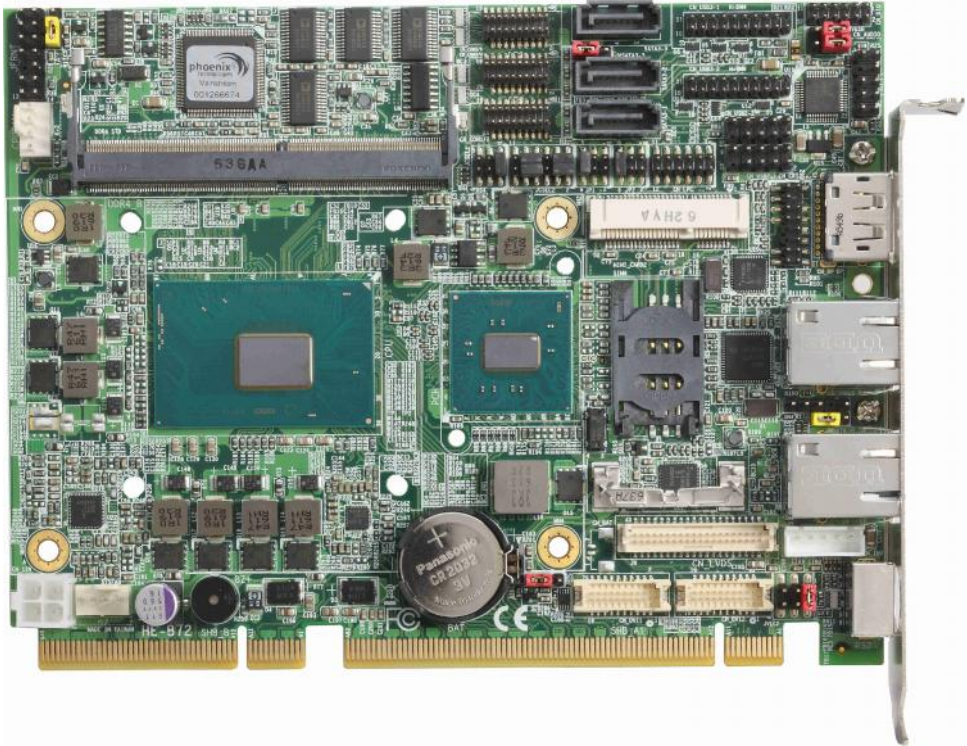


Product Test Report



Product Name	HE-B72
Product Version	A
Issued Date	2016.11.09
Report Edition	1.0
BIOS Version	1.0
Testing Engineer	Howard
Check Engineer	Daniel

REVISION HISTORY

DATE	REVISION NO.	PAGE	DESCRIPTONS
2016.11.09	Ver. 1.0	51	Initial Release

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1. Function test

1.1 Hardware function

Base Function Test (OS:Win7 Pro 64)

Item	Description	Result	Remark
1	Power Button	PASS	
2	Reset	PASS	
3	Power LED	PASS	
4	HDD LED	PASS	
5	SATA3-1	PASS	
6	SATA3-2	PASS	
7	SATA3-3	PASS	
8	CN_USB2-1	PASS	
9	CN_USB2-2	PASS	
10	CN_USB3-1	PASS	
11	CN_USB3-2	PASS	
12	DDR4_A/B	PASS	
13	CN_COM 1/2	PASS	
14	CN_COM 3/4	PASS	
15	CN_COM 5/6	PASS	
16	CN_AUDIO	PASS	
17	CN_DIO	PASS	
18	CN_LPC	PASS	
19	CPUFAN	PASS	
20	SYSFAN	PASS	
21	MINI_CARD1	PASS	
22	MINI_CARD2	PASS	

23	Display port	PASS	
24	CN_CRT	PASS	
25	CN_DVI 1/2	PASS	
26	CN_LVDS	PASS	
27	CN_INV	PASS	
28	I219_LM/I210_AM	PASS	
29	CN_12V	PASS	
30	PS/2	PASS	
31	RS422&485	PASS	

Jumper

Item	Description	Result
1	JAT	PASS
2	JRTC	PASS
3	JVLCD	PASS
4	JMSATA	PASS
5	JCSEL1	PASS
6	JCSEL2	PASS

1.2 BIOS function :

Item	Description	Result	Remark
1	Press 'Del' to run Setup Utility	PASS	
2	Ctrl-Alt-Del – Soft-Reboot	PASS	
3	Save & Exit Setup	PASS	
4	Date & Time Setting	PASS	
5	NumLock	PASS	
6	Quick Boot	PASS	
7	Diagnostic Splash Screen	PASS	
8	Diagnostic Summary Screen	PASS	
9	UEFI Boot	PASS	
10	Select Language	PASS	
13	Primary IGFX Boot Display	PASS	
14	SATA Configuration	PASS	
16	HD Audio Configuration	PASS	
17	Wake on LAN Enable	PASS	
18	Super IO Chip	PASS	
19	Watch Dog Timer Select	PASS	
20	Power Control	PASS	
21	Smart Fan Feature	PASS	
22	Hardware Monitor	PASS	

1.3 Driver

CD Edition : DIPCi1-1.4

1. Windows 7 32-bit Driver Test

Item	Description	Result	version
1	Chipset Driver	PASS	6.1.7600.16385
2	Graphic Driver	PASS	20.19.15.4352
3	Audio Driver	PASS	6.0.1.7541
4	LAN Driver	PASS	I219-LM:12.13.17.4 I210:12.13.27.0
5	USB 3.0 Driver	PASS	4.0.4.51

