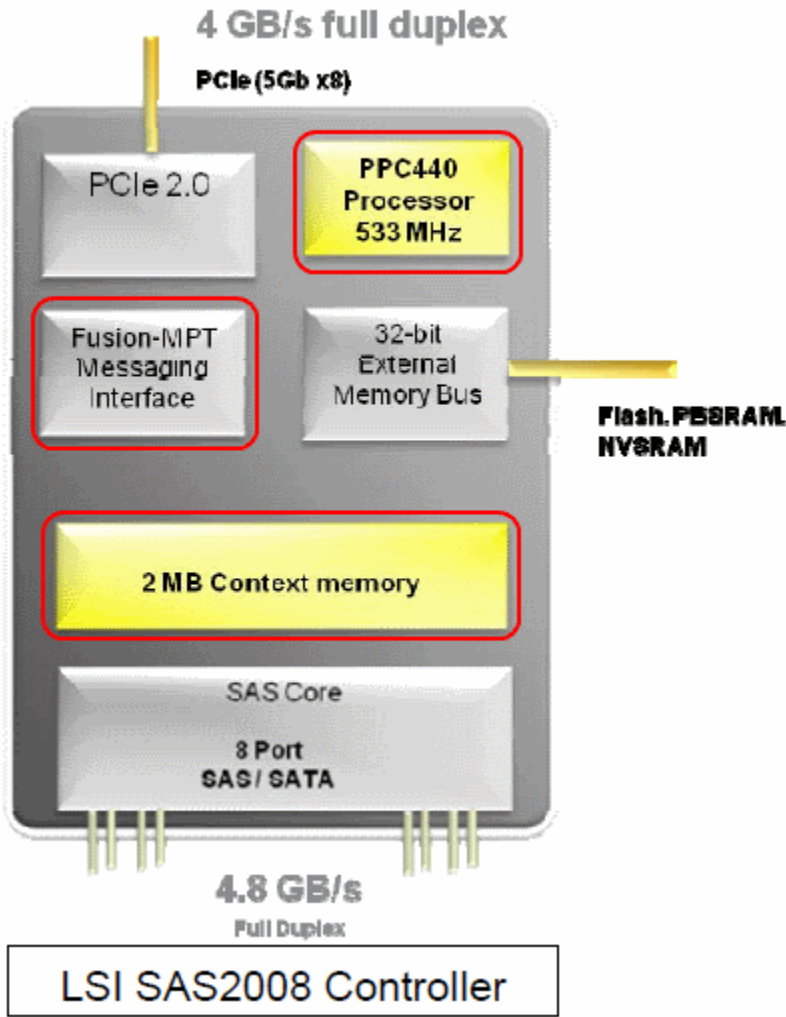




LSI IR/IMR Stack??????...
 ??????????LSISAS2008?????
 ???????...



????????, ???????:

1. Software RAID, ????, ??????"Hardware-assisted Software RAID", ????????????
2. Fusion MPT???I2O??, ?????Host??.
3. ?????PPC440 533MHz IOP, ????????, ??????????.
4. 2MB SRAM??Cache?, ???! ??????buffer????????FIFO??.
5. ??32-bit Memory Bus??????OPB Bridge, ???FLASH, NVRAM???
6. LSI SAS2008?internal Bus???PLB4, 128-bit, crossbar??, ??????.

?????????:

Features	ESRT2	RSTe	IR RAID	IR3 RAID
Silicon Support	Intel Chipset	Intel Chipset	LSI 1068, LSI 2008	LSI 1068 + Intel 80333, LSI 1078 ROC, LSI 2108 ROC
RAID Algorithm Location	Driver	Driver	Firmware	Firmware
Driver	MegaSR.sys	iaStor.sys	mpt_SAS2.sys	MegaSAS.sys
Driver Package	ESRT2	iMSM	LSI-SAS2	IR3
Utilities	RWC2, CMDtool2, ESRT2CLI (DOS)	Matrix Storage Manager	RWC2 (limited), CFGGen	RWC2, CMDTool2, API
RAID Levels	0,1,10,5 (R5 requires key)	0,1,10,5 (Limited Linux Support)	0,1,1E,10	0,1,5,6,10,50,60
XOR	System CPU	System CPU	NA	ROC Chip
Memory Usage	System Memory	System Memory	2MB Context Memory	Up to 2GB via ROC Chip Memory Controller
Battery Support	No	No	No	Yes
Number of Drives supported	8	6	16	240
Persistent Controller Log	No	No	No	Yes

Intel RAID Stack..

ESRT2 Server..

RSTe..

IR3 RAID MegaRAID...

Persistent Controller Log...

Event Log..

Firmware Log, Log....

LSI TTY log...

MegaRAID..

..

Log??...

IR Software Stack MSI-X

6Gb/s...

3Gb/s Legacy Mode...

..

..

IR IMR..

IR IRQ??...

Edit Access Specification

Name: Default Assignment:

Size	% Access	% Read	% Random	Delay	Burst	Alignment	Reply
0MB 512KB 0B	100	100	0	0	1	sector	none

Transfer Request Size
 Megabytes Kilobytes Bytes

Percent of Access Specification
 Percent

Percent Read/Write Distribution
 Write Read

Percent Random/Sequential Distribution
 Sequential Random

Burstiness
 Transfer Delay: ms
 Burst Length: I/Os

Align I/Os on
 Sector Boundaries
 Megabytes Kilobytes Bytes

Reply Size
 No Reply
 Megabytes Kilobytes Bytes

>>Write(??)

Edit Access Specification

Name: Default Assignment:

Size	% Access	% Read	% Random	Delay	Burst	Alignment	Reply
0MB 512KB 0B	100	0	0	0	1	sector	none

Transfer Request Size
 Megabytes Kilobytes Bytes

Percent of Access Specification
 Percent

Percent Read/Write Distribution
 Write Read

Percent Random/Sequential Distribution
 Sequential Random

Burstiness
 Transfer Delay: ms
 Burst Length: I/Os

Align I/Os on
 Sector Boundaries
 Megabytes Kilobytes Bytes

Reply Size
 No Reply
 Megabytes Kilobytes Bytes

???(??????):

