



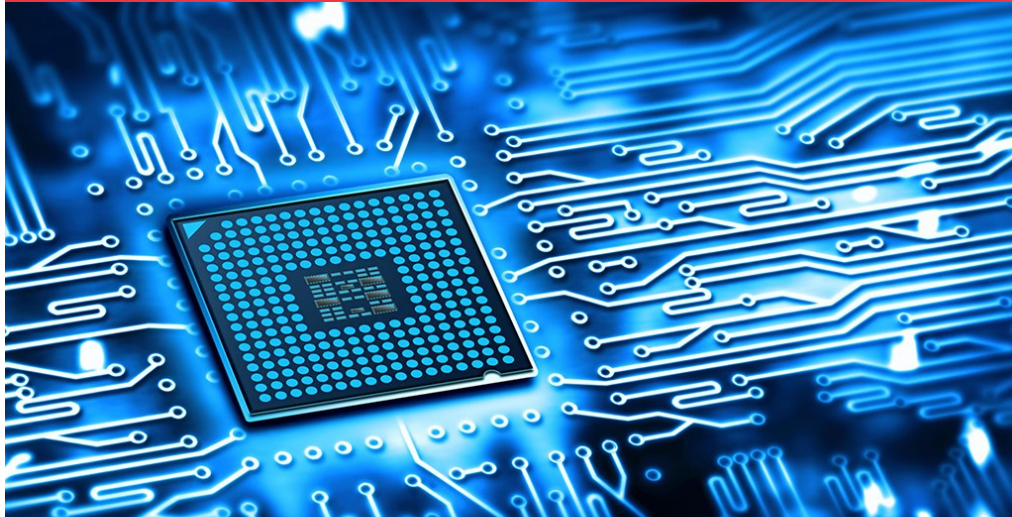
UNITED
PERFORMANCE METALS

QUALITY SOLUTIONS. TRUSTED PARTNERS.

AN ONI COMPANY

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THE UPM MARKET INFORMER



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Chip Manufacturing Equipment Sales Record in 2022

Sales of semiconductor manufacturing equipment will reach a new high of \$108.5 billion in 2022, rising 5.9% from the previous industry record of \$102.5 billion in 2021, says SEMI.

The record high caps three consecutive years of record revenue. The market is expected to contract to \$91.2 billion next year before rebounding in 2024 driven by both the front-end and back-end segments.

“Record fab constructions have driven total semiconductor manufacturing equipment sales to cross the \$100 billion mark for a second straight year,” says Ajit Manocha, SEMI president and CEO. “Emerging applications in multiple markets have set expectations for significant semiconductor industry growth this decade, which will necessitate further investments to expand production capacity.”

The wafer fab equipment segment, which includes wafer processing, fab facilities, and mask/reticle equipment, is projected to expand 8.3% to a new industry record of \$94.8 billion in 2022, followed by a 16.8% contraction to \$78.8 billion in 2023 before rebounding 17.2% to \$92.4 billion in 2024.

Equipment sales in the foundry and logic segment, accounting for more than half of total wafer fab equipment receipts, are expected to rise 16% year-over-year to \$53.0 billion in 2022 as demand for both leading-edge and mature nodes remain strong. Foundry and logic investments are projected to decrease in 2023, leading to an expected 9% drop in sales across the segment.

As enterprise and consumer demand for memory and storage weakens, DRAM equipment sales are expected to fall 10% to \$14.3 billion in 2022 and 25% to \$10.8 billion in 2023, while NAND equipment sales are projected to drop 4% to \$19.0 billion in 2022 and 36% to \$12.2 billion in 2023.

Challenging macroeconomic and semiconductor industry conditions are expected to spark a decline in back-end equipment segment sales. After registering robust 30% growth in 2021, semiconductor test equipment market sales are forecast to slip 2.6% to \$7.6 billion in 2022 and 7.3% to \$7.1 billion in 2023. Following an 87% surge in 2021, assembly and packaging equipment sales are projected to drop by 14.9% to \$6.1 billion in 2022 and 13.3% to \$5.3 billion in 2023.

Back-end equipment expenditures are expected to improve in 2024 with growth of 15.8% and 24.1%, respectively, in the test equipment and assembly and packaging equipment segments.

