

Semiconductor WEEK:

August 19, 2022

An overview of results and conclusions from recent reports at TechInsights

Chip Market Research Services

Still green but clouds loom

- Order activity for semiconductor equipment extended its decline, slipping to 84 degrees
- WFE activity is still holding up well and most WFE suppliers are not seeing any meaningful shift in demand yet
- Worldwide Chip Making Equipment Markets

Semiconductor Analytics

Last Week in the Semiconductor Market:

Semiconductor sales dipped -10% below 1Q22 levels last week.

The market was 5% above 2021. The IC weather cooled 0°F.

Zooming in on Logic ICs this week, the 13-wk MA grew 12% Y/Y, cooling off this year's peak of 32% in early March.

TechInsights forecasts it will reach \$279B in 2022, with Y/Y growth of 9% that falls to -4% in 2023.

TechInsights' IC Supply/Demand indices continued to improve last week, albeit too slight to move most of the categories.

Foundry did move from Loose to Balanced and the 3Q22

NowCast for OSATs improved from Saturated to Loose. While

Auto ICs remain in Shortage, it is nowhere near as dire as the 1st half of 2021. It has been steadily loosening since April.

Electronics' Retail Price decline is showing early signs of bottoming.

Customer Satisfaction Survey

White Paper: Edwards – Number 1 WFE Subsystems Supplier

Chip History Center

The DRAM crash of 2008

How the 2007-2008 financial crisis that led to the great recession ignited a crash in semiconductors. When it comes to semiconductor downturns, DRAMs are the canary in the coalmine. Here's how it tweeted out.

The Chip Insider

Strategy and Tactics: Surprising Near-Term versus Long-Term Decadal Trends

Semiconductor Stocks

- *TechInsights' Semiconductor Stock Indices all fell this week along with the market*
- *Semiconductor Stock Index fell*
 - *SkyWater Technology was this week's biggest winner*
- *Semiconductor Equipment Stock Index fell*
 - *Nikon came out on top*
- *EDA Stock Index fell*
- *Electronics Materials Stock Index slipped*
- *Hottest Stocks: SkyWater Technology, SK hynix, IBM, Nikon, ON Semiconductor, and JSR*

TechInsights



Number 1 WFE Subsystems Supplier


TechInsights Customer Satisfaction Survey 2022





Edwards Awarded 10 BEST Supplier

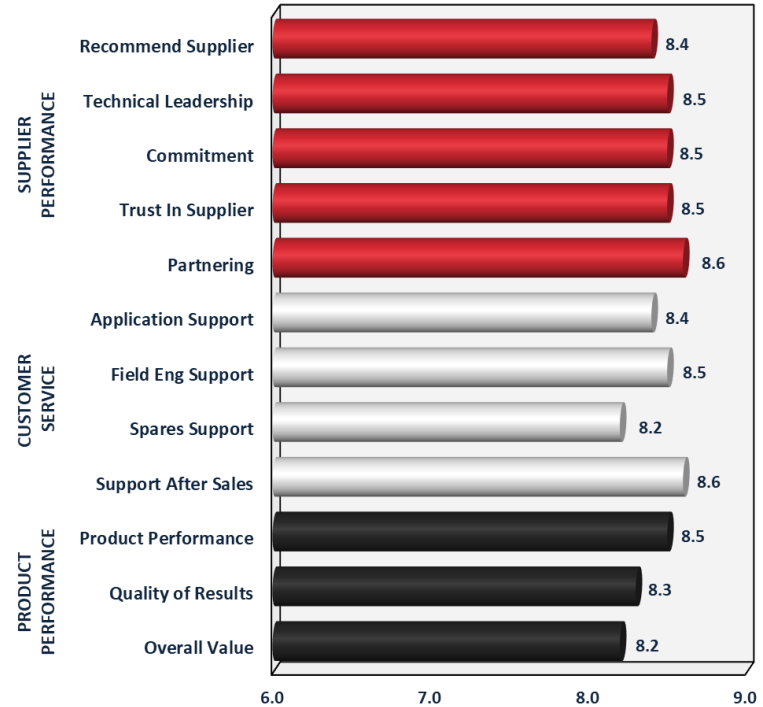
- Edwards, a leading developer of vacuum products and abatement solutions, awarded 4 Stars in the 2022 10 BEST *Large Suppliers of Chip Making Equipment*
 - with an outstanding score of 8.45
- 89% of customers said they will return to Edwards for their vacuum and abatement needs
- Edwards focus on optimum performance ensures excellent global customers success

