

# Semiconductor WEEK:

April 1, 2022

*An overview of results and conclusions from recent reports at TechInsights*

## Chip Market Research Services

***Still hot and green but distant macro clouds loom***

- Order activity for semiconductor equipment continued to trend lower, slipping half a point in the last week of March
- Fab Capacity Utilization by Wafer Size

## Semiconductor Analytics

**Last Week in the Semiconductor Market:**

Semiconductor sales slid 1% W/W in the 4th week of March. Sales remain well above 2021. The IC weather warmed up 1°F last week. Zooming in on semiconductor growth this week, 13-wk MA growth has been reverting to the mean for all segments after a tumultuous 2 years. DRAM is fastest, followed by NAND, A&P, Logic, and Auto. Chip sales will approach \$0.7T in 2022, up 14%.

TechInsights' IC Supply/Demand indices were mixed last week. DRAM eased to Balanced, Moore Foundry rose to Shortage and More than Moore Foundry went to Tight. There were signs that COVID lockdowns in China are starting to disrupt parts of the supply chain. Electronics' Retail Price MAs are rolling over on weakness in PCs, Smartphones, and Consumer.

## Chip History Center

**Time Line: Applied Materials - AME 8100 Batch Etcher:** The blockbuster that remapped the etch market ushering in the modern era of etching.

**Exhibits: Nikon - 25 Years of Innovation:** Traces the history of Nikon Steppers ending with early feasibility work on immersion.

## The Chip Insider

**Strategy and Tactics:** Intel's radical Post-Global National Mesh strategy

**Semiconductor Manufacturing:** Foundry & IDM Capital Expenditures

## **Semiconductor Stocks**

- *TechInsights' Semiconductor Stock Indices decreased this week while the market eked out a gain*
- *Semiconductor Stock Index fell*
- *Semiconductor Equipment Stock Index fell*
- *EDA Stock Index was led up by Synopsys, Cadence, and Ansys*
- *Electronics Materials Stock Index decreased*
- *Hottest Stocks: Synopsys, Cadence, Ansys, SMIC, BASF, and Analog Devices*

**TechInsights**

# The Chip Insider<sup>®</sup>'s Graphics File

**March 2022**

*Still hot and green but distant  
macro clouds loom*



- Order activity for semiconductor equipment continued to trend lower, slipping half a point in the last week of March
- The slight pullback in the last five weeks has been driven primarily by the memory segment
- TechInsights' Chip Price Performance Index declined again

Forecast as of March 2022:	2021	2022
<b>Semi Equipment (\$B):</b>	<b>\$ 124.0</b>	<b>\$ 149.2</b>
Sequential Change	34.2%	20.3%
<b>Capacity Utilization:</b>	97.2%	96.9%
<b>ICs (\$B):</b>	<b>\$ 492.3</b>	<b>\$ 568.2</b>
Sequential Change	27.4%	15.4%
<b>IC Units (BU):</b>	394.2	439.0
Sequential Change	23.7%	11.4%
<b>Electronics (\$B) :</b>	<b>\$ 2,574</b>	<b>\$ 2,758</b>
Sequential Change	18.9%	7.1%

[Contact us to access more details](#)

