

## Rambus Could Be \$1000 Per Share By 2007

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### \$1000 Per Share by 2007?

Why do we feel that Rambus has such enormous potential for appreciation? Take a look at the spreadsheet below and you may realize why we believe this is the potential of Rambus' stock price.

Obviously as with any forecast there are several market assumptions that must be made. However, realize that even if the numbers are off by a factor of two we are still talking about a stock by 2007 trading at many multiples of today's price. Keep in mind also the numbers below account only for forward revenues without any consideration for past due royalties. Past due royalties resulting in cash infusion could allow Rambus to make business decisions not at all contemplated in this analysis. We have attempted to put as clear a picture on the numbers as we can.

### The Rambus Spreadsheet

Rambus calendar earnings reported at end of first quarter in following year.	Billions	Billions	Billions	Billions
	2004	2005	2006	2007
1. Memory Mkt	18	21	26	33
2. SDRAM Mkt Share	15%	8%	1%	0%
3. SDRAM	2.70	1.68	0.26	0.00
4. RDRAM Mkt Share	5%	2%	1%	1%
5. RDRAM	0.90	0.42	0.26	0.33
6. DDR Mkt Share	80%	90%	90%	84%
7. DDR	14.40	18.90	23.40	27.72
8. XDR Mkt Share	0%	5%	8%	15%
9. XDR	0.00	1.05	2.08	4.95
10. PC Memory Ctrls	5	5	5	5
11. Non Intel PC Ctrls Share	40%	40%	40%	40%
12. Non Intel PC Ctrls	2	2	2	2
13. Other Memory Ctrls	3	4	6	8
14. # of SerDes Connects	0.20	0.40	0.60	0.80
15. Rambus Mkt Share	5%	10%	20%	50%
16. Rambus SerDes Connects	0.01	0.04	0.12	0.40
17. Rambus Lo Speed Share	80%	75%	70%	65%
18. Rambus Lo Speed Connects	0.008	0.030	0.084	0.260
19. Rambus Hi Speed Share	20%	25%	30%	35%
20. Rambus Hi Speed Connects	0.002	0.023	0.059	0.169
21. Hi Speed Parallel, Etc.	0	2	4	8
22. Intel Payment	0.04	0.04	0.04	0

Please refer to each numbered footnote for a more detailed explanation of market assumptions for these figures.

Royalty Income Based on Previous Table	Royalty Rate	Collects Royalty From Most Memory Manf.	Collects Royalty From All Memory Manf.	Collects Royalty From All Memory Manf.	Collects Royalty From All Memory Manf.
		2004	2005	2006	2007
1. Memory Mkt					
2. SDRAM Mkt Share		(Flat Rate for 0.5Yr)			
3. SDRAM	0.75%	4,050,000	12,600,000	1,950,000	0
4. RDRAM Mkt Share					
5. RDRAM	1.5%	13,500,000	6,300,000	3,900,000	4,950,000
6. DDR Mkt Share		(Flat Rate for 0.5Yr)			
7. DDR	3.5%	100,800,000	661,500,000	819,000,000	970,200,000
8. XDR Mkt Share					
9. XDR	3.5%	0	36,750,000	72,800,000	173,250,000
10. PC Memory Ctrls					
11. Non Intel PC Ctrls Share					
12. Non Intel PC Ctrls	5%	10,000,000	100,000,000	100,000,000	100,000,000
13. Other Memory Ctrls	5%	0	200,000,000	300,000,000	400,000,000
14. # of SerDes Connects					
15. Rambus Mkt Share					
16. Rambus SerDes Connects					
17. Rambus Lo Speed Share					
18. Rambus Lo Speed Connects	\$0.50	4,000,000	15,000,000	42,000,000	130,000,000
19. Rambus Hi Speed Share					
20. Rambus Hi Speed Connects	\$2.00	4,000,000	45,000,000	117,600,000	338,000,000
21. Hi Speed Parallel, Etc.	5%	0	100,000,000	200,000,000	400,000,000
22. Intel Payment		40,000,000	40,000,000	40,000,000	0
<b>Total Income</b>		<b>176,350,000</b>	<b>1,217,150,000</b>	<b>1,697,250,000</b>	<b>2,516,400,000</b>
<b>All Expenses</b>		108,000,000	146,058,000	152,752,500	201,312,000
<b>B4 Taxes Net</b>		68,350,000	1,071,092,000	1,544,497,500	2,315,088,000
<b>Tax Rate</b>		40%	40%	40%	40%
<b>Net Earnings</b>		41,010,000	642,655,200	926,698,500	1,389,052,800
<b>Per Share</b>		0.41	6.43	9.27	13.89
	<b>PE</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Share Price	20	\$8	\$129	\$185	\$278
Share Price	30	\$12	\$193	\$278	\$417
Share Price	40	\$16	\$257	\$371	\$556
Share Price	50	\$21	\$321	\$463	\$695
Share Price	75	\$31	\$482	\$695	\$1,042
Share Price	100	\$41	\$643	\$927	\$1,389