China, Taiwan and Korea are projected to remain the top three destinations for equipment spending in 2022. China is projected to maintain the top position next year after claiming it for the first time in 2020, while Taiwan is expected to regain the lead in 2024. Equipment spending for all regions tracked, except Korea, are expected to grow in 2022, though most will see a decrease in 2023 before returning to growth in 2024. [Read More](#)

Surcharge Totals November 2022 - April 2023



| | Nov | Dec | Jan | Feb | Mar | Apr |
|--------------|---------|---------|---------|---------|---------|---------|
| 15-5 | 0.9821 | 1.0176 | 1.1326 | 1.1856 | * | * |
| 15-7 | 1.4687 | 1.5353 | 1.7754 | 2.0041 | * | * |
| 17-4 | 0.9957 | 1.0321 | 1.148 | 1.2011 | * | * |
| 17-7 | 1.099 | 1.1528 | 1.3023 | 1.3454 | * | * |
| 201 | 0.8327 | 0.8539 | 0.9422 | 0.968 | * | * |
| 301 7.0% | 1.0707 | 1.1225 | 1.268 | 1.3099 | * | * |
| 302/304/304L | 1.1836 | 1.2452 | 1.4096 | 1.4562 | * | * |
| 304-8.5% | 1.2336 | 1.3002 | 1.474 | 1.5231 | * | * |
| 305 | 1.5908 | 1.6914 | 1.9319 | 1.9977 | * | * |
| 309 | 1.6354 | 1.7365 | 1.9765 | 2.0414 | * | * |
| 310 | 2.3623 | 2.5319 | 2.9047 | 3.0029 | * | * |
| 316/316L | 1.7299 | 1.8226 | 2.1115 | 2.3468 | * | * |
| 316LS/316LVM | 2.83 | 3.06 | 3.59 | 3.74 | * | * |
| 317L | 2.0414 | 2.15 | 2.5007 | 2.8297 | * | * |
| 321 | 1.2773 | 1.3484 | 1.5304 | 1.5841 | * | * |
| 347 | 1.5805 | 1.6518 | 1.8353 | 1.8868 | * | * |
| 409/409 Mod | 0.2948 | 0.2774 | 0.2894 | 0.3007 | * | * |
| 410/410S | 0.2991 | 0.2819 | 0.2951 | 0.3046 | * | * |
| 430 | 0.3565 | 0.3399 | 0.3525 | 0.3609 | * | * |
| 434 | 0.4958 | 0.4836 | 0.5285 | 0.6039 | * | * |
| 439 | 0.3775 | 0.3609 | 0.3713 | 0.3822 | * | * |
| 440A | 0.3565 | 0.3399 | 0.3525 | 0.3609 | * | * |
| 2205 | 1.5655 | 1.6199 | 1.8652 | 2.1726 | * | * |
| 263 | 11.9584 | 10.7724 | 10.9832 | 10.8442 | 11.7846 | 13.2813 |
| 276 | 9.506 | 9.5601 | 10.1487 | 10.0837 | 11.153 | 13.5698 |
| A286 | 3.0669 | 3.1578 | 3.194 | 3.0092 | 3.4243 | 4.0143 |
| 330 | 3.6909 | 3.8501 | 3.9296 | 3.6937 | 4.2924 | 4.9986 |
| 400 | 6.6443 | 6.9718 | 7.1931 | 6.8268 | 8.0201 | 9.3518 |
| Custom 455 | 1.84 | 1.98 | 2.18 | 2.02 | * | * |
| Custom 465 | 2.64 | 2.85 | 3.18 | 2.91 | * | * |
| 600 | 7.3446 | 7.6239 | 7.8565 | 7.4646 | 8.7808 | 10.2636 |
| 601 | 6.1229 | 6.3546 | 6.4998 | 6.1684 | 7.2046 | 8.3839 |
| 617 | 10.5673 | 10.019 | 10.3713 | 10.2334 | 11.3131 | 13.1396 |
| 625 | 9.6866 | 9.8369 | 10.2096 | 10.0402 | 11.1493 | 13.0263 |
| Custom 630 | 1.26 | 1.29 | 1.41 | 1.43 | * | * |
| 718 | 8.6636 | 8.8356 | 9.0313 | 8.7834 | 9.713 | 11.0007 |
| X-750 | 7.7941 | 8.0417 | 8.2187 | 7.8343 | 9.0694 | 10.4613 |
| 825 | 4.9306 | 5.0611 | 5.1995 | 5.0087 | 5.6952 | 6.7372 |
| HX | 6.7705 | 6.8404 | 7.1842 | 7.0661 | 7.9429 | 9.6011 |
| 188 | 17.6141 | 14.6262 | 14.555 | 14.287 | 14.5401 | 14.9566 |
| CCM | 20.97 | 19.61 | 17.72 | 14.34 | * | * |
| L-605 | 19.4244 | 15.6932 | 15.5614 | 15.3483 | 15.396 | 15.5962 |