**TechInsights**

## 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.

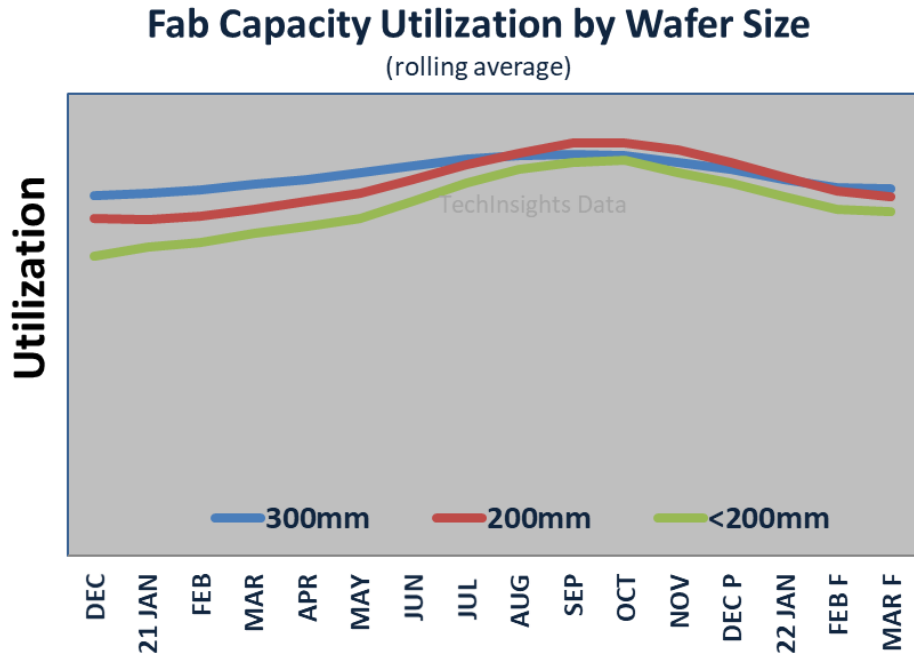
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# The Chip Insider<sup>®</sup> Graphics

## Capacity Utilization by Wafer Size:

- Utilization rates remain high across the board

**Fab Capacity Utilization by Wafer Size:** Chart gives rolling averages for 300mm, 200mm, and smaller silicon wafers



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# Semiconductor Analytics

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TechInsights' IC Supply/Demand indices were mixed last week. DRAM eased to Balanced, Moore Foundry rose to Shortage and More than Moore Foundry went to Tight. There were signs that COVID lockdowns in China are starting to disrupt parts of the supply chain. Electronics' Retail Price MAs are rolling over on weakness in PCs, Smartphones, and Consumer.