Write Test													
IR	MegaRAID	IR	MegaRAID	IR	MegaRAID	IR	MegaRAID	IR	MegaRAID	IR	MegaRAID	IR	MegaRAID
Depth	MBps	Iops	MBps	Iops	Avg. Response Time	Avg. Response Time	Interrupts	Interrupts	% CPU Utilization	% CPU Utilization	CPU Effectiveness	CPU Effectiveness	
QD001	204.705925	208.52481	409.41185	417.04962	2.440767	2.396115	602.90525	1469.510506	1.933088	2.070111	211.712824	201.462409	
QD002	211.996665	210.997824	423.992129	421.995648	4.715192	4.737227	602.808582	1895.602214	1.821149	2.434168	232.815773	173.363395	
QD004	216.593968	214.973679	433.187936	429.947357	9.231713	9.298603	605.798373	1892.325611	1.566224	2.055641	276.581111	209.154836	
QD008	198.202255	142.14183	396.404531	284.283659	20.178525	27.567336	583.427053	1300.843512	1.802852	1.911683	219.876308	148.708589	
QD016	55.974572	35.242953	111.949144	70.485906	142.038599	217.52652	304.198575	448.898112	1.171056	1.015409	95.596765	69.416248	
QD032	44.674572	17.798296	89.294913	35.596593	356.613421	875.531407	264.333196	321.308545	0.955356	1.071179	93.467655	33.231224	
QD064	20.664836	16.446755	41.329673	32.89351	1543.189623	1855.93855	210.9151	317.253558	0.987749	1.034	41.842275	31.8119	
QD128	26.663123	17.306226	53.526245	34.612451	2382.162888	3365.512098	221.210535	321.097889	0.969139	1.157946	55.024345	29.891251	
QD256	26.714508	4.510797	53.429016	9.021593	4726.620733	12091.28337	222.705544	221.71564	0.990715	0.970536	53.92974	9.295471	

Read Test													
IR	MegaRAID	IR	MegaRAID	IR	MegaRAID	IR	MegaRAID	IR	MegaRAID	IR	MegaRAID	IR	MegaRAID
Depth	MBps	Iops	MBps	Iops	Avg. Response Time	Avg. Response Time	Interrupts	Interrupts	% CPU Utilization	% CPU Utilization	CPU Effectiveness	CPU Effectiveness	
QD001	211.246322	210.627958	422.492644	421.255916	2.365598	2.372533	599.830088	1480.625054	1.228701	1.438305	343.852958	292.883564	
QD002	213.519144	213.368101	427.038289	426.736203	4.682411	4.685089	596.04956	1915.022164	1.230932	1.737705	346.922739	245.574581	
QD004	217.943304	216.25344	435.886608	432.506808	9.173176	9.246591	600.754392	1850.831407	0.98754	1.412271	441.386382	306.249261	
QD008	189.191595	178.293949	378.383191	356.587898	21.140181	22.2188	554.683569	1564.351339	1.128093	1.621171	335.418311	219.956968	
QD016	174.13907	74.52137	348.278141	149.84274	45.92777	105.836851	517.094884	741.102871	1.09419	1.02893	318.297714	144.852189	
QD032	129.732306	70.893277	259.464613	141.786554	123.318111	222.059092	426.29353	725.832902	0.903656	1.32933	287.127523	106.660149	
QD064	125.721235	57.105085	251.44247	114.21177	254.014204	553.06918	414.493456	609.556995	0.973824	0.992104	258.201073	115.111531	
QD128	125.903466	57.069062	251.806933	114.138135	503.963164	1098.718609	423.1409	646.400021	1.107452	1.363113	227.375105	83.733437	
QD256	126.175452	48.251659	252.350003	96.580318	1011.208095	2492.135021	416.555919	568.002992	0.883666	1.051418	285.572877	91.789935	

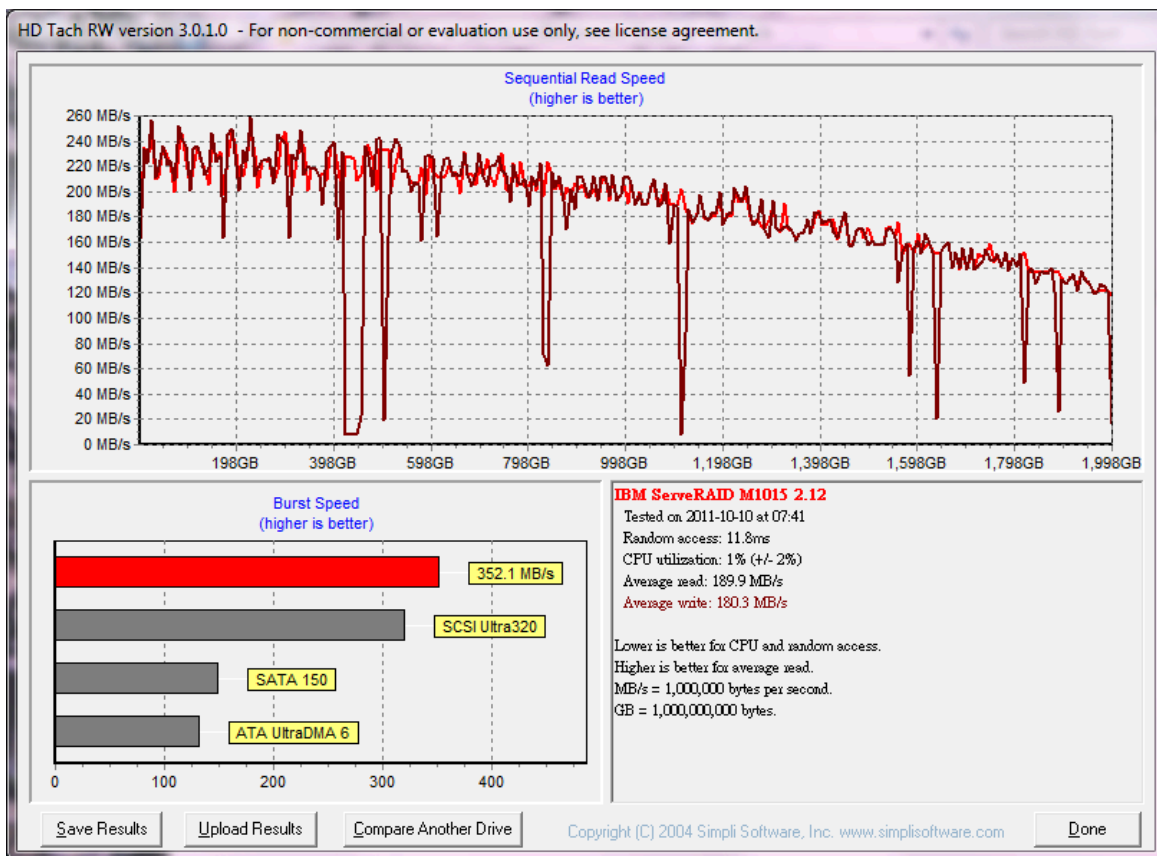
?????

????????, ?????.

