UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-Q

(Mark One)

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the quarterly period ended June 30, 2024

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to

Commission file number 000-15867

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CADENCE DESIGN SYSTEMS, INC.
(Exact Name of Registrant as Specified in Its Charter)

Delaware	**00-0000000**
(State or Other Jurisdiction of Incorporation or Organization)	**(I.R.S. Employer Identification No.)**
2655 Seely Avenue, Building 5, San Jose, California	**95134**
(Address of Principal Executive Offices)	**(Zip Code)**

(408) 943-1234

Registrant's Telephone Number, including Area Code

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.01 par value per share	**CDNS**	**Nasdaq Global Select Market**

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer	☒	Accelerated Filer	☐	Smaller Reporting Company	☐
Non-accelerated Filer	☐			Emerging Growth Company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

On June 30, 2024, approximately 273,820,000 shares of the registrant's common stock, $0.01 par value, were outstanding.

CADENCE DESIGN SYSTEMS, INC.
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PART I. FINANCIAL INFORMATION

Item 1. Financial Statements

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS
(In thousands)
(Unaudited)

	As of	
	June 30, 2024	December 31, 2023
ASSETS		
Current assets:		
Cash and cash equivalents	$ 1,058,955	$ 1,008,152
Receivables, net	564,851	489,224
Inventories	171,508	181,661
Prepaid expenses and other	401,074	297,180
Total current assets	2,196,388	1,976,217
Property, plant and equipment, net	449,422	403,213
Goodwill	2,417,747	1,535,845
Acquired intangibles, net	664,038	336,843
Deferred taxes	892,963	880,001
Other assets	605,183	537,372
Total assets	$ 7,225,741	$ 5,669,491
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Current portion of long-term debt	$ 349,732	$ 349,285
Accounts payable and accrued liabilities	505,392	576,558
Current portion of deferred revenue	678,598	665,024
Total current liabilities	1,533,722	1,590,867
Long-term liabilities:		
Long-term portion of deferred revenue	88,823	98,931
Long-term debt	998,935	299,771
Other long-term liabilities	343,369	275,651
Total long-term liabilities	1,431,127	674,353
Commitments and contingencies (Note 14)		
Stockholders' equity:		
Common stock and capital in excess of par value	3,928,477	3,166,964
Treasury stock, at cost	(4,971,955)	(4,604,323)
Retained earnings	5,413,547	4,936,384
Accumulated other comprehensive loss	(109,177)	(94,754)
Total stockholders' equity	4,260,892	3,404,271
Total liabilities and stockholders' equity	$ 7,225,741	$ 5,669,491

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED INCOME STATEMENTS
(In thousands, except per share amounts)
(Unaudited)

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
Revenue:				
Product and maintenance	$ 960,457	$ 922,790	$ 1,873,842	$ 1,886,532
Services	100,224	53,789	195,942	111,737
Total revenue	1,060,681	976,579	2,069,784	1,998,269
Costs and expenses:				
Cost of product and maintenance	94,363	74,218	169,758	174,456
Cost of services	44,907	22,640	94,709	46,874
Marketing and sales	186,725	167,070	367,314	333,736
Research and development	370,740	354,416	749,698	704,711
General and administrative	63,436	54,605	132,152	108,132
Amortization of acquired intangibles	6,667	4,302	12,074	8,569
Restructuring	(33)	—	247	—
Total costs and expenses	766,805	677,251	1,525,952	1,376,478
Income from operations	293,876	299,328	543,832	621,791
Interest expense	(12,905)	(8,877)	(21,597)	(18,137)
Other income, net	34,739	7,973	103,518	16,257
Income before provision for income taxes	315,710	298,424	625,753	619,911
Provision for income taxes	86,190	77,304	148,590	156,987
Net income	$ 229,520	$ 221,120	$ 477,163	$ 462,924
Net income per share – basic	$ 0.85	$ 0.82	$ 1.77	$ 1.72
Net income per share – diluted	$ 0.84	$ 0.81	$ 1.74	$ 1.70
Weighted average common shares outstanding – basic	270,912	269,714	270,259	269,607
Weighted average common shares outstanding – diluted	273,520	272,996	273,532	273,078

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(In thousands)
(Unaudited)

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
Net income	$ 229,520	$ 221,120	$ 477,163	$ 462,924
Other comprehensive income (loss), net of tax effects:				
Foreign currency translation adjustments	(1,338)	(2,809)	(13,967)	1,146
Changes in defined benefit plan liabilities	145	142	123	405
Unrealized losses on investments	(187)	(454)	(579)	(424)
Total other comprehensive income (loss), net of tax effects	(1,380)	(3,121)	(14,423)	1,127
Comprehensive income	$ 228,140	$ 217,999	$ 462,740	$ 464,051

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands)
(Unaudited)

	Three Months Ended June 30, 2024						
	Common Stock						
	Shares	Par Value and Capital in Excess of Par	Treasury Stock	Retained Earnings	Accumulated Other Comprehensive Loss	Total
Balance, March 31, 2024	272,134	$ 3,331,547	$ (4,840,181)	$ 5,184,027	$ (107,797)	$ 3,567,596
Net income	—	—	—	229,520	—	$ 229,520
Other comprehensive loss, net of taxes	—	—	—	—	(1,380)	$ (1,380)
Purchase of treasury stock	(423)	—	(125,004)	—	—	$ (125,004)
Issuance of common stock and reissuance of treasury stock under equity incentive plans, net of forfeitures	409	10,881	5,666	—	—	$ 16,547
Issuance of common stock in a business combination	1,741	501,824	—	—	—	$ 501,824
Stock received for payment of employee taxes on vesting of restricted stock	(41)	(3,344)	(12,436)	—	—	$ (15,780)
Stock-based compensation expense	—	87,569	—	—	—	$ 87,569
Balance, June 30, 2024	273,820	$ 3,928,477	$ (4,971,955)	$ 5,413,547	$ (109,177)	$ 4,260,892

