Semiconductor WEEK:

February 11, 2022

An overview of results and conclusions from recent reports at VLSI

Chip Market Research Services

Orders are flitting like butterflies

- Order activity for semiconductor equipment stayed red hot at 115 degrees
- Production and Capacity Plan

Semiconductor Analytics

Last Week in the Semiconductor Market:

Semiconductor sales pulled back 5% W/W in a typical early February dip. The IC weather warmed 1°F last week. Semiconductor Sales growth continued to hover above the 20% Y/Y bar. This is well above last year's levels at this time.

Zooming in on Auto ICs this week, after falling through the second-half of 2021 off an 85% peak, 13-wk MA growth bounced off 15% levels in early January and has risen above 20%. TechInsights' 2022 Forecast for the segment has sales passing \$33B and growing at 16%.

TechInsights' IC Supply/Demand indices loosened last week, with Foundry dropping to Saturated. Unchanged were DRAM, NAND, IDM, OSAT, Auto IC, and Analog & Power at Tight. With the Lunar New Year behind, the loosening is likely seasonal and not a sign of weak demand or over capacity. That said, the stark difference between foundry and the other sectors may be a sign of worse things to come.

Electronics' Retail Prices continue to soar.

Chip History Center

Applied Materials introduces Producer wafer fab system: July 2, 1998 ... **Applied Materials'** introduction of the Producer® in July 1998, marks an important turning point in the history of the semiconductor industry...

The Chip Insider's original review of Applied Materials'
Producer at its introduction July 4, 1998: a new revolution is upon us ...

The Chip Insider

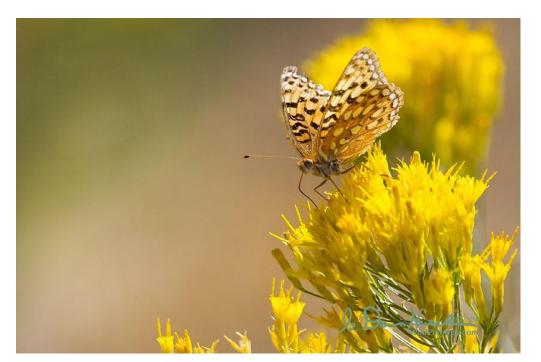
Strategy and Tactics: Inflation: Why it's worse than many fear. Moore's Law.

Semiconductor Stocks

- VLSI's Semiconductor Stock Indices fell with the market this week
- Semiconductor Stock Index slipped
 - Micron was this week's biggest winner
- Semiconductor Equipment Stock Index fell this week
- EDA Stock Index sunk
- Electronics Materials Stock Index was led up by DuPont de Nemours
- Hottest Stocks: Micron, MediaTek, SMIC, SK hynix, DuPont de Nemours, and Western Digital TechInsights

The Chip Insider®'s Graphics File





January 2022

Orders are flitting like butterflies

- Order activity for semiconductor equipment stayed red hot at 115 degrees
- Visibility for equipment suppliers has extended all the way to the end of the year and backlogs are hitting all-time-highs
- VLSI's Chip Price Performance Index was flat

Forecast as of January 2022:	2021	2022
Semi Equipment (\$B):	\$ 124.7	\$ 149.9
Sequential Change	35.0%	20.2%
Capacity Utilization:	97.3%	96.5%
ICs (\$B):	\$ 487.6	\$ 540.6
Sequential Change	26.2%	10.9%
IC Units (BU):	394.2	434.0
Sequential Change	23.7%	10.1%
Electronics (\$B):	\$ 2,536	\$ 2,710
Sequential Change	17.1%	6.8%

Contact us to access more details

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.

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

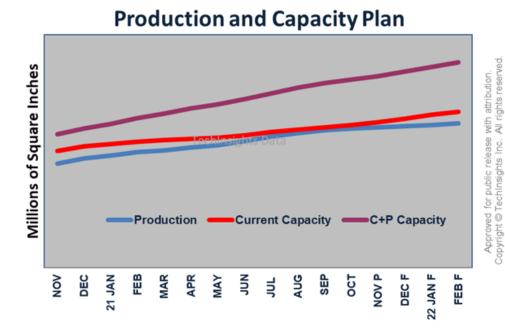


The Chip Insider® Graphics

Production and Capacity Plan:

 Production and Capacity are rising

Production and Capacity Plan: chart gives rolling averages for semiconductor production, currently active capacity, and current plus planned capacity in millions of square inches of silicon wafers.



Semiconductor Analytics

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Electronics' Retail Prices continue to soar.



