

Technology

Global server supply chain: ODM/brands driven by H200/GB200 AI server ramp and general sever recovery

Major global server brands/ODMs delivered strong 2Q/3Q24 sales and guided server revenue momentum will continue into 2H24E thanks to robust AI server demand and broad-based general server recovery. Based on Counterpoint data, 2Q24 global server revenue climbed 35% YoY to US\$45.4mn, with AI server reaching 30% of the sales mix. For 4Q24E, we expect most AI server names will continue to benefit from improved CoWoS supply and Hopper H200 ramp, while Blackwell (B200/GB200) AI servers will see shipments in small volume in late 4Q24 and bigger ramp in 1Q25E. In addition, we see growing opportunities in thermal/cooling, power supply and high-speed connectivity for data centers. Overall, we believe supply chain stocks will benefit such as FII as tier-1 GB200 server supplier, BYDE for H20/GB200 server product ramp-up and FIT Hong Teng for GB200 cables, power busbar and liquid cooling components.

- **Strong server growth momentum driven by AI demand and general server recovery.** Global server revenue grew 35% YoY to US\$45.4mn in 2Q24, with AI server reaching 30% of the sales mix, based on Counterpoint. Most server brands/ODMs posted robust server sales growth in 1H24 and guided positive outlook for 2H24E. For 2Q sales, Dell/Lenovo/HPE/SMCI's server segments (ISG/ISG/server/sever & storage) reported strong growth of 38%/65%/35%/148% YoY. For 2Q GPM, most names reported slight QoQ declines on higher costs, while Quanta's GPM improved 11 ppts QoQ/6ppts YoY due to favourable FX and seasonal Chromebook sales.
- **AI servers: Positive outlook on H200 server ramp and GB200 roll-out.** Looking ahead to 2H24/2025, supply chain is positive on Hopper momentum, and Dell/FII/SMCI expected GB200 NVL72 racks to ship in small volume in 4Q24E and achieve mass production in 1Q25E. 1) **Dell** guided ISG revenue up low-30s% YoY in 3Q driven by AI servers and general server recovery; 2) **Lenovo** targets to drive growth and profitability by leveraging investments in hybrid AI infrastructure, HPC, storage and edge systems; 3) **HPE** guided 3Q sales to grow 5-9% QoQ driven by AI system orders; 4) **Quanta** expects higher ASP in server products in 3Q24E and AI server revenue will grow by triple digits in FY24E; 5) **SMCI** expects accelerating AI demand from CSPs and Blackwell racks will ship in 4Q24E; 6) **FII** guided AI server shipments to grow 40%+ YoY and related sales to account for 40% of cloud sales in FY24E.
- **Other trends: Liquid cooling, heat dissipation, high-speed switches.** HPE at its AI Day expected liquid-cooled sever market will reach US\$35bn by 2027, with 50% CAGR in 2023-27. SMCI guided direct liquid cooling capacity will expand from 1k rack/m in 2Q24 to 3k rack/m by 4Q24E. FII partners with clients to mass-produce AI servers and liquid cooling cabinets, and 800G switches and advanced heat dissipation will start sales in 2H24E.

Valuation Table

Name	Ticker	Rating	Mkt Cap (US\$ mn)	Price (LC)	TP (LC)	Up/Down -side	P/E (x)		P/B (x)	
							FY24E	FY25E	FY24E	FY25E
BYDE	285 HK	BUY	9,683	37.23	40.9	22%	15.2	11.5	2.1	1.8
FIT Hon Teng	6088 HK	BUY	2,898	27.10	4.3	38%	15.3	10.2	1.1	1.0
FII	601138 CH	NR	73,237	31.45	-	-	20.3	15.9	2.3	3.0
SMCI	SMCI US	NR	26,918	47.90	-	-	13.7	13.7	5.0	3.8
Lenovo	992 HK	NR	17,909	1.98	-	-	14.2	10.5	2.8	2.4
DELL	DELL US	NR	85,200	19.35	-	-	15.3	12.9	-	186

Source: Company data, CMBIGM estimates

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Figure 1: Server supply chain outlook into 2H24/2025

