



Netlist FBDIMM preliminary power analysis Training

Sept 18th 2007



Features and Benefits for Quad-Rank FBdimms



- **Lowers power consumption & TCO**
- **Better thermals and higher-reliability**
- **Lower cost to achieve higher densities**

10% lower system power using 4GB 4Rx8 – 667 MHz FBDIMM



Preliminary

System Features

- Bensley based Dual Processor Xeon systems
- 1U Form-factor
- 8 DIMM slots (4-rank enabled) across 4 channels
- Fully populated (32 GB) using 8 DIMM slots
- Lock-step configuration

Power Analysis (preliminary)	Standard design	Netlist Power Optimized	%lower
Design	Planar 2Rx4	Planar 4Rx8	
4 DIMM Active Power (Estimated) (W)	61.0	41.0	
4 DIMM Standby Power (Estimated) (W)	28.7	24.7	
Total DIMM Power (Estimated) (W)	89.7	65.7	-26%
Total System Power (Measured) (W)	400	360	-10%

Notes

1. For system power measurement, Memory stressed using Memtest1.7
2. Power measured at the wall using power meter of $\pm 1.5\%$ accuracy

Strong correlation exists between the estimated and measured power savings; 35W-40W of active power savings using 8 of 4GB 4Rx8 FBDIMM (vs. standard)

10% lower system power using 2GB 4Rx8 – 667 MHz FBDIMM



Preliminary

System Features

- Bensley based Dual Processor Xeon systems
- 1U Form-factor
- 8 DIMM slots (4-rank enabled) across 4 channels
- Fully populated (32 GB) using 8 DIMM slots
- Lock-step configuration

Power Analysis (preliminary)	Standard design	Netlist Power Optimized	%lower
Design	Planar 2Rx4	Planar 4Rx8	
4 DIMM Active Power (Estimated) (W)	57.7	34.3	
4 DIMM Standby Power (Estimated) (W)	30.0	24.7	
Total DIMM Power (Estimated) (W)	87.7	58.0	-34%
Total System Power (Measured) (W)	385	355	-8%

Notes

1. For system power measurement, Memory stressed using Memtest1.7
2. Power measured at the wall using power meter of ±1.5% accuracy

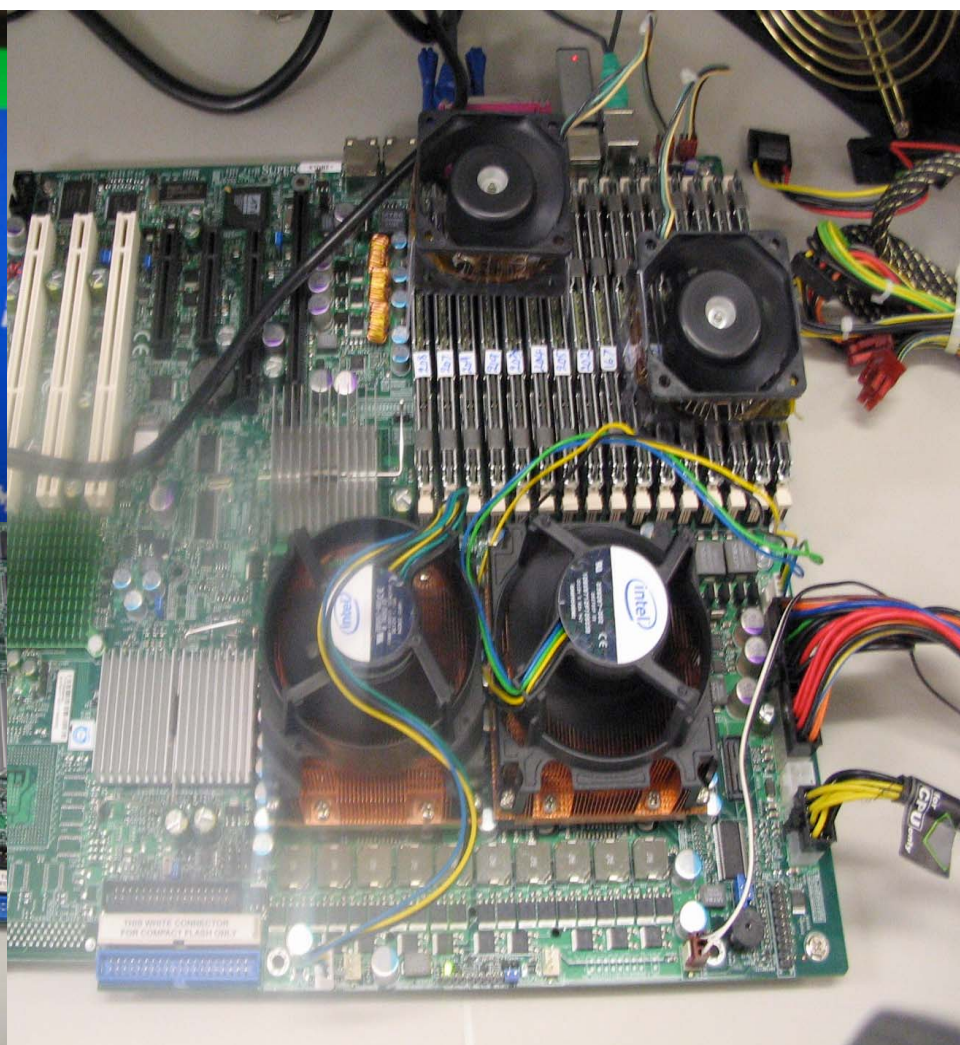
Strong correlation exists between the estimated and measured power savings; 30W of active power savings using 8 of 2GB 4Rx8 FBDIMM (vs. standard)

