

Semiconductors

Semi Week in Review

Summary

In this week's Semi Week in Review, we highlight Meta's launch of a Qualcomm Snapdragon XR2 Gen 2-based Quest 3 VR headset and Snapdragon AR1 Gen 1 smart glasses, as well as give our take on the implications of Micron's recent earnings report.

Meta launches Qualcomm Snapdragon XR2 Gen 2-based Quest 3 VR headset - The major improvements from the Quest 2 are full-color video pass through, mixed reality features, and 40% slimmer visor.

Table 1. Quest 2 vs. Quest 3

	Meta Quest 2	Meta Quest 3
Chipset	Qualcomm Snapdragon XR2	Qualcomm Snapdragon XR2 Gen 2
Display resolution	1832x1920 per eye	2064x2208 per eye
NAND Flash storage	128GB / 256GB	128GB / 512GB
DRAM memory	6GB	8GB
Connectivity	WiFi 6	WiFi 6E / 7; BT 5.2
Battery life	2-3 hours	Up to 3 hours
Size	7.5x4x5.2 inches	7.3x6.3x3.9 inches
Weight	1.1 lbs	1.1 lbs
Price	\$270 (128GB)/\$350 (256GB)	\$499 (128GB)/\$649 (512GB)

Source: Amazon.com; Tom's Hardware, company reports

Driving the upgrade is Qualcomm's Gen 2 XR2 SoC. Compared with the 1st generation XR2, gen 2 has 2.5x the GPU performance, 50% better power efficiency, 8x better AI performance, Qualcomm FastConnect and WiFi 6E / 7 provides 5.8Gbps bandwidth at 25% less power and 80% shorter latency.

Meta also introduced Snapdragon AR1 Gen 1 smart glasses - These [Ray-Ban Meta Smart Glasses](#) capture pictures and livestream video to be posted on Facebook, Instagram or WhatsApp. The glasses can also be used for phone conversations and listening to music. The AR1 processor handles the video capture, AI processing, audio processing, WiFi 7 and Bluetooth 5.3/5.2

Our Take - We view these product announcements as significant in demonstrating the flexibility of Qualcomm's Snapdragon SoC. Snapdragon is the Swiss Army Knife of system-on-chip designs. With the full featured device powering nearly all Android flagship smartphone, the product reaches 200+mn units annually. Various derivatives can leverage the volume cost advantages while addressing adjacent applications.

Meta AI assistants are the first step toward bringing generative AI applications to network edge devices. We see the next step is with the Snapdragon including hybrid AI processing included in 2024. As pointed out by Qualcomm's SVP and GM, Technology Planning & Edge Solutions, Dr. Durga Malladi during our recent webcast, a Snapdragon-based smartphone will handle generative AI models with up to 7B parameters. This includes Meta's Llama2 and also an estimated 300K other trained LLMs.

Hybrid Generative AI and its associated applications could stimulate a new smartphone upgrade cycle in late 2024 and into 2025.

Last week we marketed for 4-days in the Northeast - Investors were keen on understanding the merits of Micron's cycle bottom call, Nvidia GPU supply chain and demand dynamics, the ongoing battle of AMD and Intel, AI derivatives, networking as the next investment wave in data center (Broadcom vs. Marvell), and AMD MI300 potential vs. Nvidia Hopper.

Micron's earnings last week triggered heated debate on the timing and sustainability of the memory cycle (and by definition the semi cycle overall), that we see as starting to inflect

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unambiguously upward. Massive supply cuts, inventory normalization, the DDR5 ramp, and HBM look to create a S/D dynamic that has the potential to be historical as AI compute will not scale properly without memory scaling (content and B/W wise).

Interestingly, Micron's commentary that HBM3e ramp in 2024 will significantly impact the company's overall DRAM bit supply (negatively), is remarkable given HBM has been a niche market, Micron a non-player, and only one AI compute player has the demand profile to drastically shift memory S/D: Nvidia.