Company	Revenue	3Q22 A	4Q22 A	1Q23 A	2Q23 A	3Q23 A	4Q23 A	1Q24 A	2Q24 A	3Q24E Cons.	3Q24E Cons.	Outlook/Guidance
Revenue Growth:												
Server Brands												
Dell (DELL US)	YoY Growth %											
	Client solutions Group (CSG)	-17%	-23%	-23%	-16%	-11%	-12%	-13%	-4%	1%	8%	* 3Q24E: mid-pt rev up 10% YoY; ISG up low-30s YoY; CSG flat-to-up low-single digits; Servers to grow LSD YoY
	Infra. Solutions Group (ISG)	12%	7%	-18%	-11%	-12%	-6%	22%	38%	33%	30%	* 4Q24E: higher QoQ rev; CSG recovery more weighted in 4Q
	Total	-13%	-11%	-20%	-13%	-10%	-11%	6%	9%	10%	14%	* AI opportunity with T2 CSPs, enterprise and sovereign clients
	QoQ Growth %											* Expect AI momentum and CSG growth to continue next year
	Client solutions Group (CSG)	-11%	-3%	-10%	8%	-5%	-5%	2%	4%	0%	2%	* Tier-CSP deployments and training models as large % of backlog and 5-quarter pipeline; Continued enterprise demand
HP Enterprise (HPE US)	Infra. Solutions Group (ISG)	1%	3%	-23%	11%	0%	10%	-1%	26%	-3%	7%	
	Total	-6%	1%	-16%	10%	-3%	0%	0%	13%	-2%	4%	
	YoY Growth %											
	Server	-	16%	-7%	-14%	-20%	23%	18%	35%	33%	26%	* 3Q24E: revenue QoQ growth of 5.2-9.1%; Server growth from converting AI systems to revenue at strong pace
	Hybrid Cloud	-	12%	9%	7%	-7%	-10%	-8%	-7%	0%	31%	* H220 chips for the AIST supercomputer to ship; expect continued demand in traditional servers
	Intelligent Edge	24%	23%	47%	48%	39%	3%	-19%	-23%	-18%	15%	* 2Q24: Server sales beat on AI server order sales conversion; traditional server order climbed double-digit increase
	Financial Services	0%	4%	4%	7%	2%	0%	1%	1%	2%	2%	* FY24E revenue: high-end of 1-3% YoY growth;
	Corp. Investments & Other	-32%	-11%	-10%	3%	10%	2%	4%	7%	1%	8%	* High interest in generative AI from Enterprises and adoption is accelerating
	Total	7%	12%	4%	1%	-7%	-13%	3%	10%	12%	15%	
	QoQ Growth %											
	Server	-	-3%	-24%	-4%	13%	-6%	15%	11%	12%	-12%	
	Hybrid Cloud	11%	-4%	-1%	2%	-4%	-7%	1%	4%	3%	22%	
	Intelligent Edge	3%	16%	15%	8%	-3%	-15%	-10%	3%	3%	19%	
	Financial Services	5%	2%	-2%	2%	0%	0%	-1%	1%	1%	-1%	
Corp. Investments & Other	0%	-3%	3%	2%	7%	-10%	6%	4%	1%	-3%		
Total	13%	-1%	-11%	0%	5%	-8%	7%	7%	7%	-6%		
Supermicro (SMCI US)	YoY Growth %											
	Server & Storage Systems	102%	68%	2%	37%	15%	107%	218%	148%	217%	89%	* Demand cycles at CSP are accelerated
	Subsystems & Accessories	-24%	-24%	-43%	0%	10%	61%	27%	78%	96%	37%	* Liquid cooling supply is ramping with sustained growth rates well above industry average
	Total	79%	54%	-5%	34%	14%	103%	200%	143%	206%	87%	* Target 500 racks by production by end of FY25E; 3000 racks/month would be liquid cool
	QoQ Growth %											* Strong demand come from AI field
	Server & Storage Systems	16%	-3%	-30%	75%	-3%	75%	8%	36%	24%	4%	
Lenovo (992 HK)	Subsystems & Accessories	-9%	2%	-16%	28%	0%	50%	-34%	79%	10%	5%	