	Three Months Ended June 30, 2023					
	Common Stock					
	Shares	Par Value and Capital in Excess of Par	Treasury Stock	Retained Earnings	Accumulated Other Comprehensive Loss	Total
Balance, March 31, 2023	272,684	$ 2,878,749	$ (3,987,528)	$ 4,137,044	$ (87,389)	$ 2,940,876
Net income	—	—	—	221,120	—	$ 221,120
Other comprehensive loss, net of taxes	—	—	—	—	(3,121)	$ (3,121)
Purchase of treasury stock	(1,178)	—	(265,109)	—	—	$ (265,109)
Equity forward contract	—	(60,000)	—	—	—	$ (60,000)
Issuance of common stock and reissuance of treasury stock under equity incentive plans, net of forfeitures	325	4,838	4,519	—	—	$ 9,357
Stock received for payment of employee taxes on vesting of restricted stock	(41)	(2,310)	(8,966)	—	—	$ (11,276)
Stock-based compensation expense	—	76,608	—	—	—	$ 76,608
Balance, June 30, 2023	271,790	$ 2,897,885	$ (4,257,084)	$ 4,358,164	$ (90,510)	$ 2,908,455

	Six Months Ended June 30, 2024					
	Common Stock					
	Shares	Par Value and Capital in Excess of Par	Treasury Stock	Retained Earnings	Accumulated Other Comprehensive Loss	Total
Balance, December 31, 2023	271,706	$ 3,166,964	$ (4,604,323)	$ 4,936,384	$ (94,754)	$ 3,404,271
Net income	—	—	—	477,163	—	$ 477,163
Other comprehensive loss, net of taxes	—	—	—	—	(14,423)	$ (14,423)
Purchase of treasury stock	(848)	—	(250,010)	—	—	$ (250,010)
Issuance of common stock and reissuance of treasury stock under equity incentive plans, net of forfeitures	1,728	100,040	33,232	—	—	$ 133,272
Issuance of common stock in a business combination	1,741	501,824	—	—	—	$ 501,824
Stock received for payment of employee taxes on vesting of restricted stock	(507)	(16,049)	(150,854)	—	—	$ (166,903)
Stock-based compensation expense	—	175,698	—	—	—	$ 175,698
Balance, June 30, 2024	273,820	$ 3,928,477	$ (4,971,955)	$ 5,413,547	$ (109,177)	$ 4,260,892

	Six Months Ended June 30, 2023					
	Common Stock					
	Shares	Par Value and Capital in Excess of Par	Treasury Stock	Retained Earnings	Accumulated Other Comprehensive Loss	Total
Balance, December 31, 2022	272,675	$ 2,765,673	$ (3,824,163)	$ 3,895,240	$ (91,637)	$ 2,745,113
Net income	—	—	—	462,924	—	$ 462,924
Other comprehensive income, net of taxes	—	—	—	—	1,127	$ 1,127
Purchase of treasury stock	(1,846)	—	(390,119)	—	—	$ (390,119)
Equity forward contract	—	(60,000)		—	—	$ (60,000)
Issuance of common stock and reissuance of treasury stock under equity incentive plans, net of forfeitures	1,297	52,084	25,418	—	—	$ 77,502
Stock received for payment of employee taxes on vesting of restricted stock	(336)	(10,768)	(68,220)	—	—	$ (78,988)
Stock-based compensation expense	—	150,896	—	—	—	$ 150,896
Balance, June 30, 2023	271,790	$ 2,897,885	$ (4,257,084)	$ 4,358,164	$ (90,510)	$ 2,908,455

See notes to condensed consolidated financial statements.

CADENCE DESIGN SYSTEMS, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)
(Unaudited)

	Six Months Ended	
	June 30, 2024	June 30, 2023
Cash and cash equivalents at beginning of period	$ 1,008,152	$ 882,325
Cash flows from operating activities:		
Net income	477,163	462,924
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	87,202	70,432
Amortization of debt discount and fees	684	626
Stock-based compensation	175,698	150,896
(Gain) loss on investments, net	(80,599)	554
Deferred income taxes	(9,506)	(20,171)
Provisions for losses on receivables	614	720
ROU asset amortization and change in operating lease liabilities	(1,410)	(3,543)
Other non-cash items	212	1,834
Changes in operating assets and liabilities, net of effect of acquired businesses:		
Receivables	(49,384)	41,208
Inventories	(15,978)	(16,981)
Prepaid expenses and other	(39,868)	50,793
Other assets	(38,967)	(31,838)
Accounts payable and accrued liabilities	(93,078)	(37,049)
Deferred revenue	(18,599)	1,269
Other long-term liabilities	15,013	9,497
Net cash provided by operating activities	409,197	681,171
Cash flows from investing activities:		
Purchases of investments	(2,095)	(29,212)
Proceeds from the sale and maturity of investments	43,864	1,505
Purchases of property, plant and equipment	(78,800)	(46,655)
Cash paid in business combinations, net of cash acquired	(720,821)	(55,379)
Net cash used for investing activities	(757,852)	(129,741)
Cash flows from financing activities:		
Proceeds from revolving credit facility	—	50,000
Payments on revolving credit facility	—	(150,000)
Proceeds from term loan	700,000	—
Payment of debt issuance costs	(944)	—
Proceeds from issuance of common stock	133,272	77,502
Stock received for payment of employee taxes on vesting of restricted stock	(166,903)	(78,988)
Payments for repurchases of common stock	(250,010)	(450,119)
Net cash provided by (used for) financing activities	415,415	(551,605)
Effect of exchange rate changes on cash and cash equivalents	(15,957)	(8,225)
Increase (decrease) in cash and cash equivalents	50,803	(8,400)
Cash and cash equivalents at end of period	$ 1,058,955	$ 873,925
Supplemental cash flow information:		
Cash paid for interest	$ 21,282	$ 17,566
Cash paid for income taxes, net	197,475	61,893

See notes to condensed consolidated financial statements.