## Notes Corresponding to Rambus Spreadsheet:

1. The memory market was \$35 billion in 2000, nearly \$12 billion in 2001, and around \$18 billion in 2002. In 2001 it was a disaster for the memory manufacturers, as they lost billions because of selling memory below cost. Micron Technology lost \$959 million before an income tax benefit, Hynix lost \$3.9 billion, Infineon lost over \$1 billion before an income tax benefit, only Samsung was profitable. The memory bit growth rate has been increasing over 60% per year in recent years. My estimate for 2004 through 2007 is based upon slides shown by Rambus at a recent conference.
2. The SDRAM market share is going down as it is being replaced by DDR
4. The RDRAM market share last year was about 8% of the memory market in dollars. It will be less in units because RDRAM memory is currently more expensive than SDRAM and DDR. I am projecting RDRAM market share to be declining over the next few years. Even though Intel has eliminated its support, the Sony Playstation 2 will continue to use it and according to projections by research companies, more memory will be used in communications and consumer devices than in PCs by 2005 and RDRAM has a large advantage over DDR in these applications because of granularity. This advantage will increase as higher bit density chips replace the lower density chips. A single RDRAM chip can be used whereas it requires at least four DDR chips in an application if fast bandwidth is needed.
6. The DDR market share is growing very fast and is displacing slower SDRAM.
8. Rambus' XDR memory is going to be used in the Playstation 3 in 2005 and according to Rambus, will be used in PC's by 2006.
10. It is estimated that over 200 million PCs will ship in 2005, and at a price of \$30 per chipset for memory controllers, that would be a \$6 billion market for controllers for PCs alone. I used a figure of \$5 billion.
11. The non-Intel PC memory controller share is broken out assuming Intel has 60% of the market for PCs. That leaves 40% that Rambus could get royalty on, because Intel is already paying a flat \$40 million per year to Rambus.
13. The Other Controllers markets include communications processors, routers, switches, graphics cards, televisions, set top boxes, etc.
14. I got the number of serdes connections from statements made by Rambus. Rambus stated that there probably would be over one billion connections in 2005. I am arbitrarily reducing the estimate to 200 million in 2004, 400 million in 2005, 600 million in 2006, and then 800 million in 2007.
15. Rambus' share of the serdes market is based upon several considerations including the fact that Intel is one of twenty plus licenses Rambus announced, who have already signed serdes licensing agreements for Rambus serdes IP. I feel Intel will be responsible for Rambus' gaining a significant serdes market share, because the fact that Intel is using Rambus serdes IP should help Rambus sign additional serdes licensing agreements with many other companies. Rambus has also announced the fastest single link serdes speed of 10 Gbs, which is called RaSer X. Rambus' solution of just selling IP to incorporate into their clients' chips, has a much lower cost, uses less power and board real estate than competing discrete serdes chip solutions.
18. The royalty of \$2 per connection for high speed connections is a figure I was given at an Intel Developer's Forum. I was told that the low speed links (3.2GHZ) would be around \$2 per connection, while higher speed links would be more, the higher the speed, the higher the cost. I am conservatively using fifty cents for low speed and two dollars for high speed links
21. The income for high speed parallel chip to chip communications (Flexphase, Redwood), is a just a guess.