	Total	13%	-3%	-29%	70%	-3%	73%	5%	38%	23%	6%	
	YoY Growth %											
	Intelligent Devices Group (IDG)	-11%	-34%	-33%	-28%	-16%	7%	7%	11%	3%	1%	* Market expects AI infrastructure growth rate of 15% and storage/general-purpose server grow at 4%/10%, we will drive to get to a premium to that market
	Infra. Solutions Group (ISG)	33%	48%	56%	-8%	-23%	-13%	15%	65%	51%	28%	* ISG aim to drive growth and improve profitability by leveraging investment in hybrid AI infrastructure, HPC, storage and edge systems
	Solutions & Srv. Group (SSG)	26%	23%	18%	18%	11%	10%	10%	10%	10%	10%	* Water-cooling trend is just beginning
Server ODMs FII (601138 CH)	Total	-4%	-24%	-24%	-24%	-16%	3%	9%	20%	11%	9%	* Expect a much stronger contribution of five-pillar AI PC into 2025 and grow to 50% or even 60% of the mix in 2026
	QoQ Growth %											
	Intelligent Devices Group (IDG)	-4%	-16%	-15%	5%	12%	7%	-15%	9%	4%	5%	
	Infra. Solutions Group (ISG)	25%	9%	-23%	-13%	5%	219%	-60%	25%	-2%	2%	
	Solutions & Srv. Group (SSG)	18%	7%	-10%	4%	12%	5%	-10%	4%	12%	6%	
	Total	1%	-11%	-17%	2%	12%	9%	-12%	12%	4%	7%	
Quanta (2382 TT)	YoY (%)	46%	22%	-12%	-9%	-25%	-12%	-3%	27%	41%	68%	* 2H24E: AI server +230% YoY, general server +16% YoY
	QoQ (%)	41%	-15%	-18%	-8%	17%	0%	-10%	20%	30%	20%	* FY24E AI server shipment 1.67mn units with 41.5% YoY
Wistron (3231 TT)	YoY (%)											* FY24E: AI server sales to contribute 40% of cloud sales; Target 40% mkt share in global AI server market
	QoQ (%)											* Co-developed with customers to mass produce high-perf. AI servers, liquid cooled cabinets, and other technologies
Inventec (2356 TT)	YoY (%)											* 800G HP switches: shipment started and significant sales in 2H
	QoQ (%)											* Focuses on advanced heat dissipation solutions for AI
Gigabyte (2376 TT)	YoY (%)											
	QoQ (%)											
Profitability (GPM/OPM)												
Server Brands												
Dell	Infra. Solutions Group (ISG) OPM	14.3%	15.6%	9.7%	12.4%	12.6%	15.3%	8.0%	11.0%	12.1%	15.0%	* ISG margin to improve in 2H24E.
HPE	Server OPM	14.0%	15.7%	14.4%	10.1%	10.1%	11.4%	11.0%	10.8%	11.0%	11.1%	* FY24E GPM: 0-2% with higher AI system mix; Server GPM at low-end of 11-13%
Supermicro	Blended OPM	12.5%	12.8%	8.7%	11.0%	10.8%	11.3%	11.3%	7.8%	8.9%	9.3%	* AI new tech to weigh on NPM, esp. liquid cooling
Lenovo	Infra. Solutions Group (ISG) OPM	1.4%	1.5%	0.3%	-3.2%	-2.7%	-1.5%	-3.8%	-1.2%	-1.1%	-0.8%	* Expect margin back to corporate average of 14-17%
Server ODMs												
FII	GPM	7.6%	8.1%	7.4%	7.0%	9.3%	8.3%	7.6%	6.0%	7.8%	7.4%	
Quanta	GPM	5.6%	6.5%	6.6%	8.5%	8.1%	8.1%	8.5%	8.6%	7.5%	7.1%	3Q24E: Margin will decline QoQ
Wistron	GPM	7.2%	8.6%	7.0%	7.6%	7.9%	9.3%	7.2%	8.4%	8.6%	8.7%	2H24E: expect sequential margin improvement
Gigabyte	GPM	12.4%	9.3%	12.6%	11.8%	13.3%	11.0%	11.3%	10.8%	11.0%	11.1%	2Q24: GPM down QoQ due to higher AI server sales contribution