1: Measures Order Activity 2: Measures Pricing Power



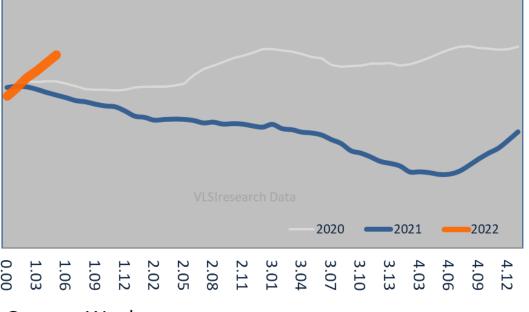
Electronics Retail Pricing Trends:

for PC notebooks Tablets Smartphones Cell phones Digital Cameras Appliances TVs

Electronics' Retail Prices continue to soar.

Electronics Pricing Barometer

indexed 13 week moving average



Quarter.Week

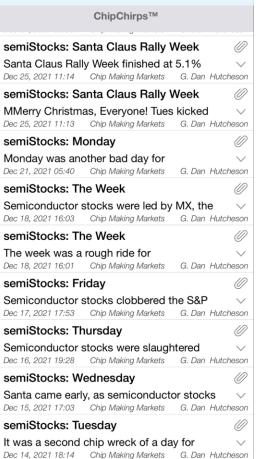
Source: Semiconductor Analytics



Chart approved for public release with attribution. Sopyright ⊚ VLSI Research Inc. All rights reserved

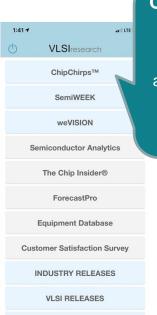
Latest Chip Chirps TM ... 8

ChipChirps™ semiStocks: Wednesday Wednesday was another good day for Jan 12, 2022 18:22 Chip Making Markets G. Dan Hutcheson semiStocks: The Week Semiconductor stocks continued their trip Jan 09, 2022 08:56 Chip Making Markets G. Dan Hutcheson semiStocks: The Week Semiconductor stocks were led last week by Jan 09, 2022 08:55 Chip Making Markets G. Dan Hutcheson semiStocks: Wednesday Semiconductor stocks were crushed by the Jan 05, 2022 19:21 Chip Making Markets G. Dan Hutcheson semiStocks: 1st Day of 2022 Semiconductor stocks hit it out of the park Jan 04, 2022 06:06 Chip Making Markets G. Dan Hutcheson semiStocks: Last Week of the Year MediaTek led the market with a 9% gain. But Dec 31, 2021 20:47 Chip Making Markets G. Dan Hutcheson semiStocks: Last Week of the Year The Santa Claus Rally for semiconductor Dec 31, 2021 20:45 Chip Making Markets G. Dan Hutcheson Omicron extending chip shortage. Omicron is extending the chip shortage Dec 30, 2021 09:41 Chip Making Markets G. Dan Hutcheson Vision Vision without execution is hallucination. Dec 29, 2021 15:56 Chip Making Markets G. Dan Hutcheson semiStocks: Santa Claus Rally



semiStocks: Week

on VLSI's app



VLSI PAPERS

are short
notifications
from VLSI's
analysts to alert
clients about
breaking news
and events



Get it on iOS or Android

Search for 'VLSIresearch' at the Apple App or Google Play store

The Chip Insider® Strategy & Tactics



Strategy and Tactics: Inflation: Why it's worse than many fear. Moore's Law.

Summaries:

Inflation: Why it's worse than central banks fear. Is inflation not transitory and worse than they say? Should we raise prices? These are two of the most common questions I have been asked since December of last year. The quick answers are yes and yes. Here's why and more:

What's been driving these questions has been in part due to the U.S. Federal Reserve's backing down from its view that inflation was transitory. The degree to which this claim is true might be questioned in Treasury Secretary Janet Yellen's recent comment that ... "If we're successful in controlling the pandemic, I expect inflation to diminish." That said, the world was pretty shocked when it was revealed that consumer prices in the U.S. rose at an annual rate of 6.8% in November and 7.0% in December – far above the FOMC's 2% target. And this is not the only place where it is happening. The Euro area, Britain, and Canada are running around 5%.

Now these are just levels and don't speak to the question of inflation being transitory or built in. That issue is dependent on the nature of pandemic-driven shortages and the money supply. The argument for it being transitory is that once the shortages are over, price gouging will end and overall levels should return to normal...

