

SATAIP

Serial ATA Transport & Link Layer IP Core

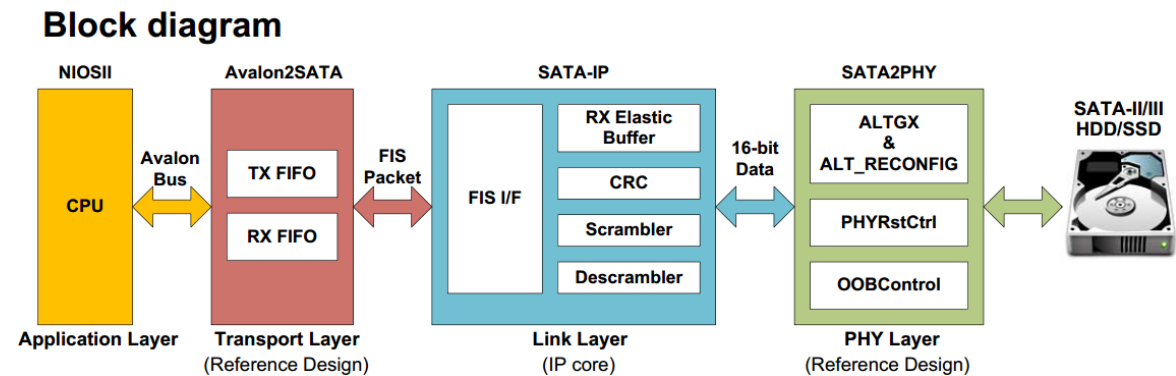
SATA IP Core, 4CH RAID0 Demo
On REFLEX CES's **ALARIC Instant-DevKit**
ARRIA 10 SoC FMC IDK

SATA-IP Core

SATA IP core provides link layer to implement SATA channel to Intel FPGAs. It supports SATA3 (6Gbps) and matches with SATA3 SSDs. It can connect with SSD/HDD without external PHY chip. The IP core license includes the reference design for Intel FPGA boards to shorten development time and reduce the cost.

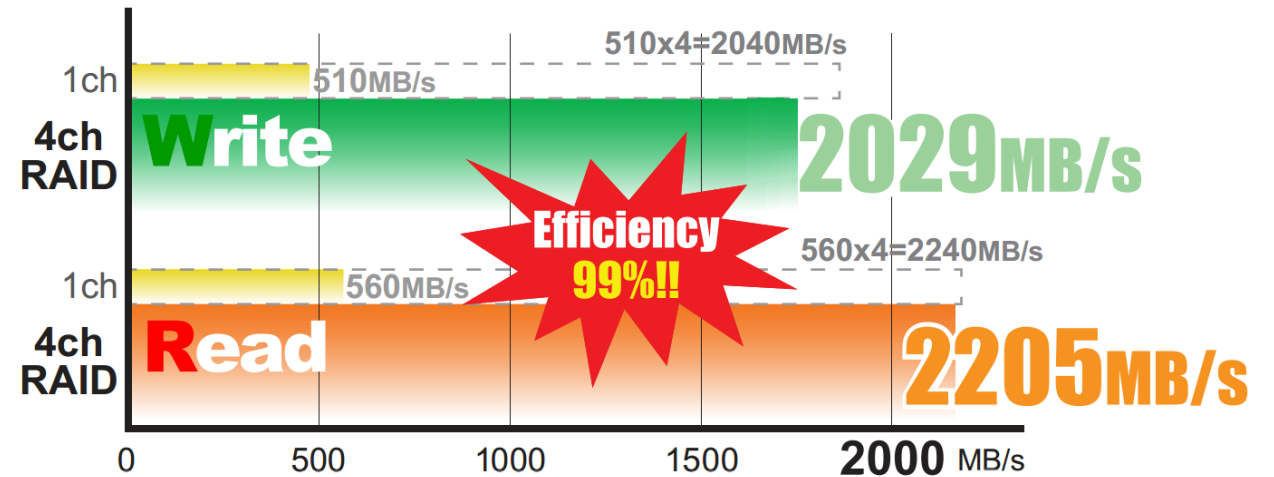
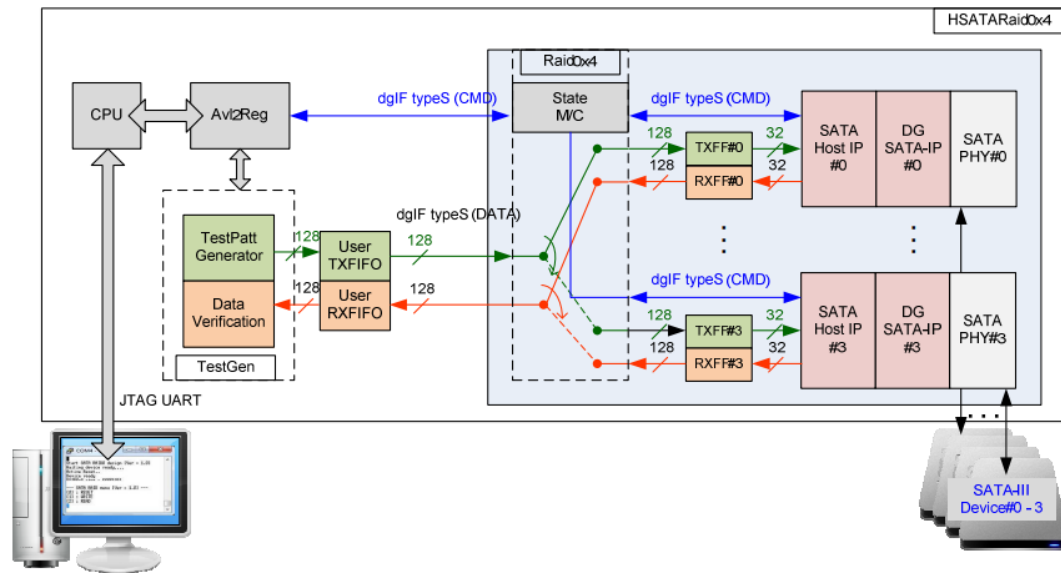
Key features