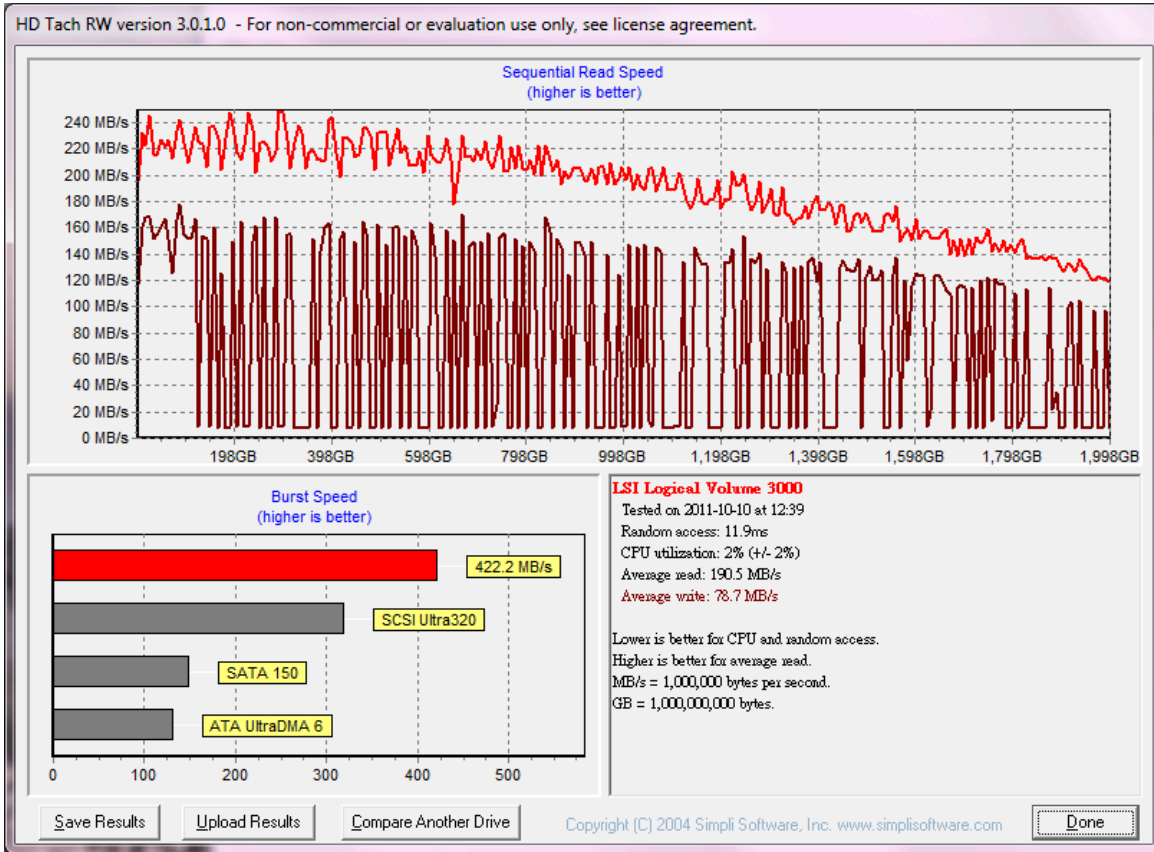
IMR?Response Time?Intterupts?IR????..

????HD Tach???????, IR????4???, ????, ?????!..

>>IMR??

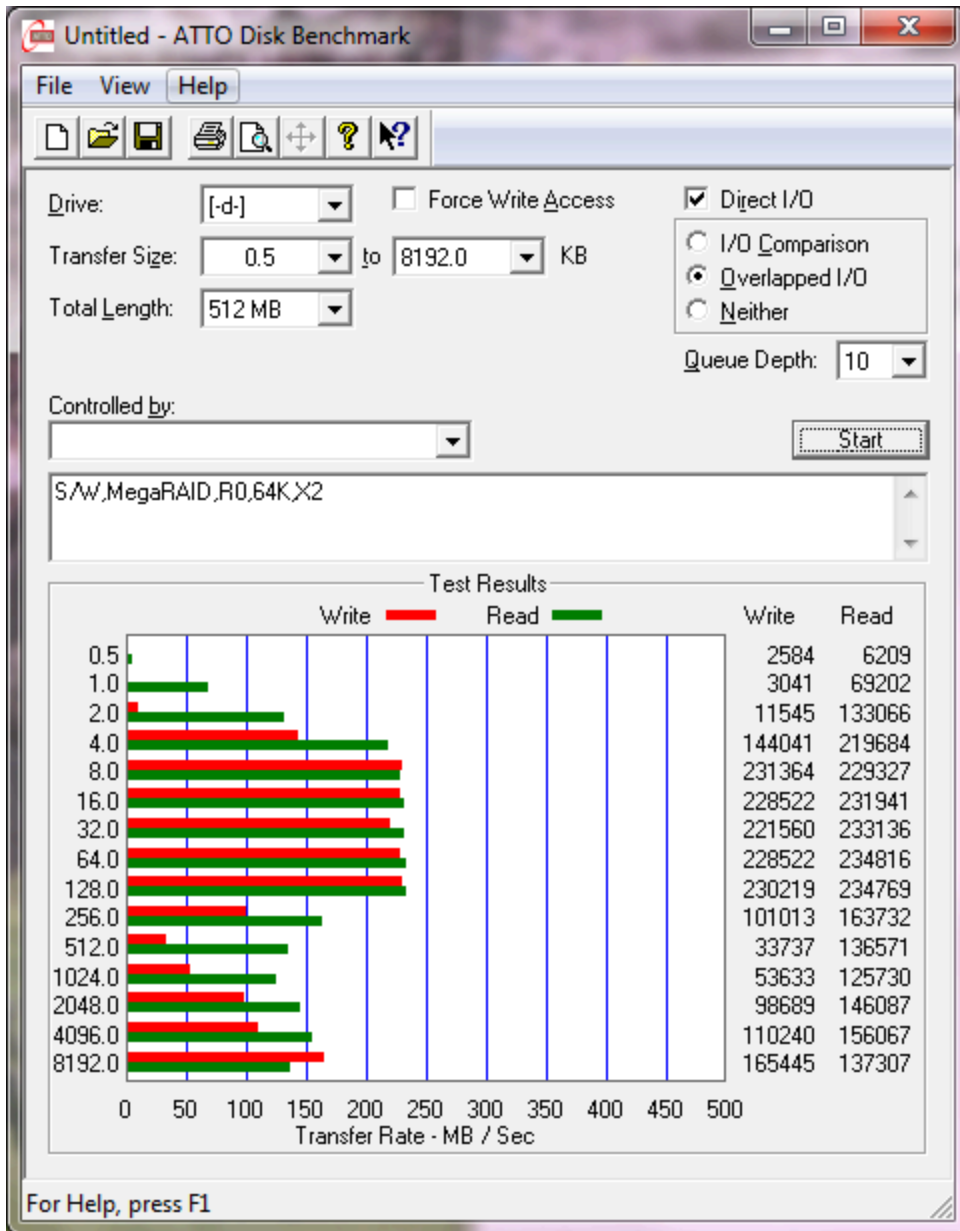


>>IR??

