

China Technology Sector

Apple WWDC 2023: Vision Pro and more

Apple announced its first MR product Vision Pro, new MacBook Air and Mac Studio in WWDC 2023, in-line with market expectations. Vision Pro features dual Apple silicon chips M2&R1, 4K micro-OLED displays, 15+ cameras/sensors, gesture-based control and external battery pack, but high price tag at USD 3499 and early 2024 availability are below expectations, leading to profit taking pressure on tech sector today. Despite its high selling price, we remain positive on Apple's first-gen MR shipment of 200-300k in 1H24E, and expect it to gradually ramp up to 10mn+ level in next few years after more affordable model launches in 2025/26. We are positive on beneficiaries such as Luxshare, Cowell, Everwin, Goertek and Zhaowin.

- Long-awaited Vision Pro spec largely in-line; high price tag likely to drag near-term shipment.** Apple's first gen MR product Vision Pro features dual chips, 3P pancake lenses, 4K Micro-OLED, eye/gesture tracking, 12 cameras /5 sensors/6 microphones, AR/VR digital switching button and external battery support. Apple also launched VisionOS for Vision Pro, which is also compatible with iPhone, iPad and Mac. Use cases include gaming, multimedia, working, social and learning. To enhance content ecosystem, Apple also announced partnership with Unity and Disney for content development.
- New MacBook Air, Mac Studio and Apple M2 Ultra chip.** Apple unveiled latest versions of MacBook Air with M2 chip, Mac Studio with M2 Max/Ultra chips and Mac Pro with M2 Ultra chip, which will be available for order on 7 Jun. Updated version of iOS, macOS, iPadOS and WatchOS will be available for public in autumn season.
- Where are the opportunities?** We believe Apple Vision Pro will have a profound impact on supply chain, setting new standards for innovation. We reiterate three opportunities for supply chain players: **1) Display:** Micro-OLED upgrade will accelerate; **2) Optics:** Pancake solution will replace Fresnel lenses; **3) Tracking/interaction:** 10+ cameras and sensors for eye tracking, gesture tracking and VST features will go mainstream.
- Near-term profit-taking but long-term positive on related supply chain.** Despite Vision Pro's high price tag, we estimate shipment will reach 200-300k in 1H24E, and ramp up multiple times to 10mn+ level in next few years after lower-priced model launches in 2025/26. We believe spec upgrade in display/ camera/sensors/semis will benefit AR/VR supply chain names, such as Luxshare (OEM), Cowell (camera module), Everwin (casing), Zhaowei (IPD system), Goertek (acoustics/OEM) and Sunny Optical/Will Semi (optical lens/CIS).

Valuation Table

Name	Ticker	Rating	Mkt Cap (US\$ mn)	TP (LC)	Upside/Downside	P/E FY23E	P/B FY24E	P/B FY23E	P/B FY24E
Luxshare	002475 CH	Buy	26,311	48.0	83%	17.4	14.1	1.8	1.6
Goertek	002241 CH	Buy	8,629	44.7	149%	9.1	12.3	1.6	1.6
Sunny Optical	2382 HK	Hold	10,308	86.8	18%	22.5	19.4	3.0	2.7
Cowell	1415 HK	NR	1,649	NA	NA	16.5	11.4	3.6	2.8
Everwin	300115 CH	NR	1,916	NA	NA	26.2	13.8	2.2	1.9
Zhaowei	003021 CH	NR	1,864	NA	NA	55.1	38.2	4.5	4.1