As COVID unfolded, broad money began to soar in early 2020 as the severity of COVID began to be realized. After the lockdowns in March, it quickly hit double-digit year-over-year growth levels in April, hitting a peak in September, slowing slightly to peak again in January-February of 2021. It did dip below double-digit levels in July of 2021 and in December was down to 8%, which is still high... Inflation didn't happen due to globalization, which was a massive arbitrage of wages from high-pay countries to low-pay countries... Hence... means the deflationary effects of globalization's wage-arbitrage are largely over. If you buy my line of reasoning, then you have to believe inflation is here to stay. Even if it isn't, you certainly don't want to miss out on the opportunity to raise prices due to the shortage.

TSMC's OIP Ecosystem Strategy: a debate on whether Moore's Law is dead. Popular definitions of density versus **Carver Mead's** definition.

"If you don't like what's being said, change the conversation"

— Don Draper, Mad Men

TechInsights

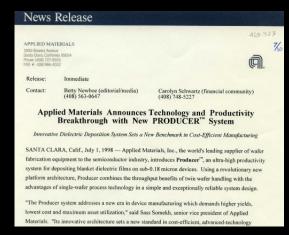
Contact us to get the full report and more





Applied Materials introduces Producer wafer fab system: July 2, 1998 ... Applied Materials' introduction of the Producer® in July 1998, marks an important turning point in the history of the semiconductor industry... The pressure to make this transition was driven by the need for greater productivity as ... AMAT's Producer design team conceived of it as a one-two punch to solve poor cluster-tool productivity and bridge the 200mm-to-300mm jump. At the time, tool designers still tended to focus designs on narrow application segments ... Customers did not want bridge tools ... The Producer platform was a gutsy move because it offered what customers needed but didn't want. Great equipment companies have done this in the past and won big. The Producer would go on to be one of the most successful platforms in the industry's history, bridging many deposition and etch applications.

The Chip Insider's original review of Applied Materials' Producer at its introduction July 4, 1998: a new revolution is upon us ... It has been ten years ... since Applied Materials set the world afire with its Precision 5000 cluster tool. Now, Applied Materials has just done what no one does better, it has reinvented itself with the PRODUCER™. The PRODUCER™ is designed around new architecture concepts which obsolete all current cluster tool designs. More importantly, Applied Materials has reinvented the cluster tool in a sweeping way that challenges all past thinking about fab equipment...























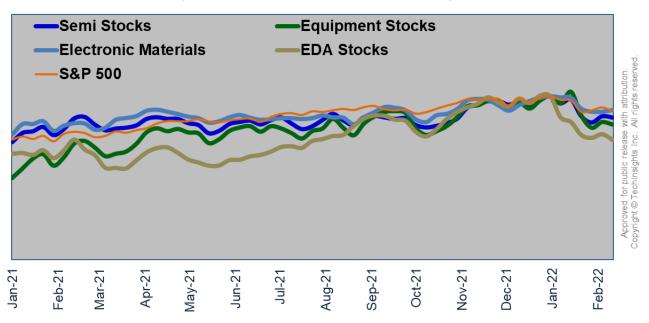
semiStockVEEK: VLSI's Semiconductor Stock Indices fell with the market this

week as geopolitical concerns are growing between Russia and Ukraine.



Semiconductor Industry Stock Performance Indices

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



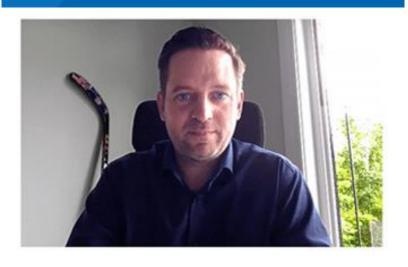
VLSI's Stock Indices:

Semiconductors -0.7% Equipment -1.4% Electronic Materials +1.0% EDA -3.4%

weVISION Interview:

Announcing a new and exciting combination: VLSIresearch joins forces with TechInsights!

Effective August 16, 2021



What the conversation is about:

The business of technology is inseparable from the technology of the business. Unlike classic business, the business of technology is about constant change. It's time to bring core-technology and market analysis together, which explains why TechInsights has acquired VI Slresearch.