LARGE SUPPLIERS OF CHIP MAKING EQUIPMENT	Rating	TechnInsights Stars
Advantest	9.48	★★★★★
ASML	9.37	★★★★★
ASM Pacific Technology	8.84	★★★★★
	8.45	★★★★
Teradyne	8.15	★★★★
Kokusai Electric	7.94	★★★★
Lam Research	7.88	★★★★
Tokyo Electron	7.73	★★★★
Applied Materials	7.70	★★★★
Hitachi High-Tech	7.63	★★★★
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How Customers Perceive Edwards

- Customers honor Edwards with an average rating of 8.5 in *Supplier Performance*, 8.4 in *Customer Service*, and 8.3 in *Product Performance*
- Improves its rating in *overall value* by 10 basis points
- Highest scores*
 - *Partnering*
 - *Support After Sales*
 - *Technical Leadership*
 - *Commitment*
 - *Trust In Supplier*
 - *Field Engineering Support*
 - *Product Performance*
 - *Recommend Supplier*
 - *Application Support*

*Listed in order of score, highest to lowest



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Tech
Insights

The Chip Insider[®]'s Graphics File

July 2022



Still green but clouds loom

- Order activity for semiconductor equipment extended its decline, slipping to 84 degrees
- All segments trended lower led by Subcon/Adv. Packaging and SOC Computing where temperatures slid more than 4 points
- WFE activity is still holding up well and most WFE suppliers are not seeing any meaningful shift in demand yet
- TechInsights' Chip Price Performance Index continued to flash warning signals as it headed further south



Forecast as of July 2022:	2021	2022
Semi Equipment (\$B):	\$ 126.6	\$ 143.1
Sequential Change	36.6%	13.0%
Capacity Utilization:	97.2%	96.5%
ICs (\$B):	\$ 492.3	\$ 555.8
Sequential Change	27.4%	12.9%
IC Units (BU):	394.2	426.0
Sequential Change	23.7%	8.1%
Electronics (\$B) :	\$ 2,574	\$ 2,732
Sequential Change	18.9%	6.1%

[Contact us to access more details](#)

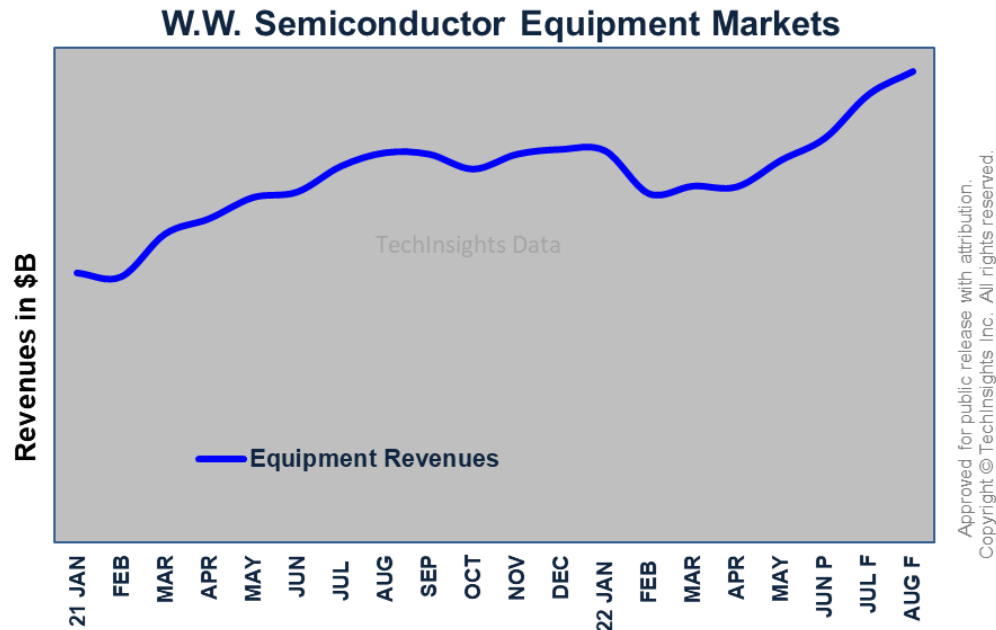
TechInsights

The Chip Insider[®] Graphics

Worldwide Chip Making Equipment Markets

- Equipment sales dipped in 1Q22 due to shortages but have turned up in 2Q22

Worldwide Chip Making Equipment Markets: Chart shows rolling averages in \$B for semiconductor equipment orders and revenues, contrasted against a 36-month rolling average of revenues



Workforce Development Solutions...

with Ajit Manocha of SEMI



What the conversation is about:

- Labor shortages have become the echo pandemic from the ravages COVID has had on the economy.
- This is no truer than in the semiconductor industry, where Workforce Development has long been on the To-Do lists of many.
- Most industry efforts appear to be more about lobbying others to do something about workforce development.
- It's really hard to do something substantive about it but SEMI is.