- Compliant with SATA 3.0 6Gbps
- Support both Host and Device side
- FAT32-IP & Host-IP is available for pure hardware Host controller without CPU/OS
- AHCI-IP for Linux reference design available



4CH RAID0 Demo on ALARIC Instant-DevKit

In the reference design, we demonstrate a pure hardware logic for 4CH RAID0 Controller by using SATA-IP and Host-IP core. 4 SATA devices are applied to run RAID0 system. 4 SATA devices connecting in the system should be same model to get the best performance and the best capacity. By using RAID0, the total capacity is equal to four times of SATA Device#0 capacity and the performance for write and read are almost four times. In our test system, Write speed of RAID0 is about 2000 MB/s and Read speed is about 2200 MB/s. (Performance from SATA Host-IP demo by using one SATA device are 510 MB/s for write command and 560 MB/s for read command).



Note: Test result with 4 of Samsung 840 PRO SATA SSD

SATA-IP 4CH Demo set up



- REFLEX CES's ALARIC Instant-DevKit
- DG's AB09 FMCRAID adapter
- Samsung 850 PRO SATA SSD

SATA SSD connection



- Connect SATA SSD (Samsung 850 PRO) to AB09 FMCRAID adapter
- Connect AB09 adapter with ALARIC's FMC connector
- Connect ATX power cable to AB09

Read/Write Performance

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/cygdrive/c/altera/16.0
Normal Erase Mode Time=2 minutes
Model Number 2: Samsung SSD 840 PRO
Security feature set is supported
Normal Erase Mode Time=2 minutes
Model Number 3: Samsung SSD 840 PRO
Security feature set is supported
Normal Erase Mode Time=2 minutes
RAID Capacity= 1024[GB]

--- Main menu [Ver = 1.31] ---
[0] : Identify Device
[1] : Write SSD
[2] : Read SSD
[3] : Security Erase
1

+++ Write data selected +++
Enter Start LBA : 0 - 0x773CCABF => 0
Enter Sector Count : 1 - 0x773CCAC0 => 0x6000000
Selected Pattern [0]Inc32 [1]Dec32
1.892 GB
3.932 GB
5.961 GB
7.998 GB
10.032 GB
12.066 GB
14.097 GB
16.131 GB
18.167 GB
20.197 GB
22.234 GB
24.267 GB
26.306 GB
28.338 GB
30.379 GB
32.412 GB
34.451 GB
36.483 GB
38.521 GB
40.554 GB
42.593 GB
44.625 GB
46.666 GB
48.699 GB
50.738 GB

Total = 51[GB] , Time = 25[s] , Transfer speed = 2029[MB/s]

--- Main menu [Ver = 1.31] ---
[0] : Identify Device
[1] : Write SSD
[2] : Read SSD
[3] : Security Erase
2

+++ Read data selected +++
Enter Start LBA : 0 - 0x773CCABF => 0
Enter Sector Count : 1 - 0x773CCAC0 => 0x6000000
Selected Pattern [0]Inc32 [1]Dec32 [2]All_0 [3]All_1 [4]LFSR=> 4
2.201 GB
4.407 GB
6.612 GB
8.818 GB
11.024 GB
13.230 GB
15.435 GB
17.640 GB
19.847 GB
22.052 GB
24.258 GB
26.463 GB
28.670 GB
30.876 GB
33.082 GB
35.287 GB
37.493 GB
39.699 GB
41.905 GB
44.111 GB
46.316 GB
48.522 GB
50.727 GB

Total = 51[GB] , Time = 23[s] , Transfer speed = 2205[MB/s]

```

Read performance

Write performance

- Average write speed performance = 2,029MB/s!
- Average read speed performance = 2,205MB/s!