*Surcharge currently not available

Leading Semiconductor Companies in the Internet of Things Theme



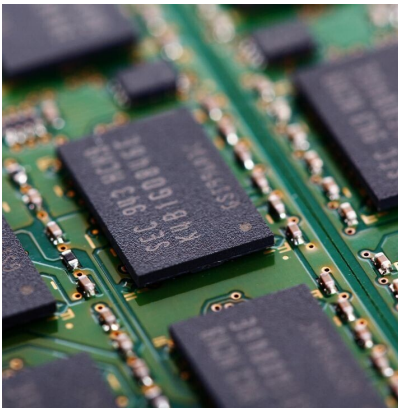
The future of the semiconductor industry will be shaped by a range of disruptive themes, with Internet of Things (IoT) being one of the themes that will have a significant impact on semiconductor companies.

IoT describes the use of connected sensors and actuators to control and monitor the environment, the things that move within it, and the people that act within it. It can be beneficial across the whole value chain and allows different assets and people to be monitored and accounted for across vast distances in hazardous conditions.

The emphasis in chip design has shifted from a race to place more transistors onto a square millimetre of silicon to a focus on building microprocessors as systems made up of multiple components, each of which performs a specialized task. As more and more sensors and microcontrollers are packed into the connected devices, the pressure on the semiconductor industry to develop smaller, cheaper, and faster chips ratchets up. For IoT to be pervasive, the underlying semiconductor technology embedded within IoT devices needs to be cheaper, more compact, and consume less power.

However, not all companies are equal when it comes to their capabilities and investments in the key themes that matter most to their industry. Understanding how companies are positioned and ranked in the most important themes can be a key leading indicator of their future earnings potential and relative competitive position. The companies most likely to benefit from this trend are NVIDIA, Qualcomm, and Intel.

Qualcomm aims to dominate the connectivity layer of our IoT value chain. Its wireless communications chips cover the broadest range of wireless technologies of any rival. Qualcomm is strong in 4G, Wi-Fi, and Bluetooth. While Huawei is the world leader in 5G telecom equipment, tensions brought on by the US-China trade war could work in Qualcomm's favour in the market for 5G equipment. Qualcomm is likely to be a leader in the IoT standard-setting process. In December 2020, a new services suite was announced to deliver IoT as a Service (IoTaaS) solutions for smart cities. As part of its plan to augment its automotive processing capabilities in infotainment systems and driver assistance, it announced the acquisition of a two-year-old start-up, Nuvia, for \$1.4bn in January 2021. [Read More.](#)



Germany's New Chip Factory is a Boost to Europe's Semiconductor Plans

Wolfspeed — a US-based silicon carbide (SiC) semiconductor maker — is set to build a chip factory in Germany, Handelsblatt reports. That's a significant step for both the country's green mobility and Europe's chip industry.

According to the newspaper, the over €2 billion-worth facility will be located at a site in southwest Saarland. Series production is expected to begin in four years.

German auto supplier ZF will hold a minority stake in the factory, but will be a majority shareholder in the accompanying research center.

Wolfspeed's decision to build a plant in Germany is a boost for the domestic car industry, especially when it comes to electric vehicles. Although silicon carbide (a compound of silicon and carbon) is costlier than conventional silicon, SiC chips are considered more promising: they can increase EV range, reduce charging time, and bring down operating costs due to lower energy consumption.

And with the plant in close proximity to Germany's (electric) car production sites — think of BMW, Ford, Mercedes, and Volkswagen — manufacturers can hope to secure easy access to the supply chain.

Wolfspeed's plant is also good news for Europe that's struggling in chip production — currently accounting for 10% of the global market. The continent's weak position was especially evident during the pandemic, when supply chains collapsed and it grappled with securing chip access, causing entire industries to sputter.