NOTE 1. BASIS OF PRESENTATION AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation

The condensed consolidated financial statements included in this Quarterly Report on Form 10-Q have been prepared by Cadence Design Systems, Inc. ("Cadence") without audit, pursuant to the rules and regulations of the United States Securities and Exchange Commission (the "SEC"). Certain information and footnote disclosures normally included in consolidated financial statements prepared in accordance with United States generally accepted accounting principles ("U.S. GAAP") have been condensed or omitted pursuant to such rules and regulations. However, Cadence believes that the disclosures contained in this Quarterly Report on Form 10-Q comply with the requirements of Section 13(a) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") for a Quarterly Report on Form 10-Q and are adequate to make the information presented not misleading. These condensed consolidated financial statements are meant to be, and should be, read in conjunction with the consolidated financial statements and the notes thereto included in Cadence's Annual Report on Form 10-K for the fiscal year ended December 31, 2023.

The unaudited condensed consolidated financial statements included in this Quarterly Report on Form 10-Q reflect all adjustments (which include only normal, recurring adjustments and those items discussed in these notes) that are, in the opinion of management, necessary to state fairly the results of operations, cash flows and financial position for the periods and dates presented. The results for such periods are not necessarily indicative of the results to be expected for the full fiscal year or other periods. Certain prior period balances have been reclassified to conform to the current period presentation. Management has evaluated subsequent events through the issuance date of the unaudited condensed consolidated financial statements.

Fiscal Year End

Cadence's fiscal year end is December 31, and its fiscal quarters end on March 31, June 30, and September 30.

Use of Estimates

Preparation of the condensed consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the condensed consolidated financial statements and the reported amounts of revenue and expenses during the reporting period.

Despite continued uncertainty and disruption in the macroeconomic and geopolitical environment, Cadence is not aware of any specific event or circumstance that would require an update to its estimates or judgments or a revision of the carrying value of its assets or liabilities as of July 23, 2024, the date of issuance of this Quarterly Report on Form 10-Q. These estimates may change, as new events or developments occur and additional information is obtained. Actual results could differ materially from these estimates under different assumptions or conditions.

Recently Adopted Accounting Standards

Cadence has not recently adopted any accounting standard updates that are material or potentially material to its condensed consolidated financial statements.

New Accounting Standards Not Yet Adopted

Segment Reporting

In November 2023, the Financial Accounting Standards Board ("FASB"), issued Accounting Standards Update ("ASU") No. 2023-07, "Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures," intended to improve reportable segment disclosure requirements, primarily through enhanced annual and interim disclosures about significant segment expenses. This standard is effective for fiscal years beginning after December 15, 2023, and interim periods within fiscal years beginning after December 15, 2024. Early adoption is permitted. Cadence is currently evaluating the impact of adopting this standard on its financial statement disclosures.

Income Taxes

In December 2023, the FASB issued ASU No. 2023-09, "Income Taxes (Topic 740): Improvements to Income Tax Disclosures," which requires disclosure of disaggregated income taxes paid, prescribes standard categories for the components of the effective tax rate reconciliation, and modifies other income tax-related disclosures. This standard is effective for fiscal years beginning after December 15, 2024, and may be applied on a retrospective or prospective basis. Cadence is currently evaluating the impact of adopting this standard on its financial statement disclosures.

NOTE 2. REVENUE

Cadence groups its products and services into five categories related to major design activities. The following table shows the percentage of revenue contributed by each of Cadence's five product categories for the three and six months ended June 30, 2024 and June 30, 2023:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
Custom Integrated Circuit ("IC") Design and Simulation	21 %	22 %	21 %	21 %
Digital IC Design and Signoff	27 %	27 %	28 %	26 %
Functional Verification, including Emulation and Prototyping Hardware*	25 %	27 %	25 %	30 %
Intellectual Property ("IP")	13 %	11 %	13 %	11 %
System Design and Analysis	14 %	13 %	13 %	12 %
Total	100 %	100 %	100 %	100 %

* Includes immaterial amount of revenue accounted for under leasing arrangements.

Cadence generates revenue from contracts with customers and applies judgment in identifying and evaluating any terms and conditions in contracts which may impact revenue recognition. Certain of Cadence's licensing arrangements allow customers the ability to remix among software products. Cadence also has arrangements with customers that include a combination of products, with the actual product selection and number of licensed users to be determined at a later date. For these arrangements, Cadence estimates the allocation of the revenue to product categories based upon the expected usage of products. Revenue by product category fluctuates from period to period based on demand for products and services, and Cadence's available resources to deliver them. No single customer accounted for 10% or more of total revenue during the three and six months ended June 30, 2024 or June 30, 2023.

Recurring revenue includes revenue recognized over time from Cadence's software arrangements, services, royalties, maintenance on IP licenses and hardware, and operating leases of hardware. Recurring revenue also includes revenue recognized at varying points in time over the term of other arrangements with non-cancelable commitments, whereby the customer commits to a fixed dollar amount over a specified period of time that can be used to purchase from a list of products or services. These arrangements do not meet the definition of a revenue contract until the customer executes a separate selection form to identify the products and services that they are purchasing. Each separate selection form under the arrangement is treated as an individual contract and accounted for based on the respective performance obligations.

The remainder of Cadence's revenue is recognized at a point in time and is characterized as up-front revenue. Up-front revenue is primarily generated by sales of emulation and prototyping hardware, individual IP licenses and certain software licenses.

The percentage of Cadence's recurring and up-front revenue in any single fiscal period is primarily impacted by delivery of hardware and IP products to its customers.

The following table shows the percentage of Cadence's revenue that is classified as recurring or up-front for the three and six months ended June 30, 2024 and June 30, 2023:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
Revenue recognized over time	85 %	82 %	86 %	79 %
Revenue from arrangements with non-cancelable commitments	3 %	3 %	3 %	3 %
Recurring revenue	88 %	85 %	89 %	82 %
Up-front revenue	12 %	15 %	11 %	18 %
Total	100 %	100 %	100 %	100 %

Significant Judgments

Cadence's contracts with customers often include promises to transfer to a customer multiple software and/or IP licenses and services, including professional services, technical support services, and rights to unspecified updates. Determining whether licenses and services are distinct performance obligations that should be accounted for separately, or not distinct and thus accounted for together, requires significant judgment. In some arrangements, such as most of Cadence's IP license arrangements, Cadence has concluded that the licenses and associated services are distinct from each other. In others, like Cadence's time-based software arrangements, the licenses and certain services are not distinct from each other. Cadence's time-based software arrangements include multiple software licenses and updates to the licensed software products, as well as technical support, and Cadence has concluded that these promised goods and services are a single, combined performance obligation.