Source: company filings, earnings presentations, earnings call transcripts, CMBIGM estimates

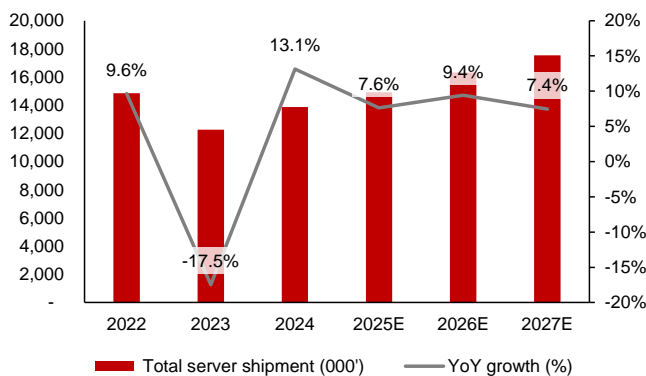
Global server supply chain outlook

Global AI server shipment momentum remains well on track into 2H24E, with H200 volume ramp until Blackwell kick-off in 4Q24E. Overall, AI server shipments continued to grow 20%/14% QoQ to 401mn/458mn units in 2Q/3Q24, with AI servers reaching 11.7%/12.6% of total servers, based on Trendforce. Looking ahead, we estimate AI training server shipments will grow 142%/87% YoY to 924mn/1,728mn units in 2024/25E, with GPU(NV/AMD)/ASIC server mix of 71%/29%. For general servers, we expect shipment recovery of 9%/2% YoY to 12.9mn/ 13.2mn in FY25/26E.

2H24E outlook: transitioning from H200 to GB200 servers

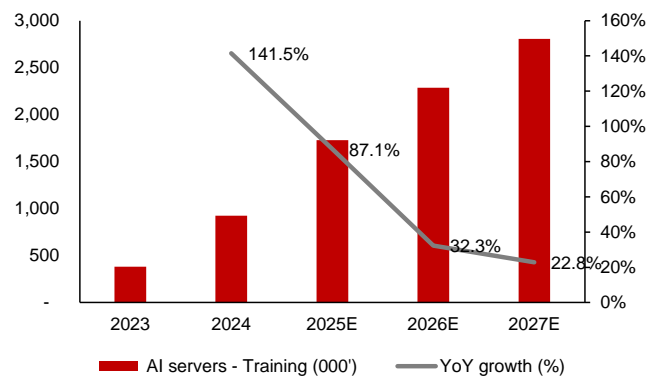
We expect AI servers to continue ramping up in 2H24E, driven by better GPU supply and H200 models; while GB200 NVL 72 server racks will start to ship in small volumes from late 2024 and achieve mass production in 1Q25E. With improved supply of CoWoS and GPUs in 2H24E, most server names expected AI server sales growth to drive sales in 2H24E, especially for Hopper servers. We estimate NVDA AI server shipments (training/inference) to grow 235%/173% YoY to 193k/237k in 3Q/4Q24E, and for 2024E, overall shipment will grow 204% YoY to reach 594k units.

Figure 2: Global server shipments in 2023-2027



Source: IDC, CMBIGM estimates

Figure 3: AI training server shipments in 2023-2027



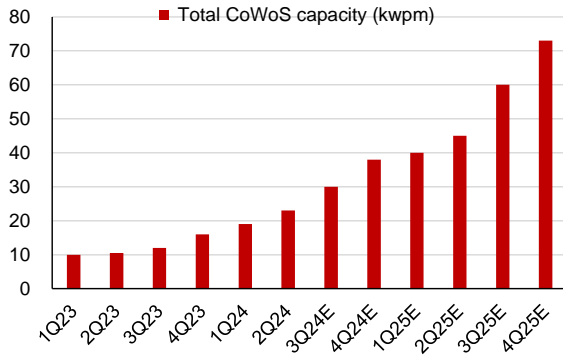
Source: CMBIGM estimates

2025 outlook: GB200/300 servers to ramp; NVL72 to become mainstream in 2H25E

We believe GB200 AI servers will be shipped in small volume in 4Q24 and enter mass production in 1Q25, and Hon Hai remains the first ODM to ship with less than 1,000 NVL72 racks in 4Q24F, based on our estimates. Following Blackwell's rebranding from Ultra to B300 series, we believe B300 (from B200 Ultra) to be launched in 2Q/3Q25E, and B300A (from B200A) will start mass production in 2Q25E following H200 peak shipment.