Net/net - Micron will be a major beneficiary of the HBM3e transition, it will be big, it will be earlier than thought, and likely signals a major transition from Hopper to Blackwell in 2H24 that should deflate the notion that Hopper is in big part all pull-ins and/or double ordering.

AMD's Lisa Su at the Code event last week helped by Microsoft's CTO cemented that MI300 ramp is happening, will be important, and will be set to gain share vs. Nvidia from the current near-zero share AMD has in GPU compute. Lisa in our comment at Code made the case that in fast growing markets that are in flux proprietary software environments (Cuda?), are not ideal for customers that want and need to move quickly, as in open-sourced roadmaps. We shall see.

What we can observe is that MI300 will be more competitive than Street consensus seems to believe and that with its innovative chiplet/tile approach (Intel still figuring out and Nvidia yet to even include in roadmaps), that AMD will have important growth ahead particularly at the Edge where the company has a broad based footprint already with Xilinx.

Incrementally in the last week investors were very keen on the possibility of networking being the next sector to benefit from the early deployments of GPU/accelerators in the data center. Indeed, early evidence from Broadcom and Marvell suggest early ramps in AI optical and switching silicon that we believe will be followed by NICs, DPUs, custom networking ASICs, and both intra and inter data center connectivity. Net/net: both Broadcom and Marvell will benefit from this next wave of spend entering 2024.

Other names we discussed last week include second wave AI plays Lattice (FGPA in the edge), Monolithic Power (AI Hopper and Blackwell power analog, and auto sector), and Supermicro (AI building block innovator). In analog, we discussed the merits of TI's massive capacity spend profile (we think strategic), and Microchip's ability to orchestrate a soft-landing to disengage from its PSP engagement with customers.