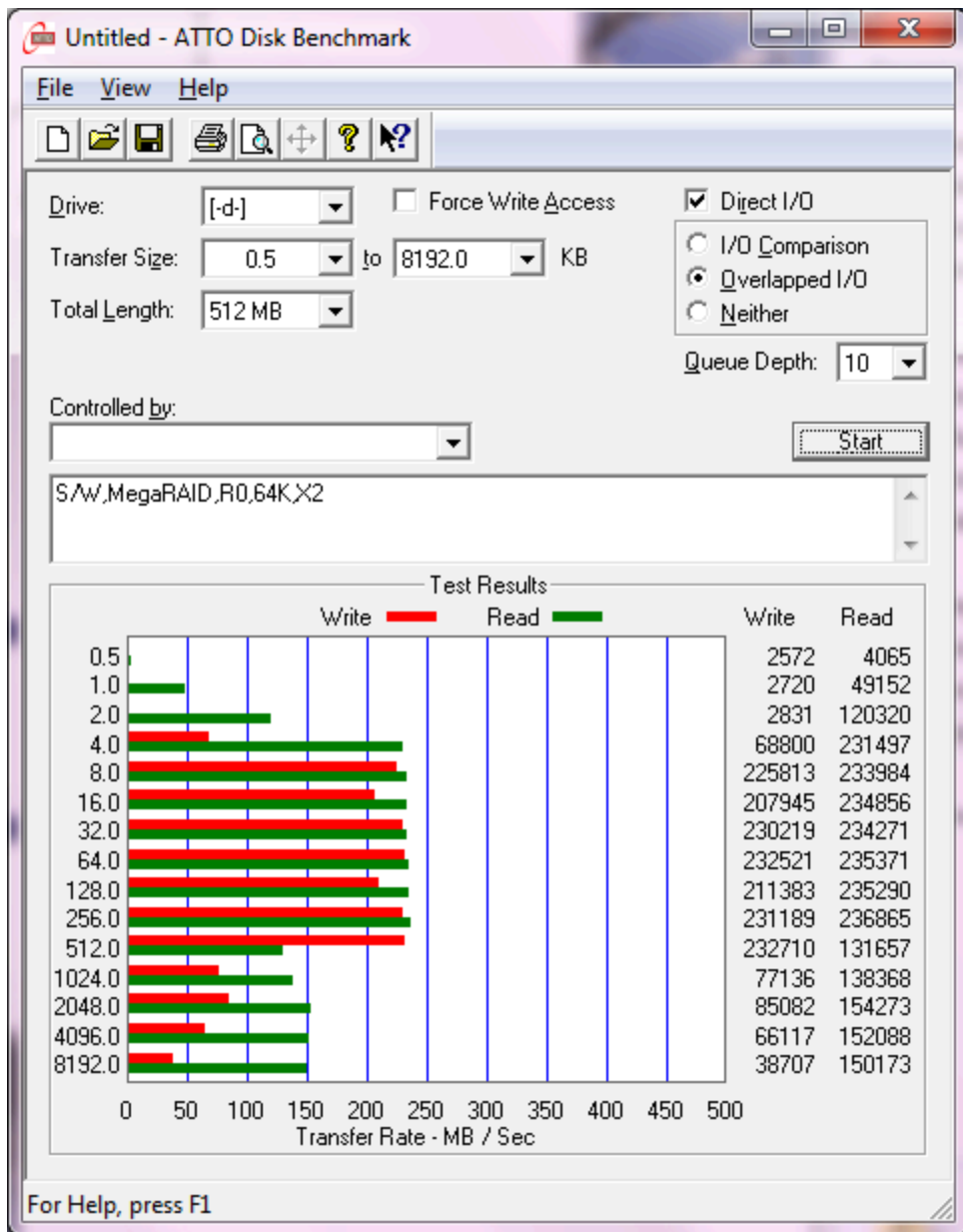


???ATTO???????, ???QD10...

>>IMR??

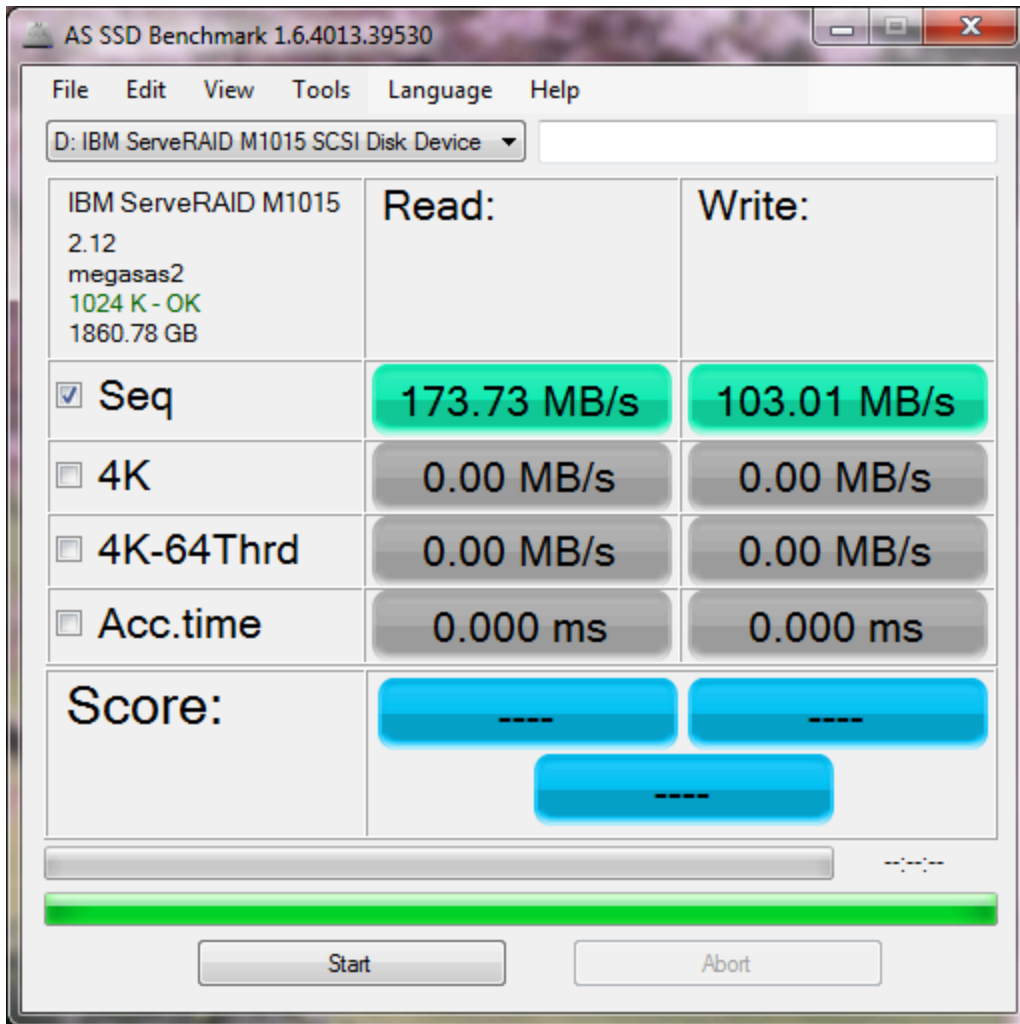


>>IR??