INTEL "Blackford" (64GB Quad-Rank FBDimm)

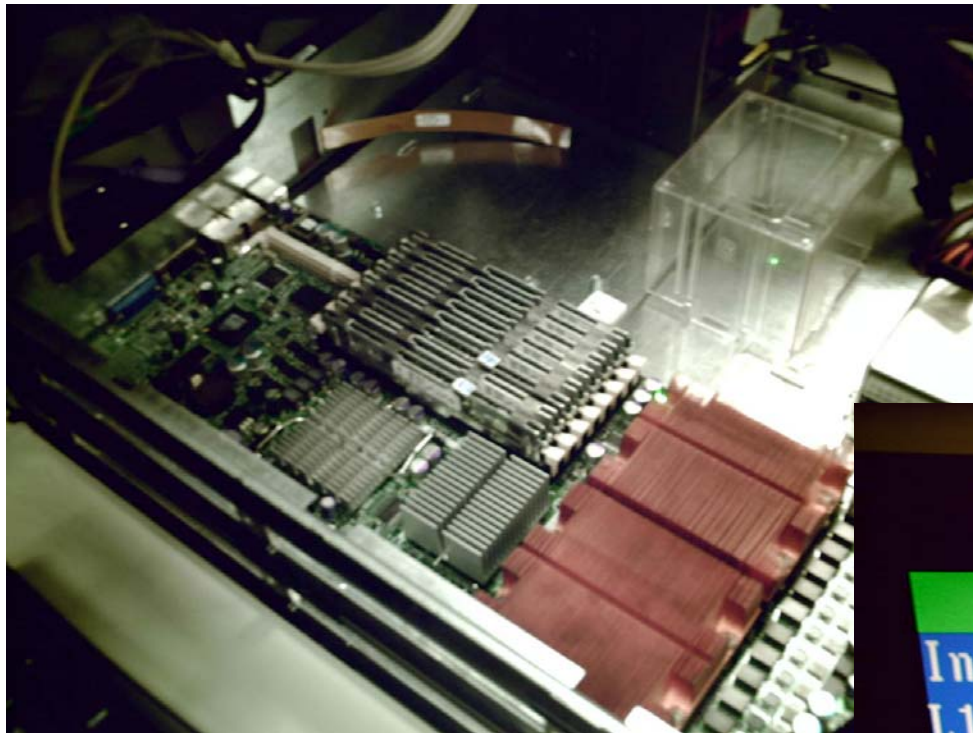


```
Memtest86 v1.70
Intel Core 2 1867 MHz
L1 Cache: 64K 30601MB/s
L2 Cache: 4096K 13053MB/s
Memory : 63G 2279MB/s
Chipset :

WallTime  Cached  RsvdMem
```