Semiconductor Industry Comp Sheet

								Valuation											
Company Name	Ticker	Rating	10/1/2023 Price	Price Target	Upside/ Downside	Market Cap (\$M)	Enterprise Value (\$M)	EV/Sales			P/E			EV/FCF			EV/EBITDA		
								CY22E	CY23E	CY24E	CY22E	CY23E	CY24E	CY22E	CY23E	CY24E	CY22E	CY23E	CY24E
Analog/MCUs																			
Microchip Technology Incorporated	MCHP-US	Buy	\$78.05	\$110.00	41%	42,485	48,828	5.7x	5.6x	5.3x	12.8x	12.7x	12.0x	14.4x	15.1x	14.1x	11.6x	11.6x	10.8x
Monolithic Power Systems, Inc.	MPWR-US	Buy	\$462.00	\$580.00	26%	22,073	21,591	11.9x	10.4x	8.9x	39.4x	35.1x	28.8x	37.2x	34.3x	28.2x	32.1x	27.6x	22.7x
ON Semiconductor Corporation	ON-US	Neutral	\$92.95	\$100.00	8%	40,111	42,839	5.1x	4.8x	4.4x	17.8x	16.4x	14.2x	49.5x	23.9x	18.6x	12.9x	11.8x	10.6x
Texas Instruments Incorporated	TXN-US	Buy	\$159.01	\$230.00	45%	144,376	147,320	8.2x	7.6x	6.9x	21.8x	20.7x	18.9x	64.3x	30.7x	25.5x	16.3x	14.7x	12.8x
SiTime Corporation	SITM-US	NR	\$114.25	NR	NR	2,538	1,957	13.4x	9.7x	7.8x	714.1x	90.7x	56.1x	NM	NM	NM	-138.3x	113.8x	45.4x
Infineon Technologies AG Sponsored ADR	IFNNY-US	NR	\$33.20	NR	NR	43,353	46,973	3.0x	2.6x	2.5x	14.9x	11.9x	11.6x	29.3x	32.5x	24.1x	8.8x	7.2x	6.8x
STMicroelectronics NV ADR RegS	STM-US	NR	\$43.16	NR	NR	39,512	39,352	2.3x	2.2x	2.0x	10.0x	10.0x	9.0x	31.8x	19.2x	15.2x	6.3x	6.2x	5.7x
Communications/DC																			
Broadcom Inc.	AVGO-US	Buy	\$830.58	\$1,000.00	20%	342,810	381,944	11.4x	10.5x	9.7x	21.6x	19.4x	17.6x	23.1x	21.1x	18.7x	18.0x	16.4x	15.2x
Lattice Semiconductor Corporation	LSCC-US	Buy	\$85.93	\$110.00	28%	11,844	11,967	15.7x	13.9x	16.6x	41.2x	35.0x	NM	44.5x	36.2x	45.9x	41.8x	32.4x	49.5x
Navitas Semiconductor Corporation	NVTS-US	Buy	\$6.95	\$12.00	73%	1,207	869	18.4x	7.0x	4.1x	NM	NM	57.2x	-17.2x	-29.4x	-32.7x	-29.3x	-63.3x	34.1x
Vicor Corporation	VICR-US	NR	\$58.89	NR	NR	1,915	2,450	5.9x	5.0x	4.1x	44.7x	33.0x	21.4x	41.2x	51.2x	29.4x	29.4x	21.4x	13.4x
QuickLogic Corporation	QUIK-US	NR	\$8.60	NR	NR	119	114	5.4x	4.0x	NM	107.5x	24.2x	NM	-24.7x	22.3x	NM	66.9x	20.7x	NM
Power Integrations, Inc.	POWI-US	NR	\$76.31	NR	NR	4,380	4,054	8.1x	6.8x	5.9x	46.6x	30.8x	26.3x	42.8x	26.4x	22.2x	35.4x	23.6x	22.8x
Wolfspeed Inc	WOLF-US	NR	\$38.10	NR	NR	4,772	6,094	6.4x	5.0x	3.5x	NM	NM	NM	-3.8x	-3.6x	-7.9x	-76.6x	-1716.4x	16.1x
Computing																			
Advanced Micro Devices, Inc.	AMD-US	Buy	\$102.82	\$200.00	95%	166,123	163,863	7.2x	6.0x	5.2x	37.4x	24.8x	19.7x	43.2x	30.7x	24.6x	40.6x	21.0x	16.4x
Ambarella, Inc.	AMBA-US	Buy	\$53.03	\$85.00	60%	2,115	1,897	8.0x	7.2x	5.2x	NM	NM	385.9x	922.3x	-82.4x	332.6x	-116.7x	-276.4x	37.1x
Intel Corporation	INTC-US	Sell	\$35.55	\$17.00	-52%	148,883	177,411	3.4x	3.0x	2.8x	56.1x	20.1x	14.8x	-13.8x	-66.8x	134.3x	16.1x	10.9x	8.6x