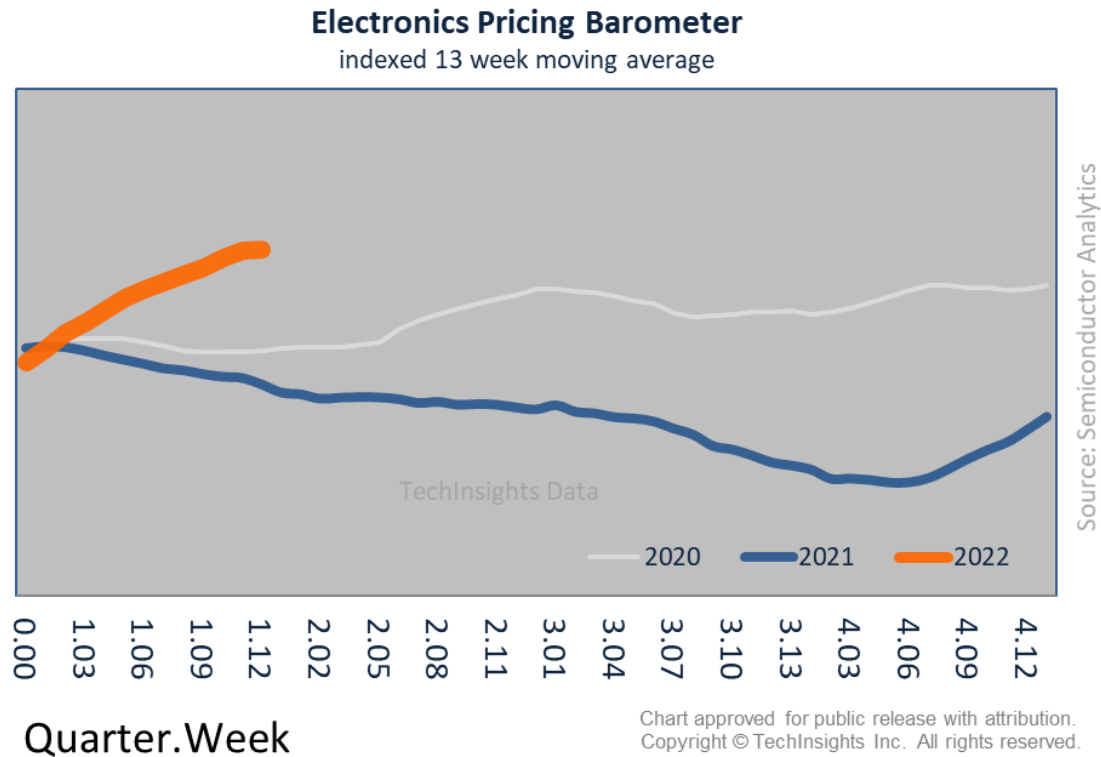


1: Measures Order Activity 2: Measures Pricing Power

# Electronics Retail Pricing Trends:

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

Electronics' Retail Price  
MAs are rolling over on  
weakness in PCs,  
Smartphones, and  
Consumer.



## Innovation in Memory ...

with Scott DeBoer of Micron  
Technology



## What the conversation is about:

- Scott DeBoer of Micron Technology has a conversation with Dan Hutcheson about what it takes to innovate in Memory today. Scott leads Micron's global technology development and engineering efforts – from silicon design to high-value system solutions.

[Click here to watch online](#) or on the weVISION button in VLSI's mobile app

# The Chip Insider®

## Strategy & Tactics



**Strategy and Tactics:** Intel's radical Post-Global National Mesh strategy.

### Summaries:

**Intel's radically new Post-Global manufacturing strategy:** By now I'm sure everyone has heard about Intel's new manufacturing "epicenter" in the EU. There is a lot of hidden meaning in Intel's particular choice of that word: The seismic definition of an epicenter is the surface point above the underground hypocenter of an energy release that creates an earthquake. So in futuristic terms, Intel's definition might mean the hypocenter is located at TMG in Oregon, where they expect an earthquake to come from reaching technology parity in 2025. In present terms, Intel's use of the term could point to the hypocenter being located in Taiwan, where the earthquake came from the 2021 chip shortage that crippled the global industrial economy with major political fallout around the world. The aftershock of that quake led to a quest for technology sovereignty in many regions and ultimately to Intel's groundbreaking – literally and figuratively – deals in Ohio and the EU.

What Intel did with the EC is far bigger than the 'just another fab' reception the media appeared to give to it. My sense is that in the future, this reception may be seen as indicative of the media's vision to the appearance of the Transistor on page 46 of the 1 July 1948 section

called "News of the Radio." Or possibly, Gordon's 'Moore's Law' paper in 1965 on page 114 of Electronics magazine. One proof of how hard it is to comprehend visionaries in the present is that Moore's Law still exists while Electronics magazine does not. I may be wrong, but I believe what Pat Gelsinger unleashed on 15 March will be remembered as far more than 'just another fab...'

What one can see when this is mapped out is that chip making strategy has evolved dramatically to deal with the transition from worldwide market availability that was apolitically globalized to major pockets of political nationalization. This requires a major revamp of go-to market strategy. Intel National Mesh strategy has clearly put it in the lead as exemplified by its getting the sitting presidents of the European Commission and the United States involved in its press conferences this year. That's never happened before and it's not like they didn't have anything else to do.

*"Intelligence is quickness in seeing things as they are"*

— George Santayana

*"Strategy requires a sense of the whole that reveals the significance of respective parts."*

— John Lewis Gaddis

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# THE CHIP HISTORY CENTER

The Virtual Museum of Semiconductors

Section

Search...



www.chiphistory.org

## Time Line: Applied Materials - AME 8100 Batch Etcher:

The blockbuster that remapped the etch market ushering in the modern era of etching. Applied celebrated its 50<sup>th</sup> anniversary in 2017.