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

Click here to read more about this development or on the VLSI RELEASES button in VLSI's mobile app



Semiconductor Stocks:

Weekly Growth and Forward P/E Ratios by Company

Weekly Gains			2/11/2022					
Semiconductor Stocks	Price Change	Forward P/E	Semiconductor Stocks	Price Change	Forward P/E			
IDM			Fab-lite to Fabless					
Intel	-0.8%	13	AMD	-8.4%	26			
Micron	10.6%	7	Analog Devices	-4.4%	19			
ON Semiconductor	2.7%	18	Broadcom	-2.8%	16			
Samsung Electronics	1.2%	_	IBM	-3.2%	13			
SK hynix	6.0%		Infineon	-4.9%	18			
STMicroelectronics	-1.1%	13	MagnaChip Semiconductor	1.4%	17			
Western Digital	3.7%	6	MaxLinear	-7.0%	16			
Foundry & OSAT			MediaTek	7.0%	_			
Amkor	-0.3%	8	NVIDIA	-1.5%	47			
ASE	3.3%	9	Panasonic	-0.6%	9			
GLOBALFOUNDRIES	2.7%	30	Qualcomm	-8.3%	15			
JCET	3.5%	16	Silicon Laboratories	-6.5%	51			
SkyWater Technology	-3.5%	_	Skyworks	-1.5%	11			
SMIC	6.4%	15	Texas Instruments	-4.1%	18			
TSMC	0.0%	19	Xilinx	-6.7%	49			
UMC	-2.0%	8						

VLSI's Semiconductor Stock Index slipped this week despite claiming five of the top six stock spots. Micron led the pack this week, followed by MediaTek, SMIC, SK hynix, and Western Digital.

IDM +3.2% Foundry & OSAT +1.3% Fabless & Fablite -3.4%

AMD AMD Analog DevicesADI AmkorAMKR ASE ASX Broadcom AVGO GLOBALFOUNDRIES GFS IBM IBM Infineon IFNNY.PK Intel INTC JCET600584.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 TechnologySKYT SkyworksSWKS SMIC SMI STMicroelectronics TXN TSMC TSM UMC STMicroelectronics Western Digital WDC Xilinx XLNX



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 Change	Forward P/E					
Wafer Fab:			Test:							
Applied Materials	-2.3%	15	Advantest	1.3%	_					
ASM International	-8.9%	26	Teradyne	-0.8%	17					
ASML	-3.8%	28	FormFactor	-0.1%	20					
KLA	-2.2%	16								
Lam Research	-3.3%	15	Assembly:							
Onto Innovation	-2.9%	_	BESI	-1.2%	_					
Nikon	0.0%	_	Kulicke & Soffa	0.0%	9					
TEL	2.0%	_	ASM Pacific Technology	0.2%						
Veeco Instruments	2.3%	17								

Above Avg Top 4-6 Top 1-3

VLSI's Semiconductor Equipment Stock Index fell this week, Veeco Instruments came out on top. Nearly half of the companies finished above the weekly average growth rate of -0.7.

WFE -2.1% Test +0.1% Assembly -0.3%

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						2/11/2022	
EDA & Electronic Materials Stocks	Price Change Cha				rice ange	Forward P/E	
EDA			DNP	2.	6%	_	
Cadence	-3.4%	41	DuPont de Nemours	4.	.3%	5	
Synopsys	-4.4%	34	JSR	3.0%		_	
Ansys	-2.4%	41	Shin-Etsu	-2	.5%	-	
Electronic Materials			SOITEC		.4%	_	
BASF	0.2%	3	Tokyo Ohka	2.4%		_	
CMC Materials	-0.7%	22					
	Above Avg				Top 4-6	Top 1-3	

VLSI's EDA Stock Index sunk this week.

VLSI's Electronic Materials Stock Index was led up by DuPont de Nemours.

Ansys, Inc. ANSS BASF BASFY
CMC Materials CCMP Cadence CDNS
DNP 7912 DuPont DD JSR 4185
Shin-Etsu 4063 SOITECSOLPA
Synopsys SNPS Tokyo Ohka 4186



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16-Jul-21	83.9	79.2	88.8	74.8	-3.2%	-3.2%	-0.5%	-1.0%	12	6.9%	-42	-10.8%	17.7%	90.8	-1.0%
23-Jul-21	85.3	82.9	89.2	78.1	1.7%	4.6%	0.5%	4.5%	36	9.4%	-18	-73.1%	82.5%	92.6	2.0%
30-Jul-21	88.4	84.2	90.6	79.1	3.7%	1.6%	1.5%	1.2%	39	24.0%	-15	-37.0%	61.0%	92.2	-0.4%
06-Aug-21	91.4	88.9	89.6	80.6	3.4%	5.6%	-1.1%	1.9%	46	29.1%	-8	-14.3%	43.4%	93.1	0.9%
13-Aug-21	88.2	84.4	89.4	81.1	-3.5%	-5.0%	-0.1%	0.6%	15	3.7%	-40	-14.0%	17.7%	93.7	0.7%
20-Aug-21	85.9	80.8	86.2	85.5	-2.6%	-4.3%	-3.6%	5.4%	7	8.1%	-48	-13.5%	21.6%	93.2	-0.6%
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%
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Weekly Growth

