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June Deep Dive Mtg, ITI/Technet Computers Presentation -- Intel Corp

Submitted in behalf of ITI and Technet

Additional submitted attachment is included below.
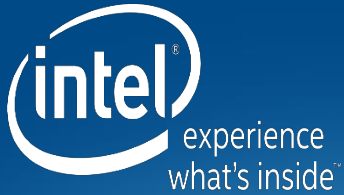
Segmentation

	High End Tower	Mainstream Tower	Green* PC	Value PC
ES V6 Category	DT-I3	DT-I2	DT-I2	DT-I1
CPU based	Core i7	Core i5	Core i3	Pentium
Market Price	$820	$524	$432	$250
Short Idle (w)	33.9	26.2	21.5	34.3
Measured TEC (kWH)	149.9	116.5	98.3	157.6
TEC Limit Energy Star V6	153.1	142.3	127.3	116.1
Proposed CEC TEC Limit	63.7	57.3	57.3	54.1
Sysmark 2014 – Overall				
HDXPRT 2014 – Overall				

Segmentation

Desktop vs. Mobile

	Desktop	Mobile
CPU based	Core i5	Core i5
Market Price	$524	$600
Short Idle	26.2	7.7
Measured TEC	116.5	25.2
TEC Limit Energy Star V6	PASS	PASS
Proposed CEC TEC Limit	FAIL	PASS
Sysmark 2014 – Overall		
HDXPRT 2014 – Overall		

Generational Energy Efficiency Improvement

	Current Desktop	**Old PC**
CPU based	Core i5 – 8 series	Core 2 Duo – 4 Series
Year First Sold	2013	2008
Board Power	7.8	20.5
PSU	80+ Bronze	80+
PSU Loss	6.5	11.6
Short Idle	26.2	43.6
Measured TEC	116.5	196.1

## Old PC did meet ENERGY STAR Ver 5

Internal Power Supply Requirements

Power Supply Requirements

Industry has Published Criteria for Power Supplies
Tests are to ensure a power supply will work with desktop computers in a variety of situations

- Intel publishes a public internal Power Supply Design guide for PSU – current Rev 1.31
  - http://cache-www.intel.com/cd/00/00/52/37/523796_523796.pdf

- Tested power supplies are listed
  - 80plus.org – Efficiency Only
  - Intel Tested Power Supply List – http://www.intel.com/cd/channel/reseller/asmo-na/eng/215842.htm

- Pico PSU - 12 Volt Rail Problem:
  - Listed as 8A Max, 15A Peak
  - If all 12 Volt rail goes to CPU only support 45 Watt CPU
  - 12V volt rail also used by Motherboard, HDD, ODD
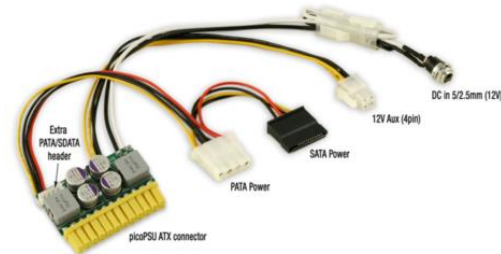
PSU 12V2 Capability Recommendations		
Processor TDP	Continuous Current	Peak Current
95W	16A	18A
65W	11A	14A
45W	7.6A	12A
35W	6A	10A

Power Supply Testing Station

Chroma 8000 PSU Test Rack
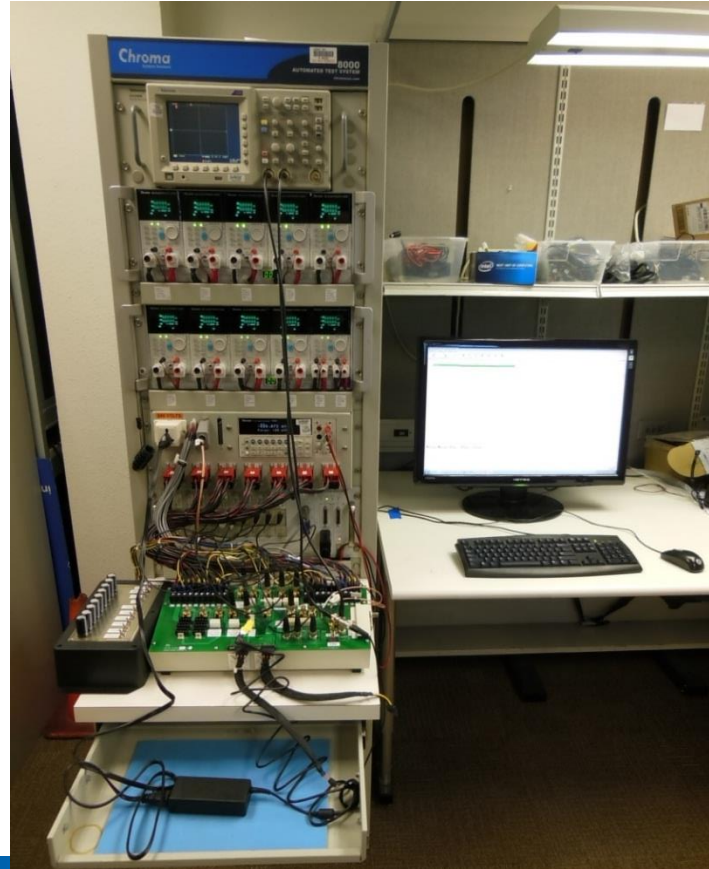
Pico PSU Test Results

