

Micron F3Q Exceeds as AI Growth Drives Memory Price Strength

MU	24 est.	Micron Tech	FY24rev:	59%
Qtr:	F3Q	Grade:	C	Growth (qtr-qtr)
Rev:	6,811	Rev:	++	Rev: 16.9%
GM:	28.1%	EPS:	++	Fcst: +9+15%
EPS:	\$0.62	Fcst:	o	Div: \$0.115

Micron Technology (MU \$131.53 -0.70 on 6/28/24)

F3Q Earnings: MU announced May-ended F3Q last Wednesday above expectations and the high-end of guidance due to AI data center growth and DRAM and NAND market price increases of +20%. Growth and profitability is expected to continue to improve, although F4Q guidance only met Street expectations.

F3Q Results: Revenue, gross margin and EPS exceeded the high-end of guidance primarily due to DRAM and NAND price increases amid AI server strength, while EPS was also helped by one-time discrete tax benefits. Gross margin improved by over 8% sequentially but would have been 15% greater excluding the benefit from previously written-down inventory during F2Q. Operating cash flow was \$2.5B, cap ex \$2.1B, free cash flow \$425M, and the company paid down \$650M of debt.

Compute and Networking Business Unit (CNBU) was 38% of total sales, growing by +18% with an operating profit of 17% vs. 1% the prior quarter. DRAM shipments to data centers more than doubled on the year. 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 and raising 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 22% of sales, down by -1% with an operating profit of 19% vs. a loss of (1%) as pricing strength nearly offset declining volume. Smartphone units are expected to grow in the low- to mid-single digits this year, and AI phones employ +50-100% greater DRAM content.

Embedded (EBU) was 19% of sales, up by +17% at an operating profit of 10% vs. break-even driven by record revenue from automotive. Industrial and retail consumer—a smaller portion of the business—is experiencing near-term demand uncertainty from both distributors and end-customers.

Storage (SBU) was 20% of sales, up by +50% with an operating profit of 6% vs. a loss of (24%) due to growth across all end markets. Record SSD sales to data centers nearly doubled sequentially.

DRAM: DRAM was 69% of revenue and increased by +13% sequentially, with bit shipments down in the mid-single-digit percentage range more than offset by a +20% price increase. Over 80% 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, excluding HBM, is now at the high-end of the mid-to-high single digits percentage, consistent with longer-term expectations as 1 β continues to ramp.

AI servers use tons of High-Bandwidth Memory (HBM). Micron's HBM3E offering consumes 30% less power than the competition and is gaining market share; the company shipped over \$100M-worth last quarter at gross margins accretive to both DRAMs and overall; several hundred millions of dollars of sales is expected this fiscal year and multiple billions of dollars in FY25—both of which are already sold out; and market bit share consistent with its overall DRAM share is expected during 2025 as it expands its customer base and product offerings. The company's 12-high HBM3E increases capacity per cube by +50% to 36GB with production expected in 2025, and HBM4 and 4E work is well underway. 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 high-capacity DIMM with 32GB 1 β die is generating several hundred million dollars in sales 2H FY24 and a 256GB MCRDIMM has sampled. Micron's LP5X product enabled all tier-1 Android AI smartphones and customer qualifications of its second-generation 1 β LPDRAM offering are on-track.

2024 DRAM industry bit demand growth is expected to persist in the mid-teens percentage.

(Verbiage continues on Page 3)