2. Windows 7 64-bit Driver Test

Item	Description	Result	version
1	Chipset Driver	PASS	6.1.7600.16385
2	Graphic Driver	PASS	20.19.15.4352
3	Audio Driver	PASS	6.0.1.7541
4	LAN Driver	PASS	I219-LM:12.13.17.4 I210:12.13.27.0
5	USB 3.0 Driver	PASS	4.0.4.51

3 Windows 8.1 64-bit Driver Test

Item	Description	Result	version
1	Chipset Driver	PASS	6.3.9600.16384
2	Graphic Driver	PASS	20.19.15.4352
3	Audio Driver	PASS	6.0.1.7541
4	LAN Driver	PASS	I219-LM:12.15.23.7 I210:12.6.47.1

4. Windows 10 64-bit driver Test

Item	Description	Result	version
1	Chipset Driver	PASS	10.0.1493.0
2	Graphic Driver	PASS	20.19.15.4501
3	Audio Driver	PASS	6.0.1.7541
4	LAN Driver	PASS	12.15.22.6

2. Compatibility test

2.1 CPU Test

Test environment:

OS Windows 7 professional SP1

Test program : PC MARK7

Spec Code	CPU Speed	Max Turbo Frequency	Family	Processor	Max TDP	Cache	Result
SR2DT	2.80GHZ	3.50GHz	Core	I7-6820EQ	45W	8MB	PASS
SR2DU	2.70GHZ	3.40GHz	Core	I5-6440EQ	45W	6MB	PASS
SR2DV	2.70GHZ	N/A	Core	I3-6100E	35W	3MB	PASS

2.2 Operation System Test

Item	Description	Result	Remark
1	Windows 7 Pro 32-bit	PASS	
2	Windows 7 Pro 64-bit	PASS	
3	Windows 8.1 pro 64bit	PASS	
4	Windows 10 Pro 64-bit	PASS	
5	Ubuntu 16.04 LTS 64bit	PASS	

2.3 Memory Test

Test environment:

OS Windows 7 Professional SP1

Test program : PC MARK 7 & AIDA64

Manufacturer/ Model No.	Chip	Frequency	Capacity Mbytes	Result
Transcend TS2SLH64V1B	SEC622 K4A8G085WB BCRC	DDR4 2133	16GB	PASS
Kinston KVR21S15D8/16	61B77D9TBH	DDR4 2133	16GB	PASS
Kingston KVR21S15D8/8	SKhynix H5AN4G8NMFR	DDR4 2133	8GB	PASS
Transcend TS1GSH64V1H	SEC 613 BCPB K4A4G085WD	DDR4 2133	8GB	PASS
Crucial Micron CT4G4SFS8213	Micron SRA77D9RGQ	DDR4 2133	4GB	PASS

2.4 Graphic Quality Test

2.4.1 Test environment OS : Windows7 Pro 32/64-bit

Driver version : 20.19.15.4352

Resolution	Color	CRT	DVI	Display Port
800*600	16 / 32bit	PASS	PASS	PASS
1024*768	16 / 32bit	PASS	PASS	PASS
1152*864	16 / 32bit	PASS	PASS	PASS
1280*600	16 / 32bit	PASS	PASS	PASS
1280*720	16 / 32bit	PASS	PASS	PASS
1280*768	16 / 32bit	PASS	PASS	PASS
1280*800	16 / 32bit	PASS	PASS	PASS
1280*960	16 / 32bit	PASS	PASS	PASS
1280*1024	16 / 32bit	PASS	PASS	PASS
1360*768	16 / 32bit	PASS	PASS	PASS
1366*768	16 / 32bit	PASS	PASS	PASS
1400*1050	16 / 32bit	PASS	PASS	PASS
1440*900	16 / 32bit	PASS	PASS	PASS
1600*900	16 / 32bit	PASS	PASS	PASS
1680*1050	16 / 32bit	PASS	PASS	PASS
1920*1080	16 / 32bit	PASS	PASS	PASS
1920*1200	16 / 32bit			PASS
1920*1440	16 / 32bit			PASS
2048*1152	16 / 32bit			PASS
2560*1920	16 / 32bit			PASS
3840*2160	16 / 32bit			PASS

2.4.2 Test environment OS : Windows 10 Pro64-bit

Driver version : 20.19.15.4501

Resolution	Color	CRT	DVI	Display Port
800*600	16 / 32bit	PASS	PASS	PASS
1024*768	16 / 32bit	PASS	PASS	PASS
1152*864	16 / 32bit	PASS	PASS	PASS
1280*600	16 / 32bit	PASS	PASS	PASS
1280*720	16 / 32bit	PASS	PASS	PASS
1280*768	16 / 32bit	PASS	PASS	PASS
1280*800	16 / 32bit	PASS	PASS	PASS
1280*960	16 / 32bit	PASS	PASS	PASS
1280*1024	16 / 32bit	PASS	PASS	PASS
1360*768	16 / 32bit	PASS	PASS	PASS
1366*768	16 / 32bit	PASS	PASS	PASS
1400*1050	16 / 32bit	PASS	PASS	PASS
1440*900	16 / 32bit	PASS	PASS	PASS
1600*900	16 / 32bit	PASS	PASS	PASS
1680*1050	16 / 32bit	PASS	PASS	PASS
1920*1080	16 / 32bit	PASS	PASS	PASS
1920*1200	16 / 32bit			PASS
1920*1440	16 / 32bit			PASS
2048*1152	16 / 32bit			PASS
2560*1920	16 / 32bit			PASS
3840*2160	16 / 32bit			PASS

2.5 Audio

Test environment:

OS Windows 7 32-bit

Driver version : 6.0.1.7541

Item	Description	Result	Remark
1	2 CH	PASS	
2	Microphone	PASS	
3	Line in	N/A	

OS Windows 7 64-bit

Driver version : 6.0.1.7541

Item	Description	Result	Remark
1	2 CH	PASS	
2	Microphone	PASS	
3	Line in	N/A	

OS Windows 10 64-bit

Driver version : 6.0.1.7541

Item	Description	Result	Remark
1	2 CH	PASS	
2	Microphone	PASS	
3	Line in	N/A	

2.6 HDD Test

Test environment:

OS Windows 7 Pro 64bit

Model	Interface	Capacity	Size Detect	Data Transfer
WD WD10EALX-009BA0	SATA3	1TB	PASS	PASS
WD WD2500AAKS-00YA0	SATA2	250GB	PASS	PASS
ACPI MSS4F-M	MSATA	64GB	PASS	PASS
PLEXTOR PX-256M8PeY	PCIe	256GB	PASS	PASS

2.7 DVD/CD-ROM Test

Test environment:

OS Windows 7 Pro 64bit

Model	Interface	Detect	Data Transfer	Play CD
LITEON eTAU108	USB	PASS	PASS	PASS
Pioneer DVR-XD11T	USB	PASS	PASS	PASS
Pioneer DDVR-S19LBK-24X	SATA	PASS	PASS	PASS
ASUS DRW-1814BLT	SATA	PASS	PASS	PASS

2.8 USB device Test

1. Windows 7 32/64-bit

Item	Result	Remark
External USB Keyboard Test	PASS	
External USB Mouse Test	PASS	
Hot plugging test	PASS	
DVD/CD ROM	PASS	
USB Mass storage	PASS	
USB 3.0	PASS	

*USB device need to install driver first.

2. Windows 10 64-bit

Item	Result	Remark
External USB Keyboard Test	PASS	
External USB Mouse Test	PASS	
Hot plugging test	PASS	
DVD/CD ROM	PASS	
USB Mass storage	PASS	

2.9 Serial Port Test

1. Windows 7 32-bit

Item	Description	Result	Remark
1	Device Manager Check	PASS	
2	RS-232 Mouse Test	PASS	

2. Windows 7 64-bit

Item	Description	Result	Remark
1	Device Manager Check	PASS	
2	RS-232 Mouse Test	PASS	

3. Windows 10 64-bit

Item	Description	Result	Remark
1	Device Manager Check	PASS	
2	RS-232 Mouse Test	PASS	

2.10 PS2 Keyboard 、 Mouse Test

1. MS-DOS

Item	Description	Result	Remark
1	Keyboard LED Status Test	PASS	
2	Keyboard Typing Test	PASS	
3	Mouse Detect Test	N/A	

2. Windows 7 32bit

Item	Description	Result	Remark
1	Keyboard LED Status Test	PASS	
2	Keyboard Typing Test	PASS	
3	Mouse Detect Test	PASS	

3. Windows 7 64-bit

Item	Description	Result	Remark
1	Keyboard LED Status Test	PASS	
2	Keyboard Typing Test	PASS	
3	Mouse Detect Test	PASS	

4. Windows 10 64-bit

Item	Description	Result	Remark
1	Keyboard LED Status Test	PASS	
2	Keyboard Typing Test	PASS	
3	Mouse Detect Test	PASS	

2.11 Power Supply Test

Item	TYPE	Description	Result	Remark
1	ATX Power(12V)	CHANNEL WELL CWT-250ATX12 250W	PASS	
2	ATX Power(12V)	Corsair CX500	PASS	
3	ATX Power(12V)	Snake PK-350W	PASS	

2.12 PCI Express mini card

Motherboard	PCI Express mini card	Result
HE-B72	MPX-210D	PASS
	MPX-210D2	PASS
	MPX-350	PASS
	MPX-574D	PASS
	MPX-574D2	PASS
	MPX-2213	PASS
	MPX-885	PASS
	MPX-954	PASS
	MPX-954E	PASS
	MPX-5201	PASS
	MPX-6864	PASS
	MPX-7202	PASS
	MPX-9125	PASS
	MPX-24794G2	PASS
	MPX-25858	PASS
MPX-TP4R	PASS	

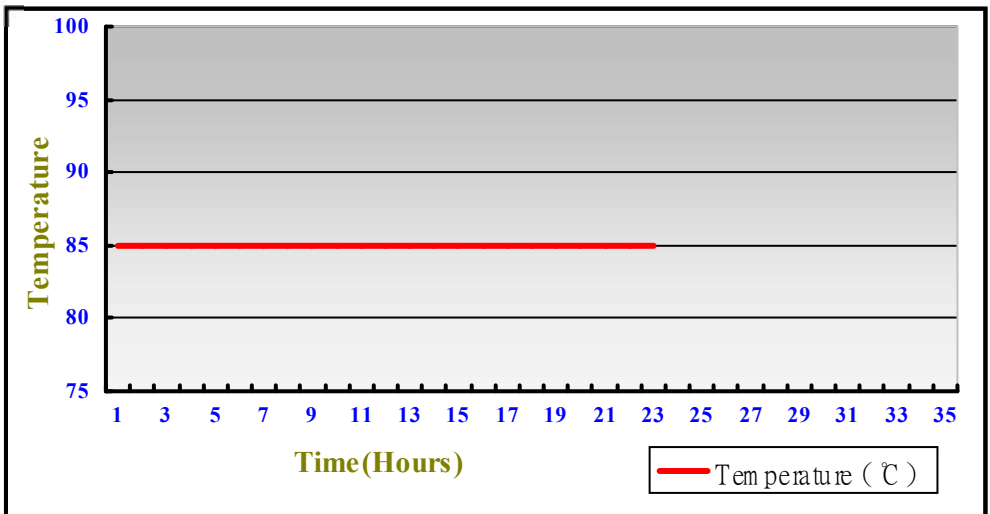
2.13 PCI Backplane

Brand	Module	Result	Remark
COMMELL	BP-6P3X2	PASS	R64/90.9Ω
COMMELL	CBPE-1X2P	PASS	
COMMELL	CBPE-2X1P	PASS	
ADVANTECH	PCE-3B06-03A1E	PASS	
AXIOMTEK	HAB206	PASS	