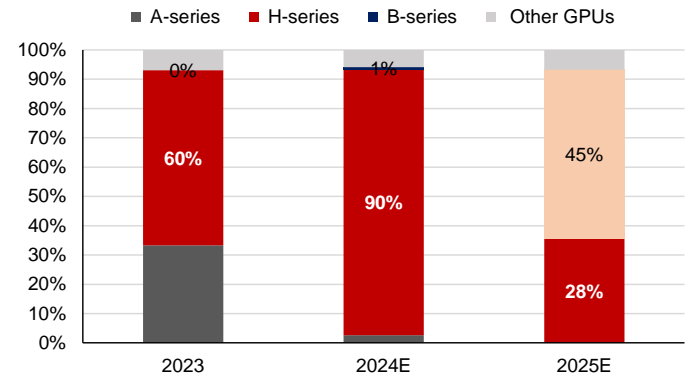
For downstream, we expect GB200 server rack to be around 40k NVL72 equivalent racks with 65% of Blackwell in GB200 form factor, and HGX AI servers will take up 35% of Blackwell GPUs, based on 4.5mn total Blackwell chips in 2025E. In addition, despite higher infrastructure requirement (e.g. liquid cooling), NVL72 will become mainstream form factor in 2H25E, as we believe recent NVL72 contribution to OCP and NV's latest product strategy to focus on NVL72 will accelerate the development across NVL72 supply chain.

Figure 4: Total CoWoS capacity plan in 2024/2025



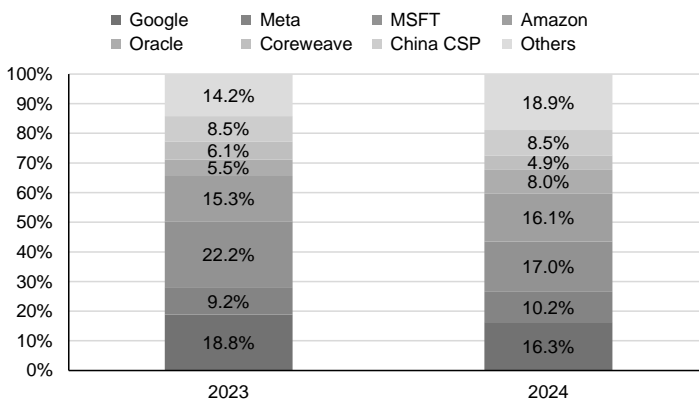
Source: Company data, CMBIGM estimates

Figure 5: Production of H/B series GPUs in 2023-25



Source: CMBIGM estimates

Figure 6: AI server demand by CSPs in 2023-24



Source: Trendforce, CMBIGM

Figure 7: NVDA product roadmap updates

Old Name	New Name	Major SKU	CoWoS
B100	B100	HGX	CoWoS-L
B200	B200	HGX	CoWoS-L
B200 Ultra	B300	HGX	CoWoS-L
GB200	GB200	NLV72/ NVL36	CoWoS-L
GB200 Ultra	GB300	NLV72/ NVL36	CoWoS-L
B200A Ultra	B300A	HGX, MGX	CoWoS-S
GB00A Ultra	GB300A	HGX, MGX	CoWoS-S