The accounting for contracts with multiple performance obligations requires the contract's transaction price to be allocated to each distinct performance obligation based on relative stand-alone selling price ("SSP"). Judgment is required to determine the SSP for each distinct performance obligation because Cadence rarely licenses or sells products on a standalone basis. In instances where the SSP is not directly observable because Cadence does not sell the license, product or service separately, Cadence determines the SSP using information that maximizes the use of observable inputs and may include market conditions. Cadence typically has more than one SSP for individual performance obligations due to the stratification of those items by classes of customers and circumstances. In these instances, Cadence may use information such as the size of the customer and geographic region of the customer in determining the SSP.

Revenue is recognized over time for Cadence's combined performance obligations that include software licenses, updates, technical support and maintenance that are separate performance obligations with the same term. For Cadence's professional services, revenue is recognized over time, generally using costs incurred or hours expended to measure progress. Judgment is required in estimating project status and the costs necessary to complete projects. A number of internal and external factors can affect these estimates, including labor rates, utilization and efficiency variances and specification and testing requirement changes. For Cadence's other performance obligations recognized over time, revenue is generally recognized using a time-based measure of progress reflecting generally consistent efforts to satisfy those performance obligations throughout the arrangement term.

If a group of agreements are so closely related that they are, in effect, part of a single arrangement, such agreements are deemed to be one arrangement for revenue recognition purposes. Cadence exercises significant judgment to evaluate the relevant facts and circumstances in determining whether the separate agreements should be accounted for separately or as, in substance, a single arrangement. Cadence's judgments about whether a group of contracts comprise a single arrangement can affect the allocation of consideration to the distinct performance obligations, which could have an effect on results of operations for the periods involved.

Cadence is required to estimate the total consideration expected to be received from contracts with customers. In limited circumstances, the consideration expected to be received is variable based on the specific terms of the contract or based on Cadence's expectations of the term of the contract. Generally, Cadence has not experienced significant returns or refunds to customers. These estimates require significant judgment and a change in these estimates could have an effect on its results of operations during the periods involved.

Contract Balances

The timing of revenue recognition may differ from the timing of invoicing to customers, and these timing differences result in receivables, contract assets, or contract liabilities (deferred revenue) on Cadence's condensed consolidated balance sheets. For certain software, hardware and IP agreements with payment plans, Cadence records an unbilled receivable related to revenue recognized upon transfer of control because it has an unconditional right to invoice and receive payment in the future related to those transferred products or services. Cadence records a contract asset when revenue is recognized prior to invoicing and Cadence does not have the unconditional right to invoice or retains performance risk with respect to that performance obligation. Cadence records deferred revenue when revenue is recognized subsequent to invoicing. For Cadence's time-based software agreements, customers are generally invoiced in equal, quarterly amounts, although some customers prefer to be invoiced in single or annual amounts.

The contract assets indicated below are included in prepaid expenses and other in the condensed consolidated balance sheets and primarily relate to Cadence's rights to consideration for work completed but not billed as of the balance sheet date on services and customized IP contracts. The contract assets are transferred to receivables when the rights become unconditional, usually upon completion of a milestone.

Cadence's contract balances as of June 30, 2024 and December 31, 2023 were as follows:

	As of	
	June 30, 2024	December 31, 2023
	(In thousands)	
Contract assets	$ 25,400	$ 17,554
Deferred revenue	767,421	763,955

Cadence recognized revenue of $185.9 million and $510.3 million during the three and six months ended June 30, 2024, and $162.6 million and $525.8 million during the three and six months ended June 30, 2023, that was included in the deferred revenue balance at the beginning of each respective fiscal year. All other activity in deferred revenue, with the exception of deferred revenue assumed from acquisitions, is due to the timing of invoices in relation to the timing of revenue as described above.

Payment terms and conditions vary by contract type, although terms generally include a requirement of payment within 30 to 60 days. In instances where the timing of revenue recognition differs from the timing of invoicing, Cadence has determined that its contracts generally do not include a significant financing component. The primary purpose of invoicing terms is to provide customers with simplified and predictable ways of purchasing Cadence's products and services, and not to facilitate financing arrangements.

Remaining Performance Obligations

Revenue allocated to remaining performance obligations represents the transaction price allocated to the performance obligations that are unsatisfied, or partially unsatisfied, which includes unearned revenue and amounts that will be invoiced and recognized as revenue in future periods. Cadence has elected to exclude the potential future royalty receipts from the remaining performance obligations. Contracted but unsatisfied performance obligations were approximately $6.0 billion as of June 30, 2024, which included $0.4 billion of non-cancelable commitments from customers where actual product selection and quantities of specific products or services are to be determined by customers at a later date.

Cadence estimates its remaining performance obligations at a point in time. Actual amounts and timing of revenue recognition may differ from these estimates largely due to changes in actual installation and delivery dates, as well as contract renewals, modifications and terminations. As of June 30, 2024, Cadence expected to recognize 56% of the contracted but unsatisfied performance obligations, excluding non-cancelable commitments, as revenue over the next 12 months, 39% over the next 13 to 36 months and the remainder thereafter.

Cadence recognized revenue of $15.1 million and $30.1 million during the three and six months ended June 30, 2024, and $11.6 million and $26.8 million during the three and six months ended June 30, 2023, from performance obligations satisfied in previous periods. These amounts represent royalties earned during the period and exclude contracts with nonrefundable prepaid royalties. Nonrefundable prepaid royalties are recognized upon delivery of the IP because Cadence's right to the consideration is not contingent upon customers' future shipments.

