

The CHIPS and Science Act - Update on Progress

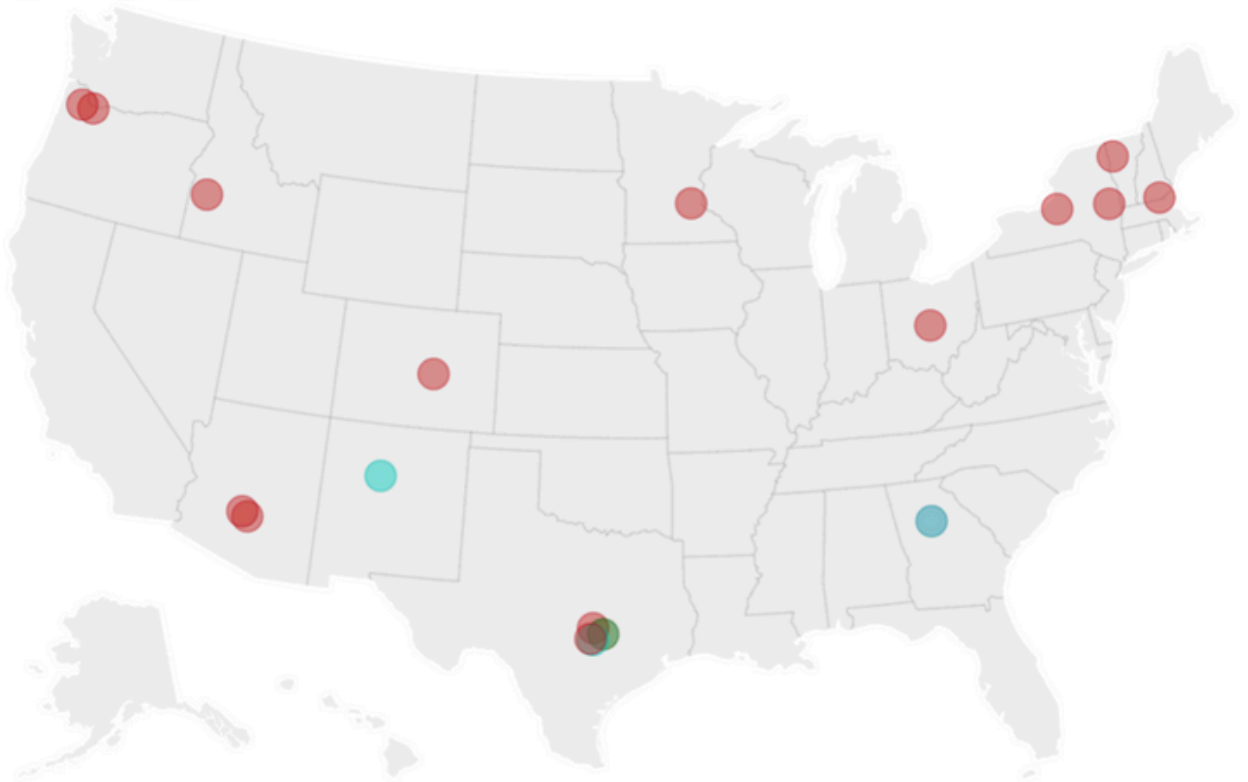
In August 2022, we wrote [The Growth Factor Vol. 34](#) about the CHIPS and Science Act and the benefits that this historic spending package should provide for the domestic semiconductor industry. With increasing geopolitical tensions and the explosion of Artificial Intelligence, the importance of this program has only increased.

Two years later, CHIPS Act funding has started to be distributed. So how has the \$39 billion bill been allocated so far, and where else could it flow? Below we break down the awards announced to date and discuss how some of Needham Funds' holdings may be affected.

Announced Awards

Preliminary memoranda of terms (PMTs) announced since December 2023

■ Equipment
 ■ Materials
 ■ Packaging
 ■ R&D
 ■ Semiconductors



Source: CHIPS Program Office

Five Major Awards - \$29.1 Billion

February 2024 – GlobalFoundries, Inc. (GFS) received \$1.5 billion to support the development and expansion of facilities in Malta, NY, and Burlington, VT. The Malta projects include the construction of a new state-of-the-art 300mm fab (fabrication facility) and the expansion of its existing fab, primarily for manufacturing semiconductors used in the automotive industry. In Burlington, the award will revitalize an existing fab to produce 200mm

technologies used in the automotive, communications, and defense industries. The two projects combined are expected to create 1,500 manufacturing jobs and 9,000 construction jobs.¹

