

**COMPARE ALTERNATIVES**  
**for**  
**Future High Performance, High Volume DRAM Designs**

DRAM	PROs -	CONs -
Sync	<ul style="list-style-type: none"> <li>* Public Domain</li> <li>* JEDEC Standard</li> <li>* Replace Commodity</li> <li>* 2% Larger Chip</li> <li>* LOW COST!</li> <li>* Fully Synchronous</li> <li>* Wide-Range of Use</li> <li>* Fastest w/ Cache-Miss</li> </ul>	<ul style="list-style-type: none"> <li>* Cache Size = Row/Page</li> <li>* Patent Problems?</li> <li>--- (Motorola/Rambus)</li> </ul>
Rambus	<ul style="list-style-type: none"> <li>* Faster than SyncDRAM</li> <li>* Modular Assembly</li> <li>* Fully Synchronous</li> <li>* Pinout doesn't change</li> </ul>	<ul style="list-style-type: none"> <li>* Rambus Property</li> <li>* 15% Larger Chip</li> <li>* Difficult to Test</li> <li>* Support may vary</li> <li>* HIGH COST!</li> <li>* Cache Size = Row/Page</li> <li>* Burst Mode Needed</li> <li>* 32 Chips/Board Max</li> <li>* High Power/Temperature</li> <li>* Hi Perf = Cache-Hit</li> </ul>
Cached	<ul style="list-style-type: none"> <li>* Speed = SyncDRAM</li> <li>* More flexible Cache</li> </ul>	<ul style="list-style-type: none"> <li>* Non-Synchronous</li> <li>* Processor Specific</li> <li>* 7% Larger Chip</li> <li>* No Standards</li> <li>* Worst w/ Cache-Miss</li> </ul>

## WHAT IS RAMBUS ?

- A SMALL FIRM W/O A FAB
- CO-OPERATING W/ NEC; FUJITSU; TOSHIBA (INTEL; IBM)
- SELLING A LICENCE W/O PATENT
- SELLING A TECHNOLOGY W/O TECHNOLOGY
  
- RAMBUS IS NOT A MEMORY !
  
- 500 MHz COMPUTER INTERFACE + PROTOCOL
- $\mu$ P + CONTROLLER + MEMORY + PC-BOARD
- MEMORY PACKAGE (VSMP)
- COMPUTER PC-BOARD (10cm; 1  $\mu$ P+1 "RAMBUS" + 32 DRAMs)
  
- NO LICENCE FOR "RAMBUS" CONTROLLER OR PC-BOARD

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**HL SP PST 1**

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**RAMBUS PROs AND CONs**

- FASCINATING TECHNICAL CONCEPT
- JAPAN INVOLVED
- MODULAR "TINKER TOY" COMPUTER CONCEPT
  
- ANY KIND OF COMPUTER CAN BE DESIGNED
  - 1 MODULE = PORTABLE W/ POWER OF A WS
  - 8 MODULES = PC W/ POWER OF A CRAY
  - 1K MODULES = MF CONNECTION MACHINE
  - 1M MODULES = PENTAGON ?
  
- NO NEED FOR SKILLED HIGH TECH SYSTEM DESIGN
  
- DEADLY MENACE TO THE ESTABLISHED COMPUTER INDUSTRY
- ANY GARAGE FIRM CAN BUILD ANY COMPUTER
- HAS TO BUY MODULES FROM RAMBUS

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**ALTERNATIVES ?**

- PUSH THE COMPUTER TECHNOLOGY  
JOIN RAMBUS
  
- PROTECT YOUR OWN COMPUTER INDUSTRY  
BUY RAMBUS *and dump it !*
  
- SUPPORT THE JAPS  
WAIT AND WATCH
  
- MAKE IT PUBLIC DOMAIN  
*JOIN SYNC DRAM !!!*

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(251805)

TO Mr. Penzel	FROM HL ST E DER	Received stamp/note
HL GP Mch-B/MN	W. Meyer Mch B 94-8650 94-3907 meyerw@vincent.hl.siemens.de3	
Your Ref and your message dated	Our Ref	Place and date Mch B, March 31, 1994

**Subject: RAMBUS Seminar, April 14, 1994; Your fax to Dr. v. Zitzewitz dated March 30, 1994**

*The same thing was tried via Dr. Schumacher; we refused then, too!*

It's just a publicity event! Not interesting in terms of development because:

The topics included in the agenda are familiar.

The technical background is familiar; I have had all of the documents for six months.

I have already seen the demonstration with Richard C. Crisp (RAMBUS college with JEDEC). You really can put video images on the screen. There were a dozen or so of this sort at the CBIT, without RAMBUS.

None of our customers has – as far as I know – included RAMBUS DRAMs in their purchase spectrum. *No demand, no chip.*

Some users (Silicon Graphics, Nintendo, Apple) are currently discussing RAMBUS as a replacement for VRAM.

RAMBUS should first of all secure a sustainable base among our customers. RAMBUS is not a memory, it is a memory system including controller, bus, interface, protocol and memory. One day all computers will (have to) be built like this, but hopefully without the royalties going to RAMBUS.

Sincerely,

cc. Dr. v. Zitzewitz