NOTE 3. RECEIVABLES, NET

Cadence's current and long-term receivables balances as of June 30, 2024 and December 31, 2023 were as follows:

	As of	
	June 30, 2024	December 31, 2023
	(In thousands)	
Accounts receivable	$ 386,713	$ 299,814
Unbilled accounts receivable	182,823	193,963
Long-term receivables	11,718	10,755
Total receivables	581,254	504,532
Less allowance for doubtful accounts	(4,685)	(4,553)
Total receivables, net	$ 576,569	$ 499,979

Cadence's customers are primarily concentrated within the semiconductor and electronics systems industries. As of June 30, 2024, one customer accounted for approximately 11% of Cadence's total receivables. As of December 31, 2023, no single customer accounted for 10% or more of Cadence's total receivables.

NOTE 4. DEBT

Cadence’s outstanding debt was as follows:

	June 30, 2024			December 31, 2023		
	(In thousands)					
	Principal	Unamortized Discount	Carrying Value	Principal	Unamortized Discount	Carrying Value
2024 Notes	350,000	(268)	349,732	350,000	(715)	349,285
2025 Term Loan	300,000	(161)	299,839	300,000	(229)	299,771
2026 Term Loan	700,000	(904)	699,096	—	—	—
Total outstanding debt	$ 1,350,000	$ (1,333)	$ 1,348,667	$ 650,000	$ (944)	$ 649,056

Revolving Credit Facility

In June 2021, Cadence entered into a five-year senior unsecured revolving credit facility with a group of lenders led by Bank of America, N.A, as administrative agent (the “2021 Credit Facility”). In September 2022, Cadence amended the 2021 Credit Facility to, among other things, allow Cadence to change its fiscal year to match the calendar year commencing in 2023 and change the interest rate benchmark for loans under the 2021 Credit Facility from the London Inter-Bank Offered Rate (“LIBOR”) to Term Secured Overnight Financing Rate (“SOFR”). The material terms of the 2021 Credit Facility otherwise remain unchanged.

The 2021 Credit Facility provides for borrowings up to $700.0 million, with the right to request increased capacity up to an additional $350.0 million upon the receipt of lender commitments, for total maximum borrowings of $1.05 billion. The 2021 Credit Facility expires on June 30, 2026. Any outstanding loans drawn under the 2021 Credit Facility are due at maturity on June 30, 2026, subject to an option to extend the maturity date. Outstanding borrowings may be repaid at any time prior to maturity. Debt issuance costs of $1.3 million were recorded to other assets in Cadence’s condensed consolidated balance sheet at the inception of the agreement and are being amortized to interest expense over the term of the 2021 Credit Facility. As of June 30, 2024, there were no outstanding borrowings under the 2021 Credit Facility.

Interest accrues on borrowings under the 2021 Credit Facility at a rate equal to, at Cadence’s option, either (1) SOFR plus a margin between 0.750% and 1.250% per annum, determined by reference to the credit rating of Cadence’s unsecured debt, plus a SOFR adjustment of 0.10% or (2) the base rate plus a margin between 0.000% and 0.250% per annum, determined by reference to the credit rating of Cadence’s unsecured debt. Interest is payable quarterly. A commitment fee ranging from 0.070% to 0.175% is assessed on the daily average undrawn portion of revolving commitments. Borrowings bear interest at what is estimated to be current market rates of interest. Accordingly, the carrying value of the 2021 Credit Facility approximates fair value.

The 2021 Credit Facility contains customary negative covenants that, among other things, restrict Cadence’s ability to incur additional indebtedness, grant liens and make certain asset dispositions. In addition, the 2021 Credit Facility contains financial covenants that require Cadence to maintain a funded debt to EBITDA ratio not greater than 3.25 to 1, with a step up to 3.75 to 1 for one year following an acquisition by Cadence of at least $250.0 million that results in a pro forma leverage ratio between 3.00 to 1 and 3.50 to 1. As of June 30, 2024, Cadence was in compliance with all financial covenants associated with the 2021 Credit Facility.

2024 Notes

In October 2014, Cadence issued a $350.0 million aggregate principal amount of 4.375% Senior Notes due October 15, 2024 (the “2024 Notes”). Cadence received net proceeds of $342.4 million from the issuance of the 2024 Notes, net of a discount of $1.4 million and issuance costs of $6.2 million. Both the discount and issuance costs are being amortized to interest expense over the term of the 2024 Notes using the effective interest method. Interest is payable in cash semi-annually in April and October. The 2024 Notes are unsecured and rank equal in right of payment to all of Cadence’s existing and future senior indebtedness. As of June 30, 2024 and December 31, 2023, the carrying value of the 2024 Notes was classified as a current liability on Cadence’s condensed consolidated balance sheet. As of June 30, 2024, the fair value of the 2024 Notes was approximately $348.4 million.

Cadence may redeem the 2024 Notes, in whole or in part, at a redemption price equal to the greater of (a) 100% of the principal amount of the notes to be redeemed and (b) the sum of the present values of the remaining scheduled payments of principal and interest, plus any accrued and unpaid interest, as more particularly described in the indenture governing the 2024 Notes.

The indenture governing the 2024 Notes includes customary representations, warranties and restrictive covenants, including, but not limited to, restrictions on Cadence’s ability to grant liens on assets, enter into sale and lease-back transactions, or merge, consolidate or sell assets, and also includes customary events of default.

2025 Term Loan

In September 2022, Cadence entered into a $300.0 million three-year senior non-amortizing term loan facility due on September 7, 2025 with a group of lenders led by Bank of America, N.A., as administrative agent (the “2025 Term Loan”). The 2025 Term Loan is unsecured and ranks equal in right of payment to all of Cadence’s unsecured indebtedness. Proceeds from the loan were used to fund Cadence’s acquisition of OpenEye Scientific Software, Inc. in fiscal 2022. Debt issuance costs associated with the 2025 Term Loan were not material.

