

Micron F2Q Exceeds on Memory Price Strength

MU	24 est.	Micron Tech	FY24rev:	43%
Qtr:	F2Q	Grade:	B	Growth (qtr-qtr)
Rev:	5,824	Rev:	+++	Rev: 23.2%
GM:	20.0%	EPS:	+++	Fcst: +10+17%
EPS:	\$0.42	Fcst:	++	Div: \$0.115

Micron Technology (MU \$110.21 +0.36 on 3/22/24)

F2Q Earnings: MU announced February-ended F2Q last Wednesday above the high-end of expectations and guidance primarily due DRAM and NAND market price strength—which is expected to continue this quarter. The timing and magnitude of its return to profitability was surprising and is expected to continue to improve this year.

F2Q Results: Revenue, gross margin and EPS exceeded the high-end of guidance primarily due to DRAM and NAND price increases, while gross margin also benefited from the \$382M remainder of previous inventory write downs and EPS was boosted by \$0.34 from tax benefit gymnastics associated with the quicker than expected return to profitability. Operating cash flow was \$1.22B, cap ex \$1.25B, and adjusted free cash flow was negative (\$29M).

Compute and Networking Business Unit (CNBU) was 38% of total sales, growing by +26% with operating profit of 1% vs. a loss of (23%) the prior quarter. Cloud revenue more than doubled and data center growth was robust. Server units are expected to grow in the mid- to high-single digits this year driven by strong growth for AI servers and modest growth for traditional servers. AI server demand is driving rapid growth for leading-edge DRAM and NAND which is tightening availability, resulting in a positive ripple effect on pricing across all memory markets. PC units are expected to grow in the low single-digit range, although AI PCs with Neural Processors require +40-80% more DRAM content.

Mobile (MBU) was 27% of sales, up by +24% with an operating loss of (1%) vs. (53%) as pricing strength more than offset declining volume. Smartphone units are expected to grow in the low- to mid-single digits, and AI phones employ +50-100% greater DRAM content.

Embedded (EBU) was 19% of sales, up by +7% at operating break-even vs. a profit of 1%. Growth came from leading-edge products to industrial markets amid improving distribution inventory, bookings and demand visibility. Automotive remains strong with easing supply constraints and the launching of new vehicles.

Storage (SBU) was 16% of sales, up by +39% with an operating loss of (24%) from (75%) due to double-digit growth across all end markets. Data center SSD sales more than doubled over last year due to share gains.

DRAM: DRAM was 71% of revenue and increased by +21% sequentially, with bit shipments up in the low single-digit percentage and prices increasing in the high-teens. *DDR5 volume is expected to cross over DDR4 early this year and.* Over three-quarters of current bits are built on leading-edge 1 α (1-alpha) and 1 β (1-beta) nodes, while pilot production of next generation 1 γ (1-gamma) using extreme ultraviolet lithography (EUV) has begun with volume expected in 2025. DRAM front-end cost reduction for FY24 remains in the mid-to-high single digits percentage, consistent with longer-term expectations as 1 β continues to ramp.

AI servers use gobs of High-Bandwidth Memory (HBM). Micron began shipping its HBM3E offering last quarter; high-volume production has already begun this quarter when gross margins are expected to be accretive; several hundred millions of dollars of sales is expected this fiscal year (which is already sold out); and market bit share consistent with its overall DRAM share is expected during 2025—much of which has already been allocated. The company sampled its 12-high HBM3E this month, which increases capacity per cube by +50% to 36GB, with production expected in 2025. Industry-wide, HBM3E consumes three-times as many wafers as DDR5 (whose die is twice the size of DDR4); includes a logic interface chip; and has a complex packaging stack that hurts yields. This means the ramp of HBM will constrain overall industry DRAM bit supply—and the ratio for HBM4 is even higher.

Separately, Micron's 128GB module with 1 β die is expected to generate several hundred million dollars in sales 2HFY24 and a 256GB MCRDIMM has already sampled. Micron is also sampling a 2nd-generation 1 β LPDRAM LP5X product for smartphones.