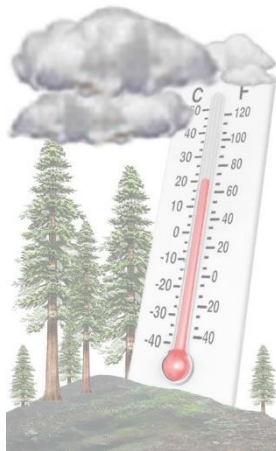
[Click here to watch online](#)

Semiconductor Analytics

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Semiconductor sales dipped -10% below 1Q22 levels last week. The market was 5% above 2021. The IC weather cooled 0°F. Zooming in on Logic ICs this week, the 13-wk MA grew 12% Y/Y, cooling off this year's peak of 32% in early March. TechInsights forecasts it will reach \$279B in 2022, with Y/Y growth of 9% that falls to -4% in 2023.

TechInsights' IC Supply/Demand indices continued to improve last week, albeit too slight to move most of the categories. Foundry did move from Loose to Balanced and the 3Q22 NowCast for OSATs improved from Saturated to Loose. While Auto ICs remain in Shortage, it is nowhere near as dire as the 1st half of 2021. It has been steadily loosening since April. Electronics' Retail Price decline is showing early signs of bottoming.

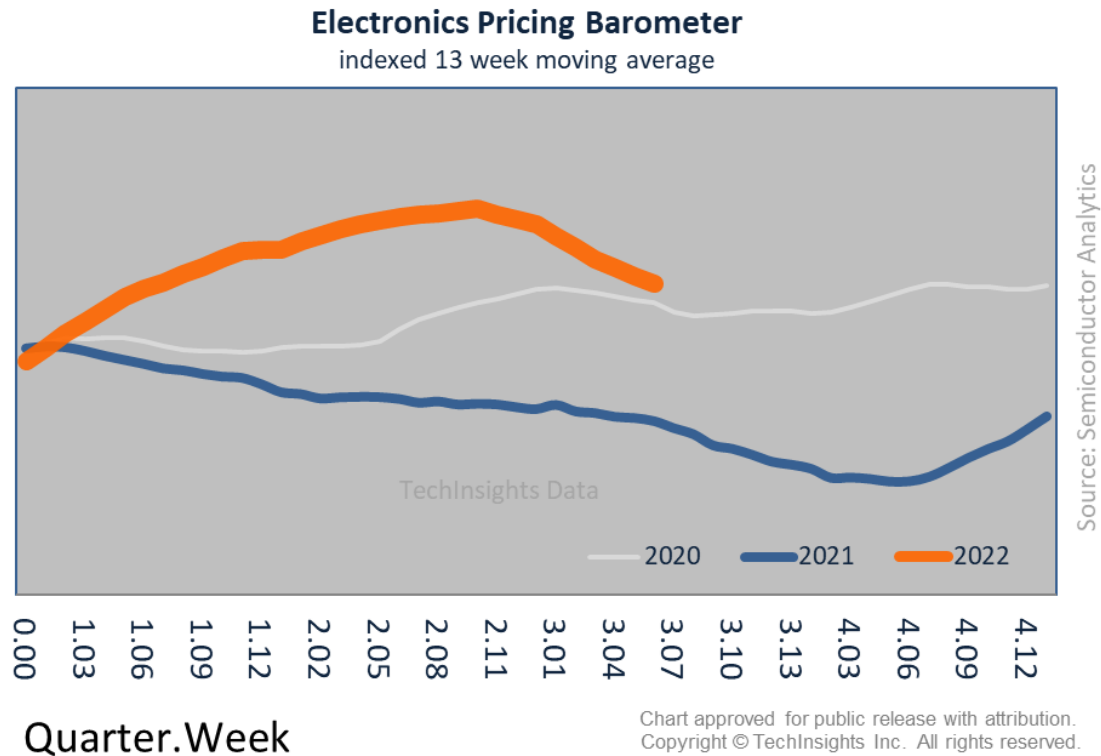


1: Measures Order Activity 2: Measures Pricing Power

Electronics Retail Pricing Trends:

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

Electronics' Retail Price decline is showing early signs of bottoming.