Source: Company data, CMBIGM estimates

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Focus Charts

Fig.1: Specifications of latest AR/VR products by different brands

Name	Apple Vision Pro	Meta Quest 3	Meta Quest Pro	Meta Quest 2	Pico Neo 4/4 Pro	Sony PSVR2	HTC Vive XR Elite	DPVR E4
Type	Standalone	Standalone	Standalone	Standalone	Standalone	Tethered	Standalone	PC-Power
Release Date	Jun 2023	Jun 2023	Oct 2022	Oct 2020	Sep 2022	Feb 2023	Mar 2023	Feb 2023
Processor	Dual-Chip M2 & R1	Qualcomm XR2 Gen 2	Qualcomm XR2+	Qualcomm XR2	Qualcomm XR2	MediaTek	Qualcomm XR2	-
Storage	-	128GB	256GB	128GB/256GB	128GB/256GB	-	128GB	-
Display	Micro OLED	Mini-LED	Mini-LED	Fast-LCD	Fast-LCD	Fast-LCD	Fast-LCD	Fast-LCD
Resolution	4K	2064*2208	1800*1920	1832*1920	2160*2160	1280*1440	1920*1920	1832*1920
Refresh Rate	-	120Hz	90Hz	90Hz	90Hz	120Hz	90Hz	120Hz
Optical	Pancake	Pancake	Pancake	Fresnel	Pancake	Fresnel	Pancake	Fresnel
FOV (Deg)	-	-	106	100	104	110	110	95
Tracking	-	6DoF	6DoF	6DoF	6DoF	6DoF	6DoF	6DoF
Weight	-	-	722g	503g	586g	560g	625g	480g
Price (US\$)	\$3499	\$499	\$1499	\$299 \$399	RMB2499	\$399	\$1099	\$549

Source: Company, CMBIGM

Fig.1: Overview of Apple MR hardware supply chain

Category	Component	Supplier	No.	ASP (USD)	Total (USD)
SoC	SoC	Apple M2 Series	1	100	100
ISP	ISP	Apple	1	60	60
Memory	ROM	Samsung, Kioxia	1	20	20
	RAM	SK Hynix, Samsung	1	30	30
Inner Display	Micro-OLED	Sony	2	300	600
Outer Display	AMOLED/OLED	LG	1	30	30
Optics	Pancake Lens	Genius, Young Optics	2	30	60
	Module	GIS	1	50	50
Interaction Sensors	6DoF tracking	Lens: Largan; Module Cowell	4	5	20
	VST RGB camera	Lens: Largan; Module Cowell	2	8	16
	Eye-tracking	Sony	2	12	24
	Face-tracking	Sony	2	12	24
	Body-tracking	Lens: Largan; Module: Cowell	2	5	10
	Gesture-tracking	Lens: Largan; Module: Foxconn	1	10	10
	ToF	Lens: Genius; Module: LG	1	10	10
	IMU	TDK	1	3	3
Structural components	Haptics		2	2	4
	Outer shield, frame	Everwin, Lingyi Itech	1	120	120
Acoustics	MIC	Merry	3	3	9
	SPK	Goertek	4	2	8
PCB+FPC	PCB+FPC	Avary, Dongshan Precision	1	55	55
Headset battery	Battery		1	3	3
External battery	Battery	Desay, Sunwoda	1	15	15
OEM/ODM	Assembly	Luxshare, Pegatron	1	130	130
Others	WiFi, PMIC, Thermal dissipation, waterproof		1	100	100
Total BOM					1511