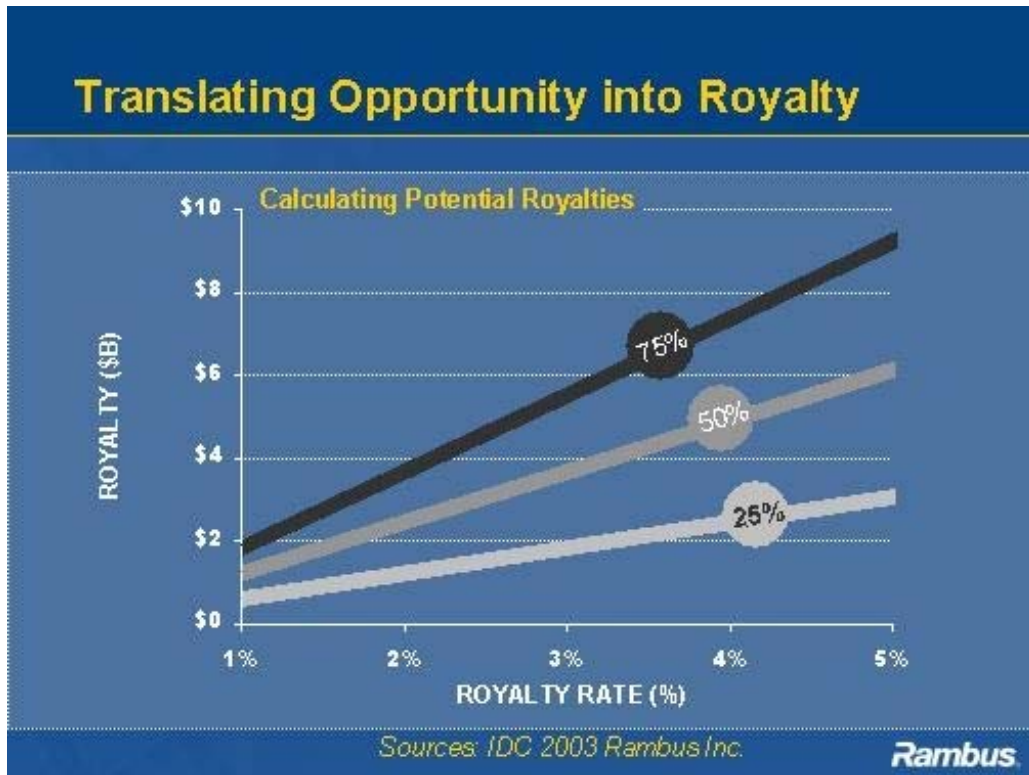
22. The flat \$40 million dollars per year from Intel is from a signed \$200 million contract Rambus has with Intel, giving licensing rights to Rambus' patents to Intel. It expires at the end of 2006
23. Rambus' last quarter total expenses were \$22.2 million, including legal fees (about \$89 million annualized). With reduced legal fees because of resolution of litigation, I believe expenses of \$108 million in 2004 and \$130 million in 2005 are reasonable estimates. I then keep increasing them at a small rate of 10% because of Rambus' business model of licensing and not manufacturing.

The authors of this article have a long position in Rambus.

This projection contains forward-looking statements. These statements are based on current expectations, estimates and projections about the Company's industry, my beliefs, and certain assumptions made by me. You can identify these and other forward-looking statements by the use of words such as "may", "will", "should," "expects," "plans," "anticipates," "believes," "estimates," "predicts," "intends," "potential," "continue" or the negative of such terms, or other comparable terminology. Forward-looking statements also include the assumptions underlying or relating to the foregoing statements. Actual results could differ materially from those anticipated in these forward-looking statements as a result of various factors, including those identified in Rambus' recent filings with the Securities and Exchange Commission, including its recently filed Form 10-Q, and also including the uncertainty of new technologies; and the uncertainty regarding the technical and market demands for such technologies. All forward-looking statements included in this projection are based on information available to me on the date hereof. Hager Technology Research assumes no obligation to update any forward-looking statements.

## Can the numbers really be that high?

At a recent analyst day conference Rambus displayed a chart with potential royalty revenue forecasts based on available market. The numbers in that chart support the model developed here. In fact, the spreadsheet's \$2.5 Billion revenue number in 2007 is right in line with the median shown in the Rambus' chart for a 2.5% royalty rate.



Slide from 2003 Rambus analyst day presentation

## But what about the litigation?

In our firm view the result of the patent litigation and antitrust litigation will favor Rambus. There are several reasons we maintain this view. The entire fiasco that occurred in the initial Richmond trial is over. Not only was the fraud reversed and the infringement trial remanded back to Virginia; but the claim definitions Rambus received at the Federal Circuit are extremely favorable to Rambus. In addition, the case at the FTC fundamentally relied on an initial finding of wrongdoing against Rambus that no longer exists.