3. Environmental test

3.1 Temperature Test

System Board	HE-B72
CPU	Intel® Core™ i7-6820EQ Processor
Memory	Crucial DDR4 2133 4GB
HDD	WD WD2500AAKS-00VY0 250GB
Power	Snake PK-350W
Operating OS	Windows 10 Pro 64bit
Test Equipment	GIANT FORCE (GTH-150-60-CP-AR)
Test Program	3DMark06 +AIDA64



Boot Up Test:

Hardware Device list:

System Board	HE-B72
CPU	Intel® Core™ i7-6820EQ Processor
Memory	Crucial DDR4 2133 4GB
HDD	WD WD2500AAKS-00VY0 250GB
Power	Snake PK-350W

Temperature	Result	Remark
85°C	PASS	50 Times
-40°C	PASS	50 Times

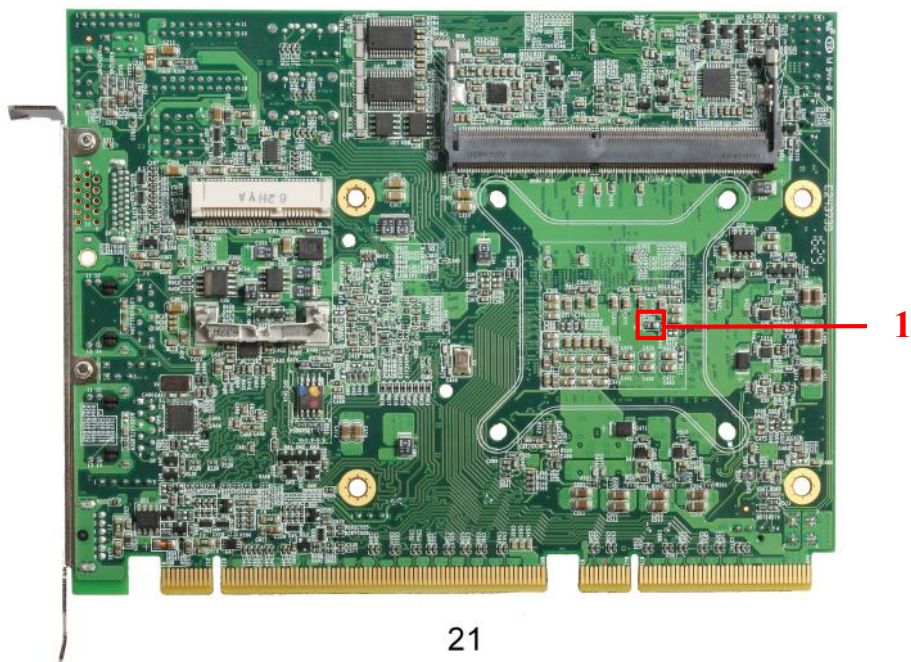
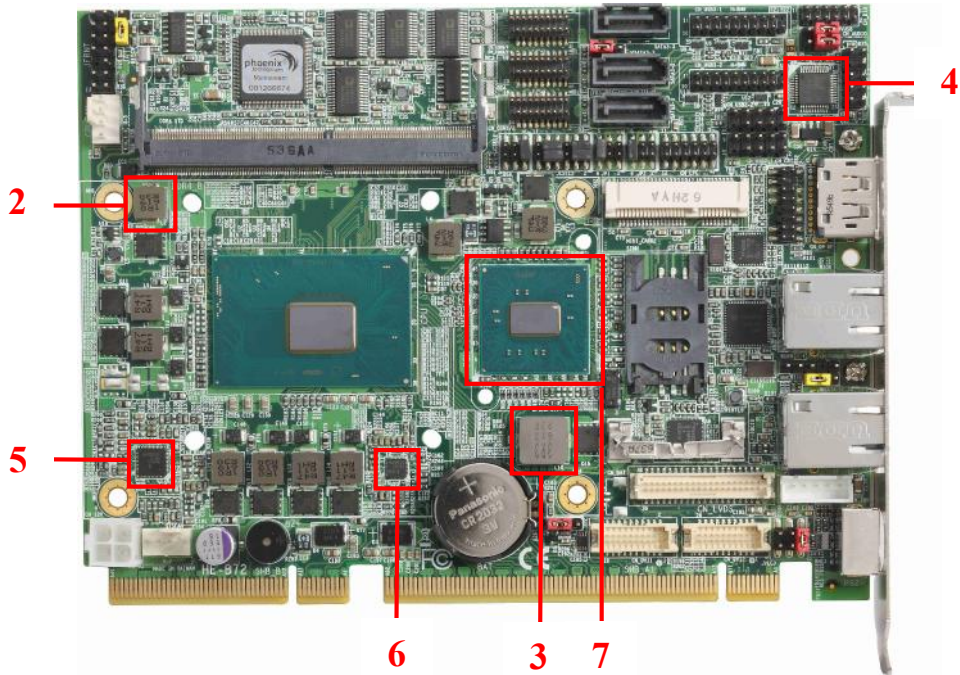
3.2 Thermal measurements at various points on the board