Source: Wellsenn XR, CMBIGM

Figure 3: Apple's first-gen MR product Vision Pro



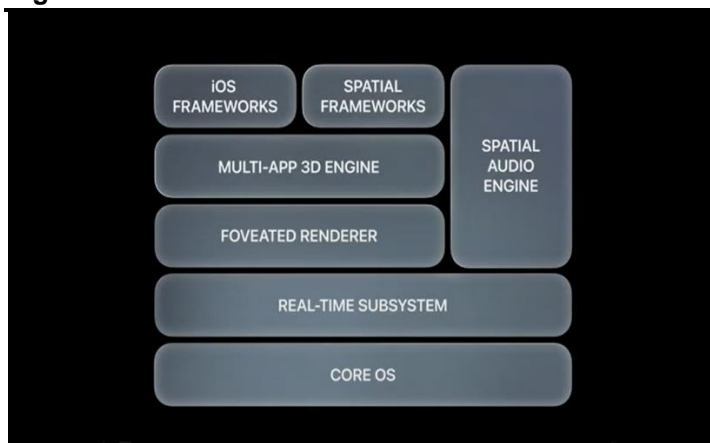
Source: Apple, CMBIGM

Figure 4: Digital applications in social/working/gaming



Source: Apple, CMBIGM

Figure 5: Launch of VisionOS



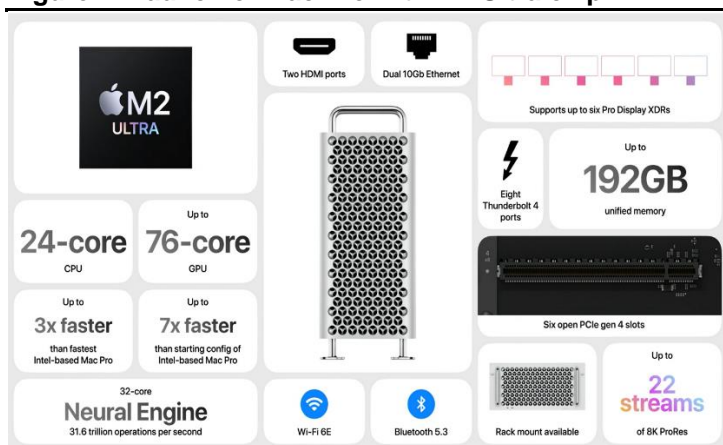
Source: Apple, CMBIGM

Figure 6: Launch of new 15" MacBook Air with M2 chip



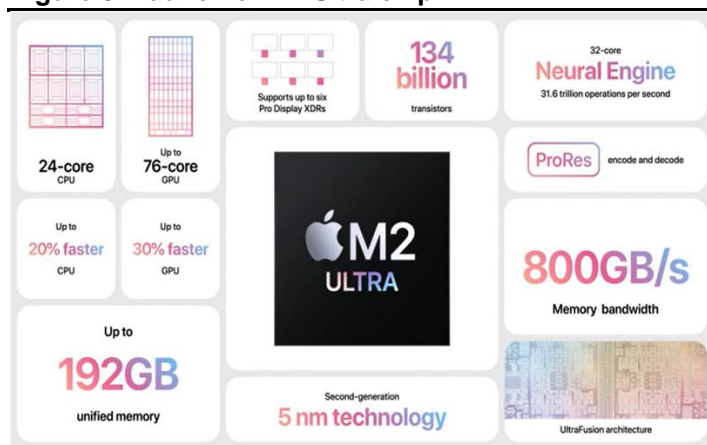
Source: Apple, CMBIGM

Figure 7: Launch of Mac Pro with M2 Ultra chip



Source: Apple, CMBIGM

Figure 8: Launch of M2 Ultra chip



Source: Apple, CMBIGM

Figure 9: Peers Comparison

Company	Ticker	Rating	Mkt Cap (US\$ mn)	Price (LC)	TP (LC)	Up/Down -side	P/E (x)		P/B (x)		ROE (%)	
							FY23E	FY24E	FY23E	FY24E	FY23E	FY24E
Optics												
Sunny Optical	2382 HK	Hold	10,308	73.70	86.8	18%	22.5	19.4	3.0	2.7	13.4	14.1
Q Tech	1478 HK	Buy	483	3.20	5.2	63%	6.7	4.9	0.7	0.6	9.8	12.0
Truly	732 HK	NR	355	0.88	NA	NA	-	-	-	-	-	-
Cowell	1415 HK	NR	1,649	15.24	NA	NA	16.5	11.4	3.6	2.8	23.6	26.7
Largan	3008 TT	NR	9,797	2255	NA	NA	17.7	16.0	1.8	1.7	11.0	11.2
Genius	3406 TT	NR	1,424	388	NA	NA	16.6	15.0	2.1	1.9	13.3	13.7
Primax	4915 TT	NR	966	64.60	NA	NA	10.5	9.8	1.7	1.6	15.5	15.8
Lite-On	2301 TT	NR	7,220	93.90	NA	NA	16.6	13.9	2.7	2.5	15.8	18.6
O-Film	002456 CH	NR	2,219	4.85	NA	NA	-	-	6.6	6.6	(42.5)	(22.5)
Samsung Elec	009150 KS	NR	8,521	148400	NA	NA	16.4	11.5	1.4	1.3	9.0	11.7
Lg Innotek	011070 KS	NR	5,603	308000	NA	NA	9.8	7.5	1.5	1.3	16.2	18.4
Partron	091700 KS	NR	414	9140	NA	NA	10.4	9.2	1.0	0.9	10.0	10.4
Average							14.4	11.9	2.4	2.2	8.7	11.8
Acoustics/Haptics												
AAC Tech	2018 HK	Hold	2,390	15.64	15.6	0%	14.3	12.9	0.7	0.7	5.2	5.7
Goertek	002241 CH	Buy	8,629	17.96	44.7	149%	9.1	12.3	1.6	1.6	17.8	13.1
Luxshare	002475 CH	Buy	26,311	26.27	48.0	83%	17.4	14.1	1.8	1.6	10.5	11.4