In response, the EU has been trying to improve its domestic manufacturing capacity. First and foremost comes the European Chips Act, aiming to foster a local semiconductor industry and pushing the bloc's global market share to 20% by 2030. The Union has also been attempting to attract global players to build factories in the continent — like Intel's €68 billion investment in a site in Germany and now Wolfspeed. Europe may only be at the beginning of its plans to become a major chip producer, but there is cause for hope. [Read More.](#)

UK's CML Buys Silicon Valley's Microwave Technology for \$18 Million



UK-based CML Microsystems Plc, which develops mixed-signal, RF and microwave semiconductors for communications applications, has entered into a definitive agreement to acquire Silicon Valley-based semiconductor firm Microwave Technology Inc (MwT), for up to \$18m. Founded in 1982, MwT designs and manufactures gallium arsenide (GaAs)- and gallium nitride (GaN)-based monolithic microwave integrated circuits (MMICs), discrete devices, and hybrid amplifier products for commercial wireless communication, defense, space and medical (MRI) applications. It became part of the IXYS Corp, which was then acquired in 2018 by Chicago-based technology manufacturing company Littelfuse Inc. In 2019, MwT underwent a management buy-out from Littelfuse, while transitioning away from manufacturing to a fabless semiconductor model with a specific focus on MMICs. The business currently has of just over 20 staff and operates from its sole location in Fremont, CA.

CML says that the acquisition will expand its product portfolio, strengthen and enhance its support resources and increase its R&D capabilities, providing essential knowhow and experience in system-level understanding, product manufacturing and packaging techniques. MwT's products are complementary to CML's existing range, and most of its focus and client concentration is within the USA. CML's board believes that there is a significant opportunity to increase its current market share by internationalizing MwT's products. The acquisition, which is subject to US regulatory clearance, is valued at a maximum of \$18m and will be funded from a mixture of CML's existing cash resources and the issue to the sellers of new CML ordinary shares in a ratio of about 60/40. The MwT team will provide highly complementary management capability for MMIC products, reckons CML. MwT's unaudited US GAAP results for 2022 recorded revenue of \$6.5m and a pre-tax loss of \$132,000 with net assets of about \$2.4m. The acquisition is expected to complete during first-half 2023. The board expects that MwT will be earnings enhancing in its first full year of ownership within CML.

Upon successful closing of the transaction, MwT's majority shareholder and current chairman Dr Nathan Zommer will join CML's board of directors in a non-executive capacity (subject to completion of normal regulatory due diligence checks). Zommer is the founder of IXYS Corp and was chairman & CEO of IXYS from 1993 until its acquisition in January 2018 by Littelfuse, of which Zommer is also a director. Prior to founding IXYS, he served in a variety of positions with Intersil, Hewlett Packard and General Electric. Zommer holds a bachelor's degree and MS in physical chemistry from Tel Aviv University and a Ph.D. in electrical engineering from Carnegie Mellon University.

"He has unrivalled knowledge of the semiconductor world and I have no doubt that CML can benefit greatly from his expertise," comments CML's group managing director Chris Gurry. [Read More](#)

UPM Focus: Semiconductors with Eric Paulsen and Josh Gondkoff



United Performance Metals serves a number of industries, including the semiconductor industry. For this month's issue of the UPM Market Informer, we sat down with two of our team members out in Benicia, CA, Eric Paulsen and Josh Gondkoff, both of whom have extensive experience in the semiconductor space. Eric and Josh originally worked at Plus Ten Stainless, but Plus Ten was acquired by UPM in 2011 and the pair have become crucial pieces of UPM's business.

"The beginning of the semiconductor industry can be traced back to the 1950s", Paulsen said. "It was really driven by the U.S. government and has been present in the Bay Area ever since then. IBM and NASA were also big players in causing the flourishing of the industry in our country. I was first exposed to the semiconductor industry In 1987, when I was working at my first machine shop." Paulsen has been working in the semiconductor space almost his entire career. UPM's start in the semiconductor industry really took off with the acquisition of Paulsen and Gondkoff's former company: Plus Ten Stainless. According to Gondkoff, UPM's role in the semiconductor space is a bit of a hidden one. "The

materials we provide may be four or five steps away from the actual chips being made, but we are one of the few companies in the industry that offers the value added services needed to create the proper machines for chip creation".

The semiconductor industry has a big future, and only time will tell how big it will be for the U.S. economy. Gondkoff attributes the rapid growth of the semiconductor sector in the United States to the government. "The government has essentially put the industry in a renaissance. With the subsidization of some companies that operate mostly in southeast Asia, the government has brought much chip manufacturing back to the US. Arizona is quickly becoming a hotbed for the semiconductor industry", he said. When asked about the potential outlook for the semiconductor industry's future, Paulsen said "My guess is that there will be less sole proprietor machine shops in the next 5-10 years. Larger companies will have machine shops who will also do sheet metal work, fabrication, assembly, plating, etc. I also believe that the industry will slowly start moving away from the Bay Area as it is quite expensive to do business here." For more information about United Performance Metals' role in the semiconductor industry, please contact us at sales@upmet.com.