Test Environment :

CPU	Intel® Core™ i7-6820EQ Processor
Memory	Kingston KVR21S15D8/16 16GB*2
HDD	WD WD10EALX-009BA0 1TB
Power	CHANNEL WELL CWT-250ATX12 250W
Operating System	Windows 7 SP1 64bit
Test Program	3DMark 2006 + AIDA64

Test Result:

Item	Environmental temperature	24.7°C
1	RT9	44.2°C
2	L2(LLC1.0UH/063T)	46.4°C
3	L10(LLC3.3UH/0445)	39.5°C
4	U11(ICHALC262)	50.1°C
5	U22(ISL95855)	43.4°C
6	U23(ISL95853HRZ)	44.8°C
7	PCH(QM170)	48.9°C



4. Reliability Test

4.1 Power Consumption Test

1. Test Environment:

Motherboard	HE-B72
CPU	Intel® Core™ i3-6100E Processor
Memory	Kingston KVR21S15D8/16 16GB*2
HDD	ACPI MSS4F-M 64GB MSATA

Voltage	MS-DOS Boot up		Win7 64bit 3DMARK 06(once) + AIDA64	
	Current (A)	Power (W)	Current (A)	Power (W)
3.3V	0.546	1.8018	0.582	1.9206
5V	0.006	0.03	0.028	0.14
12V	1.155	13.86	2.706	32.472
5VSB	0.024	0.12	0.063	0.315
		15.8118		34.8476

The same as above but with LCD panel

Display Panel	M170EG01
----------------------	-----------------

Voltage	MS-DOS Boot up		Win7 64bit 3DMARK 06(once) + AIDA64	
	Current (A)	Power (W)	Current (A)	Power (W)
3.3V	0.694	2.2902	0.926	3.0558
5V	0.004	0.02	0.005	0.025
12V	2.952	35.424	4.680	56.16
5VSB	0.022	0.11	0.049	0.245
		37.8442		59.4858

2. Test Environment:

Motherboard	HE-B72
CPU	Intel® Core™ i5-6440EQ Processor
Memory	Kingston KVR21S15D8/16 16GB*2
HDD	ACPI MSS4F-M 64GB MSATA

Voltage	MS-DOS Boot up		Win7 64bit 3DMARK 06(once) + AIDA64	
	Current (A)	Power (W)	Current (A)	Power (W)
3.3V	0.539	1.7787	0.745	2.4585
5V	0.008	0.04	0.008	0.04
12V	1.153	13.836	2.947	35.364
5VSB	0.012	0.06	0.053	0.265
		15.7147		38.1275

The same as above but with LCD panel

Display Panel	M170EG01
----------------------	-----------------

Voltage	MS-DOS Boot up		Win7 64bit 3DMARK 06(once) + AIDA64	
	Current (A)	Power (W)	Current (A)	Power (W)
3.3V	0.685	2.2605	0.854	2.8182
5V	0.003	0.015	0.023	0.115
12V	2.942	35.304	4.760	57.12
5VSB	0.039	0.195	0.078	0.39
		37.7745		60.4432

3. Test Environment:

Motherboard	HE-B72
CPU	Intel® Core™ i7-6820EQ Processor
Memory	Kingston KVR21S15D8/16 16GB*2
HDD	ACPI MSS4F-M 64GB MSATA

Voltage	MS-DOS Boot up		Win7 64bit 3DMARK 06(once) + AIDA64	
	Current (A)	Power (W)	Current (A)	Power (W)
3.3V	0.539	1.7787	0.563	1.8579
5V	0.006	0.03	0.006	0.03
12V	1.313	15.756	3.950	47.4
5VSB	0.025	0.125	0.541	2.705
		17.6897		51.9929

The same as above but with LCD panel

Display Panel	M170EG01
----------------------	-----------------

Voltage	MS-DOS Boot up		Win7 64bit 3DMARK 06(once) + AIDA64	
	Current (A)	Power (W)	Current (A)	Power (W)
3.3V	0.702	2.3166	0.889	2.9337
5V	0.017	0.085	0.032	0.16
12V	3.042	36.504	5.670	68.04
5VSB	0.027	0.135	0.056	0.28
		39.0406		71.4137

5. Performance Test

5.1 Performance Test 8.0

Windows 7 32-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ Transcend DDR4 2133 16GB WD WD10EALX 1TB SATA3	PASS	Summary 1494 CPU Mark 5953 2D Graphics Mark 477 3D Graphics Mark 333 Memory Mark 1323 Disk Mark 930

Windows 7 32-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ Transcend DDR4 2133 16GB WD WD10EALX 1TB SATA3	PASS	Summary 1435 CPU Mark 4765 2D Graphics Mark 455 3D Graphics Mark 329 Memory Mark 1353 Disk Mark 933

Windows 7 32-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ Transcend DDR4 2133 16GB WD WD10EALX 1TB SATA3	PASS	Summary 1335 CPU Mark 3254 2D Graphics Mark 449 3D Graphics Mark 325 Memory Mark 1344 Disk Mark 949

Windows 7 64-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ Transcend DDR4 2133 16GB ACPI MSS4F-M 64GB MSATA	PASS	Summary 1976 CPU Mark 7539 2D Graphics Mark 651 3D Graphics Mark 329 Memory Mark 2101 Disk Mark 2520

Windows 7 64-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ Transcend DDR4 2133 16GB ACPI MSS4F-M 64GB MSATA	PASS	Summary 1860 CPU Mark 5708 2D Graphics Mark 638 3D Graphics Mark 326 Memory Mark 1903 Disk Mark 2490