MU Financials

FYE August	FY2023						FY2024			
	FY21	FY22	1Q	2Q	3Q	4Q	FY23	1Q	2Q	3Q
Product Revenue										
DRAM	20,039	22,386	2,829	2,722	2,672	2,755	10,978	3,427	4,158	4,692
NAND	7,007	7,811	1,103	885	1,013	1,205	4,206	1,230	1,567	2,065
NOR/other	659	561	153	86	67	50	356	69	99	54
Total Revenue	27,705	30,758	4,085	3,693	3,752	4,010	15,540	4,726	5,824	6,811
non-GAAP										
Gross Profit	10,987	14,113	934	(1,161)	(603)	(366)	(1,196)	37	1,163	1,917
Gross Margin	39.7%	45.9%	22.9%	-31.4%	-16.1%	-9.1%	-7.7%	0.8%	20.0%	28.1%
Operating Profit	7,667	10,281	(65)	(2,077)	(1,469)	(1,208)	(4,819)	(955)	204	941
Operating Margin	27.7%	33.4%	-1.6%	-56.2%	-39.2%	-30.1%	-31.0%	-20.2%	3.5%	13.8%
EPS (GAAP)	5.14	7.75	(0.18)	(2.12)	(1.73)	(1.31)	(5.34)	(1.12)	0.71	0.30
EPS (non-GAAP)	6.06	8.35	(0.04)	(1.91)	(1.43)	(1.07)	(4.45)	(0.95)	0.42	0.62
Dividend		0.43	0.115	0.115	0.115	0.115	0.46	0.115	0.115	0.115
Shares Repurchased	15.6	35.4	8.6	0	0	0	8.6	0	0	
Product Percent										
DRAM	72.3%	72.8%	69.3%	73.7%	71.2%	68.7%	70.6%	72.5%	71.4%	68.9%
NAND	25.3%	25.4%	27.0%	24.0%	27.0%	30.0%	27.1%	26.0%	26.9%	30.3%
NOR/other	2.4%	1.8%	3.7%	2.3%	1.8%	1.2%	2.3%	1.5%	1.7%	0.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Product Growth										
DRAM		11.7%	-41.2%	-3.8%	-1.8%	3.1%	-51.0%	24.4%	21.3%	12.8%
NAND		11.5%	-34.7%	-19.8%	14.5%	19.0%	-46.2%	2.1%	27.4%	31.8%
NOR/other		-14.9%	4.8%	-43.8%	-22.1%	-25.4%	-36.5%	38.0%	43.5%	-45.5%
Total		11.0%	-38.5%	-9.6%	1.6%	6.9%	-49.5%	17.9%	23.2%	16.9%
Business Segment										
CNBU	12,280	13,693	1,746	1,375	1,389	1,200	5,710	1,737	2,185	2,573
MBU	7,203	7,260	655	945	819	1,211	3,630	1,293	1,598	1,588
EBU	4,209	5,235	1,000	865	912	860	3,637	1,037	1,111	1,294
SBU	3,973	4,553	680	507	627	739	2,553	653	905	1,353
other	40	17	4	1	5	0	10	6	25	3
Total Revenue	27,705	30,758	4,085	3,693	3,752	4,010	15,540	4,726	5,824	6,811
Segment Percent										
CNBU	44.3%	44.5%	42.7%	37.2%	37.0%	29.9%	36.7%	36.8%	37.5%	37.8%
MBU	26.0%	23.6%	16.0%	25.6%	21.8%	30.2%	23.4%	27.4%	27.4%	23.3%
EBU	15.2%	17.0%	24.5%	23.4%	24.3%	21.4%	23.4%	21.9%	19.1%	19.0%
SBU	14.3%	14.8%	16.6%	13.7%	16.7%	18.4%	16.4%	13.8%	15.5%	19.9%
other	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.1%	0.1%	0.4%	0.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Segment Growth										
CNBU		11.5%	-40.4%	-21.2%	1.0%	-13.6%	-58.3%	44.8%	25.8%	17.8%
MBU		0.8%	-56.7%	44.3%	-13.3%	47.9%	-50.0%	6.8%	23.6%	-0.6%
EBU		24.4%	-23.3%	-13.5%	5.4%	-5.7%	-30.5%	20.6%	7.1%	16.5%
SBU		14.6%	-23.7%	-25.4%	23.7%	17.9%	-43.9%	-11.6%	38.6%	49.5%
other		-57.5%	-42.9%	-75.0%	400.0%	-100.0%	-41.2%	#DIV/0!	316.7%	-88.0%
Total		11.0%	-38.5%	-9.6%	1.6%	6.9%	-49.5%	17.9%	23.2%	16.9%
Operating Profit										
CNBU	4,295	5,844	190	(35)	(337)	(403)	(585)	(397)	28	442
MBU	2,173	2,160	(195)	(344)	(478)	(733)	(1,750)	(687)	(9)	301
EBU	1,006	1,752	194	88	65	35	382	10	(1)	124
SBU	173	513	(257)	(357)	(601)	(672)	(1,887)	(490)	(217)	76
other	20	12	3	1	2	2	8	4	21	(2)
Total (GAAP)	7,667	10,281	(65)	(647)	(1,349)	(1,771)	(3,832)	(1,560)	(178)	941
Operating Margin										
CNBU	35.0%	42.7%	10.9%	-2.5%	-24.3%	-33.6%	-10.2%	-22.9%	1.3%	17.2%
MBU	30.2%	29.8%	-29.8%	-36.4%	-58.4%	-60.5%	-48.2%	-53.1%	-0.6%	19.0%
EBU	23.9%	33.5%	19.4%	10.2%	7.1%	4.1%	10.5%	1.0%	-0.1%	9.6%
SBU	4.4%	11.3%	-37.8%	-70.4%	-95.9%	-90.9%	-73.9%	-75.0%	-24.0%	5.6%
other	50.0%	70.6%	75.0%	100.0%	40.0%	#DIV/0!	80.0%	66.7%	84.0%	-66.7%
Total (GAAP)	27.7%	33.4%	-1.6%	-17.5%	-36.0%	-44.2%	-24.7%	-33.0%	-3.1%	13.8%
Market Percent			1Q	6mo	9mo			1Q	6mo	9mo
Mobile	25%	25%	15%	20%	20%		25%	25%	25%	25%
Auto/Ind/Consumer	15%	15%	25%	25%	25%		25%	20%	20%	20%
Client & Graphics	20%	20%	15%	20%	20%		15%	20%	20%	15%
Ent/Cloud Server	20%	20%	20%	20%	20%		10%	15%	15%	20%
SSD & other storage	15%	15%	15%	15%	15%		15%	15%	15%	15%
Total	95%	95%	90%	100%	100%	0%	90%	95%	95%	95%
Regional Sales										
US	12,155	16,026					7,805			
Taiwan	6,606	6,185					2,697			
China	2,456	3,311					2,181			
Japan	1,652	1,696					987			
APAC	1,420	1,223					752			
Europe	573	505					682			
Hong Kong	2,582	1,665					340			
other	261	147					96			
Total	27,705	30,758					15,540			
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 30% of revenue and increased by +32% sequentially with bit shipments growing in the high-single digits and pricing increasing by +20%. Over 90% of bits are now on leading-edge 176-layer and 232-layer nodes. FY24 NAND front-end cost reduction remains in the low-teens percentage range, 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.