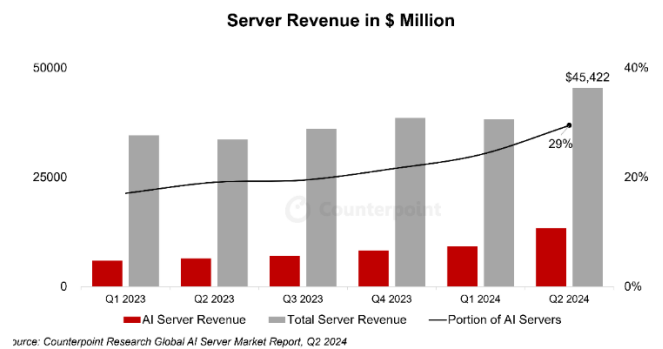
Source: Trendforce, CMBIGM

Figure 8: HPE: liquid-cooled servers to make up 20% of AI server market in 2027E

	Hyperscaler & model builders ¹	T2/T3 Service providers ²	Sovereigns ³	Enterprises	Total
AI WW TAM '27	\$66B	\$44B	\$19B	\$42B	\$171B
CAGR '23-'27	29%	30%	18%	19%	25%
Liquid-cooled servers	\$2B → \$18B	\$1B → \$9B	\$1B → \$4B	\$1B → \$4B	\$35B
Ethernet network	\$1B → \$8B	\$0.3B → \$4B	\$0.2B → \$1B	\$0.1B → \$2B	\$15B
Advisory & support	\$2B → \$8B	\$3B → \$8B	\$3B → \$5B	\$5B → \$11B	\$31B
Air-cooled servers & storage	\$19B → \$33B	\$12B → \$23B	\$6B → \$9B	\$15B → \$25B	\$90B
AI use cases	<ul style="list-style-type: none"> Foundational model training Large scale inference by API 	<ul style="list-style-type: none"> Foundational model training Large scale inference by API 	<ul style="list-style-type: none"> All model training Generative model fine-tuning Large scale inference by API 	<ul style="list-style-type: none"> Flow-tuning models API inference Agent (customer, codigen, chatbot) run-time 	
AI workload characteristics	<ul style="list-style-type: none"> 100-1000+ cluster size Optical/Ethernet back-end Central compute servers Fragmented silicon options Air-to-liquid cooled systems 	<ul style="list-style-type: none"> Up to 100+ cluster size 100+ Ethernet back-end Central compute servers Air-to-liquid cooled systems Service attach 	<ul style="list-style-type: none"> 10 to 100+ cluster size 100+ Ethernet back-end Central compute servers Hybrid liquid-cooled systems Storage services attach 	<ul style="list-style-type: none"> 100-100+ cluster size 100+ Ethernet back-end Server clusters/appliances Hybrid air-cooled systems Storage, SAN, services attach 	