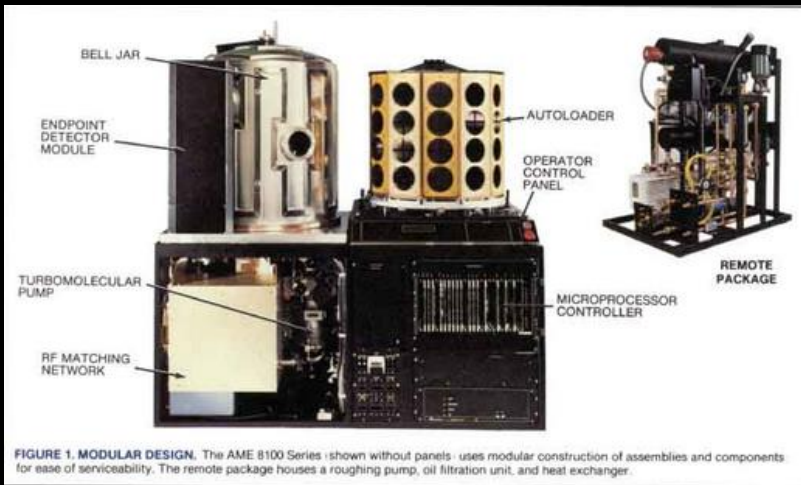


FIGURE 1. MODULAR DESIGN. The AME 8100 Series (shown without panels) uses modular construction of assemblies and components for ease of serviceability. The remote package houses a roughing pump, oil filtration unit, and heat exchanger.

Exhibits: Nikon - 25 Years of Innovation: Traces the history of Nikon Steppers ending with early feasibility work on immersion. Nikon celebrated its 100<sup>th</sup> anniversary in 2017.



Nikon's first stepper: NSR-1010G

Supporters:

ADVANTEST

APPLIED MATERIALS  
make possible

ASE Technology  
Holding Co., Ltd.

exyte

intel

KLA  
Keep Looking Ahead

semi

VLSIresearch  
Intelligence to make better decisions faster

# The Chip Insider®

## *Semiconductor Manufacturing*



### Foundry & IDM Capital Expenditures

- Changes Since Last Forecast
- Company Focus
- Advanced Logic & Foundry
- DRAM & NAND
- Semiconductor Manufacturing CapEx
- VLSI's View

WildPhotons: Never let life's hardships to...



# Company Focus

*Spending is increasing in 2022 as chipmakers bring more capacity online to meet end demand*