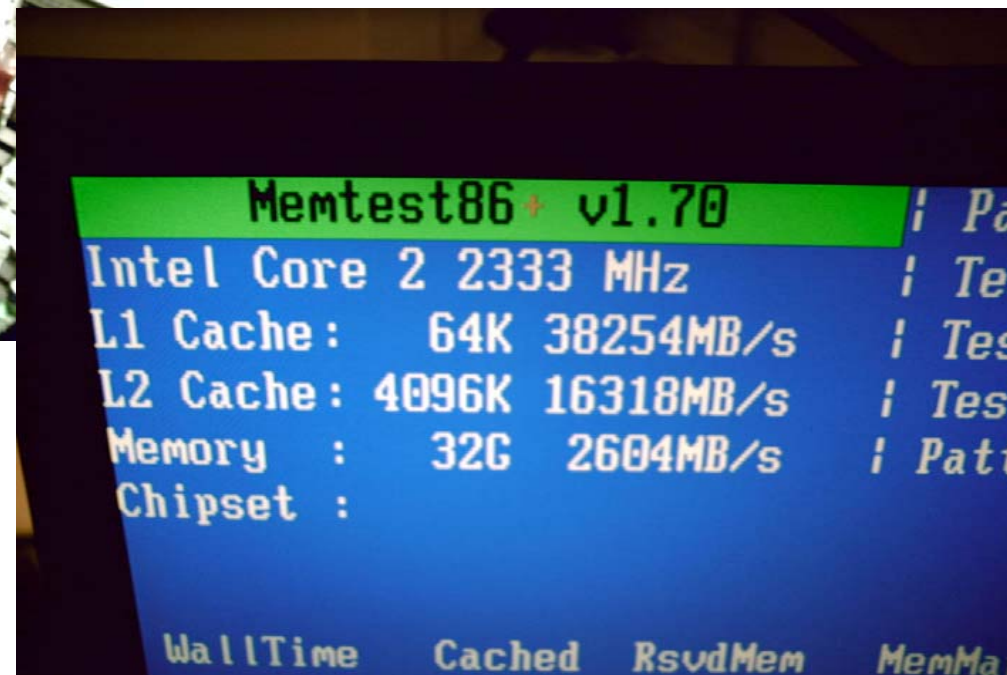


SM "X7DBT" (32GB Quad-Rank FBDimm)