Amounts outstanding under the 2025 Term Loan accrue interest at a rate equal to, at Cadence’s option, either (1) Term SOFR plus a margin between 0.625% and 1.125% per annum, determined by reference to the credit rating of Cadence’s unsecured debt, plus a SOFR adjustment of 0.10% or (2) base rate plus a margin between 0.000% and 0.125% per annum, determined by reference to the credit rating of Cadence’s unsecured debt. As of June 30, 2024, the interest rate on the 2025 Term Loan was 6.18%. Interest is payable quarterly. Borrowings bear interest at what is estimated to be current market rates of interest. Accordingly, the carrying value of the 2025 Term Loan approximates fair value.

The 2025 Term Loan contains customary negative covenants that, among other things, restrict Cadence’s ability to incur additional indebtedness, grant liens and make certain asset dispositions. In addition, the 2025 Term Loan contains a financial covenant that requires Cadence to maintain a funded debt to EBITDA ratio not greater than 3.25 to 1, with a step-up to 3.75 to 1 for one year following an acquisition by Cadence of at least $250.0 million that results in a pro forma leverage ratio between 3.00 to 1 and 3.50 to 1. As of June 30, 2024, Cadence was in compliance with all financial covenants associated with the 2025 Term Loan.

2026 Term Loan

On May 30, 2024, Cadence entered into a $700.0 million two-year senior non-amortizing term loan facility due on May 30, 2026 with a group of lenders led by Bank of America, N.A, as administrative agent (the “2026 Term Loan”). The 2026 Term Loan is unsecured and ranks equal in right of payment to all of Cadence’s unsecured indebtedness. All proceeds from the 2026 Term Loan were used to finance Cadence’s acquisition of BETA CAE Systems International AG (“BETA CAE”). Debt issuance costs associated with the 2026 Term Loan were not material.

Amounts outstanding under the 2026 Term Loan accrue interest at a rate equal to, at Cadence’s option, either (1) Term SOFR plus a margin of between 0.875% and 1.375% per annum, determined by reference to the credit rating of Cadence’s unsecured debt, plus a SOFR adjustment of 0.10%, or (2) base rate plus a margin of between 0.000% and 0.375% per annum, determined by reference to the credit rating of Cadence’s unsecured debt. As of June 30, 2024, the interest rate on the 2026 Term Loan was 6.44%. Interest is payable quarterly. Borrowings bear interest at what is estimated to be current market rates of interest. Accordingly, the carrying value of the 2026 Term Loan approximates fair value.

The 2026 Term Loan contains customary negative covenants that, among other things, restrict Cadence’s ability to incur additional indebtedness, grant liens and make certain asset dispositions. In addition, the 2026 Term Loan contains a financial covenant that requires Cadence to maintain a funded debt to Consolidated EBITDA ratio not greater than 3.25 to 1, with a step-up to 3.75 to 1 for one year following an acquisition by Cadence of at least $250.0 million that results in a pro forma leverage ratio between 3.00 to 1 and 3.50 to 1. As of June 30, 2024, Cadence was in compliance with all financial covenants associated with the 2026 Term Loan.

NOTE 5. ACQUISITIONS

Acquisition of BETA CAE

On May 30, 2024, Cadence acquired all of the outstanding equity of BETA CAE, a system analysis platform provider of multi-domain, engineering simulation solutions. The aggregate purchase consideration for Cadence’s acquisition of BETA CAE, net of cash acquired of $91.3 million, was $1.14 billion. The aggregate purchase consideration was comprised of $636.2 million of cash and non-cash consideration of 1.74 million shares of Cadence common stock with an aggregate acquisition date fair value of $501.8 million. The addition of BETA CAE’s technologies and talent is intended to accelerate Cadence’s Intelligent System Design™ strategy by expanding its multiphysics system analysis portfolio and enabling entry into the structural analysis space.

In connection with its acquisition of BETA CAE, Cadence paid an additional $55.8 million to a third-party escrow agent that will be released to certain former BETA CAE shareholders, now employed by Cadence, through the second quarter of fiscal 2026. The release of these funds is subject to continuous service and other conditions and is accounted for over the required service period as post-acquisition compensation expense in Cadence’s condensed consolidated income statements.

The total purchase consideration was allocated to the assets acquired and liabilities assumed with Cadence's acquisition of BETA CAE based on their respective fair values on the acquisition date as follows:

	Fair Value
	(In thousands)
Current assets	$ 122,215
Goodwill	827,212
Acquired intangibles	345,000
Other long-term assets	16,890
Total assets acquired	1,311,317
Current liabilities	41,175
Long-term liabilities	40,907
Total liabilities assumed	82,082
Total purchase consideration	$ 1,229,235

The recorded goodwill is attributed to intangible assets that do not qualify for separate recognition, including the acquired assembled workforce, and is expected to be deductible for U.S. income tax purposes.

Definite-lived intangible assets acquired with Cadence's acquisition of BETA CAE were as follows:

	Fair Value	Weighted Average Amortization Period
	(In thousands)	(in years)
Existing technology	$ 140,000	6.0 years
Agreements and relationships	190,000	15.0 years
Tradenames, trademarks and patents	15,000	7.0 years
Total acquired intangibles with definite lives	$ 345,000	11.0 years

As of June 30, 2024, the allocation of purchase consideration to the acquired assets and assumed liabilities from BETA CAE was preliminary. Cadence will continue to evaluate the estimates and assumptions used to derive the fair value of certain acquired assets and assumed liabilities, primarily related to contracts with customers and income taxes, during the measurement period (up to one year from the acquisition date). The allocation of purchase consideration may change materially as additional information about conditions existing at the acquisition date becomes available.

Acquisition of Invecas, Inc.

On January 8, 2024, Cadence acquired all of the outstanding equity of Invecas, Inc. ("Invecas"), a provider of design engineering, embedded software and system-level solutions. The aggregate cash consideration for Cadence's acquisition of Invecas, net of cash acquired of $23.8 million, was $71.5 million. The acquisition adds a skilled system design engineering team to Cadence, with expertise in providing customers with custom solutions across chip design, product engineering, advanced packaging and embedded software. In connection with its acquisition of Invecas, Cadence paid an additional amount to a third-party escrow agent that will be released to certain former Invecas shareholders, now employed by Cadence, through the first quarter of fiscal 2028. The release of these funds is subject to continuous service and other conditions and is accounted for over the required service period as post-acquisition compensation expense in Cadence's condensed consolidated income statements.