Strategy and Tactics: Surprising Near-Term versus Long-Term Decadal Trends

Summaries:

Near-Term versus Long-Term Decadal Trends: As everyone knows, the near-term picture has been darkening for some time. DRAM and Foundry markets started to shift out of the shortage situation in 2Q22, as capacity gains increased supply and economic slowing cooled demand. Demand was also hit by inflation. This was more than the Russo-Ukraine war. Coming off the COVID communications-demand bubble when the work world went from ... But when this flow reversed and people started moving again, it was only natural there would be a surge in auto demand, as the market for laptops and chrome books drove off the cliff, 'Thelma and Louise' style. Of course, just like in the movies, where actors live past endings, semiconductor markets always live past dips – even Grand Canyon sized drops... This, along with other key data points triggered this month's major revision. Data deviations from expectations took the forecast for 2023 into the dark side with a U-turn saddling the 2H22 and 1H23. This pulls the previous projection of a downturn from 2024 into 2023 ... odds are the Fed may well achieve its goal of licking inflation with a soft landing... Far from Thelma and Louise, the experience of the silicon cycle teaches executives to be more like Evil Knievel: Fearless, yet prepared. Now, let's consider our decadal future.

Long-Term Decadal Trends: Many have heard time and again the semiconductor market will be taken to \$1T by 2030. ICs should reach that level by 2032. It is the long-term growth trend causing most experienced executives in the industry to dismiss the silicon cycle as mere bumps in the

road to this horizon. They are, in my opinion, right to see the chip world this way. Moreover, as you can see the speed bumps have gone from the sleeping-policeman-sized bumps you see in parking lots to street-sized variations with little need to slow down. To a large degree, this explains the shift by semiconductor companies from tactical to strategic capital investing, resulting in a similar moderation of the demand cycle for semiconductor equipment. But that's a different topic.

Of course, the \$1T number for chips assumes the electronics market will stay on its trend to reach \$4T by 2032. But is it sustainable? This question is critical, because one divided by four assumes a 25% semiconductor content rate... In the late seventies, an IBM economics paper that forecasted a peak of 15% postulated it could not sustain levels above 15% without challenging the electronics' business model... Before you look at the next two charts, let me ask you to imagine if electronics is becoming a bigger or smaller part of the economy? It's a parallel question to the content value of electronics in semiconductors. If you're like me, the answer seems obvious: electronics must be a larger part of the economy today than it was decades ago. RIGHT? The results are not so obvious... By 2032, current trends will take the semiconductor equipment market to \$0.3T... For all the silicon cycle [Evil Knievel](#)'s out there, there's plenty more things to jump as we ride into the coolest industry's decadal future.

"Forecasting is difficult... Especially when it's about the future" – Yogi Berra

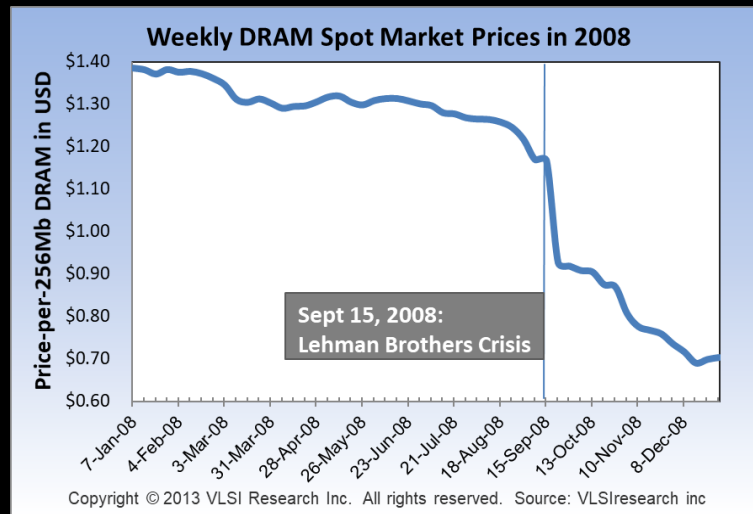
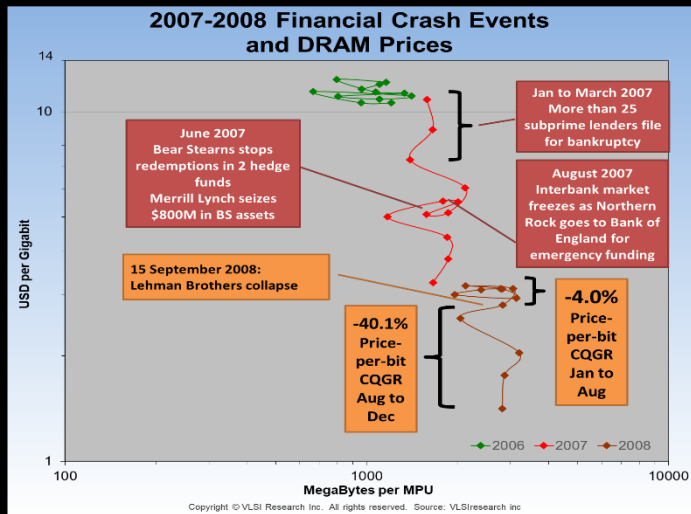
[Contact us to get the full report and more](#)

TechInsights



The DRAM crash of 2008

How the 2007-2008 financial crisis that led to the great recession ignited a crash in semiconductors. When it comes to semiconductor downturns, DRAMs are the canary in the coalmine. Here's how it tweeted out.