Windows 7 64-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ Transcend DDR4 2133 16GB ACPI MSS4F-M 64GB MSATA	PASS	Summary 1749 CPU Mark 4151 2D Graphics Mark 635 3D Graphics Mark 319.9 Memory Mark 2027 Disk Mark 2535

Windows 10 64-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ Transcend DDR4 2133 16GB PLEXTOR M8PeY 256GB SSD PCIe	PASS	Summary 4357 CPU Mark 10385 2D Graphics Mark 770 3D Graphics Mark 5347 Memory Mark 2299 Disk Mark 3434

Windows 10 64-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ Transcend DDR4 2133 16GB PLEXTOR M8PeY 256GB SSD PCIe	PASS	Summary 2195 CPU Mark 5486 2D Graphics Mark 592 3D Graphics Mark 5347 Memory Mark 1974 Disk Mark 6897

Windows 10 64-bit

WEIGHTED SUITE	Test Environment	Result	Remark
Performance Test 8.0	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ Transcend DDR4 2133 16GB PLEXTOR M8PeY 256GB SSD PCIe	PASS	Summary 1920 CPU Mark 4164 2D Graphics Mark 570 3D Graphics Mark 363 Memory Mark 1869 Disk Mark 11105

5.2 3D MARK

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	WD WD10EALX 1TB SATA3			
WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4788	
	SM2.0 Score	PASS	1550	
	HDR/SM3.0 Score	PASS	1873	
	CPU Score	PASS	5854	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P605	
	Graphics score	PASS	512	
	Physics score	PASS	5995	
	Combined score	PASS	619	

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	WD WD10EALX 1TB SATA3			
WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4692	
	SM2.0 Score	PASS	1530	
	HDR/SM3.0 Score	PASS	1840	
	CPU Score	PASS	5287	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P601	
	Graphics score	PASS	510	
	Physics score	PASS	5191	
	Combined score	PASS	610	

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	WD WD10EALX 1TB SATA3			
WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4489	
	SM2.0 Score	PASS	1500	
	HDR/SM3.0 Score	PASS	1791	
	CPU Score	PASS	3718	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P560	
	Graphics score	PASS	476	
	Physics score	PASS	3623	
	Combined score	PASS	601	

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	ACPI MSS4F-M 64GB MSATA			
WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4779	
	SM2.0 Score	PASS	1548	
	HDR/SM3.0 Score	PASS	1866	
	CPU Score	PASS	5975	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P608	
	Graphics score	PASS	514	
	Physics score	PASS	6735	
	Combined score	PASS	613	

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	ACPI MSS4F-M 64GB MSATA			
WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4730	
	SM2.0 Score	PASS	1537	
	HDR/SM3.0 Score	PASS	1858	
	CPU Score	PASS	5381	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P616	
	Graphics score	PASS	522	
	Physics score	PASS	5478	
	Combined score	PASS	633	

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	ACPI MSS4F-M 64GB MSATA			
WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4489	
	SM2.0 Score	PASS	1495	
	HDR/SM3.0 Score	PASS	1794	
	CPU Score	PASS	3755	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P561	
	Graphics score	PASS	475	
	Physics score	PASS	3921	
	Combined score	PASS	606	

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	PLEXTOR-M8PeY 256GB SSD PCIe			
WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4416	
	SM2.0 Score	PASS	1491	
	HDR/SM3.0 Score	PASS	1643	
	CPU Score	PASS	6363	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P675	
	Graphics score	PASS	575	
	Physics score	PASS	6369	
	Combined score	PASS	659	

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	PLEXTOR-M8PeY 256GB SSD PCIe			
WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4678	
	SM2.0 Score	PASS	1533	
	HDR/SM3.0 Score	PASS	1821	
	CPU Score	PASS	5460	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P678	
	Graphics score	PASS	579	
	Physics score	PASS	5326	
	Combined score	PASS	662	

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	PLEXTOR-M8PeY 256GB SSD PCIe

WEIGHTED SUITE		Result	Score	Remark
<u>3DMARK6</u>	3DMARK Score	PASS	4403	
	SM2.0 Score	PASS	1459	
	HDR/SM3.0 Score	PASS	1757	
	CPU Score	PASS	3825	
<u>3DMARK11</u>	3DMARK11 Score	PASS	P621	
	Graphics score	PASS	531	
	Physics score	PASS	3781	
	Combined score	PASS	634	

5.3 PC MARK

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	WD WD10EALX 1TB SATA3			
WEIGHTED SUITE		Result	Score	Remark
PCMARK7	PCMark score	PASS	2786	
PCMARK8	Home 3.0 score	PASS	2621	

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	WD WD10EALX 1TB SATA3			
WEIGHTED SUITE		Result	Score	Remark
PCMARK7	PCMark score	PASS	2957	
PCMARK8	Home 3.0 score	PASS	2575	

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	WD WD10EALX 1TB SATA3			
WEIGHTED SUITE		Result	Score	Remark
PCMARK7	PCMark score	PASS	2812	
PCMARK8	Home 3.0 score	PASS	2346	

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	ACPI MSS4F-M 64GB MSATA			
WEIGHTED SUITE		Result	Score	Remark
<u>PCMARK7</u>	PCMark score	PASS	4283	
<u>PCMARK8</u>	Home 3.0 score	PASS	2703	

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	ACPI MSS4F-M 64GB MSATA			
WEIGHTED SUITE		Result	Score	Remark
<u>PCMARK7</u>	PCMark score	PASS	4264	
<u>PCMARK8</u>	Home 3.0 score	PASS	2653	