March 2024 – Intel Corp. (INTC) will receive \$8.5 billion from the CHIPS Act for four projects in Chandler, AZ, New Albany, OH, Rio Rancho, NM, and Hillsboro, OR. Intel plans to build four new, leading-edge fabs in Arizona and Ohio and to modernize two existing fabs in New Mexico and Arizona into advanced packaging facilities. Additionally, Intel will invest in its leading-edge R&D hub in Oregon, where it will utilize the world’s first High NA EUV (numerical aperture extreme ultraviolet) lithography equipment. The four projects are estimated to create 10,000 manufacturing jobs and 20,000 construction jobs.²

April 2024 – Taiwan Semiconductor Manufacturing Co., Ltd. (TSM), arguably the most important semiconductor company in the world, announced it was awarded \$6.6 billion for three leading-edge fabs in Phoenix, AZ. TSM manufactures chips used in highly demanded AI GPUs (artificial intelligence graphics processing units) and other growing industries such as consumer electronics, the Internet of Things, automotive, and high-performance computing. The project is estimated to create 6,000 manufacturing jobs and 20,000 construction jobs.³

April 2024 – Samsung Electronics Co., Ltd. (KRX: 005930) was awarded \$6.4 billion for two projects in Taylor, TX. Samsung will expand its current campus in Texas to include two new, leading-edge logic fabs, an R&D fab, and an advanced packaging facility. The CHIPS Act funding will also help increase capacity at its current Austin facility. The planned expansion is expected to create 4,500 manufacturing jobs and 17,000 construction jobs.⁴

April 2024 – Micron Technology, Inc. (MU) received a \$6.14 billion investment for two projects in Boise, ID, and Clay, NY. The Idaho project will focus on developing a high-volume manufacturing fab producing leading-edge DRAM chips. The fab will be co-located with the company’s existing R&D facility to increase efficiencies and synergies. The award will also help build two of four fabs in New York that will focus on manufacturing leading-edge DRAM chips. The two projects will help create over 11,000 manufacturing jobs and 9,000 construction jobs.⁵

Other Announced Awards - \$392 Million

December 2023 – BAE Systems Plc (BAESF) was the first company to receive CHIPS Act funding, with \$35 million to modernize the company’s Microelectronics Center in Nashua, NH. The facility manufactures mature-node chips used in next-generation defense programs, such as the F-35 fighter jet program.⁶

January 2024 – Microchip Technology, Inc. (MCHP) was awarded \$162 million for two projects in Gresham, OR, and Colorado Springs, CO. \$72 million will be invested to expand its Oregon fab, while \$90 million is allocated to modernize and increase capacity at its Colorado facility. Both facilities will help increase U.S. production of microcontroller units and other semiconductors used in the automotive, commercial, industrial, aerospace, and defense industries. The two projects will help create over 700 construction and manufacturing jobs.⁷

May 2024 – Polar Semiconductor LLC (private), a subsidiary of Sanken Electric Co., Ltd. (TKS: 6707), announced it received \$120 million in CHIPS Act funding to expand and modernize its Bloomington, MN facility. The expansion will allow Polar to double its production of sensor and power chips. The expansion is expected to create 170 manufacturing and construction jobs.⁸

May 2024 – Absolics, Inc. (private), a subsidiary of SKC Co., Ltd. (KRX: 011790), was awarded \$75 million to aid the construction of a new facility in Covington, GA, and the development of new glass substrate technology used in semiconductor advanced packaging. The new facility will result in 200 manufacturing and R&D jobs and 1,000 construction jobs.⁹

Secure Enclave - \$3.5 Billion

Not originally included in the CHIPS and Science Act, \$3.5 billion of the bill was shifted to a separate Pentagon program called “Secure Enclave” in the government’s March 2024 spending bill.¹⁰ While not much information is available at this time, it is believed that Intel will be the recipient of this program’s funds, which will be used to establish a specialized facility for manufacturing and assembling chips critical to Pentagon activities.¹¹

How do Needham Funds’ portfolio holdings potentially benefit?

As the world continues the process of the electrification of everything, semiconductors and the domestic manufacturing of semiconductors will become more critical than ever.

