## Semiconductor WEEK:

## April 8, 2022

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

#### Chip Market Research Services

#### All eyes are focused on the supply chain

- Order activity for semiconductor equipment leveled off at a hot 113 degrees following three weeks of slight declines
- Capacity Utilization by Node

#### Semiconductor Analytics

Last Week in the Semiconductor Market:

Semiconductor sales rose 5% W/W in the last week of March. Sales remain well above 2021. The IC weather cooled 4°F last week.

TechInsights' IC Supply/Demand indices remained in Shortage conditions. More Moore Foundry eased to Tight and More than Moore Foundry to Balanced. 1Q22 ended the quarter in Tight conditions with OSAT tightening to Shortage. Zooming in on DRAM growth this week, 13-wk MA growth has been slowing, from record levels, the last 4 weeks though remains well above 2020 levels. Growth is forecast to continue slowing and finish 2022 around +16% Y/Y, reaching \$111B.

Electronics' Retail Price MAs are flat.

#### **Chip History Center**

**People: Alex d'Arbeloff** on Teradyne's history and the lessons he learned from co-founding and leading this legendary company **People: Kumud Srinivasan**, Director of Fab Automation, discusses the status of Semiconductor Fab Automation at Intel in this 2004 interview.

#### The Chip Insider

**Strategy and Tactics:** Why governments became so concerned about Semiconductor Self-Sufficiency

#### **Semiconductor Stocks**

- TechInsights' Semiconductor Stock Indices plunged further this
  week
  - Nikon and SMIC were the only companies to finish out the week in positive territory
  - Semiconductor Stock Index plummeted
- Semiconductor Equipment Stock Index plummeted
  - Nikon was this week's top performer
- EDA Stock Index sunk
- Electronics Materials Stock Index sunk
- Hottest Stocks: Nikon, SMIC, JSR, IBM, Samsung, and Intel

## The Chip Insider®'s Graphics File





#### All eyes are focused on the supply chain

- Order activity for semiconductor equipment leveled off at a hot 113 degrees following three weeks of slight declines
- Equipment suppliers are very optimistic about 2022 from the demand perspective
- TechInsights' Chip Price Performance Index declined at a slower rate

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

### **TechInsights**



#### Contact us to access more details

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weVISION Interview:

### 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 or on the weVISION button in VLSI's mobile app

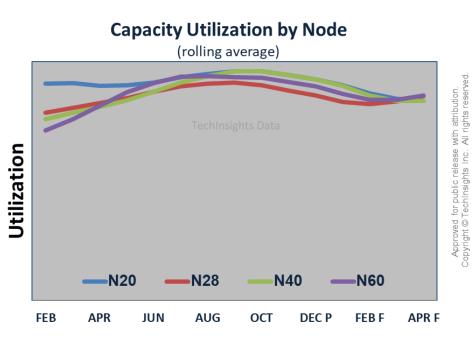


## The Chip Insider® Graphics

# Capacity Utilization by Node:

 Utilization rates remain at high levels

Fab Capacity Utilization by Node:chart gives rolling averagesfor 20nm 22nm 28nm 32nm 40nm 45nm 60nm 65nm and larger



## Semiconductor Analytics

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Zooming in on DRAM growth this week, 13wk MA growth has been slowing, from record levels, the last 4 weeks though remains well above 2020 levels. Growth is forecast to continue slowing and finish 2022 around +16% Y/Y, reaching \$111B. Electronics' Retail Price MAs are flat.





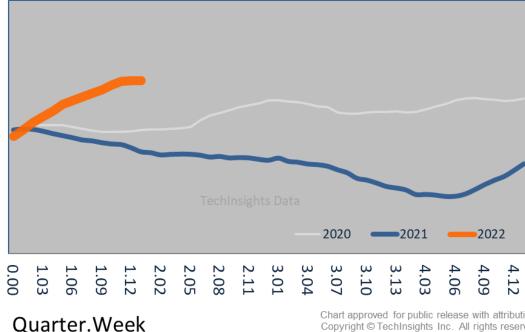
1: Measures Order Activity 2: Measures Pricing Power

## **Electronics Retail Pricing Trends:**

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

**Electronics Pricing Barometer** 

indexed 13 week moving average



### **Electronics' Retail Price** MAs are flat

Chart approved for public release with attribution Copyright © TechInsights Inc. All rights reserved.

**TechInsights** 

Source: Semiconductor Analytics

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8 April 2022

#### weVISION Interview:

## 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:** Why governments became so concerned about Semiconductor Self-Sufficiency

#### <u>Summaries:</u>

Why governments became so concerned about Semiconductor Self-Sufficiency: When the world's economy was globalized, the resulting fragmentation of the semiconductor supply chain as it chased hyper-coherent efficiency was of no concern... In the 1980s, Japan had displaced the U.S. and was the largest producer of semiconductors. In the 1990s, the U.S. would re-emerge like a phoenix from the ashes – the ashes made from the abandoned wafer fabs as EDA cleanly separated design from manufacturing. This led to the rise of Taiwan and the fabless/foundry business model. Everything was going nicely until 'Made in China 2025' was published, marking its government's concern about Semiconductor Self-Sufficiency... then COVID disrupted global supply chains in 2020 and the great semiconductor shortage came in 2021 which it the concern of most governments.