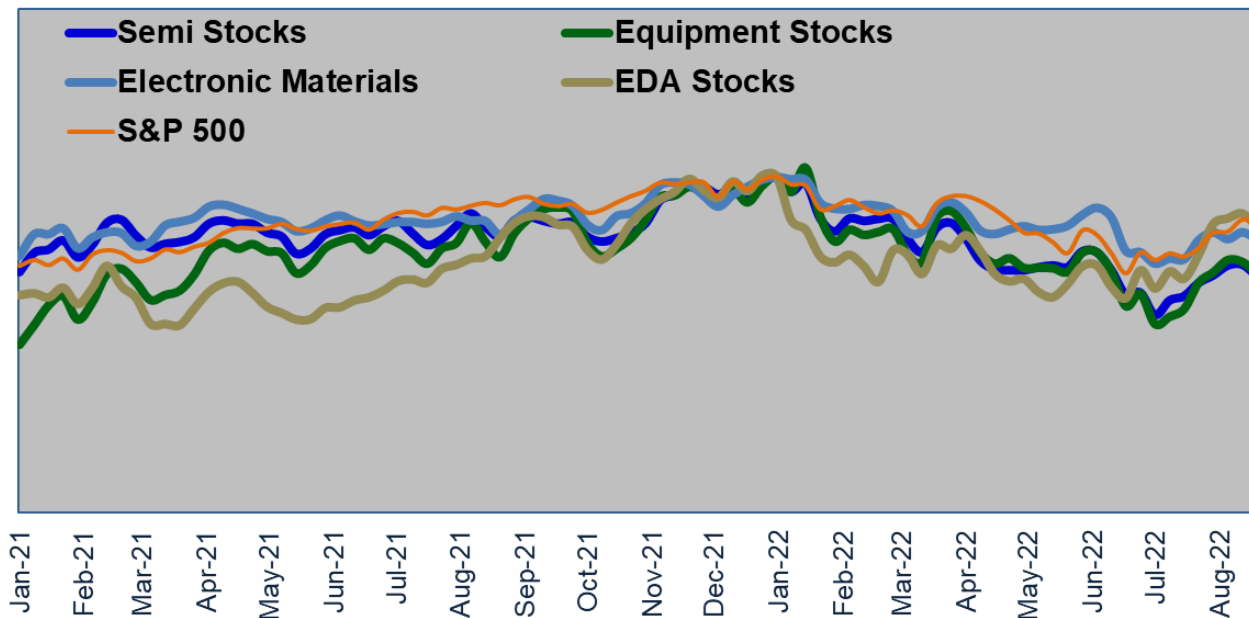
semiStockWEEK:

TechInsights' Semiconductor Stock Indices all fell this week along with the market.



Semiconductor Industry Stock Performance Indices

(Stock Prices Indexed to 100 in last week of 2021)



TechInsights' Stock Indices:

Semiconductors -3.6%
Equipment -3.3%
Electronic Materials -1.9%
EDA -3.6%

Semiconductor Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			8/19/2022		
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E
IDM			Fab-lite to Fabless		
Intel	-2.0%	10	AMD	-4.8%	21
Micron	-7.0%	10	Analog Devices	-6.3%	18
ON Semiconductor	1.9%	15	Broadcom	-1.8%	14
Samsung Electronics	1.2%	–	IBM	3.2%	13
SK hynix	3.3%		Infineon	-7.7%	14
STMicroelectronics	-5.3%	11	MagnaChip Semiconductor	-6.9%	10
Western Digital	-5.9%	9	MaxLinear	-4.8%	10
Foundry & OSAT			MediaTek	1.3%	–
Amkor	-3.6%	7	NVIDIA	-4.6%	30
ASE	-5.2%	7	Panasonic	-1.8%	12
GLOBALFOUNDRIES	-5.8%	27	Qualcomm	-2.4%	12
JCET	-6.4%	16	Silicon Laboratories	-6.0%	35
SkyWater Technology	17.4%	–	Skyworks	-4.7%	10
SMIC	-7.1%	11	Texas Instruments	-4.8%	21
TSMC	-4.0%	14			
UMC	-4.0%	7			

Above Avg

Top 4-6

Top 1-3

TechInsights' Semiconductor Stock Index fell this week, ending a six week run of gains, despite claiming four of the six top performing stocks. SkyWater Technology was this week's biggest winner buoyed by strong quarterly earnings.