Source: HPE, CMBIGM

Figure 9: Global server/AI server revenue in 2023-24



Source: Counterpoint, CMBIGM

Figure 10: Peers' valuation

		Market Cap	Price	P/E (x)		P/B (x)		ROE (%)		Perf
Company	Ticker	(US\$ mn)	(LC)	FY24E	FY25E	FY24E	FY25E	FY24E	FY25E	YTD (%)
PC/Server										
Lenovo	992 HK	17,908	11.22	NA	NA	19.2	14.2	2.9	2.8	2.7
Dell	DELL US	85,200	120.40	NA	NA	18.1	15.3	-	-	57.4
HP Enterprise	HPE US	25,831	19.89	NA	NA	10.2	9.4	1.1	1.1	17.1
HP Inc	HPQ US	34,915	36.23	NA	NA	10.7	10.1	-	-	20.4
ASUSTeK	2357 TT	13,902	600.00	NA	NA	14.8	13.6	1.8	1.7	22.6
Inspur	000977 CH	8,946	43.29	NA	NA	29.1	23.5	3.2	2.8	30.4
Dawning	603019 CH	11,343	55.22	NA	NA	36.7	30.1	3.9	3.5	39.8
		Average				19.8	16.6	2.6	2.4	27.2
ODM/OEM										
Foxconn Industrial	601138 CH	73,241	26.26	NA	NA	20.2	15.9	3.3	3.0	73.7
Super Micro	SMCI US	26,918	45.97	NA	NA	19.4	13.7	4.9	3.8	61.7
Huaqing	603296 CH	8,293	58.15	NA	NA	19.2	15.9	2.5	2.2	1.9
Quanta	2382 TT	38,436	319.00	NA	NA	21.0	17.2	6.2	5.4	42.1
Wistron	3231 TT	10,212	113.00	NA	NA	17.0	13.3	2.6	2.3	14.6
Wiwynn	6669 TT	11,739	2,025.00	NA	NA	17.2	14.3	5.6	4.7	11.0
Inventec	2356 TT	5,148	46.00	NA	NA	21.2	15.8	2.6	2.4	(12.9)
GigaByte	2376 TT	5,726	274.00	NA	NA	16.7	14.0	3.9	3.4	3.0
		Average				19.0	15.0	4.0	3.4	24.4
Switch/Storage										
Cisco	CSCO US	225,609	56.60	NA	NA	15.3	15.9	4.9	4.8	12.0
Arista	ANET US	124,580	396.56	NA	NA	48.0	41.7	13.3	10.5	68.4
Juniper	JNPR US	12,900	39.19	NA	NA	23.7	19.7	2.8	2.7	32.9
Keysight	KEYS US	26,962	155.36	NA	NA	25.1	22.3	5.1	4.6	(2.3)
Seagate	STX US	23,676	112.64	NA	NA	112.4	16.4	-	-	31.9
Western Digital	WDC US	23,423	67.76	NA	NA	-	8.8	2.0	1.8	29.4
		Average				39.3	20.6	5.1	4.5	30.1
EMS/Distributor										
Flextronics	FLEX US	13,604	34.26	NA	NA	13.8	14.2	2.5	2.6	54.6
Jabil	JBL US	14,069	124.02	NA	NA	14.8	14.3	8.1	9.2	(2.7)
Arrow	ARW US	7,069	133.51	NA	NA	12.4	9.1	1.2	1.1	9.2
Avnet	AVT US	4,724	54.06	NA	NA	10.7	12.2	1.0	0.9	7.3
		Average				12.9	12.5	3.2	3.5	17.1
Substrate										
Unimicron	3037 TT	7,778	163.50	NA	NA	28.2	12.8	2.6	2.3	(7.1)
Ibiden	4062 JP	4,457	4,781.00	NA	NA	19.9	19.6	1.5	1.3	(38.8)
NYPB	8046 TT	2,832	140.50	NA	NA	73.9	20.4	2.0	1.9	(44.1)
		Average				40.7	17.6	2.1	1.8	(30.0)
PCB										
WUS Printed	002463 CH	11,636	43.28	NA	NA	33.8	26.3	7.2	5.9	95.7
Victory Giant	300476 CH	6,007	49.60	NA	NA	36.6	25.5	5.0	4.3	168.8
Gold Circuit	2368 TT	3,114	203.00	NA	NA	16.2	13.1	4.8	4.0	(6.9)
		Average				5.7	4.7	22.6	24.0	85.9
Power Supply										
Delta	2308 TT	32,775	404.50	NA	NA	27.1	22.3	4.8	4.2	17.2
Lite-on	2301 TT	7,688	105.00	NA	NA	18.4	15.4	2.8	2.6	15.2
		Average				22.8	18.8	3.8	3.4	16.2
Thermal										
Foxconn Industrial	601138 CH	73,241	26.26	NA	NA	20.2	15.9	3.3	3.0	16.7
Sunowalth	2412 TT	29,764	123.00	NA	NA	25.4	24.5	2.4	2.5	9.8
AVC	3017 TT	8,166	683.00	NA	NA	33.5	23.4	9.6	7.7	31.2
		Average				26.4	21.3	5.1	4.4	19.2

Source: Bloomberg, CMBIGM

Note: Data as of 22 Oct 2024.

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BUY : Stock with potential return of over 15% over next 12 months
HOLD : Stock with potential return of +15% to -10% over next 12 months
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NOT RATED : Stock is not rated by CMBIGM

OUTPERFORM : Industry expected to outperform the relevant broad market benchmark over next 12 months
MARKET-PERFORM : Industry expected to perform in-line with the relevant broad market benchmark over next 12 months
UNDERPERFORM : Industry expected to underperform the relevant broad market benchmark over next 12 months

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