2023 industry bit demand growth in the low double-digits was a few percentage points higher than expected which raises the absolute level of 2024 bit demand for industry growth expected in the mid-teens.

(Verbiage continues on Page 3)

MU Financials

FYE August	FY2022						FY2023					FY2024	
	FY21	1Q	2Q	3Q	4Q	FY22	1Q	2Q	3Q	4Q	FY23	1Q	2Q
Product Revenue													
DRAM	20,039	5,587	5,719	6,271	4,809	22,386	2,829	2,722	2,672	2,755	10,978	3,427	4,158
NAND	7,007	1,878	1,957	2,288	1,688	7,811	1,103	885	1,013	1,205	4,206	1,230	1,567
NOR/other	659	222	110	83	146	561	153	86	67	50	356	69	99
Total Revenue	27,705	7,687	7,786	8,642	6,643	30,758	4,085	3,693	3,752	4,010	15,540	4,726	5,824
non-GAAP													
Gross Profit	10,987	3,616	3,724	4,097	2,676	14,113	934	(1,161)	(603)	(366)	(1,196)	37	1,163
Gross Margin	39.7%	47.0%	47.8%	47.4%	40.3%	45.9%	22.9%	-31.4%	-16.1%	-9.1%	-7.7%	0.8%	20.0%
Operating Profit	7,667	2,725	2,750	3,144	1,662	10,281	(65)	(2,077)	(1,469)	(1,208)	(4,819)	(955)	204
Operating Margin	27.7%	35.4%	35.3%	36.4%	25.0%	33.4%	-1.6%	-56.2%	-39.2%	-30.1%	-31.0%	-20.2%	3.5%
EPS (GAAP)	5.14	2.04	2.00	2.34	1.35	7.75	(0.18)	(2.12)	(1.73)	(1.31)	(5.34)	(1.12)	0.71
EPS (non-GAAP)	6.06	2.16	2.14	2.59	1.45	8.35	(0.04)	(1.91)	(1.43)	(1.07)	(4.45)	(0.95)	0.42
Dividend		0.10	0.10	0.115	0.115	0.43	0.115	0.115	0.115	0.115	0.46	0.115	0.115
Shares Repurchased	15.6	3.6	4.8	13.8	13.2	35.4	8.6	0	0	0	8.6	0	0
Product Percent													
DRAM	72.3%	72.7%	73.5%	72.6%	72.4%	72.8%	69.3%	73.7%	71.2%	68.7%	70.6%	72.5%	71.4%
NAND	25.3%	24.4%	25.1%	26.5%	25.4%	25.4%	27.0%	24.0%	27.0%	30.0%	27.1%	26.0%	26.9%
NOR/other	2.4%	2.9%	1.4%	1.0%	2.2%	1.8%	3.7%	2.3%	1.8%	1.2%	2.3%	1.5%	1.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Product Growth													
DRAM			2.4%	9.7%	-23.3%	11.7%	-41.2%	-3.8%	-1.8%	3.1%	-51.0%	24.4%	21.3%
NAND			4.2%	16.9%	-26.2%	11.5%	-34.7%	-19.8%	14.5%	19.0%	-46.2%	2.1%	27.4%
NOR/other			-50.5%	-24.5%	75.9%	-14.9%	4.8%	-43.8%	-22.1%	-25.4%	-36.5%	38.0%	43.5%
Total			1.3%	11.0%	-23.1%	11.0%	-38.5%	-9.6%	1.6%	6.9%	-49.5%	17.9%	23.2%
Business Segment													
CNBU	12,280	3,406	3,461	3,895	2,931	13,693	1,746	1,375	1,389	1,200	5,710	1,737	2,185
MBU	7,203	1,907	1,875	1,967	1,511	7,260	655	945	819	1,211	3,630	1,293	1,598
EBU	4,209	1,220	1,277	1,435	1,303	5,235	1,000	865	912	860	3,637	1,037	1,111
SBU	3,973	1,150	1,171	1,341	891	4,553	680	507	627	739	2,553	653	905
other	40	4	2	4	7	17	4	1	5	0	10	6	25
Total Revenue	27,705	7,687	7,786	8,642	6,643	30,758	4,085	3,693	3,752	4,010	15,540	4,726	5,824
Segment Percent													
CNBU	44.3%	44.3%	44.5%	45.1%	44.1%	44.5%	42.7%	37.2%	37.0%	29.9%	36.7%	36.8%	37.5%