IDM -2.0%
Foundry & OSAT -2.3%
Fabless & Fablite -3.7%

AMD AMD Analog Devices^{ADI} Amkor^{AMKR} ASE
ASX Broadcom^{AVGO} GLOBALFOUNDRIES^{GFS}
IBM IBM Infineon^{IFNNY.PK} Intel^{INTC}
JCET^{600584.SS} Micron Technology^{MU} On
Semiconductor^{ON} Panasonic^{PC} MagnaChip
Semiconductor^{MX} MaxLinear^{MXL}
MediaTek^{2454.TW} NVIDIA^{NVDA} Qualcomm^{QCOM}
Samsung Electronics^{005930.KS} Silicon
Laboratories^{SLAB} SkyWater Technology^{SKYT}
Skyworks^{SWKS} SMIC^{SMI} STMicroelectronics^{STM}
Texas Instruments^{TXN} TSMC^{TSM} UMC^{UMC}
Western Digital^{WDC}

Chip Equipment & Related Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			8/19/2022		
Equipment Stocks	Price Change	Forward P/E	Equipment Stocks	Price Change	Forward P/E
Wafer Fab:			Test:		
Applied Materials	-5.2%	13	Advantest	-0.5%	–
ASM International	-3.7%	23	Teradyne	-7.2%	16
ASML	-5.3%	28	FormFactor	-3.4%	19
KLA	-2.5%	17			
Lam Research	-8.1%	14	Assembly:		
Onto Innovation	-3.3%	–	BESI	-2.8%	–
Nikon	2.9%	–	Kulicke & Soffa	-5.2%	8
TEL	0.4%	–	ASM Pacific Technology	-3.1%	
Veeco Instruments	-3.0%	12			
			<div>Above Avg</div> <div>Top 4-6</div> <div>Top 1-3</div>		

TechInsights' Semiconductor Equipment Stock Index also fell this week, Nikon came out on top. Nikon and TEL were the only companies to end the week in positive territory.

WFE -3.1%

Test -3.7%

Assembly -3.7%

Applied Materials ^{AMAT} Advantest ^{ATEYY}
 ASM International ^{ASMIY}
 ASM Lithography ^{ASML} ASM Pacific ^{0522.HK}
 BE Semiconductor ^{BESIY.PK}
 FormFactor ^{FORM} KLA ^{KLAC}
 Kulicke & Soffa ^{KLIC} Lam Research ^{LRCX}
 Onto Innovation ^{ONTO} Nikon ⁷⁷³¹ Teradyne
 TER Tokyo Electron Limited ⁸⁰³⁵ Veeco
 VECO

Electronic Materials Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			8/19/2022		
EDA & Electronic Materials Stocks	Price Change	Forward P/E	EDA & Electronic Materials Stocks	Price Change	Forward P/E
EDA			DNP	-0.2%	—
Cadence	-0.4%	41	DuPont de Nemours	-3.5%	5
Synopsys	-5.8%	40	JSR	1.7%	—
Ansys	-4.6%	33	Shin-Etsu	-0.7%	—
Electronic Materials			SOITEC	-4.6%	—
BASF	-5.1%	2	Tokyo Ohka	-1.5%	—
Entegris	-1.6%	22			
			Above Avg	Top 4-6	Top 1-3

TechInsights' EDA Stock Index fell.

TechInsights' Electronic Materials Stock Index decreased this week with JSR coming out on top.

Ansys, Inc. ^{ANSS} BASF ^{BASFY}
 Entegris ^{ENTG} Cadence ^{CDNS} DNP ⁷⁹¹²
 DuPont ^{DD} JSR ⁴¹⁸⁵ Shin-Etsu ⁴⁰⁶³
 SOITEC ^{SOI.PA} Synopsys ^{SNPS} Tokyo
 Ohka ⁴¹⁸⁶

