

Feeding the Beast: Servers Consume High Density DRAM Modules

May 2008

Report Number: VM103-08

Analysts: Bob Merritt and Sherry L. Garber

Table of Contents

Executive Summary	1
The Server Market	3
The DRAM Market	5
DRAM Revenue Forecasts for Server Applications	8
DDR3 Demand as Defined by Intel and AMD	12
Module Incremental Values	16
Packaging Industry Overview	17
DRAM Module Packaging Technology	20
A Server Company View of High-Density DRAM Packaging	21
Base Packaging Technology	22
Wafer Level Packaging.....	22
Packaging Characteristics by End Application.....	24
Adhesive.....	24
Equipment Needs.....	25
Backend Equipment Investment.....	25
The Companies	27
Amkor	27
Micron.....	28
Hynix	30

Qimonda	33
Samsung	33
Entorian Technologies/	34
Elpida	36
Viking InterWorks	37
Smart Modular Technologies Inc.	39
Summary	41

List of Figures

Figure 1. Server Units and Gigabyte per System	2
Figure 2. Server by Price Point and Router/Switch Unit Shipments	4
Figure 3. DRAM Revenue and Units Shipments	5
Figure 4: Forecast of Intel DDR3 Demand for 2008.....	12
Figure 5: DRAM Interfaces by % Units	14
Figure 6: DRAM Interfaces by Bits.....	15
Figure 7. Module Market Gigabyte Equivalents	43

List of Tables

Table 1. Server, Switch, Router Unit Forecast	4
Table 2. DRAM Units, ASP and Cost per Megabit.....	7
Table 3: Module Units for Computing Applications.....	8
Table 4: Summary of Server Modules	9
Table 5: Theoretical DRAM Demand for Server Modules	9
Table 6: Forecast of Actual Component Usage	10
Table 7. High-End Switch and Router Module Demand	10
Table 8. 1-GByte Module Equivalents by Server and High-End Switch/Router...	11
Table 9: AMD DDR3 Platforms and Chipsets	13
Table 10. Packaging Options by Vendor.....	20
Table 11. Typical Backend Equipment for DRAM Manufacturer	26

Copyright Semico Research, 2008. All rights reserved.

Reproduction in whole or part is prohibited without the express written permission of Semico.

The contents of this report represent the interpretation and analysis of statistics and information that is generally available to the public or released by responsible agencies or individuals, but is not guaranteed as to its accuracy or completeness