MBU	26.0%	24.8%	24.1%	22.8%	22.7%	23.6%	16.0%	25.6%	21.8%	30.2%	23.4%	27.4%	27.4%
EBU	15.2%	15.9%	16.4%	16.6%	19.6%	17.0%	24.5%	23.4%	24.3%	21.4%	23.4%	21.9%	19.1%
SBU	14.3%	15.0%	15.0%	15.5%	13.4%	14.8%	16.6%	13.7%	16.7%	18.4%	16.4%	13.8%	15.5%
other	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.1%	0.1%	0.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Segment Growth													
CNBU			1.6%	12.5%	-24.7%	11.5%	-40.4%	-21.2%	1.0%	-13.6%	-58.3%	44.8%	25.8%
MBU			-1.7%	4.9%	-23.2%	0.8%	-56.7%	44.3%	-13.3%	47.9%	-50.0%	6.8%	23.6%
EBU			4.7%	12.4%	-9.2%	24.4%	-23.3%	-13.5%	5.4%	-5.7%	-30.5%	20.6%	7.1%
SBU			1.8%	14.5%	-33.6%	14.6%	-23.7%	-25.4%	23.7%	17.9%	-43.9%	-11.6%	38.6%
other			-50.0%	100.0%	75.0%	-57.5%	-42.9%	-75.0%	400.0%	-100.0%	-41.2%	#DIV/0!	316.7%
Total			1.3%	11.0%	-23.1%	11.0%	-38.5%	-9.6%	1.6%	6.9%	-49.5%	17.9%	23.2%
Operating Profit													
CNBU	4,295	1,524	1,562	1,778	980	5,844	190	(35)	(337)	(403)	(585)	(397)	28
MBU	2,173	624	588	640	308	2,160	(195)	(344)	(478)	(733)	(1,750)	(687)	(9)
EBU	1,006	422	421	504	405	1,752	194	88	65	35	382	10	(1)
SBU	173	152	178	221	(38)	513	(257)	(357)	(601)	(672)	(1,887)	(490)	(217)
other	20	3	1	1	7	12	3	1	2	2	8	4	21
Total (GAAP)	7,667	2,725	2,750	3,144	1,662	10,281	(65)	(647)	(1,349)	(1,771)	(3,832)	(1,560)	(178)
Operating Margin													
CNBU	35.0%	44.7%	45.1%	45.6%	33.4%	42.7%	10.9%	-2.5%	-24.3%	-33.6%	-10.2%	-22.9%	1.3%
MBU	30.2%	32.7%	31.4%	32.5%	20.4%	29.8%	-29.8%	-36.4%	-58.4%	-60.5%	-48.2%	-53.1%	-0.6%
EBU	23.9%	34.6%	33.0%	35.1%	31.1%	33.5%	19.4%	10.2%	7.1%	4.1%	10.5%	1.0%	-0.1%
SBU	4.4%	13.2%	15.2%	16.5%	-4.3%	11.3%	-37.8%	-70.4%	-95.9%	-90.9%	-73.9%	-75.0%	-24.0%
other	50.0%	75.0%	50.0%	25.0%	100.0%	70.6%	75.0%	100.0%	40.0%	#DIV/0!	80.0%	66.7%	84.0%
Total (GAAP)	27.7%	35.4%	35.3%	36.4%	25.0%	33.4%	-1.6%	-17.5%	-36.0%	-44.2%	-24.7%	-33.0%	-3.1%
Market Percent													
			9mo				1Q	6mo	9mo			1Q	6mo
Mobile	25%		25%		25%	25%	15%	20%	20%	25%	25%	25%	25%
Auto/Ind/Consumer	15%			15%	15%	15%	25%	25%	25%	25%	25%	20%	20%
Client & Graphics	20%			20%	20%	20%	15%	20%	20%	20%	15%	20%	20%
Ent/Cloud Server	20%			20%	20%	20%	20%	20%	20%	20%	10%	15%	15%
SSD & other storage	15%			15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Total	95%	0%	0%	95%	0%	95%	90%	100%	100%	0%	90%	95%	95%
Regional Percent													
US	43.9%					52.1%					50.2%		
Taiwan	23.8%					20.1%					17.4%		
China	8.9%					10.8%					14.0%		
Japan	6.0%					5.5%					6.4%		
APAC	5.1%					4.0%					4.8%		
Europe	2.1%					1.6%					4.4%		
Hong Kong	9.3%					5.4%					2.2%		
other	0.9%					0.5%					0.6%		
Total	100.0%					100.0%					100.0%		
>10% Customers													
Kingston						12%							
WPG	13%					11%							