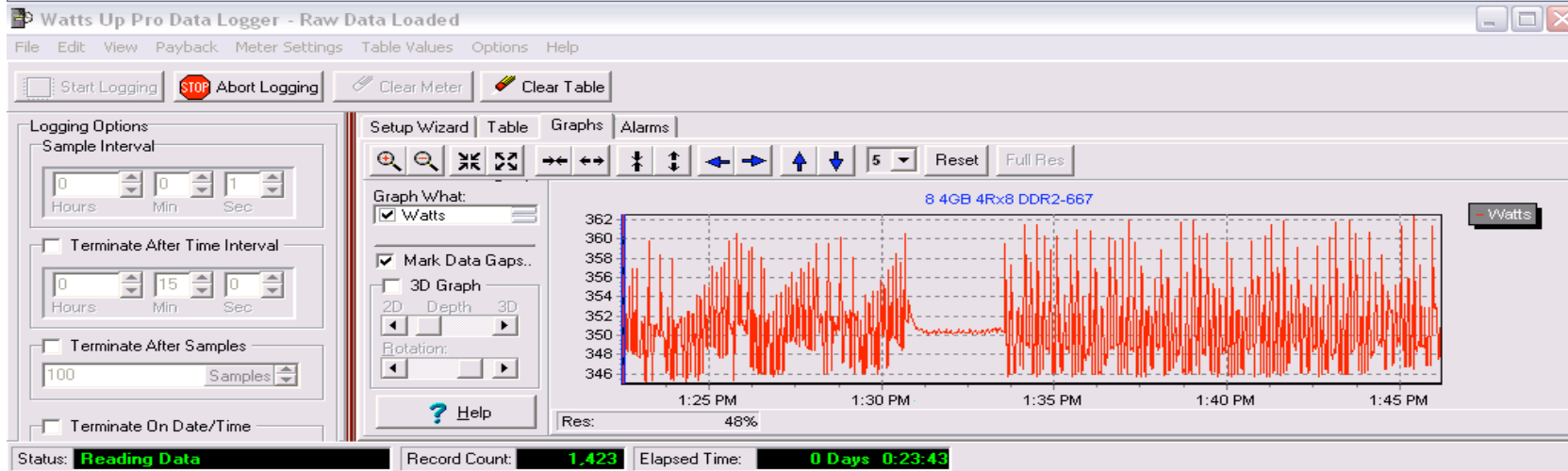
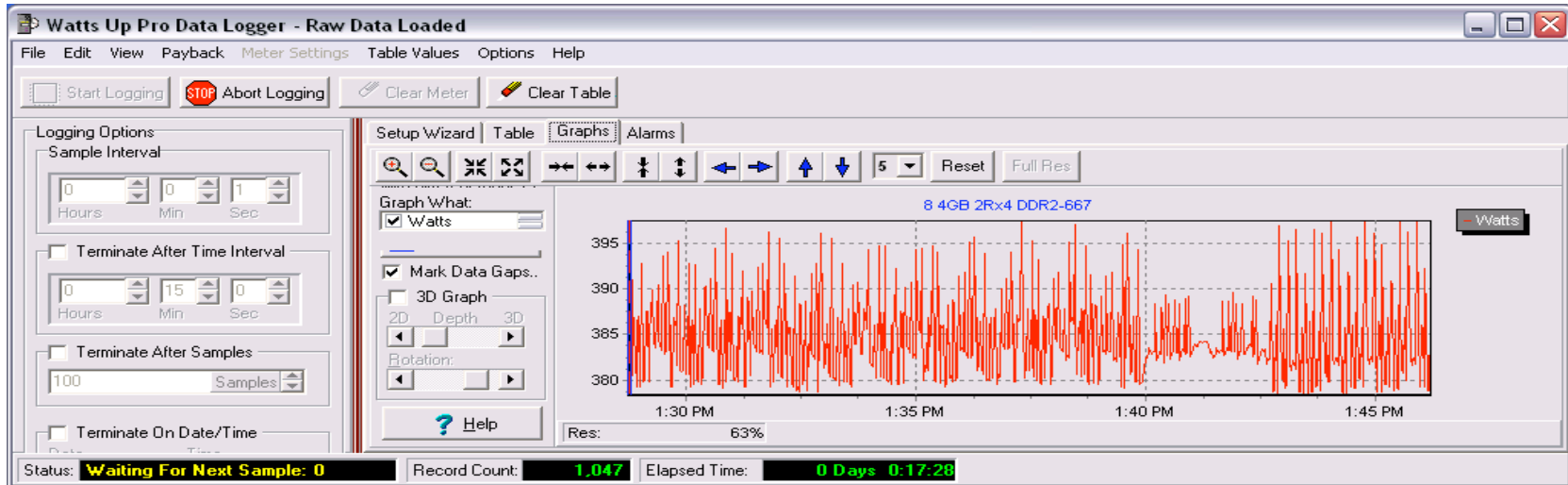


(8) 4GB Quad-Rank FBdimms

Stress Testing with Memtest 86+



System Power Measurement using 4GB FBDIMM



Measured system power using 8 of 4GB 2Rx4 FBDIMM range is 380-400 W
Measured system power using 8 of 4GB 4Rx8 FBDIMM range is 345-360W