - At Speed BIST

Overview

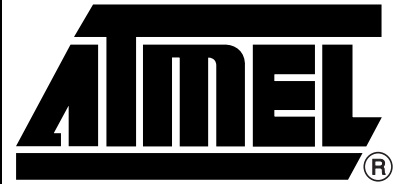
The AT78C5091 is a 1-channel SATA PHY supporting Gen 1 speeds of 1.5 Gbps. The IP has been designed based on the requirements stated in the Serial ATA Standard, Rev 1.0a, Jan 2003.

On the transmit path, parallel data is registered, passed through a transmit FIFO to compensate for phase differences between the link and PHY clocks, 8B/10B encoded and then passed out via a high speed serializer using a spread spectrum clock. Built-in flexibility permits bypassing the encoding block in addition to optionally disabling the spread spectrum clocking. The user can control the transmit buffer output swing and pre-emphasis levels via direct input signals.

On the receive path, the AT78C5091 performs the serial-to-parallel conversion, using a high bandwidth clock and data recovery (CDR) block. The recovered data is then passed through a comma alignment block and an optional 8B/10B decode block before being passed to the phyCtrl layer via a parallel interface. This interface is synchronous to the recovered clock.

The PHY core has an out of band (OOB) processor. As specified by the Serial ATA standard, three out of band (OOB) signals are used/detected by the PHY, namely COMRESET, COMINIT, and COMWAKE. Each of these signals are indicated by a number of bursts of four ALIGN primitives followed by defined idle periods during which the differential voltage on the serial line is null. OOB signals are observed by detecting the temporal spacing between adjacent bursts of activity.

Test functions including BIST, scan, parallel and serial loopback modes are configured and controlled by the use of direct input signals. Similarly, error/status bits are indicated through direct output signals such as bistErr.



1-channel Serial ATA PHY

AT78C5091

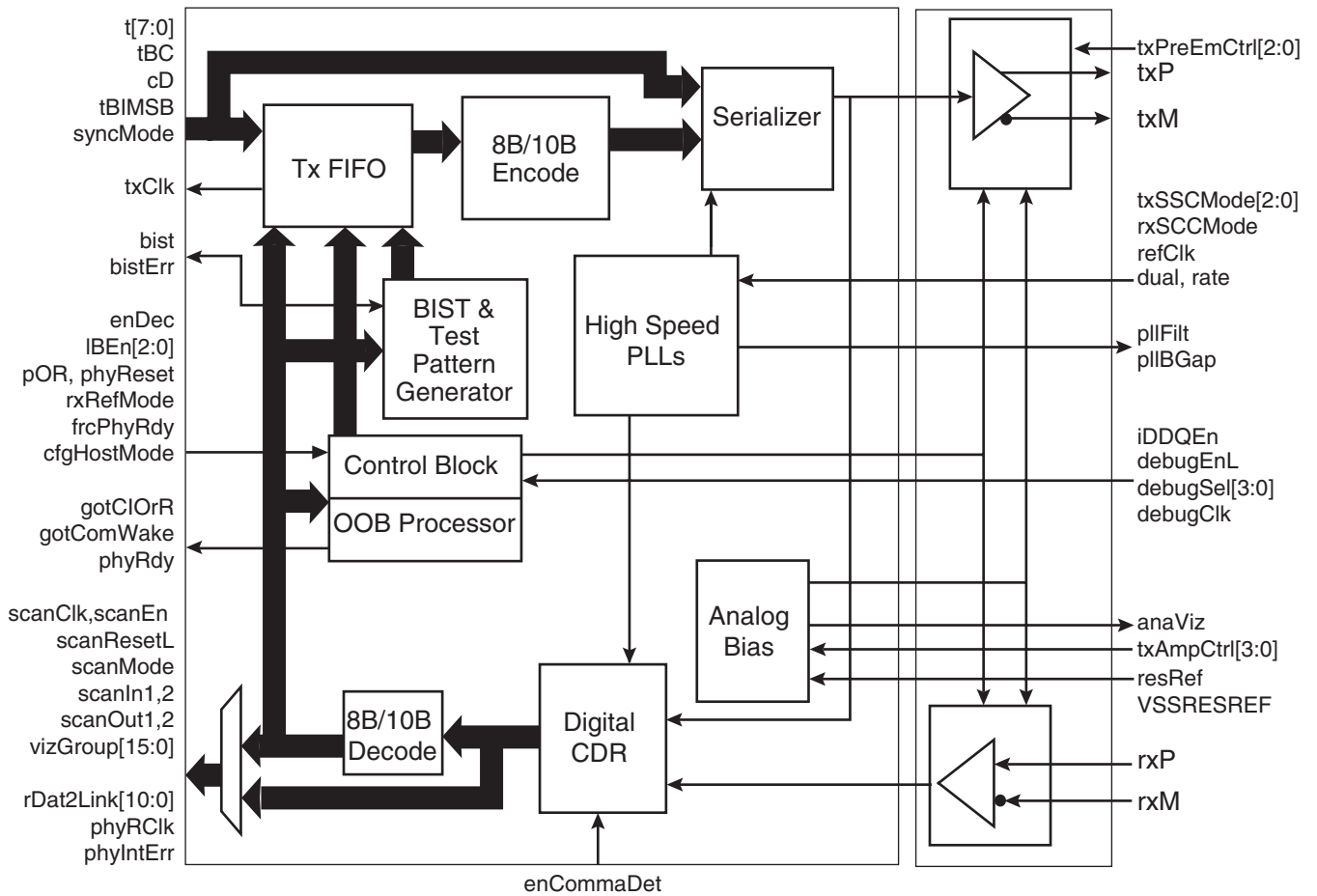
Summary

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Note: This is a summary document. A complete document is available under NDA. For more information, please contact your local Atmel sales office.

Block Diagram





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