Materials

Stocks

0.0%

EDA

Stocks

0.5%

Equipment

Stocks

-2.7%

VLSI's Indices of Chip Industry Stocks

Materials

Stocks

89.2

EDA

Stocks

75.6

Semi

Stocks

-3.3%

Equipment

Stocks

81.9

The Prior Week's

Close

09-Jul-21

Semi

Stocks

86.6

Companies Up

19

Max Growth

7.3%

Companies Down

-36

Min Growth

-10.5%

Range of Growth

17.8%

S&P 500

91.7

S&P 500 Growth

0.4%

Links to **Conference Call** Transcripts

February 11th

Cohu, Inc. (COHU) CEO Luis Müller on Q4 2021 Results - Earnings Call Transcript

ASE Technology's (ASX) Management on Q4 2021 Results - Earnings Call Transcript

Advanced Energy Industries, Inc. (AEIS) CEO Steve Kelley on Q4 2021 Results - Earnings Call Transcript

GlobalFoundries Inc. (GFS) CEO Tom Caulfield on Q4 2021 Results - Earnings Call Transcript

Onto Innovation Inc. (ONTO) CEO Michael Plisinski on Q4 2021 Results - Earnings Call Transcript

<u>DuPont de Nemours, Inc. (DD) CEO Ed Breen on Q4 2021 Results - Earnings Call Transcript</u>

ams-OSRAM AG (AMSSY) CEO Alex Everke on Q4 2021 Results - Earnings Call Transcript

Axcelis Technologies, Inc.'s (ACLS) CEO Mary Puma on Q4 2021 Results - Earnings Call Transcript

ON Semiconductor Corporation (ON) CEO Hassane El-Khoury on Q4 2021 Results - Earnings Call Transcript

February 4th and before

Kulicke and Soffa Industries' (KLIC) CEO Fusen Chen on Q1 2022 Results - Earnings Call Transcript

Infineon Technologies AG. (IFNNY) CEO Reinhard Ploss on Q1 2022 Results - Earnings Call Transcript

Qorvo, Inc. (QRVO) CEO Bob Bruggeworth on Q3 2022 Results - Earnings Call Transcript

FormFactor, Inc. (FORM) CEO Mike Slessor on Q4 2021 Results - Earnings Call Transcript

MaxLinear's (MXL) CEO Kishore Seendripu on Q4 2021 Results - Earnings Call Transcript

QUALCOMM Incorporated's (QCOM) CEO Cristiano Amon on Q1 2022 Results - Earnings Call Transcript

Advanced Micro Devices, Inc. (AMD) CEO Lisa Su on Q4 2021 Results - Earnings Call Transcript



Links to **Conference Call** Transcripts

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Aehr Test Systems' (AEHR) CEO Gayn Erickson on Q2 2022 Results - Earnings Call Transcript

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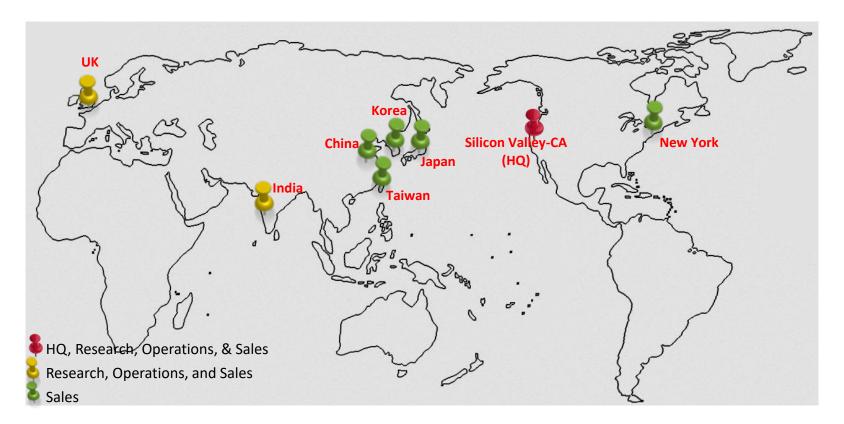
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