Now many ask the simple question of why does an industry that's largely cash-flow positive even in downturns need government support? ... the top merchant semiconductor companies, with the

exception of Samsung and SK Hynix are all American. You might loolin at the 43% share held by these U.S. based companies hold of the global market and see why China and Europe are so worried, but not the U.S. This is only the merchant companies that sell their semiconductors on the open market to makers of electronics products... Add the hypervertical whale named Apple ... and it takes the U.S. share to 52% ... you have to ask: Why is the U.S. so worried? ... But what about TSMC? Shouldn't they up there in the list too? ... not to mention the other the foundries. Now that's a very complex question because TSMC is not really a semiconductor company. It is a supplier to semiconductor companies. It sees every company on the list above as a customer ... and not a competitor... TSMC's real size – in the end market revenues its customers bring in - is \$142B. That takes them to the top of the list with a 24% relevant share of the semiconductor market. What the U.S. government is and should be - so concerned about is that more than half of its semiconductor leadership is at risk should something happen to those foundries...

### "A good plan, violently executed now is better than a perfect plan tomorrow"

- General George S. Patton



#### Contact us to get the full report and more

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#### The Chip History Center

The Virtual Museum of Semiconductors



**People**: Alex d'Arbeloff on Teradyne's history and the lessons he learned from cofounding and leading this legendary company. In his discussion of Nick DeWolf's business model, you'll find lots of the fundamental aspects to starting a business hasn't changed. You'll also find out



ashy,ell as how successful start-ups ups are about more than innovation. Alex appears in 3 videos cover <u>Teradyne's Early</u> <u>Days</u>, <u>Teradyne's Rise</u>, and in Lessons Learned he covers his <u>Essential rules for running a semiconductor equipment</u> <u>company</u> **People:** Kumud Srinivasan, Director of Fab Automation, discusses the status of <u>Semiconductor Fab Automation</u> <u>at Intel</u> in this 2004 interview. Find out where Intel was at the time and what it saw ahead in fab automation. At the time, 300mm wafer sizes had just come into vogue

andthe industry was about to make the jump from Microchips to Nanochips as it moved scale from microns to nanometers.















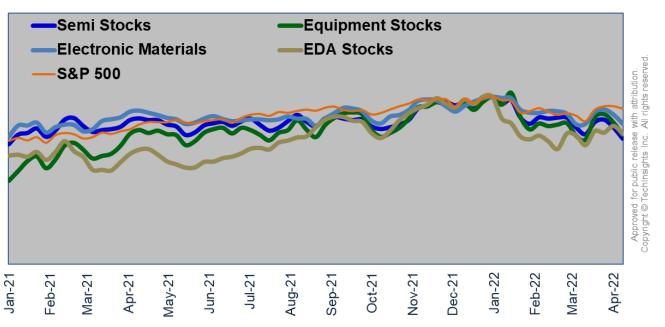


## semiStockWEEK: TechInsights' Semiconductor Stock Indices plunged further

this week, Nikon and SMIC were the only companies to finish out the week in positive territory.

#### Semiconductor Industry Stock Performance Indices

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



#### TechInsights' Stock Indices:

Semiconductors -6.2% Equipment -6.8% Electronic Materials -4.8% EDA -4.4%





#### weVISION Interview:

### 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.

<u>Click here to watch online</u> or on the weVISION button in VLSI's mobile app



## Semiconductor Stocks: Weekly Growth and Forward P/E Ratios by Company

Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E	
IDM			Fab-lite to Fabless			
Intel	-2.3%	13	AMD	-6.6%	23	
Micron	-5.3%	6	Analog Devices	-4.0%	18	
ON Semiconductor	-11.6%	13	Broadcom	-6.4%	16	
Samsung Electronics	-1.9%	-	IBM	-1.8%	12	
SK hynix	-3.4%		Infineon	-11.8%	15	
STMicroelectronics	-11.6%	12	MagnaChip Semiconductor	-5.1%	11	
Western Digital	-2.5%	5	MaxLinear	-17.5%	14	
Foundry & OSAT			MediaTek	-6.7%	_	
Amkor	-10.6%	8	NVIDIA	-13.5%	39	
ASE	-3.1%	9	Panasonic	-5.7%	9	
GLOBALFOUNDRIES	-9.9%	22	Qualcomm	-7.0%	12	
JCET	-2.7%	13	Silicon Laboratories	-8.0%	44	
SkyWater Technology	-17.6%	_	Skyworks	-7.4%	10	
SMIC	0.6%	11	Texas Instruments	-4.4%	19	
TSMC	-3.4%	16				
UMC	-4.2%	9				

#### **TechInsights' Semiconductor Stock**

**Index** plummeted this week, SMIC came out on top for the second consecutive week followed by IBM, Samsung, and Intel. SMIC has been able to keep their factories open during the lockdown by having workers live onsite and testing regularly.