NAND: NAND was 27% of revenue and increased by +27% sequentially as a reduction of bit shipments in the low-single digits was more than offset by a greater-than +30% increase in pricing. Over 90% of bits are now on leading-edge 176-layer and 232-layer nodes. FY24 NAND front-end cost reduction is expected in the low-teens percentage, consistent with long-term expectations and supported by the 232-layer ramp. (Less on the back-end, so high-single digit net reduction.) Next generation product production is on-track for CY25.

2023 industry bit demand growth in the low-20's percentage range was a few percentage points higher than expected which raises the absolute level of 2024 bit demand for industry growth in the mid-teens. Medium term bit demand growth is expected in the low-20's.

Guidance: F3Q non-GAAP revenue at \$6.63B +/-200M; gross margin of 26.5% +/-150 basis points on even higher market prices; operating expenses of \$990M +/-15M on a \$30M increase in R&D; tax expense of \$240M; cap ex up sequentially; and EPS of \$0.45 +/- \$0.07 based on 1.1B shares. DRAM bit shipments expected to decline modestly while NAND increases somewhat amid improving demand and supply constraints—especially at the leading edge.

Micron continues to expect industry supply to be below demand for both DRAM and NAND for 2024, which will lower inventories and increase prices throughout the year. The company expects to end FY24 with low double-digit percentage less wafer capacity in both DRAM and NAND than peak levels in FY22.

Expectations for FY24 include: op ex slightly higher at \$4B; taxes of \$400M up from \$300M on expected income improvements; cap ex remains at \$7.5-8B to support the HBM3E ramp (although fab equipment will be down); and operating income improvements and positive free cash flow for both F3Q and F4Q. For FY25 management expects record revenue and much improved profitability.

Growth and Momentum Upside: MU's business continues to be highly leveraged to DRAM market dynamics which have turned more favorable more quickly than previously expected, and is well positioned for significant growth in both revenue and profitability over the next several quarters. While much of this is already priced into the shares at the current price level, accelerating growth is not unlikely and could easily drive share price upside, in my opinion. The shares are currently trading at 2.8-times book value, 3.9-times FY25 sales (after two years of over 40% expected growth), and 16-times FY25 earnings that consensus estimates have now approaching \$7 per share—although ranges at the high-end at \$11.80 per share, or 9.3-times earnings.

LEGEND

		Grade	
+++	exceeded the high-end of the range	A	all +++
++	above consensus, within the high-end of the range	B	all +
+	slightly above consensus	C	all o/+
o	met consensus	D	mixed -o/+
-	slightly below consensus	E	all o/-
--	missed consensus, within the low-end of the range	F	all -
---	missed the low-end of the range		

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