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	ACPI MSS4F-M 64GB MSATA			
WEIGHTED SUITE		Result	Score	Remark
<u>PCMARK7</u>	PCMark score	PASS	4053	
<u>PCMARK8</u>	Home 3.0 score	PASS	2500	

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	PLEXTOR M8PeY 256GB SSD PCIe			
WEIGHTED SUITE		Result	Score	Remark
<u>PCMARK7</u>	PCMark score	PASS	4705	
<u>PCMARK8</u>	Home 3.0 score	PASS	2743	

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	PLEXTOR M8PeY 256GB SSD PCIe			
WEIGHTED SUITE		Result	Score	Remark
<u>PCMARK7</u>	PCMark score	PASS	3916	
<u>PCMARK8</u>	Home 3.0 score	PASS	2724	

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ			
Memory	Transcend DDR4 2133 16GB			
HDD	PLEXTOR M8PeY 256GB SSD PCIe			
WEIGHTED SUITE		Result	Score	Remark
<u>PCMARK7</u>	PCMark score	PASS	4481	
<u>PCMARK8</u>	Home 3.0 score	PASS	2406	

5.4 AIDA64 Benchmark

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ
Memory	Transcend DDR4 2133 16GB
HDD	WD WD10EALX 1TB SATA3
Memory Read	16484 MB/s
Memory Write	15791 MB/s
Memory Copy	1692 MB/s
Memory Latency	65.5 ns
CPU Queen	34063
CPU PhotoWorxx	9747 MPixel/s
CPU ZLib	243.6 MB/s
CPU AES	12749 MB/s
CPU Hash	2724 MB/s
FPU VP8	4727
FPU Julia	23800
FPU Mandel	12492
FPU SinJulia	3366
FP32 Ray-Trace	4334 KRay/s
FP64 Ray-Trace	2082 KRay/s

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	WD WD10EALX 1TB SATA3
Memory Read	16625 MB/s
Memory Write	15807 MB/s

Memory Copy	16484 MB/s
Memory Latency	68.3 ns
CPU Queen	24356
CPU PhotoWorxx	10081 MPixel/s
CPU ZLib	183.4 MB/s
CPU AES	11919 MB/s
CPU Hash	2429 MB/s
FPU VP8	4160
FPU Julia	18798
FPU Mandel	9679
FPU SinJulia	2289
FP32 Ray-Trace	3663 KRay/s
FP64 Ray-Trace	1968 KRay/s

Windows 7 32-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	WD WD10EALX 1TB SATA3
Memory Read	16093 MB/s
Memory Write	15843 MB/s
Memory Copy	15912 MB/s
Memory Latency	70.9 ns
CPU Queen	17525
CPU PhotoWorxx	9919 MPixel/s
CPU ZLib	118.4 MB/s
CPU AES	6142 MB/s
CPU Hash	1308 MB/s

FPU VP8	2925
FPU Julia	11456
FPU Mandel	6008
FPU SinJulia	1618
FP32 Ray-Trace	2064 KRay/s
FP64 Ray-Trace	1083 KRay/s

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @2.80GHZ
Memory	Transcend DDR4 2133 16GB
HDD	ACPI MSS4F-M 64GB MSATA
Memory Read	16639 MB/s
Memory Write	15929 MB/s
Memory Copy	16630 MB/s
Memory Latency	64.2 ns
CPU Queen	34125
CPU PhotoWorxx	10053 MPixel/s
CPU ZLib	249.8 MB/s
CPU AES	12744 MB/s
CPU Hash	3216 MB/s
FPU VP8	5025
FPU Julia	23836
FPU Mandel	12793
FPU SinJulia	3373
FP32 Ray-Trace	5145 KRay/s
FP64 Ray-Trace	2541 KRay/s

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	ACPI MSS4F-M 64GB MSATA
Memory Read	16048 MB/s
Memory Write	15728 MB/s
Memory Copy	14683 MB/s
Memory Latency	94.3 ns
CPU Queen	24825
CPU PhotoWorxx	10656 MPixel/s
CPU ZLib	190.8 MB/s
CPU AES	11840 MB/s
CPU Hash	2937 MB/s
FPU VP8	4092
FPU Julia	22091
FPU Mandel	12244
FPU SinJulia	2273
FP32 Ray-Trace	4241 KRay/s
FP64 Ray-Trace	2329 KRay/s

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	ACPI MSS4F-M 64GB MSATA
Memory Read	15816 MB/s
Memory Write	15874 MB/s
Memory Copy	15597 MB/s

Memory Latency	79.3 ns
CPU Queen	18348
CPU PhotoWorxx	10348 MPixel/s
CPU ZLib	121.3 MB/s
CPU AES	6141 MB/s
CPU Hash	1556 MB/s
FPU VP8	2993
FPU Julia	11419
FPU Mandel	6160
FPU SinJulia	1625
FP32 Ray-Trace	2441 KRay/s
FP64 Ray-Trace	1375 KRay/s

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ
Memory	Transcend DDR4 2133 16GB
HDD	PLEXTOR M8PeY 256GB SSD PCIe
Memory Read	16957 MB/s
Memory Write	16261 MB/s
Memory Copy	17154 MB/s
Memory Latency	64.3 ns
CPU Queen	3414
CPU PhotoWorxx	10076 MPixel/s
CPU ZLib	251.4 MB/s
CPU AES	12743 MB/s
CPU Hash	3207 MB/s
FPU VP8	5484

FPU Julia	23773
FPU Mandel	12788
FPU SinJulia	3372
FP32 Ray-Trace	5146 KRay/s
FP64 Ray-Trace	2572 KRay/s