Test Criteria	# of Tests	# of Pass	# of Fail
Line Regulation	6	4	2
Load Cross Regulation	32	0	32
Efficiency for ErP	3	3	0
Efficiency for Energy Star	80+ Bronze		
Power Factor for Energy Star & 80 Plus	2	2	0
Ripple & Noise Test	4	0	4
Dynamic Load	48	0	48
12V2 Peak Loading Test	2	0	2
Timing T1-T6	24	18	6
12VDC/5VDC/3.3VDC Power Sequencing Test	6	0	6
Hold Up Time	2	0	2
Short Circuit Protection	12	0	12
Over Current Protection	12	12	0
Energy Hazard Safety Criteria (240VA)	8	0	8
12V2 Load 16A Continue & 18A Peak	2	0	2
12V2 Min Load 0A	4	0	4
Totals	167	39	128

Some Tests would NOT complete
Testing equipment would get stuck in loops

Detail Slides

One slide per system

Gaming System Demo
Exemption – Core i7 Extreme processor based

Item	Part #	Market Price**	Short Idle Power
CPU	Intel Core i7-5960K	$1050	18.5
Board	MSI X99 SLI Plus	$220	19.2
Memory	DDR4-2133, 64GB	$600	
Graphics	nVidia GTX 980 (Qty 2) (FB_BW = 224 GB/Sec)	$1040	19.7
HDD	Intel 730 SSD (Qty 2)	$1140	3.0
ODD	none	-	-
PSU	80+ Bronze 1000W (Cooler Master RS-A00-AMBA-J3)	$160	29.4
Chassis	Cooler Master	$190	
Total		$4400	89.8

Benchmark Scores

Sysmark 2014

Overall	
Financial Analysis	
Media Creation	
Office Productivity	

HDXPRT 2014

Overall	
Edit Photos	
Convert Video	
Edit Music	

	Measured TEC	TEC Limit – ES V6	TEC Limit – CEC Draft
Dual GPU	403.5		
Single GPU	342.4	343.1	128.1 (No Gfx adder)
		PASS	FAIL

Gaming System Demo
Exemption – Core i7 Extreme processor based

Segmentation Demo
High End - Volume Core i7 processor based

Item	Part #	Market Price	Short Idle Power
CPU	Intel Core i7-4770	$305	7.8
Board	Asus Z87-K	$120	10.6
Memory	DDR3-1600, 16GB	$111	
Graphics	Integrated	–	–
HDD	WD Black 2TB	$125	7.8
ODD	LG Bluray	$50	0.7
PSU	80+ Gold 400W	$55	6.8
Chassis	Cooler Master	$54	
Total		$820	33.9

Benchmark Scores	
Sysmark 2014	
Overall	
Financial Analysis	
Media Creation	
Office Productivity	
HDXPRT 2014	
Overall	
Edit Photos	
Convert Video	
Edit Music	

Measured TEC	TEC Limit – ES V6	TEC Limit – CEC Draft
149.9	153.1	63.7
	PASS	FAIL

Segmentation Demo
High End - Volume Core i7 processor based

Segmentation Demo
Mainstream – Volume Core i5 processor based

Item	Part #	Market Price	Short Idle Power
CPU	Intel Core i5-4570	$205	6.7
Board	Foxconn H87MX-D	$65	7.8
Memory	DDR3-1600, 8GB	$55	
Graphics	Integrated	–	–
HDD	WD Blue 1TB	$55	4.3
ODD	LG Bluray	$50	0.9
PSU	80+ Bronze 300W	$55	6.5
Chassis		$39	
Total		$524	26.2

Benchmark Scores	
Sysmark 2014	
Overall	
Financial Analysis	
Media Creation	
Office Productivity	
HDXPRT 2014	
Overall	
Edit Photos	
Convert Video	
Edit Music	