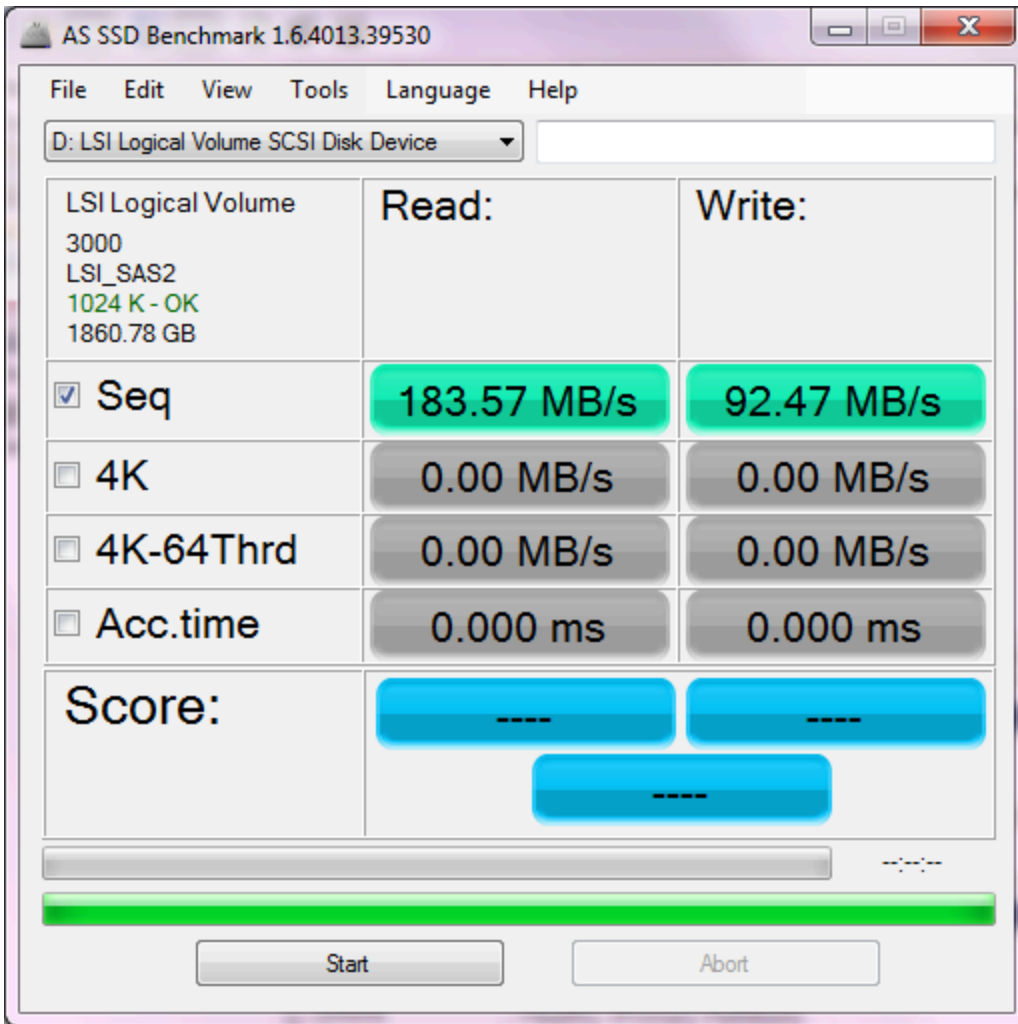


IR??????????...

AS SSD???SEQ. I/O:
 >>IMR??