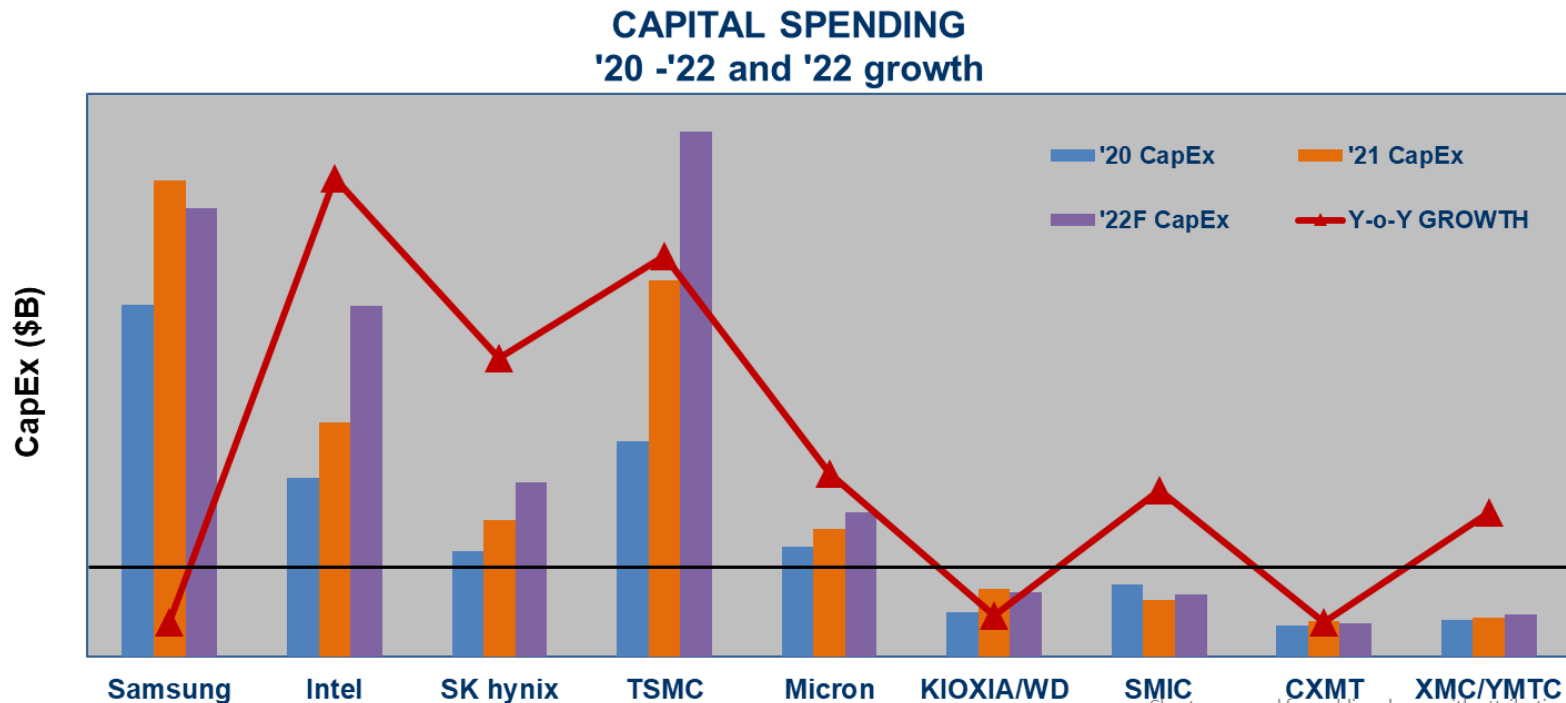


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## Memory Market Forecast 2022...

with Jim Handy of Objective Analysis



### What the conversation is about:

- In this video conversation, Dan talks with Jim about how 2021 unfolded, how it was different, and what he expects will happen in the markets for DRAM and NAND in 2022. Jim has been one of our most popular guests and is one of the most respected memory analysts in the world.

[Click here to watch online](#) or on the weVISION button in VLSI's mobile app

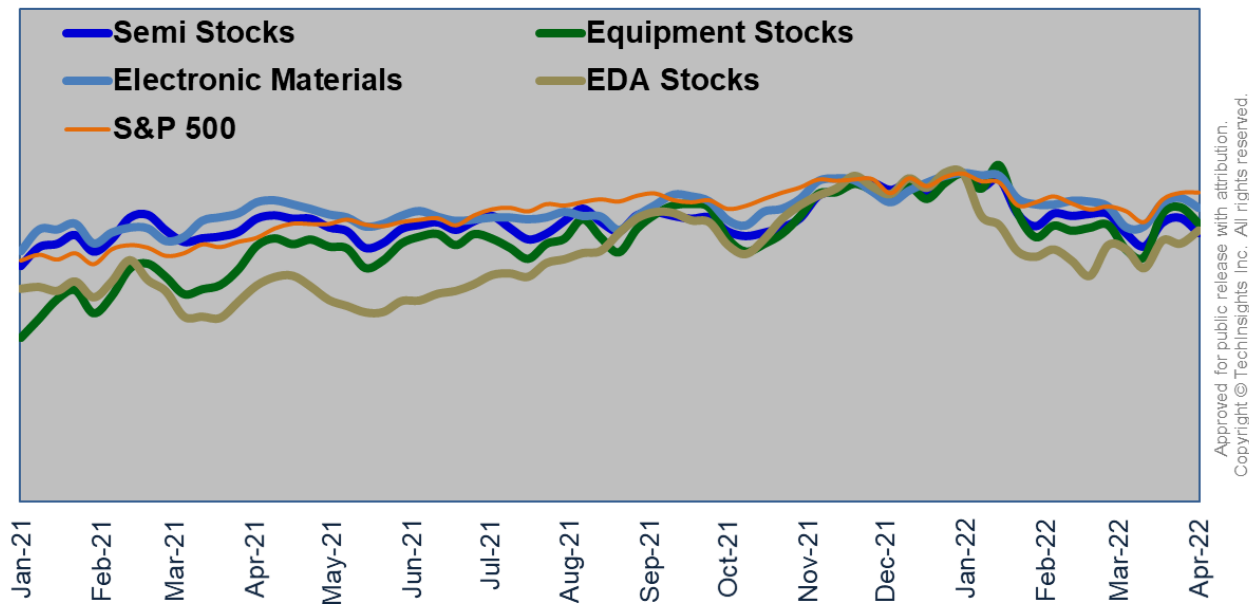
# semiStockWEEK:

*TechInsights' Semiconductor Stock Indices decreased this week while the market eked out a gain.*



## Semiconductor Industry Stock Performance Indices

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



### TechInsights' Stock Indices:

Semiconductors -4.2%  
Equipment -4.3%  
Electronic Materials -2.6%  
EDA +3.9%



# Semiconductor Stocks:

## Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			4/1/2022		
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E
<b>IDM</b>			<b>Fab-lite to Fabless</b>		
Intel	-7.2%	14	AMD	-9.6%	26
Micron	-2.5%	6	Analog Devices	-0.2%	18
ON Semiconductor	-6.6%	14	Broadcom	-0.3%	16
Samsung Electronics	-1.0%	—	IBM	-1.0%	12
SK hynix	-1.7%		Infineon	-2.3%	15
STMicroelectronics	-3.9%	13	MagnaChip Semiconductor	-3.4%	12
Western Digital	-4.8%	6	MaxLinear	-10.9%	16
<b>Foundry &amp; OSAT</b>			MediaTek	-7.3%	—
Amkor	-10.9%	9	NVIDIA	-3.5%	41
ASE	-5.1%	10	Panasonic	-2.9%	9
GLOBALFOUNDRIES	-23.1%	29	Qualcomm	-7.0%	13
JCET	-3.0%	15	Silicon Laboratories	-2.1%	45
SkyWater Technology	-6.2%	—	Skyworks	-4.3%	11
SMIC	1.1%	11	Texas Instruments	-1.5%	20
TSMC	-3.6%	17			
UMC	-6.7%	10			

Above Avg

Top 4-6

Top 1-3

**TechInsights' Semiconductor Stock Index** fell this week with SMIC being the only company to finish in positive territory. Analog Devices was also a top performer claiming one of top six stock spots this week.

IDM -4.0%

Foundry & OSAT -7.2%

Fabless & Fabless -4.0%

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

# Chip Equipment & Related Stocks:

## Weekly Growth and Forward P/E Ratios by Company

**TechInsights' Semiconductor Equipment Stock Index** fell this week. Nikon, Advantest, ASM Pacific Technology, KLA, ASM International, ASML, Tokyo Electron, and FormFactor all performed above the weekly average.

WFE -4.0%  
Test -3.7%  
Assembly -5.8%

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

Weekly Gains			4/1/2022		
Equipment Stocks	Price Change	Forward P/E	Equipment Stocks	Price Change	Forward P/E
<b>Wafer Fab:</b>			<b>Test:</b>		
Applied Materials	-7.0%	15	Advantest	-1.3%	—
ASM International	-2.4%	26	Teradyne	-6.2%	18
ASML	-2.9%	31	FormFactor	-3.5%	21
KLA	-1.7%	15			
Lam Research	-5.3%	14	<b>Assembly:</b>		
Onto Innovation	-4.0%	—	BESI	-6.7%	—
Nikon	-1.1%	—	Kulicke & Soffa	-9.1%	10
TEL	-2.9%	—	ASM Pacific Technology	-1.6%	
Veeco Instruments	-8.6%	15			