The total purchase consideration was allocated to the assets acquired and liabilities assumed with Cadence’s acquisition of Invecas based on their respective fair values on the acquisition date as follows:

		Fair Value
		(In thousands)
Current assets	$	50,608
Goodwill		42,480
Acquired intangibles		15,500
Other long-term assets		24,402
Total assets acquired		132,990
Current liabilities		17,114
Long-term liabilities		20,635
Total liabilities assumed		37,749
Total purchase consideration	$	95,241

As of June 30, 2024, the allocation of purchase consideration to certain assets and liabilities was preliminary. Cadence will continue to evaluate certain estimates and assumptions, primarily related to assumed tax liabilities, during the measurement period (up to one year from the acquisition date). The allocation of purchase consideration may change materially as additional information about conditions existing at the acquisition date becomes available.

The recorded goodwill is attributed to intangible assets that do not qualify for separate recognition, including the acquired assembled workforce, and will not be deductible for tax purposes.

The definite-lived intangible assets acquired with Cadence’s acquisition of Invecas include agreements and relationships of $15.0 million and tradenames of $0.5 million. These assets will be amortized over a weighted average life of 6.8 years.

Other Acquisitions

During the second quarter of fiscal 2024, Cadence completed one other business combination for aggregate cash consideration of $13.3 million, net of cash acquired. The total purchase consideration was allocated to assets acquired and liabilities assumed based on their respective estimated fair values on the acquisition dates. Cadence recorded $3.5 million of definite-lived intangible assets with a weighted average amortization period of 6.3 years. Cadence also recognized $13.1 million of goodwill, which is primarily attributed to the assembled workforce of the acquired business. The goodwill recognized with this acquisition is not expected to be deductible for tax purposes.

Pro Forma Financial Information

Cadence has not presented pro forma financial information for its fiscal 2024 acquisitions because the results of operations are not material to Cadence’s condensed consolidated financial statements.

Acquisition-Related Transaction Costs

Transaction costs associated with acquisitions, which consist of professional fees and administrative costs, are expensed as incurred and are included in general and administrative expense in Cadence’s condensed consolidated income statement. During the three and six months ended June 30, 2024, transaction costs associated with acquisitions were $3.4 million and $12.3 million, respectively. During the three and six months ended June 30, 2023, transaction costs associated with acquisitions were $3.1 million and $6.0 million, respectively.

NOTE 6. GOODWILL AND ACQUIRED INTANGIBLES

Goodwill

The changes in the carrying amount of goodwill during the six months ended June 30, 2024 were as follows:

		Gross Carrying Amount
		(In thousands)
Balance as of December 31, 2023	$	1,535,845
Goodwill resulting from acquisitions		882,813
Effect of foreign currency translation		(911)
Balance as of June 30, 2024	$	2,417,747

Acquired Intangibles, Net

Acquired intangibles as of June 30, 2024 were as follows:

	Gross Carrying Amount	Accumulated Amortization	Acquired Intangibles, Net
		(In thousands)	
Existing technology	$ 472,024	$ (164,369)	$ 307,655
Agreements and relationships	395,646	(62,747)	332,899
Tradenames, trademarks and patents	28,940	(5,456)	23,484
Total acquired intangibles	$ 896,610	$ (232,572)	$ 664,038

During the six months ended June 30, 2024, Cadence completed certain projects previously included in in-process technology and transferred $6.8 million to existing technology.

Acquired intangibles as of December 31, 2023 were as follows:

	Gross Carrying Amount	Accumulated Amortization	Acquired Intangibles, Net
		(In thousands)	
Existing technology	$ 325,710	$ (141,659)	$ 184,051
Agreements and relationships	198,259	(61,395)	136,864
Tradenames, trademarks and patents	13,460	(4,332)	9,128
Total acquired intangibles with definite lives	$ 537,429	$ (207,386)	$ 330,043
In-process technology	6,800	—	6,800
Total acquired intangibles	$ 544,229	$ (207,386)	$ 336,843

Amortization expense from existing technology and maintenance agreements is included in cost of product and maintenance. Amortization expense for the three and six months ended June 30, 2024 and June 30, 2023 by condensed consolidated income statement caption was as follows:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
		(In thousands)		
Cost of product and maintenance	$ 13,488	$ 10,618	$ 24,836	$ 20,878
Amortization of acquired intangibles	6,667	4,302	12,074	8,569
Total amortization of acquired intangibles	$ 20,155	$ 14,920	$ 36,910	$ 29,447

As of June 30, 2024, the estimated amortization expense for intangible assets with definite lives was as follows for the following five fiscal years and thereafter:

	(In thousands)
2024 - remaining period	$ 53,697
2025	93,905
2026	88,301
2027	85,875
2028	81,455
2029	66,765
Thereafter	194,040
Total estimated amortization expense	$ 664,038

NOTE 7. STOCK-BASED COMPENSATION

Stock-based compensation expense is reflected in Cadence's condensed consolidated income statements for the three and six months ended June 30, 2024 and June 30, 2023 as follows:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In thousands)			
Cost of product and maintenance	$ 1,352	$ 1,035	$ 2,632	$ 2,101
Cost of services	1,721	1,317	3,350	2,674
Marketing and sales	16,000	15,686	33,836	30,777
Research and development	54,491	44,807	108,128	89,129
General and administrative	14,005	13,763	27,752	26,215
Total stock-based compensation expense	$ 87,569	$ 76,608	$ 175,698	$ 150,896

Cadence had total unrecognized compensation expense related to stock option and restricted stock grants of $495.4 million as of June 30, 2024, which is expected to be recognized over a weighted average vesting period of 1.8 years.