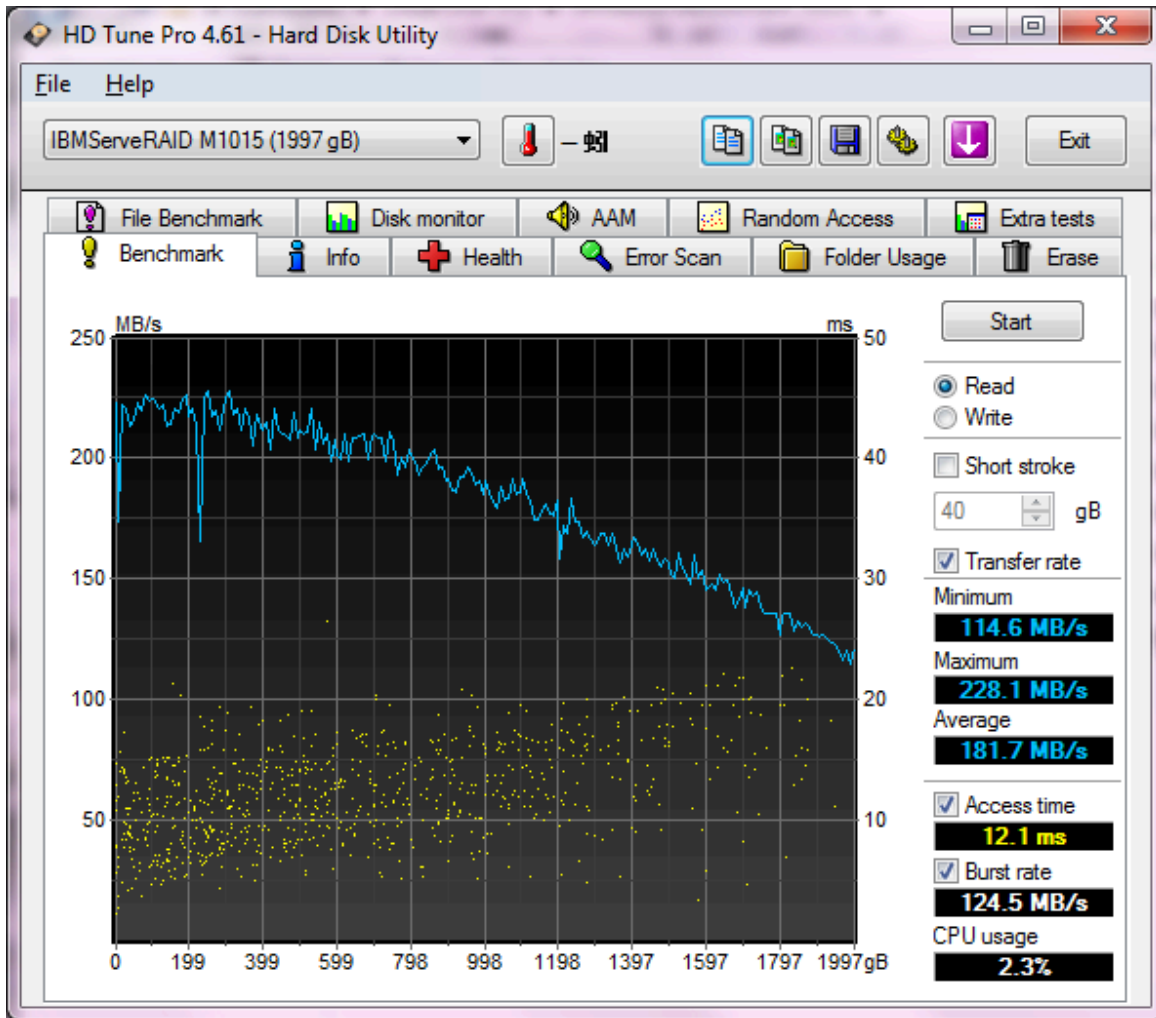


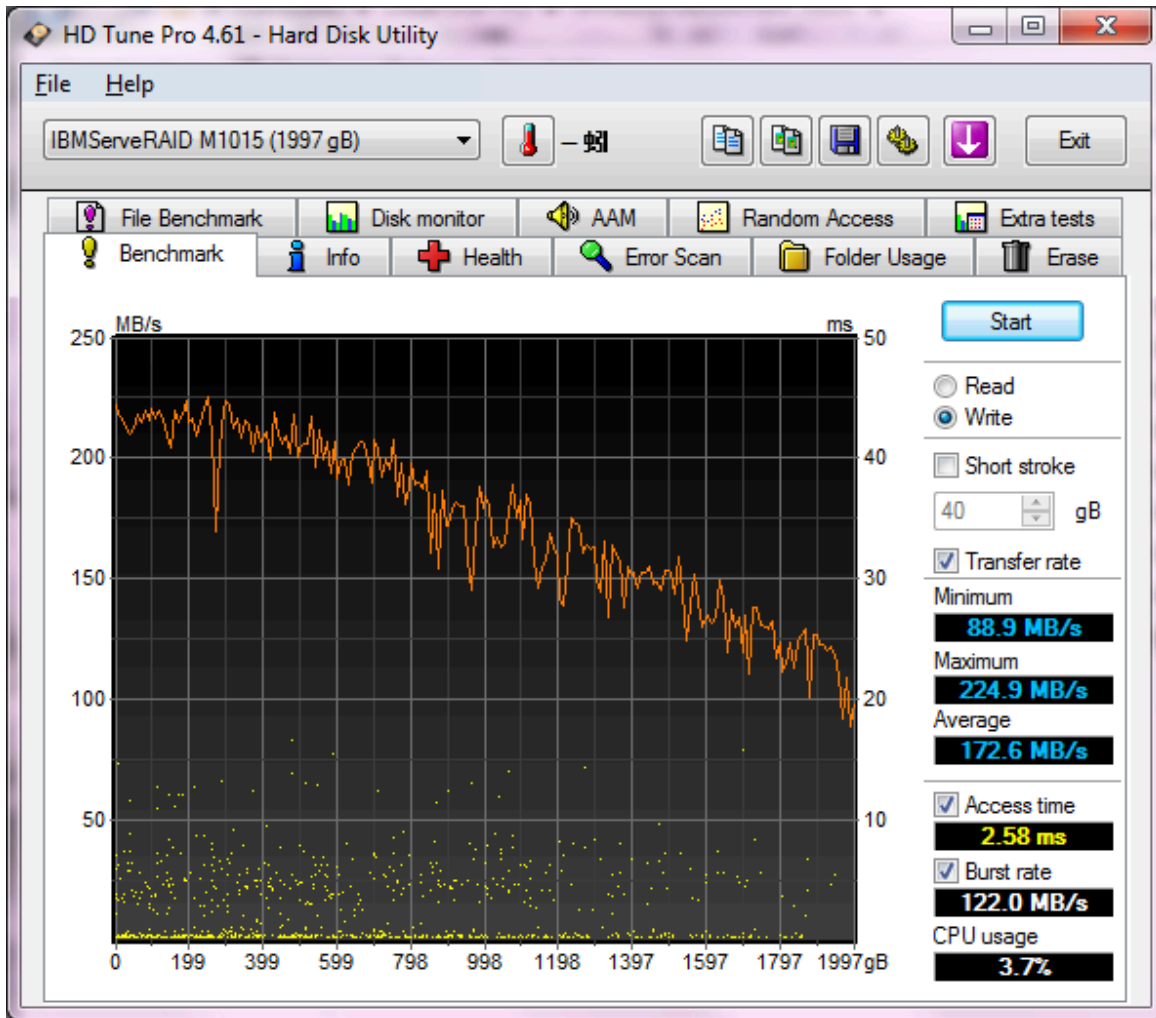
>>IR??



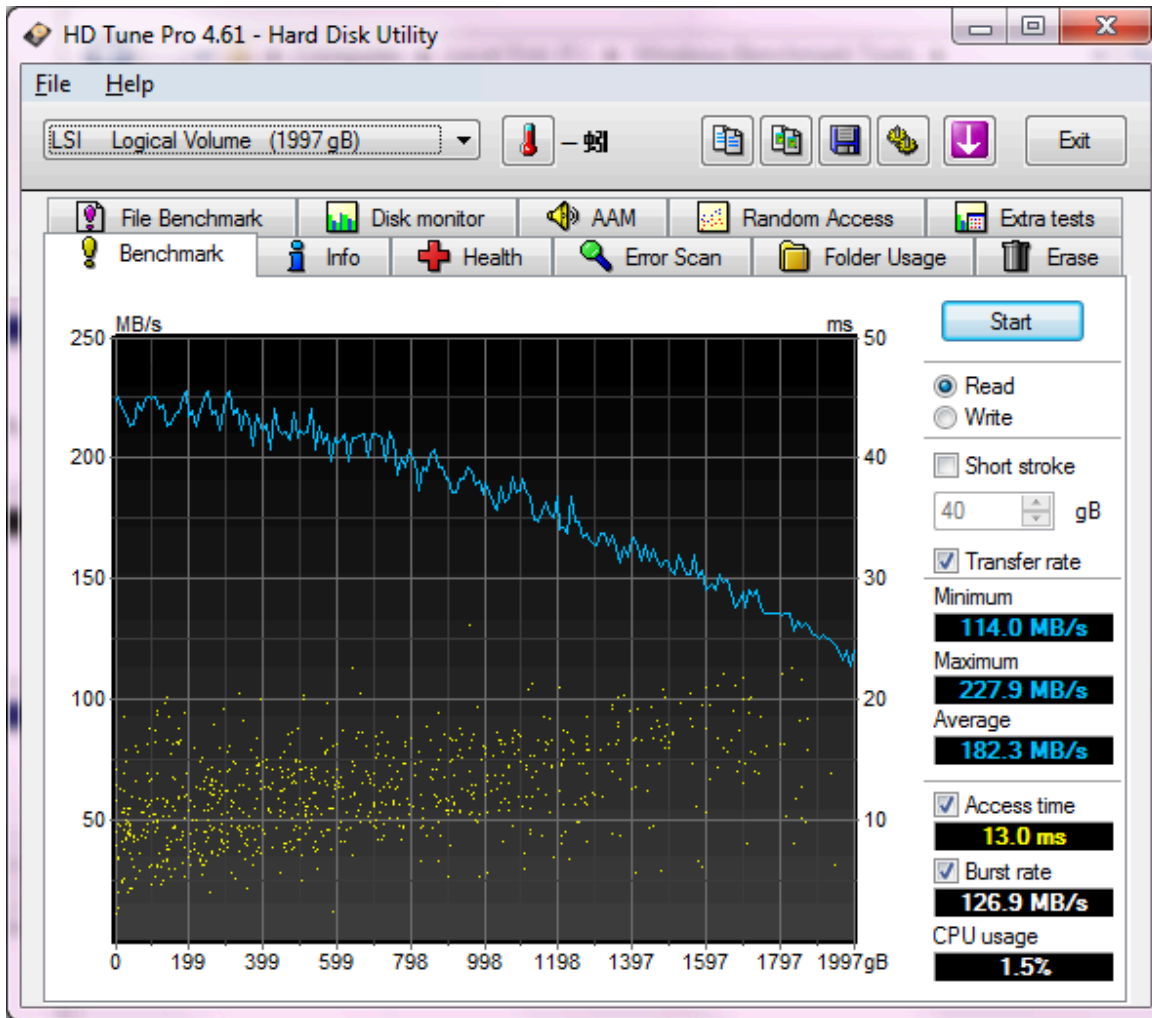
?????, IR?????, ??????.....