Above Avg Top 4-6 Top 1-3

# Electronic Materials Stocks:

## Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			4/1/2022		
EDA & Electronic Materials Stocks	Price Change	Forward P/E	EDA & Electronic Materials Stocks	Price Change	Forward P/E
<b>EDA</b>			DNP	-4.5%	—
Cadence	4.3%	37	DuPont de Nemours	-3.1%	5
Synopsys	5.0%	35	JSR	-3.7%	—
Ansys	2.4%	35	Shin-Etsu	-2.2%	—
<b>Electronic Materials</b>			SOITEC	-2.5%	—
BASF	0.6%	2	Tokyo Ohka	-2.7%	—
CMC Materials	-2.6%	22			
			Above Avg	Top 4-6	Top 1-3

**TechInsights' EDA Stock Index** was led up by Synopsys, Cadence, and Ansys who were this week's top performers.

**TechInsights' Electronic Materials Stock Index** decreased this week, BASF came out on top.

Ansys, Inc. <sup>ANSS</sup> BASF <sup>BASFY</sup>  
 CMC Materials <sup>CCMP</sup> Cadence <sup>CDNS</sup>  
 DNP <sup>7912</sup> DuPont <sup>DD</sup> JSR <sup>4185</sup>  
 Shin-Etsu <sup>4063</sup> SOITEC <sup>SOI.PA</sup>  
 Synopsys <sup>SNPS</sup> Tokyo Ohka <sup>4186</sup>

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							
27-Aug-21	89.7	86.6	89.6	89.0	4.5%	7.1%	4.0%	4.2%	52	36.9%	-2	-4.3%	41.2%	94.6	1.5%
03-Sep-21	90.5	90.0	92.2	90.6	0.8%	4.0%	2.9%	1.7%	33	23.7%	-21	-6.0%	29.7%	95.2	0.6%
10-Sep-21	89.6	92.2	94.7	90.4	-1.0%	2.4%	2.7%	-0.2%	24	11.4%	-29	-8.1%	19.5%	93.5	-1.7%
17-Sep-21	88.9	92.6	94.3	88.6	-0.8%	0.4%	-0.4%	-2.0%	23	5.5%	-30	-6.8%	12.3%	93.0	-0.6%
24-Sep-21	89.2	91.7	93.1	88.1	0.3%	-1.0%	-1.3%	-0.5%	22	5.8%	-30	-5.2%	11.0%	93.5	0.5%
01-Oct-21	85.8	84.2	88.6	82.6	-3.8%	-8.2%	-4.8%	-6.2%	6	4.3%	-48	-14.7%	19.0%	91.4	-2.2%
08-Oct-21	84.7	81.0	87.3	80.3	-1.4%	-3.8%	-1.5%	-2.8%	15	2.9%	-39	-14.3%	17.2%	92.1	0.8%
15-Oct-21	85.5	82.8	90.6	83.9	1.0%	2.2%	3.8%	4.4%	39	8.1%	-14	-11.8%	19.9%	93.8	1.8%
22-Oct-21	86.8	85.3	91.3	88.9	1.5%	3.0%	0.8%	5.9%	40	15.7%	-14	-11.6%	27.3%	95.4	1.6%
29-Oct-21	89.0	89.6	93.7	92.2	2.6%	5.0%	2.6%	3.8%	38	24.6%	-16	-8.3%	32.9%	96.6	1.3%
05-Nov-21	94.4	95.0	98.0	94.6	6.1%	6.1%	4.6%	2.5%	45	30.5%	-8	-29.8%	60.3%	98.6	2.0%
12-Nov-21	95.9	95.5	98.7	96.4	1.5%	0.4%	0.7%	1.9%	31	8.5%	-16	-12.1%	20.6%	98.3	-0.3%
19-Nov-21	98.3	97.5	98.2	99.4	2.6%	2.1%	-0.4%	3.2%	39	12.2%	-16	-16.8%	29.0%	98.6	0.3%
26-Nov-21	97.7	96.0	95.5	96.8	-0.6%	-1.6%	-2.8%	-2.7%	16	11.8%	-39	-9.6%	21.4%	98.6	0.1%
03-Dec-21	95.9	94.5	92.9	95.0	-1.9%	-1.6%	-2.7%	-1.9%	12	6.0%	-44	-11.1%	17.1%	95.2	-3.5%
10-Dec-21	97.5	96.9	95.7	98.8	1.6%	2.6%	3.0%	4.0%	40	13.2%	-15	-7.5%	20.7%	98.9	3.8%
17-Dec-21	94.7	93.8	97.7	96.5	-2.9%	-3.2%	2.1%	-2.3%	12	25.6%	-43	-15.6%	41.2%	96.9	-1.9%
24-Dec-21	98.6	97.7	99.3	100.2	4.1%	4.2%	1.7%	3.8%	50	13.8%	-6	-2.8%	16.6%	99.2	2.3%
31-Dec-21	100.0	100.0	100.0	100.0	1.5%	2.3%	0.7%	-0.2%	44	8.1%	-11	-2.7%	10.8%	100.0	0.9%
07-Jan-22	96.6	96.3	99.4	89.7	-3.4%	-3.7%	-0.6%	-10.3%	10	7.4%	-45	-17.5%	24.9%	98.1	-1.9%
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%