The patent portion of the case is now very favorable. Armed with the claim definition results of the Federal Circuit, Rambus should have little problem demonstrating memory manufacturers are infringing their patents. It is likely that only a patent validity defense will be of any concern in the face of such strong patent claims.

Our opinion is that a validity defense will fail especially given the infringers own statements about the revolutionary nature of Rambus work, the novelty of using delay to increase speed in DRAM, the volume and breadth of prior art presented in obtaining the patents, and the decision to license made by numerous patent savvy companies. Rambus had so much correspondence with memory manufacturers who asked questions about "how the design works" that to call their efforts at improving speeds "obvious" or "a collection of prior art" is certainly a tough sell. To the extent that Rambus has used any prior art in a novel way to achieve a novel result remains unchallenged in court. These validity challenges require clear and convincing evidence to succeed and in our view are unlikely to bear fruit for the infringers. To a very large degree, the hopes of infringers avoiding royalty payments to Rambus rest with the faint hopes of the Federal Trade Commission coming to their aid.

## The FTC Case

This week the December 18<sup>th</sup> deadline for the Administrative Law Judge to issue an initial decision was extended. The ALJ requested a new deadline date of February 17<sup>th</sup>, 2004. The decision could come earlier but not later than that unless the ALJ requests yet another extension. Additional extension remains a possibility though we doubt that another extension will occur. The ALJ commented in his request for an extension that he was wrestling with over 1000 findings of fact.

In our view, the FTC case should be won on the merits. The best possible outcome is for a complete vindication of Rambus. With the recent Unocal decision, another ALJ refused jurisdiction over the entangling patent issues. When you consider that a fundamental element of the FTC complaint is that members “cannot see the inventions present” in a patent specification Rambus disclosed to the standard setting body a fundamental “entanglement” arises. The patent United States Patent and Trademark Office (USPTO) says “those skilled in the art” can indeed see the inventions from the specification disclosed. While there are certainly as many entangling issues of patent law in Rambus’ case, a decision on the merits is actually a better outcome than the jurisdictional dismissal that occurred in Unocal. Keep in mind that both Micron and Hynix have antitrust elements in pending patent litigation cases with Rambus. A denial of jurisdiction does not resolve the questions of fact that would still be potentially in play in those cases. A decision that addresses the facts can benefit Rambus as it may effectively end the pending antitrust issues in both Micron and Hynix. I welcome the delay in the ALJ decision as long as it results in crafting a decision that is based on the facts of the case.

However, even a decision against Rambus could simply lead to the requirement that Rambus license its patents to the industry standard at a reasonable royalty. We firmly believe the remedy the FTC sought for a compulsory license at zero royalty is simply not going to happen. The ALJ questions whether such a remedy would even be Constitutional. We also doubt that the FTC can fix the royalty rate below what Rambus has established through agreements with willing licensees as reasonable. Further, even in a scenario where the ALJ would try to set a royalty below the present rate of royalty (say at the rate that is received for RDRAM), Rambus would receive huge revenues from memory manufacturers currently refusing to pay.

While we consider setting a royalty below the current rate a remote possibility, we also realize Rambus would appeal such a decision. In addition, such a result would be an impact of less than 50% on the spreadsheet. Accounting even for such an adverse result subject to appeal, the spreadsheet would look like this in the 2007 column.

PE	Share Price
20	\$185
30	\$278
40	\$371
50	\$463
75	\$695
100	\$927

Our belief is that the infringement trial in 2004 will proceed with “any” determination that Rambus would receive a royalty. The infringement trial against Infineon is set to proceed in May 2004. It may proceed regardless of the FTC result.

### **\$1000 Per Share by 2007?**

The path of delay while continuing to use Rambus intellectual property without payment to Rambus is getting nearer to an end. Converging with this resolution will be a new stream of revenues from new products. Rambus may indeed be \$1000/share by 2007. The PowerPoint revenue slide of Rambus, along with our analysis, certainly suggests the stock could reach \$1000 by 2007.

We firmly believe Rambus is one of the best investments for big returns in the next several years.

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