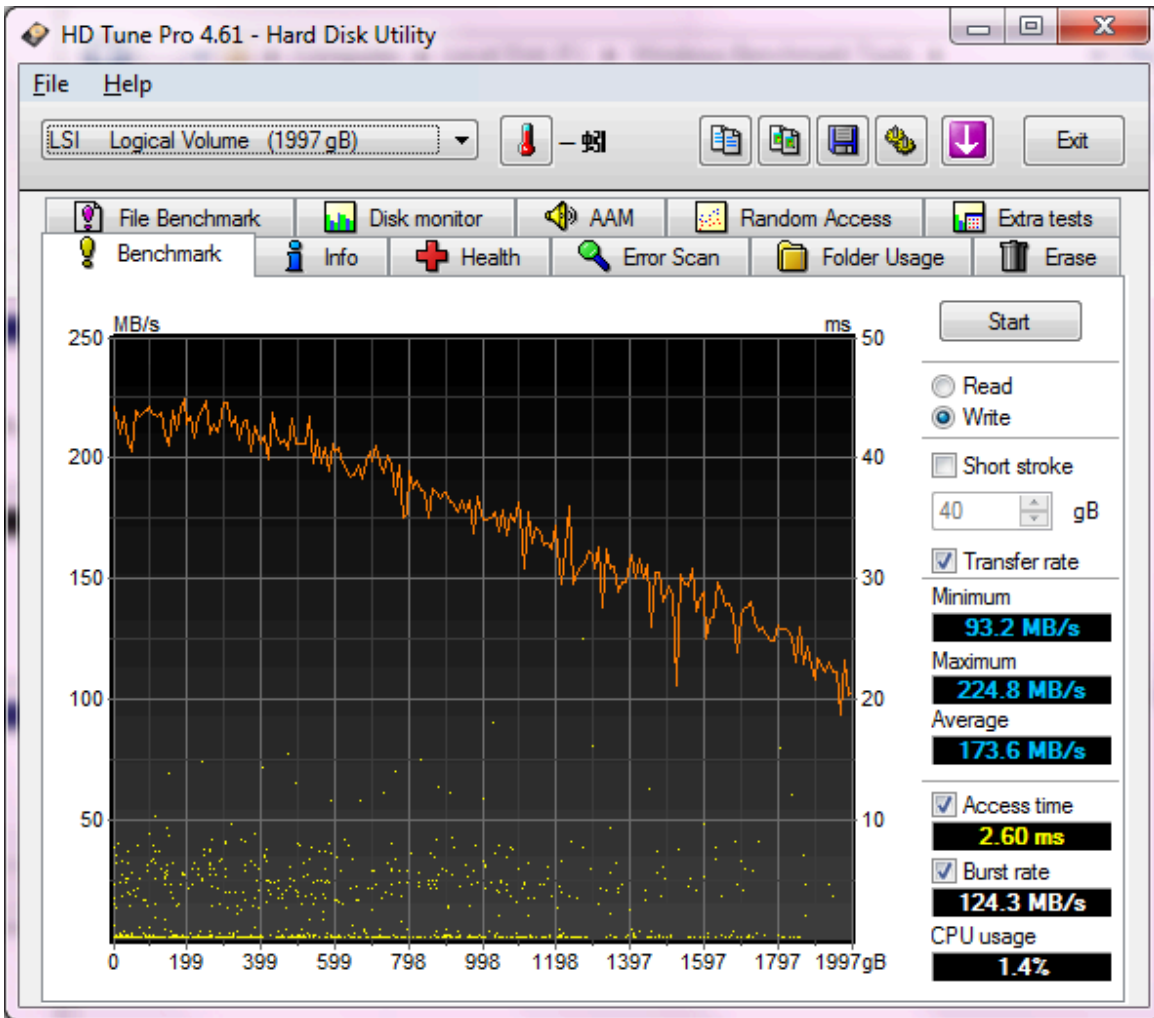
???HDD Tune????(?????????)...
->IMR??





>>IR??





??????????...

LSI SAS2008:

???????:

???????????? RAID ??????????????

- RAID Driver based driver ICH, P67

- ?+ RAID Firmware based RAID driver IOP (?) RAID 5 ? CPU ? LSI SAS2008

- RAID IOP RAID 5 Host CPU LSI SAS2108

"- RAID Driver based driver ICH, P67

- ?+ RAID Firmware based RAID driver

driver (pass-through), RAID Utility (RAID)...

firmware-based RAID driver-based RAID..

Software RAID...

ICH10 P67 ROMB RAID...

LSI f/w RAID..

LSI SAS2008 S/W RAID...

RAID..