NVIDIA Corporation	NVDA-US	Buy	\$434.99	\$1,100.00	153%	1,074,425	1,081,971	20.7x	13.9x	11.5x	43.5x	27.0x	22.4x	49.7x	28.6x	22.7x	38.2x	23.8x	19.5x
Super Micro Computer, Inc.	SMCI-US	Buy	\$274.22	\$375.00	37%	14,508	15,198	1.7x	1.3x	NM	19.2x	14.3x	NM	42.9x	45.8x	NM	15.3x	12.0x	NM
IoT																			
Synaptics Incorporated	SYNA-US	Buy	\$89.44	\$100.00	12%	3,491	3,691	3.1x	3.1x	NM	16.1x	17.4x	NM	17.4x	24.4x	NM	13.3x	14.1x	NM
IP																			
Arteris, Inc.	AIP-US	Buy	\$6.51	\$21.00	223%	235	179	3.2x	2.6x	1.9x	NM	NM	29.6x	-19.9x	-119.5x	NM	-5.9x	-7.1x	NM
CEVA, Inc.	CEVA-US	Buy	\$19.39	\$35.00	81%	458	329	2.9x	2.6x	2.1x	169.2x	38.2x	23.0x	31.6x	88.8x	21.1x	NM	NM	NM
Rambus Inc.	RMBS-US	Buy	\$55.79	\$73.00	31%	6,088	5,925	10.6x	8.9x	7.4x	32.2x	25.8x	20.6x	29.9x	29.9x	25.9x	20.6x	16.5x	13.0x
Adeia Inc.	ADEA-US	NR	\$10.68	NR	NR	1,140	1,754	4.4x	4.1x	NM	7.9x	7.3x	NM	NM	NM	NM	6.8x	6.4x	NM
Movella Holdings Inc.	MVLA-US	NR	\$0.54	NR	NR	27	31	0.9x	0.7x	NM	NM	NM	NM	NM	NM	NM	-2.0x	-174.0x	NM
Memory/Storage																			
Marvell Technology, Inc.	MRVL-US	Buy	\$54.13	\$100.00	85%	46,703	50,865	9.2x	7.9x	6.9x	34.2x	24.0x	18.8x	51.9x	31.8x	23.4x	30.0x	22.1x	17.5x
Micron Technology, Inc.	MU-US	Buy	\$68.03	\$100.00	47%	74,513	78,696	4.6x	3.3x	2.5x	NM	100.3x	10.8x	-19.7x	92.7x	21.2x	20.2x	8.9x	5.3x
Seagate Technology Holdings PLC	STX-US	Buy	\$65.95	\$68.00	3%	13,708	18,699	2.7x	2.4x	2.2x	162.0x	26.4x	13.4x	34.9x	27.6x	18.4x	21.0x	14.1x	10.4x
SMART Global Holdings, Inc.	SGH-US	Buy	\$24.35	\$35.00	44%	1,219	1,695	1.0x	1.0x	0.9x	7.4x	9.7x	9.5x	NM	NM	NM	6.7x	7.7x	6.8x
Western Digital Corporation	WDC-US	Neutral	\$45.63	\$38.00	-17%	14,688	20,717	1.7x	1.5x	1.2x	NM	NM	9.4x	-22.1x	210.7x	16.7x	-72.9x	14.6x	6.3x
Mobile																			
Qorvo, Inc.	QRVO-US	Neutral	\$95.47	\$95.00	0%	9,348	10,708	3.0x	2.7x	2.4x	18.1x	13.7x	10.1x	18.0x	13.4x	10.7x	12.9x	10.8x	8.9x
QUALCOMM Incorporated	QCOM-US	Buy	\$111.06	\$145.00	31%	123,943	131,644	3.1x	3.6x	3.4x	9.7x	13.1x	11.9x	16.9x	14.6x	12.4x	7.5x	10.0x	9.8x
Skyworks Solutions, Inc.	SWKS-US	Buy	\$98.59	\$150.00	52%	15,715	16,750	3.2x	3.5x	3.3x	9.4x	11.5x	10.5x	12.6x	9.1x	9.3x	6.9x	8.1x	7.9x
LIDAR																			
Luminar Technologies, Inc. Class A	LAZR-US	Neutral	\$4.55	\$6.00	32%	1,334	2,008	23.9x	8.2x	3.5x	NM	NM	NM	-8.4x	-14.8x	-80.2x	-7.7x	-11.8x	-37.0x
Ouster, Inc.	OUST-US	Buy	\$5.04	\$17.50	247%	199	39	0.5x	0.3x	0.2x	NM	NM	NM	NM	NM	NM	-0.3x	-0.5x	-0.7x
Innoviz Technologies Ltd.	INVZ-US	Neutral	\$1.95	\$5.00	156%	318	179	10.7x	2.2x	0.6x	NM	NM	NM	-1.9x	-2.1x	-4.0x	-1.5x	-1.6x	-4.2x

Sources: Rosenblatt Estimates, FactSet

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			Count	Percent
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