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	PLEXTOR M8PeY 256GB SSD PCIe
Memory Read	15769 MB/s
Memory Write	15710 MB/s
Memory Copy	15756 MB/s
Memory Latency	79.6 ns
CPU Queen	24921
CPU PhotoWorxx	10655 MPixel/s
CPU ZLib	191.3 MB/s
CPU AES	11887 MB/s
CPU Hash	2946 MB/s
FPU VP8	4311
FPU Julia	22178
FPU Mandel	12300
FPU SinJulia	2284
FP32 Ray-Trace	4262 KRay/s
FP64 Ray-Trace	2339 KRay/s

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	PLEXTOR M8PeY 256GB SSD PCIe
Memory Read	16043 MB/s
Memory Write	16234 MB/s
Memory Copy	15853 MB/s
Memory Latency	72.3 ns
CPU Queen	18412
CPU PhotoWorxx	10260 MPixel/s
CPU ZLib	122.7 MB/s
CPU AES	6136 MB/s
CPU Hash	1545 MB/s
FPU VP8	3141
FPU Julia	11432
FPU Mandel	6156
FPU SinJulia	1624
FP32 Ray-Trace	2443 KRay/s
FP64 Ray-Trace	1375 KRay/s

5.5 CINEBENCH R15

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @2.80GHZ
Memory	Transcend DDR4 2133 16GB
HDD	ACPI MSS4F-M 64GB MSATA
OpenGL	16.2 fps
CPU	616 cb

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	ACPI MSS4F-M 64GB MSATA
OpenGL	17.87 fps
CPU	251 cb

Windows 7 64-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	ACPI MSS4F-M 64GB MSATA
OpenGL	15.18 fps
CPU	214 cb

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @ 2.80GHZ
Memory	Transcend DDR4 2133 16GB
HDD	PLEXTOR M8PeY 256GB SSD PCIe
OpenGL	16.41 fps
CPU	602 cb

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @ 2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	PLEXTOR M8PeY 256GB SSD PCIe
OpenGL	17.42 fps
CPU	418 cb

Windows 10 64-bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ
Memory	Transcend DDR4 2133 16GB
HDD	PLEXTOR M8PeY 256GB SSD PCIe
OpenGL	16.47 fps
CPU	291 cb

5.6 GEEKBENCH4

Windows 7 32 bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @2.80GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3180
Multi-Core score	10644
Result	link

Windows 7 32 bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @2.70GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3081
Multi-Core score	8986
Result	link

Windows 7 32 bit

CPU	Intel(R) Core(TM) CPU i3-6100E @ 2.70GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3031
Multi-Core score	5966
Result	link

Windows 7 64 bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @2.80GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3522
Multi-Core score	10778
Result	link

Windows 7 64 bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @2.70GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3143
Multi-Core score	9036
Result	link

Windows 7 64 bit

CPU	Intel(R) Core(TM) CPU i3-6100E @2.70GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3386
Multi-Core score	6362
Result	link

Windows 10 64 bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @2.80GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3387
Multi-Core score	10363
Result	link

Windows 10 64 bit

CPU	Intel(R) Core(TM) CPU i5-6440EQ @2.70GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3331
Multi-Core score	8470
Result	link

Windows 10 64 bit

CPU	Intel(R) Core(TM) CPU i3-6100E @2.70GHZ
Memory	Transcend DDR4 2133 16GB
Single-Core score	3275
Multi-Core score	6101
Result	<u>link</u>

Ubuntu 16.04 LTS 64Bit

CPU	Intel(R) Core(TM) CPU i7-6820EQ @2.80GHZ
Memory	Crucial DDR4 2133 4GB
Single-Core score	3441
Multi-Core score	9112
Result	<u>link</u>

5.7 Storage Performance

5.7.1 HDD

Test environment:

OS Windows 7 (64Bit)

Program (HD Tune)

HDD Model	Interface	Capacity	Average	Burst Rate	Access time
SanDisk Cruzer Switch	USB2.0	4GB	17.7 MB/s	14.1 MB/s	0.776ms
SanDisk Ultra	USB3.0	32GB	62.0 MB/s	43.3 MB/s	1.47ms
ADATA S102	USB3.0	32GB	109.0 MB/s	62.9 MB/s	1.42ms
SanDisk Extreme	USB3.0	64GB	166.8 MB/s	59.4 MB/s	0.449ms
WD WD2500AAKS-00VYA0	SATA2	250GB	59 MB/s	82.4 MB/s	13.4 ms
ACPI MSS4F-M	MSATA	64GB	395.7 MB/s	102.3 MB/s	0.084ms
PLEXTOR PX-256M8PeY	PCIe	256GB	944.3 MB/s	342.2 MB/s	0.041ms

5.7.2 CD/DVD-ROM

Test environment:

OS Windows 7 (64Bit)

Program (NERO)

CD/DVD-ROM Model	Interface	Average Speed	Full Read	Burst Rate	DVD
LITEON eBAU108	USB	5.91x	235 ms	17 MB/s	1-16X DVD-R
LITEON eTAU108	USB	5.98x	211 ms	19 MB/s	1-16X DVD-R
Pioneer DVR-XD11T	USB	6.01x	184 ms	21 MB/s	1-16X DVD-R
Pioneer DDVR-S19LBK-24X	SATA	11.92x	206 ms	37 MB/s	1-16X DVD-R
LITEON iHES312	SATA	11.70X	162 ms	42 MB/s	1-16X DVD-R
ASUS DRW-1814BLT	SATA	8.80x	191 ms	35 MB/s	1-16X DVD-R