The Prior Week's Close	TechInsights' Indices of Chip Industry Stocks				Weekly Growth				Companies Up	Max Growth	Companies Down	Min Growth	Range of Growth	S&P 500	S&P 500 Growth
	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks							
14-Jan-22	98.5	102.0	99.3	87.4	2.0%	5.9%	-0.1%	-2.5%	36	23.7%	-20	-4.9%	28.6%	97.8	-0.3%
21-Jan-22	90.1	90.4	93.8	81.0	-8.5%	-11.4%	-5.6%	-7.3%	3	5.1%	-53	-20.3%	25.4%	92.3	-5.7%
28-Jan-22	87.1	84.5	92.4	79.7	-3.4%	-6.6%	-1.5%	-1.7%	11	5.0%	-45	-21.8%	26.8%	93.0	0.8%
04-Feb-22	90.2	87.3	92.3	81.5	3.5%	3.3%	-0.1%	2.3%	41	17.5%	-13	-4.3%	21.8%	94.4	1.6%
11-Feb-22	89.6	86.1	93.2	78.7	-0.7%	-1.4%	1.0%	-3.4%	20	10.6%	-33	-8.9%	19.5%	92.7	-1.8%
18-Feb-22	90.1	86.8	93.0	75.0	0.6%	0.8%	-0.2%	-4.7%	28	12.2%	-26	-7.0%	19.2%	91.2	-1.6%
25-Feb-22	90.1	87.5	91.9	82.5	0.0%	0.8%	-1.3%	9.9%	30	14.7%	-25	-9.5%	24.2%	92.0	0.8%
04-Mar-22	85.3	81.4	86.8	81.5	-5.3%	-6.9%	-5.5%	-1.2%	7	6.4%	-48	-18.6%	25.0%	90.8	-1.3%
11-Mar-22	82.1	79.7	87.1	76.9	-3.7%	-2.2%	0.3%	-5.7%	9	9.7%	-45	-11.1%	20.8%	88.2	-2.9%
18-Mar-22	87.9	90.3	92.7	83.7	7.1%	13.3%	6.5%	8.8%	53	31.3%	-2	-5.9%	37.2%	93.6	6.2%
25-Mar-22	89.1	91.8	94.0	82.9	1.3%	1.7%	1.3%	-0.9%	36	9.2%	-16	-5.5%	14.7%	95.3	1.8%
01-Apr-22	85.4	87.8	91.5	86.1	-4.2%	-4.3%	-2.6%	3.9%	5	5.0%	-50	-23.1%	28.1%	95.4	0.1%
08-Apr-22	80.1	81.9	87.1	82.3	-6.2%	-6.8%	-4.8%	-4.4%	2	5.5%	-53	-17.6%	23.1%	94.2	-1.3%
15-Apr-22	78.1	79.2	86.4	76.9	-2.5%	-3.3%	-0.9%	-6.6%	6	4.2%	-49	-10.9%	15.1%	92.2	-2.1%
22-Apr-22	77.8	80.5	87.4	75.2	-0.3%	1.6%	1.3%	-2.2%	30	9.3%	-25	-18.8%	28.1%	89.6	-2.8%
29-Apr-22	77.8	78.2	88.2	75.7	0.0%	-2.9%	0.9%	0.7%	22	21.1%	-32	-14.9%	36.0%	86.7	-3.3%
06-May-22	78.6	78.3	87.3	72.6	0.9%	0.1%	-1.0%	-4.1%	30	12.0%	-25	-11.7%	23.7%	86.5	-0.2%
13-May-22	79.0	78.1	87.5	71.4	0.5%	-0.1%	0.2%	-1.6%	28	8.2%	-25	-10.0%	18.2%	84.4	-2.4%
20-May-22	78.6	77.3	88.3	74.5	-0.5%	-1.1%	1.0%	4.3%	22	17.9%	-30	-7.7%	25.6%	81.9	-3.0%
27-May-22	82.3	81.9	90.9	78.7	4.8%	6.0%	2.9%	5.6%	48	30.3%	-7	-7.8%	38.1%	87.2	6.6%
03-Jun-22	82.1	82.0	92.6	78.9	-0.3%	0.1%	1.9%	0.3%	29	7.7%	-26	-4.6%	12.3%	86.2	-1.2%
10-Jun-22	77.8	77.3	90.3	73.8	-5.2%	-5.7%	-2.5%	-6.5%	6	9.7%	-49	-11.9%	21.6%	81.8	-5.1%
17-Jun-22	72.0	69.1	82.3	71.2	-7.5%	-10.6%	-8.9%	-3.6%	2	4.0%	-53	-17.3%	21.3%	77.1	-5.8%
24-Jun-22	72.5	72.1	82.0	77.8	0.8%	4.3%	-0.3%	9.3%	41	12.8%	-14	-19.4%	32.2%	82.1	6.4%
01-Jul-22	67.2	64.9	79.3	73.5	-7.3%	-10.1%	-3.3%	-5.6%	3	6.1%	-52	-20.1%	26.2%	80.3	-2.2%
08-Jul-22	70.7	66.6	80.5	77.5	5.2%	2.7%	1.5%	5.5%	47	20.5%	-7	-4.8%	25.3%	81.8	1.9%
15-Jul-22	71.7	68.5	80.3	75.8	1.4%	2.8%	-0.2%	-2.2%	32	10.1%	-21	-9.1%	19.2%	81.1	-0.9%
22-Jul-22	74.9	74.7	84.9	81.5	4.4%	9.1%	5.7%	7.5%	52	66.7%	-3	-8.3%	75.0%	83.1	2.5%
29-Jul-22	76.6	77.2	86.7	88.8	2.4%	3.3%	2.2%	9.0%	39	12.4%	-16	-9.9%	22.3%	86.7	4.3%
05-Aug-22	79.0	80.1	85.1	90.1	3.1%	3.8%	-1.9%	1.5%	47	33.8%	-8	-17.1%	50.9%	87.0	0.4%
12-Aug-22	79.2	79.6	86.8	91.2	0.3%	-0.6%	1.9%	1.3%	33	22.3%	-22	-17.4%	39.7%	89.8	3.3%
19-Aug-22	76.4	77.0	85.1	88.0	-3.6%	-3.3%	-1.9%	-3.6%	9	17.4%	-46	-8.1%	25.5%	88.7	-1.2%