Sunway	300136 CH	Buy	2,609	19.20	NA	NA	19.7	16.2	2.4	2.1	12.8	14.0
Merry	2439 TT	NR	651	92	NA	NA	15.2	14.1	1.6	1.6	10.4	11.2
Knowles	KN US	NR	1,533	16.78	NA	NA	16.4	12.7	-	-	-	-
Nidec	6594 JP	NR	31,665	7400	NA	NA	53.2	27.3	3.2	2.9	7.0	11.4
Alps Alpine	6770 JP	NR	1,951	1240	NA	NA	10.5	10.9	0.6	0.6	6.2	5.8
Average							19.5	15.1	1.7	1.6	10.0	10.4
Connector												
FIT Hon Teng	6088 HK	Buy	1,348	1.45	2.2	50%	9.1	7.3	0.5	0.5	5.6	6.7
Luxshare	002475 CH	Buy	26,311	26.27	48.0	83%	17.4	14.1	1.8	1.6	10.5	11.4
TE	TEL US	NR	39,137	124.20	NA	NA	18.9	16.5	3.5	3.1	18.6	20.0
Amphenol	APH US	NR	45,661	76.70	NA	NA	26.6	24.1	5.8	5.2	24.5	24.5
Average							18.0	15.5	2.9	2.6	14.8	15.7
EMS/OEM												
BYDE	285 HK	Buy	6,809	23.70	24.5	3%	16.2	13.3	1.7	1.5	10.4	11.4
Luxshare	002475 CH	Buy	26,311	26.27	48.0	83%	17.4	14.1	1.8	1.6	10.5	11.4
Hon Hai Precision	2317 TT	NR	48,284	107.00	NA	NA	12.1	9.5	0.9	0.9	8.2	9.8
Pegatron	4938 TT	NR	6,728	77.50	NA	NA	12.7	11.5	1.1	1.1	8.4	8.9
Wistron	3231 TT	NR	6,664	70.60	NA	NA	23.5	16.2	2.0	1.8	8.9	11.6
Average							29.0	20.9	6.6	5.0	13.6	19.9
Casing												
BYDE	285 HK	Buy	6,809	23.70	24.5	3%	16.2	13.3	1.7	1.5	10.4	11.4
Tongda	698 HK	Buy	122	0.10	0.2	104%	2.7	2.5	0.1	0.1	2.9	4.7
TK Group	2283 HK	Buy	156	1.47	3.4	130%	2.8	3.8	0.6	0.6	20.7	17.8
Ju Teng	3336 HK	NR	207	1.35	NA	NA	-	-	-	-	-	-
Everwin	300115 CH	NR	1,916	11.36	NA	NA	26.2	13.8	2.2	1.9	8.9	14.7
Lens Tech	300433 CH	NR	7,950	11.38	NA	NA	18.6	12.6	1.2	1.1	7.6	9.3
Chaozhou Three	300408 CH	NR	7,901	29.35	NA	NA	27.4	20.7	3.0	2.7	11.1	13.2
Catcher	2474 TT	NR	4,164	188.0	NA	NA	19.6	17.6	0.8	0.8	4.1	4.5
Jabil	JBL US	NR	12,151	91.58	NA	NA	10.9	10.1	4.0	3.3	40.8	36.3
Average							15.6	11.8	1.7	1.5	13.3	14.0

Source: Bloomberg, CMBIGM estimates.

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