AI is also driving SSD growth as Micron gained share by more than tripling its bit shipments of 232-layer 6500 30TB into AI data center applications, while the company is the first to supply over-200-layer QLC product for enterprise storage. SSD offerings are also doing well in smartphone and automotive markets. Note Storage Business Unit metrics as a proxy for NAND growth and profitability.

2024 industry NAND bit demand growth remains in the mid-teens, albeit in the high-teens medium term.

Guidance: F4Q non-GAAP revenue at \$7.6B +/-200M; gross margin of 34.5% +/-100 basis points on even higher market prices; operating expenses of \$1.06B +/-15M on increasing R&D and the lack of a land-sale benefit last quarter; tax expense of \$320M; cap ex up to \$3.0B; and EPS of \$1.08 +/- \$0.08 based on 1.1B shares. DRAM bit shipments are expected to be flat while NAND is expected to increase slightly.

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

The FY24 tax rate is expected to be in the mid-teens percentage of sales while capital expenditures are now at the high-end of the previous \$7.5-8B to support the HBM3E ramp, although fab equipment will be down.

For FY25 management expects record revenue as AI data center growth continues and then bleeds into PCs and smartphones, and much improved profitability due to a richer mix of higher-margin offerings. Current product shortages are increasing customer interest in long-term purchase agreements. Cap ex will be meaningfully higher approximating 30% of sales, half or more of which will support new fab construction in Idaho and New York that won't deliver product until the second half of this decade.

Growth and Momentum Upside: MU's business continues to be highly leveraged to DRAM market dynamics 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 could drive share price upside, in my opinion. The shares are currently trading at 3.4-times book value, 4-times FY25 sales (after two years of 50% expected growth), and 14.5-times FY25 earnings with a consensus estimate over \$9 per share—although ranges at the high-end at \$15 per share, or 8.8-times earnings.

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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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