Links to Conference Call Transcripts

August 19th

[Applied Materials, Inc.'s \(AMAT\) CEO Gary Dickerson on Q3 2022 Results - Earnings Call Transcript](#)

[Synopsys, Inc. \(SNPS\) CEO Aart de Geus on Q3 2022 Results - Earnings Call Transcript](#)

[Analog Devices Inc. \(ADI\) CEO Vincent Roche on Q3 2022 Results - Earnings Call Transcript](#)

[Agilent Technologies, Inc. \(A\) CEO Mike McMullen on Q3 2022 Results - Earnings Call Transcript](#)

[SkyWater Technology, Inc. \(SKYT\) CEO Thomas Sonderman on Q2 2022 Results - Earnings Call Transcript](#)

August 12th and before

[Magnachip Semiconductor Corporation \(MX\) CEO YJ Kim on Q2 2022 Results - Earnings Call Transcript](#)

[ACM Research, Inc. \(ACMR\) CEO David Wang on Q2 2022 Results - Earnings Call Transcript](#)

[Western Digital Corporation \(WDC\) CEO David Goeckeler on Q4 2022 Results - Earnings Call Transcript](#)

[Skyworks Solutions, Inc.'s \(SWKS\) CEO Liam Griffin on Q3 2022 Results - Earnings Call Transcript](#)

[Kulicke and Soffa Industries, Inc. \(KLIC\) CEO Fusen Chen on Q3 2022 Results - Earnings Call Transcript](#)

[Infineon Technologies AG \(IFNNY\) CEO Jochen Hanebeck on Q3 2022 Results - Earnings Call Transcript](#)

[Advanced Energy Industries, Inc. \(AEIS\) CEO Stephen Kelley on Q2 2022 Results - Earnings Call Transcript](#)

[Qorvo, Inc.'s \(QRVO\) CEO Bob Bruggeworth on Q1 2023 Results - Earnings Call Transcript](#)

[Microchip Technology Incorporated's \(MCHP\) CEO Ganesh Moorthy on Q1 2023 Results - Earnings Call Transcript](#)

[Advanced Micro Devices, Inc.'s \(AMD\) CEO Lisa Su on Q2 2022 Results - Earnings Call Transcript](#)

[Cirrus Logic, Inc.'s \(CRUS\) CEO John Forsyth on Q1 2023 Results - Earnings Call Transcript](#)

Links to Conference Call Transcripts

[Amkor Technology, Inc. \(AMKR\) CEO Giel Rutten on Q2 2022 Results - Earnings Call Transcript](#)

[ON Semiconductor Corporation's \(ON\) CEO Hassane El-Khoury on Q2 2022 Results - Earnings Call Transcript](#)

[SK Hynix, Inc.'s \(HXSCF\) Q2 2022 Results - Earnings Call Transcript](#)

[LG Electronics Inc.'s \(LGEAF\) Q2 2022 Results - Earnings Call Transcript](#)

[STMicroelectronics N.V. \(STM\) CEO Jean-Marc Chery on Q2 2022 Results - Earnings Call Transcript](#)

[ASE Technology Holding Co., Ltd. \(ASX\) Q2 2022 Results - Earnings Call Transcript](#)

[Cohu, Inc. \(COHU\) CEO Luis Müller on Q2 2022 Results - Earnings Call Transcript](#)

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