Looking at Needham Funds, we have broken down our holdings into two categories:

- Potential Recipients of CHIPS Act Funding: portfolio companies that we believe are well-suited to receive funding from the \$39 billion spending package. Below, we discuss projects and initiatives these companies are working on in anticipation of ramped semiconductor manufacturing.
- Potential Beneficiaries of CHIPS Act Spending: portfolio companies that we think should benefit from the buildout of semiconductor manufacturing sites as demand for the tools and technology required to build the chips increases. Below we discuss software and hardware that will be in demand for these manufacturing facilities.

It is important to note that this is solely our opinion and no official announcements have been made at this time.

Potential Recipients of CHIPS Act Funding:

Entegris, Inc. (ENTG) – In June 2023, Entegris announced it began construction on a \$600 million Manufacturing Center of Excellence in Colorado Springs. The new facility will primarily service the semiconductor industry by increasing capacity for the company’s Microcontamination Control and Advanced Materials Handling divisions. The company should benefit from state and local incentives as well.¹²

FormFactor, Inc. (FORM) – In November 2023, FormFactor announced its participation in Elevate Quantum, a collective of companies and research groups that helped designate Denver as a regional “Tech Hub” under the Commerce Department’s Tech Hubs initiative. The initiative is part of the CHIPS and Science Act that aims to boost regional innovation in the semiconductor and adjacent industries. FormFactor’s involvement will support the development of quantum technologies.¹³

TTM Technologies, Inc. (TTMI) - In November 2023, TTM Technologies announced that it selected New York State as the location for a new, high-tech greenfield manufacturing facility producing ultra-high-density interconnect printed circuit boards in support of national security requirements. While no official announcement of funding has been made, Senator Schumer (D-NY) stated, “When I wrote my CHIPS & Science Act, I did so with the vision that all the components

of the supply chain for this revolutionary technology would be stamped 'Made in New York,' and with TTM making their East Syracuse expansion one of the first in the nation to manufacture these advanced circuit boards, that vision is one step closer to becoming a reality.”¹⁴

Coherent Corp. (COHR) – Similar to FormFactor, Coherent announced in April 2024 that it was participating in a CHIPS Act Tech Hub program based in North Carolina. The company has secured \$15 million to accelerate the commercialization of wide and ultrawide bandgap semiconductors that will be used in transportation electrification, smart power grids, and quantum technologies.¹⁵

Analog Devices, Inc. (ADI) – In July 2023, Analog Devices announced more than \$1 billion in investments to expand its Beaverton, OR semiconductor wafer fab. The investment aims to more than double the fab’s capacity. Analog Devices’ CEO Vivek Jain shared during the announcement ceremony, “By expanding ADI’s Beaverton facility, we are increasing our production capacity in critical industries, boosting domestic manufacturing in line with the vision of the CHIPS Act, and enhancing the global resiliency of ADI’s hybrid manufacturing model.”¹⁶

Potential Beneficiaries of CHIPS Act Spending:

PDF Solutions, Inc. (PDFS) – PDF Solutions’ Exensio Analytics Platform is an enterprise-level, end-to-end analytics software that collects data over the entire semiconductor manufacturing process, including design, fabrication, test, and packaging. We believe Intel is already a large customer of PDF Solutions and that Intel’s investments might increase the need for its software even more.

MKS Instruments, Inc. (MKSI) – MKS provides systems and subsystems involved in the semiconductor manufacturing process including process control solutions, measurement solutions, and environmental monitoring solutions.

Teradyne, Inc. (TER) – Teradyne manufactures automated test equipment and robotics solutions used by semiconductor manufacturing companies.

Nova Ltd. (NVMI) – Nova provides metrology equipment used for advanced process control, including X-ray, optical, and materials.

Photronics, Inc. (PLAB) – Photronics is a leader in providing photomask products and services for both trailing-edge and leading-edge semiconductors, as well as integrated circuits and flat panel displays.

ASML Holding NV (ASML) – ASML, one of the largest and most important semiconductor capital equipment providers in the world, provides photolithography equipment essential for high-volume semiconductor manufacturing. It is the sole supplier of EUV lithography systems required for leading-edge semiconductor manufacturing. ASML also manufactures metrology and inspection systems.

Lam Research Corp. (LRCX) – Lam, another one of the world’s largest semiconductor capital equipment providers, provides etching, deposition, and cleaning solutions to the semiconductor manufacturing industry.

Conclusion

While the semiconductor and semiconductor capital equipment industries are still in the early stages of investment and expansion after the passing of the CHIPS Act, we are enthusiastic about the announced plans so far. We patiently await more funding announcements, and we are excited about the growth and resilience in store. It is more evident now than ever that investment in this space is imperative, and we applaud the original passing of this bill.