# Links to Conference Call Transcripts

April 1<sup>st</sup>

None this week.

March 25<sup>th</sup> and before

[Western Digital Corporation \(WDC\) Presents at Morgan Stanley 2022 Technology, Media & Telecom Conference \(Transcript\)](#)

[Cisco Systems, Inc. \(CSCO\) Management Presents at Morgan Stanley Technology, Media and Telecom Conference 2022 Transcript](#)

[International Business Machines Corporation \(IBM\) Management Presents at Morgan Stanley Technology, Media and Telecom Brokers Conference 2022 \[Transcript\]](#)

[Texas Instruments Incorporated \(TXN\) CEO Rich Templeton Presents at Morgan Stanley 2022 Technology, Media & Telecom Conference \(Transcript\)](#)

[IDT Corporation \(IDT\) CEO Shmuel Jonas on Q2 2022 Results - Earnings Call Transcript](#)

[Lam Research Corporation's \(LRCX\) Management Presents at Morgan Stanley Technology, Media and Telecom Conference 2022 \(Transcript\)](#)

[NXP Semiconductors N.V. \(NXPI\) Presents at Morgan Stanley Tech Conference, San Francisco Conference \(Transcript\)](#)

[Intel Corporation \(INTC\) CEO Patrick Gelsinger Presents at Morgan Stanley Technology, Media and Telecom Conference 2022 \(Transcript\)](#)

[NVIDIA Corporation \(NVDA\) Presents at Morgan Stanley 2022 Technology, Media and Telecom Conference \(Transcript\)](#)



# Links to Conference Call Transcripts

[Thermo Fisher Scientific Inc. \(TMO\) CEO Marc Casper on 42nd Annual Cowen Health Care Conference \(Transcript\)](#)  
[Qorvo \(QRVO\) CEO, Bob Bruggeworth Presents at Raymond James 43rd Annual Institutional Investors Conference - Company Call Transcript](#)  
[Broadcom's \(AVGO\) CEO Hock Tan on Q1 2022 Results - Earnings Call Transcript](#)  
[VAT Group AG \(VACNY\) CEO Mike Allison on Q4 2021 Results - Earnings Call Transcript](#)  
[Dell Technologies Inc. \(DELL\) Management on Q4 2022 Results - Earnings Call Transcript](#)  
[AIXTRON SE \(AIXXF\) CEO Felix Grawert on Q4 2021 Results - Earnings Call Transcript](#)  
[ChipMOS TECHNOLOGIES INC. \(IMOS\) Q4 2021 Results - Earnings Call Transcript](#)  
[ASM International NV \(ASMIY\) CEO Benjamin Loh on Q4 2021 Results - Earnings Call Transcript](#)  
[SkyWater Technology, Inc. \(SKYT\) CEO Thomas Sonderman on Q4 2021 Results - Earnings Call Transcript](#)  
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