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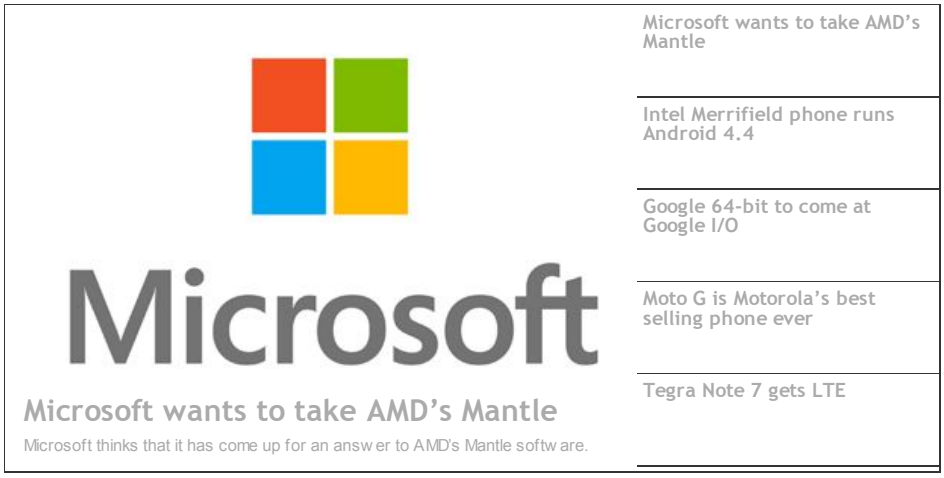

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Thursday, 27 February 2014 11:22

New spec for Hybrid Memory Cube memory technology

Written by Nick Farrell

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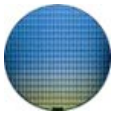

Could this replace DDR3?

The Hybrid Memory Cube Consortium, which aims to replace standard DDR3 has proposed a faster and more power-efficient specification for its emerging Hybrid Memory Cube technology. The HMC Gen2 specification doubles the throughput of the original specification and could provide 15 times the bandwidth of a standard DDR3 module, while consuming 70 percent less energy.

The new specification could speed up calculations in supercomputers, boost in-memory computing for applications like databases, or aid in providing faster response times to web requests. HMC technology is based on current DDR3 DRAM but memory modules are structured like a cube instead of being placed flat on a motherboard. By stacking memory chips in a cube it is possible to link them through a wire-like connection called Through Silicon Via. HMC is being seen as a link technology to things like MRAM (magnetoresistive RAM), RRAM (resistive RAM) and PCM (phase-change memory), which are still years away from being useful.

HMC Gen2 specification boosts memory throughput to 30G bps (bits per second), which is double that of the previous specification. The Gen2 specification will be finalized by the middle of this year, and will replace the previous specification released in the middle of last year.

HMC is being pushed by Samsung and Micron and members of the consortium include Microsoft, ARM, Altera and Xilinx. Micron has released HMC products with multiple memory channels with throughput speed of 160GBps

(bytes per second). With the new specification, throughput of that memory product could double, Black said.

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Mohammad Imtianul Haque Dimik • 4 days ago
15X faster than DDR3, then why don't it go against DDR4 ?
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Sly Cooper → Mohammad Imtianul Haque Dimik • 4 days ago
Vs stacked ddr4? Because that'll be on their plate as well.
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They target different markets. DDR4 was designed primarily to go low power and be cheap. HMC was designed to be as fast as possible, while not worrying about cost. Laptops/desktops are no longer limited by DRAM speeds, so the design of DDR4 makes sense. If extra speed doesn't help, might as well make it use less power and make it cheaper.

Also, with DDR4s stacked spec, it doesn't help speeds sadly. Just helps density at the expense of cost. Can't imagine seeing it used much.
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massau → Mohammad Imtianul Haque Dimik • 13 hours ago
ddr4 isn't put yet and is twice as fast as ddr3 whit the same or lower power consumption but HMC is a lot faster than ddr4 and more efficient. but the prices will be really high.
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medo • 4 days ago
The HMC Gen2 specification doubles the throughput of the original specification and could provide 15 times the bandwidth of a standard DDR3 module, while consuming 70 percent less energy.

If the above market hype is true, this thing will beat GDDR5 and GDDR6 as well,

my question is, if there linking as a CUbe, do you need 4 dimms full in order to utilize this, or more ?

5 ▲ | ▼ • Reply • Share ›

cegli ➚ medo • 3 days ago

In the original 1.0 spec, they considered 320gb/s to be the max speed, assuming a single link runs at 10gb/s, and you were running 16 bidirectional links. 16 Read Links + 16 Write Links = 320gb/s. Full width for a chip is 8-links, so you would need to run 2x full width HMCs to get full speed.

The smallest 8-link device was 4GB, so you would need at least 8GB total to hit 320gb/s. Now they've increased the speed of the links from 10GB/s to 30GB/s, so a single chip can hit 480GB/s and two can hit 960GB/s.

There won't be HMC DIMMs. Since it's stacked DRAM a single "chip" will be 4 to 8GB. You will most likely see this as a GDDR competitor, and it will be soldered down directly to boards.

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Mohammad Imtianul Haque Dimik ➚ medo • 4 days ago

I agree

▲ | ▼ • Reply • Share ›

Κωνσταντίνος Κ. • 2 days ago

now imagine a company to create an SSD using that, of course if you turn the power down it will erase the data but it would be a ramdrive (temp storage, help ssd's life etc)

or use an external battery to hold the data (much like gigabyte's solution back in the days)

I'll love to have 10GB of space with these speeds, loading a game would be faster than a double click :P

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p. asta • 3 days ago

HMC is intended to follow DDR4. Anything sooner is just demonstrating proof of concept or really specialized applications that can pay big $$$ development costs. Not PC or consumer graphics products. Come back in 5+ years

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cegli ➚ p. asta • 3 days ago

They aren't in the same markets. HMC costs considerably more than DDR type technology and will be that way for the foreseeable future. Stacking is expensive, has lower yields, and is hard to validate. Each chip has it's own controller, which is expensive from a silicon point of view. HMC-like DRAM are meant to go in super-computers and GPUs where memory bandwidth is still a problem, and cost can be high.

HMC/HBM will most likely replace GDDR5.

GPUs are more likely to use something like HBM, because they won't want to pay for the memory controllers on each chip. It's a similar technology, but the controllers can be baked into the master. I'm sure they're evaluating both though.

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blastx • 3 days ago

From what i heard this is not for our regular PC, yet, since there's not even mobo's to support it. So we will still have to go through DDR4 for mobos. And GDDR6 for GPUS...then Volta with its stacked dram will arrive and a new era will begin.Or maybe GDDR6 is the stacked DRAM. Ok im lost now xD

Also someone tell me this : so esentially stacked DRAM is HMC? and Nvidia will

Kryojenix

Diazene prefers his women in a tent. X-D

Just jokes, sorry Diazene, I couldn't resist!

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maroon1

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develop their own stacked DRAM for Volta? because i see no mention of Nvidia in the HMC consortium members. Also http://gpu.cs.uct.ac.za/Slides...

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cegli ➚ blastx • 3 days ago

I think Nvidia will most likely be looking at something like HBM, because it will be cheaper to produce at the expense of designing a more complex memory controller in the GPU. They have plenty of memory controller design experience, so I think they would consider HBM to be a better fit for them.

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