Measured TEC	TEC Limit – ES V6	TEC Limit – CEC Draft
116.5	142.3	57.3
	PASS	FAIL

Segmentation Demo
Mainstream – Volume Core i5 processor based

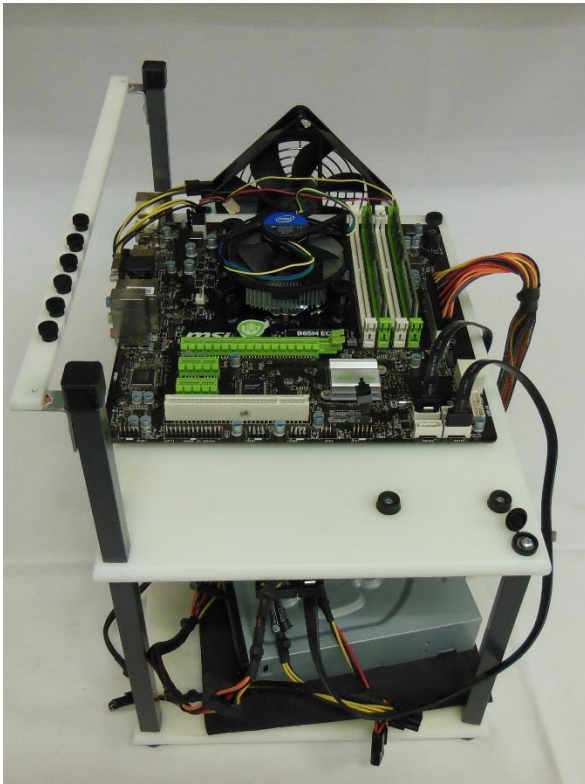# Segmentation Demo
Green PC – Volume Core i3 processor based

Item	Part #	Market Price	Short Idle Power
CPU	Intel Core i3-4130	$120	4.2
Board	MSI B85 Eco	$81	6.7
Memory	DDR3-1600, 8GB	$54	
Graphics	Integrated	–	–
HDD	WD Green 1TB	$52	4.2
ODD	DVD	$20	0.4
PSU	80+ Bronze 300W	$55	6.0
Chassis	example	$50	
Total		$432	21.5

Benchmark Scores	
Sysmark 2014	
Overall	
Financial Analysis	
Media Creation	
Office Productivity	
HDXPRT 2014	
Overall	
Edit Photos	
Convert Video	
Edit Music	

Measured TEC	TEC Limit – ES V6	TEC Limit – CEC Draft
98.3	127.3	57.3
	PASS	FAIL

Segmentation Demo
Green PC – Volume Core i3 processor based

Segmentation Demo
Value – Volume Pentium processor based

Item	Part #	Market Price	Short Idle Power
CPU	Intel Pentium G3220	$57	6.6
Board	ECS H81H3-M4	$45	8.1
Memory	DDR3-1333, 4GB	$34	
Graphics	Integrated	–	–
HDD	Seagate 320 GB	$47	4.4
ODD	DVD	$20	0.6
PSU	Cheap 200W ($50 adder 80+ Bronze 300W)	$20	14.6 (8.3)
Chassis	Cooler Master	$27	
Total		$250	34.3 (27.8)

Benchmark Scores	
Sysmark 2014	
Overall	
Financial Analysis	
Media Creation	
Office Productivity	
HDXPRT 2014	
Overall	
Edit Photos	
Convert Video	
Edit Music	

Measured TEC	TEC Limit – ES V6	TEC Limit – CEC Draft
157.6 / 127.7	116.1	54.1
	FAIL	FAIL

Segmentation Demo
Value – Volume Pentium processor based

Mobile vs. Desktop Demo
Mobile – Volume Core i5 processor based

Item	Part #	Market Price	Short Idle Power
CPU	Intel Core i5-4210U		
Board	HP Pavilion		
Memory	LPDDR3-1600, 6GB		
Graphics	Integrated		
HDD	Platter drive, 750 GB		
ODD	None		
PSU	HP 45W (Level V)		
Chassis	HP Pavilion		
Total		$600	7.7

Benchmark Scores	
Sysmark 2014	
Overall	
Financial Analysis	
Media Creation	
Office Productivity	
HDXPRT 2014	
Overall	
Edit Photos	
Convert Video	
Edit Music	

Measured TEC	TEC Limit – ES V6	TEC Limit – CEC Draft
25.2	45.5	53.5
	PASS	PASS

Mobile vs. Desktop Demo
Mobile – Volume Core i5 processor based

Generational Improvement Demo
Old PC – Volume Core 2 Duo processor based

Item	Part #	Short Idle Power
CPU	Intel Core 2 Duo E8400	5.8
Board	Intel DQ45CB	20.5
Memory	DDR2-800, 2GB	
Graphics	Integrated	–
HDD	WD Blue 80 GB	4.75
ODD	DVD	1.0
PSU	80+ 350W	11.6
Chassis	Cooler Master	
Total		43.6

Energy Regulations	
Energy Star V6 method	
Measured TEC	196.1
TEC Limit – ES V6	113.6
TEC Limit – CEC Draft	
Energy Star V5 method	
Measured TEC	159.7
TEC Limit – ES V5	175

System was originally sold during ES V5 timeframe

Generational Improvement Demo
Old PC – Volume Core 2 Duo processor based