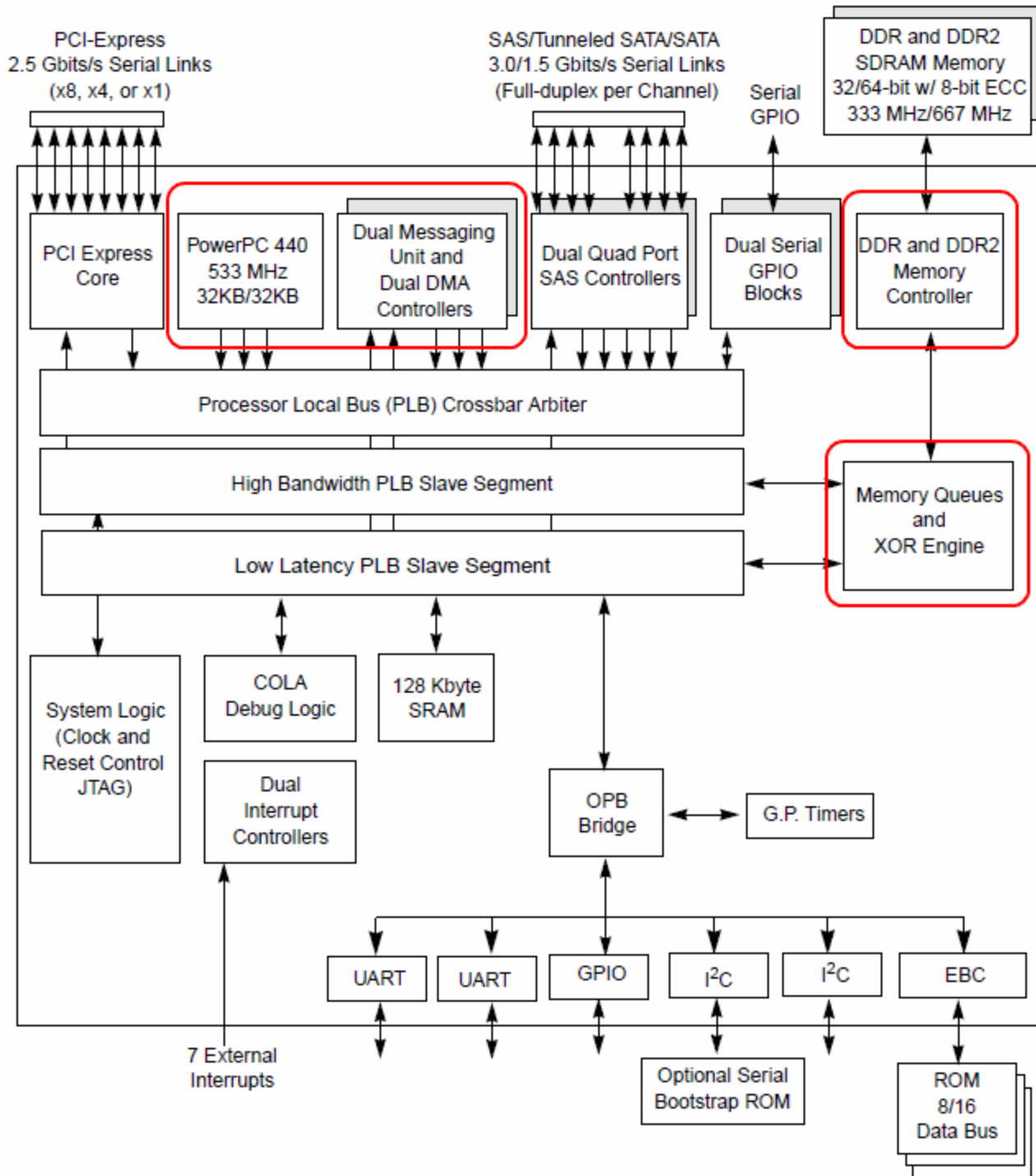
Intel RST...
Firmware-based...
RAID firmware...
RAID BIOS...
RAID...
H/W-assisted S/W RAID LSI...

"IOP (!) RAID 5 ? CPU ? LSI SAS2008"

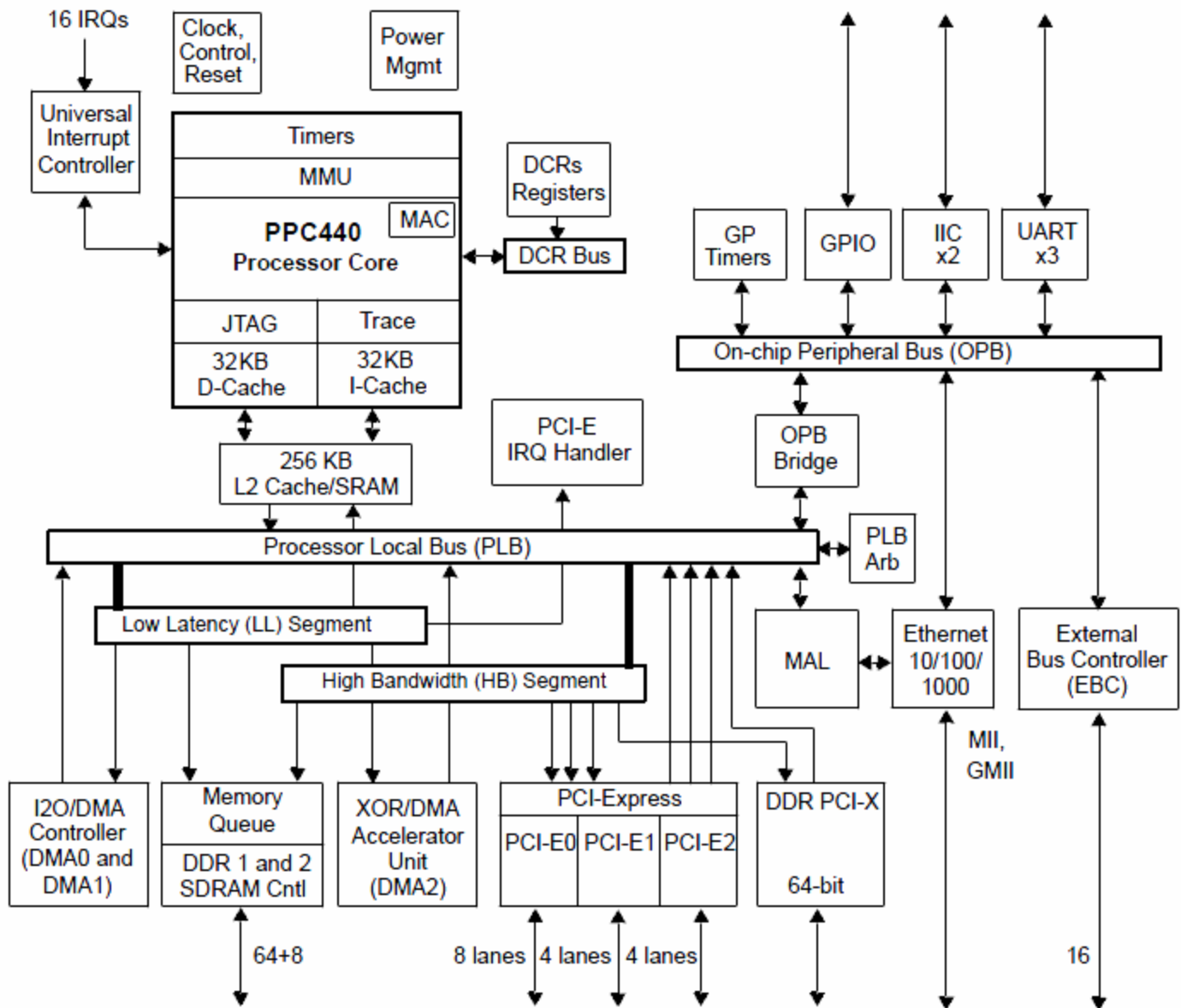
IOP I/O Processor..
LSISAS2008 IOP...
.....

Pure-H/W RAID:

1. **Hardware RAID Assist**
 2. **Internal MCU Cache Memory**
 3. Built-in Processor
 4. **firmware stack I/O Processing RAID Controller..**
-



?????????
 ???XOR Engine..
 ???XOR Engine??XOR???
 ???H/W RAID?????
 ???AMCC?PPC440spe?????..



XXXXXXXXXXXXXXXXXXXXXXXXXOR operation...
 ??DMA Unit????????XOR??????...
 PPC440?Built-in Processor??I/O??????????????..
 ?????????H/W RAID?????..

LSISAS2008????Software RAID...
 ???firmware???????I/O Processing??host?....
 LSISAS2008?Built-in Processor?????????..
 ??????????..!!