IDM -5.5% Foundry & OSAT -6.4% Fabless & Fablite -7.6%

AMD AMD Analog Devices<sup>ADI</sup> Amkor<sup>AMKR</sup> ASE <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>STMicroelectronics</sup> Western Digital WDC

## Chip Equipment & Related Stocks: Weekly Growth and Forward P/E Ratios by Company

Weekly Gains											
Equipment Stocks	Price Change	Forward P/E	Equipment Stocks		Price nange	Forward P/E					
Wafer Fab:			Test:								
Applied Materials	-5.8%	14	Advantest	-7	7.9%	_					
ASM International	-8.5%	25	Teradyne	-(	6.6%	17					
ASML	-8.5%	30	FormFactor	-1	2.1%	21					
KLA	-5.3%	15									
Lam Research	-6.4%	14	Assembly:								
Onto Innovation	-14.4%	_	BESI	-1	4.5%	_					
Nikon	5.5%	_	Kulicke & Soffa		5.1%	9					
TEL	-10.2%	_	ASM Pacific Technology	-2	2.8%						
Veeco Instruments	-4.2%	14									
				Above Avg	Top 4-6	Top 1-3					

**TechInsights' Semiconductor Equipment Stock Index** plummeted this week, Nikon was this week's top performer. Nikon announced plans to repurchase shares which is driving up the value of their stock.

WFE -6.4% Test -8.9% Assembly -7.5%

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 4/8/20											
EDA & Electronic Materials Stocks	Price Change Forward P/E EDA & Electronic Materials Store				ice ange	Forward P/E					
EDA			DNP	-4.	4%	_					
Cadence	-4.5%	39	DuPont de Nemours	-7.	9%	5					
Synopsys	-4.5%	37	JSR	-1.	4%	_					
Ansys	-4.2%	36	Shin-Etsu	-5.	8%	-					
Electronic Materials			SOITEC		0%	_					
BASF	-3.3%	2	Tokyo Ohka	-5.	3%	-					
CMC Materials	-4.2%	22									
			Abo	ove Avg	Top 4-	6 Top 1-3					

TechInsights' EDA Stock Index sunk.

**TechInsights' Electronic Materials Stock Index** sunk, JSR decreased the least making them one of the top performers this week.

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	TechInsights' Indices of Chip Industry Stocks				Weekly Growth			panies Up Growth	owth	n n	wth	e of th	500	₽ 0	
Week's Close	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks	Semi Stocks	Equipment Stocks	Materials Stocks	EDA Stocks	Companies Up	Max Gro	Companies Down	Min Growth	Range of Growth	S&P 5	S&P 500 Growth
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%
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%

## Links to **Conference Call** Transcripts

April 8<sup>th</sup>

None this week

April 1<sup>st</sup> and before

<u>Western Digital Corporation (WDC) Presents at Morgan Stanley 2022 Technology, Media & Telecom Conference</u> (Transcript)

<u>Cisco Systems, Inc. (CSCO) Management Presents at Morgan Stanley Technology, Media and Telecom Conference 2022</u> <u>Transcript</u>

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

<u>Texas Instruments Incorporated (TXN) CEO Rich Templeton Presents at Morgan Stanley 2022 Technology, Media &</u> <u>Telecom Conference (Transcript)</u>

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 Lenovo Group Limited (LNVGY) CEO Yang Yuanging On Q3 2022 Results - Earnings Call Transcript ASM Pacific Technology Limited (ASMVF) CEO Robin Gerard Ng on Q4 2021 Results - Earnings Call Transcript Agilent Technologies, Inc.'s (A) CEO Mike McMullen on Q1 2022 Results - Earnings Call Transcript BE Semiconductor Industries N.V. (BESIY) CEO Richard Blickman on Q4 2021 Results - Earnings Call Transcript Keysight Technologies, Inc. (KEYS) CEO Ronald Nersesian on Q1 2022 Results - Earnings Call Transcript NVIDIA Corporation's (NVDA) CEO Jensen Huang on Q4 2022 Results - Earnings Call Transcript Magnachip Semiconductor Corporation (MX) CEO YJ Kim on Q4 2021 Results - Earnings Call Transcript Synopsys, Inc. (SNPS) CEO Aart de Geus on Q1 2022 Results - Earnings Call Transcript Veeco Instruments Inc. (VECO) CEO Bill Miller on Q4 2021 Results - Earnings Call Transcript **TechInsights** 

## Links to Conference Call Transcripts

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