[Map] <https://www.semiconductors.org/chips-incentives-awards/>

[1] <https://www.nist.gov/news-events/news/2024/02/biden-harris-administration-announces-preliminary-terms-globalfoundries>

[2] <https://www.nist.gov/news-events/news/2024/03/biden-harris-administration-announces-preliminary-terms-intel-support>

[3] <https://www.nist.gov/news-events/news/2024/04/biden-harris-administration-announces-preliminary-terms-tsmc-expanded>

[4] <https://www.commerce.gov/news/press-releases/2024/04/biden-harris-administration-announces-preliminary-terms-samsung>

[5] <https://www.nist.gov/news-events/news/2024/04/biden-harris-administration-announces-preliminary-terms-micron-onshore>

[6] <https://www.nist.gov/news-events/news/2023/12/biden-harris-administration-and-bae-systems-inc-announce-chips-preliminary>

[7] <https://www.nist.gov/news-events/news/2024/01/biden-harris-administration-announces-chips-preliminary-terms-microchip>

[8] <https://www.nist.gov/news-events/news/2024/05/biden-harris-administration-announces-preliminary-terms-polar-semiconductor>

[9] <https://www.nist.gov/news-events/news/2024/05/biden-harris-administration-announces-preliminary-terms-absolics-support>

[10] <https://www.politico.com/news/2024/05/23/3-billion-secret-program-undermining-bidens-tech-policy-00158757>

[11] <https://www.politico.com/newsletters/digital-future-daily/2024/05/28/whats-really-inside-a-secret-chips-project-00160233>

[12] <https://investor.entegris.com/news-releases/news-release-details/entegris-breaks-ground-manufacturing-center-excellence-colorado>

[13] <https://www.formfactor.com/blog/2023/announcement-update-formfactor-participating-in-new-tech-hub-initiative/>

[14] <https://investors.ttm.com/news-events/press-releases/detail/267/ttm-technologies-inc-announces-the-state-of-new-york-as>

[15] <https://www.coherent.com/news/press-releases/coherent-secures-chips-act-funding>

[16] <https://investor.analog.com/news-releases/news-release-details/analog-devices-invests-more-1-billion-semiconductor-facility>

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[Manager Commentary & Insights](#)

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Portfolio holdings are subject to change and may be long or short. Needham Aggressive Growth Fund’s ownership as a percentage of net assets in the stated securities as of March 31, 2024: GFS: 0.00%, INTC: 0.00%, TSM: 0.00%, KRX-005930: 0.00%, MU: 0.00%, BAESF: 0.00%, MCHP: 0.00%, TKS-6707: 0.00%, KRX-011790: 0.00%, ENTG: 1.34%, FORM: 1.14%, TTMI: 0.00%, COHR: 0.00%, ADI: 0.00%, PDFS: 3.42%, MKSI: 0.81%, TER: 0.12%, NVMI: 1.71%, PLAB: 1.12%, ASML: 0.39% AND LRCX: 0.00%.

Portfolio holdings are subject to change and may be long or short. Needham Growth Fund’s ownership as a percentage of net assets in the stated securities as of March 31, 2024: GFS: 0.00%, INTC: 0.00%, TSM: 0.00%, KRX-005930: 0.00%, MU: 0.00%, BAESF: 0.00%, MCHP: 0.00%, TKS-6707: 0.00%, KRX-011790: 0.00%, ENTG: 6.38%, FORM: 2.47%, TTMI: 0.40%, COHR: 0.82%, ADI: 0.95%, PDFS: 4.57%, MKSI: 1.41%, TER: 0.73%, NVMI: 3.75%, PLAB: 1.97%, ASML: 1.05% AND LRCX: 1.17%.

DEFINITIONS AND DISCLOSURES (Continued)

Portfolio holdings are subject to change and may be long or short. Needham Small Cap Growth Fund's ownership as a percentage of net assets in the stated securities as of March 31, 2024: GFS: 0.00%, INTC: 0.00%, TSM: 0.00%, KRX-005930: 0.00%, MU: 0.00%, BAESF: 0.00%, MCHP: 0.00%, TKS-6707: 0.00%, KRX-011790: 0.00%, ENTG: 0.00%, FORM: 2.89%, TTMI: 6.14%, COHR: 0.37%, ADI: 0.00%, PDFS: 3.20%, MKSI: 4.82%, TER: 0.00%, NVMI: 0.00%, PLAB: 0.00%, ASML: 0.00% AND LRCX: 0.00%.