NOTE 8. STOCK REPURCHASE PROGRAM

Cadence is authorized to repurchase shares of its common stock under a publicly announced program that was most recently increased by its Board of Directors in August 2023. The actual timing and amount of repurchases are subject to business and market conditions, corporate and regulatory requirements, stock price, acquisition opportunities and other factors.

During the three and six months ended June 30, 2024, Cadence purchased approximately 0.4 million and 0.8 million shares of Cadence stock on the open market for an aggregate purchase price of $125.0 million and $250.0 million, respectively, in accordance with its current authorization from its Board of Directors. As of June 30, 2024, approximately $1.1 billion of Cadence's share repurchase authorization remained available to repurchase shares of Cadence common stock.

During the three and six months ended June 30, 2023, Cadence repurchased approximately 0.6 million and 1.2 million shares of Cadence common stock on the open market for an aggregate purchase price of $125.0 million and $250.0 million, respectively.

In June 2023, Cadence also entered into an accelerated share repurchase ("ASR") agreement with HSBC Bank USA, National Association ("HSBC") to repurchase an aggregate of $200.0 million of Cadence common stock. The ASR agreement was accounted for as two separate transactions: (1) a repurchase of common stock and (2) an equity-linked contract on Cadence's own stock. In June 2023, Cadence received an initial share delivery of approximately 0.6 million shares, which represented the number of shares at a market price equal to $140.0 million. An equity-linked contract for $60.0 million, representing the remaining shares to be delivered by HSBC under the ASR agreement, was recorded to stockholders' equity as of June 30, 2023. In August 2023, the ASR agreement settled and resulted in a delivery of approximately 0.3 million additional shares to Cadence. In total, Cadence received approximately 0.9 million shares under the ASR agreement at an average price per share of $228.26. The shares received were treated as repurchased common stock for purposes of calculating earnings per share.

The shares repurchased under Cadence's repurchase authorizations, which includes shares repurchased on the open market and under an ASR, and the total cost of repurchased shares, including commissions, during the three and six months ended June 30, 2024 and June 30, 2023 were as follows:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In thousands)			
Shares repurchased	423	1,178	848	1,846
Total cost of repurchased shares	$ 125,004	$ 265,109	$ 250,010	$ 390,119

NOTE 9. OTHER INCOME, NET

Cadence's other income, net, for the three and six months ended June 30, 2024 and June 30, 2023 were as follows:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In thousands)			
Interest income	$ 8,885	$ 7,427	$ 18,397	$ 13,800
Gains (loss) on investments	25,205	(647)	80,599	(525)
Gains on securities in Non-Qualified Deferred Compensation ("NQDC") trust	1,697	3,155	6,285	6,305
Losses on foreign exchange	(708)	(37)	(1,039)	(1,080)
Other expense, net	(340)	(1,925)	(724)	(2,243)
Total other income, net	$ 34,739	$ 7,973	$ 103,518	$ 16,257

For additional information relating to Cadence's investments and the gains on investments, see Note 11 in the notes to condensed consolidated financial statements.

NOTE 10. NET INCOME PER SHARE

Basic net income per share is computed by dividing net income during the period by the weighted average number of shares of common stock outstanding during that period, less unvested restricted stock awards. Diluted net income per share is impacted by equity instruments considered to be potential common shares, if dilutive, computed using the treasury stock method of accounting.

The calculations for basic and diluted net income per share for the three and six months ended June 30, 2024 and June 30, 2023 are as follows:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In thousands, except per share amounts)			
Net income	$ 229,520	$ 221,120	$ 477,163	$ 462,924
Weighted average common shares used to calculate basic net income per share	270,912	269,714	270,259	269,607
Stock-based awards	2,608	3,282	3,273	3,471
Weighted average common shares used to calculate diluted net income per share	273,520	272,996	273,532	273,078
Net income per share - basic	$ 0.85	$ 0.82	$ 1.77	$ 1.72
Net income per share - diluted	$ 0.84	$ 0.81	$ 1.74	$ 1.70

The following table presents shares of Cadence's common stock outstanding for the three and six months ended June 30, 2024 and June 30, 2023 that were excluded from the computation of diluted net income per share because the effect of including these shares in the computation of diluted net income per share would have been anti-dilutive:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In thousands)			
Long-term market-based awards	—	1,830	—	1,828
Options to purchase shares of common stock	229	525	144	429
Non-vested shares of restricted stock	3	6	6	28
Total potential common shares excluded	232	2,361	150	2,285

NOTE 11. INVESTMENTS

Investments in Equity Securities

Marketable Equity Investments

Cadence's investments in marketable equity securities consist of purchased shares of publicly held companies and are included in prepaid expenses and other in Cadence's condensed consolidated balance sheets. Changes in the fair value of these investments are recorded to other income, net in Cadence's condensed consolidated income statements. The carrying value of marketable equity investments was $119.6 million and $80.6 million as of June 30, 2024 and December 31, 2023, respectively.

Non-Marketable Equity Investments

Cadence's investments in non-marketable equity securities generally consist of stock or other instruments of privately held entities and are included in other assets on Cadence's condensed consolidated balance sheets. Cadence holds a 16% interest in a privately held company that is accounted for using the equity method of accounting. The carrying value of this investment was $108.1 million and $111.1 million as of June 30, 2024 and December 31, 2023, respectively.

Cadence records its proportionate share of net income from the investee, offset by amortization of basis differences, to other income, net in Cadence's condensed consolidated income statements. For the three and six months ended June 30, 2024, Cadence recognized losses of $0.2 million and $0.6 million, respectively. For the three and six months ended June 30, 2023, Cadence recognized losses of $1.0 million and $1.1 million, respectively.

Cadence also holds other non-marketable investments in privately held companies where Cadence does not have the ability to exercise significant influence and the fair value of the investments is not readily determinable. The carrying value of these investments was $26.7 million and $27.2 million as of June 30, 2024 and December 31, 2023, respectively. Gains and losses on these investments were not material to Cadence's condensed consolidated financial statements for the periods presented.

The portion of gains and losses included in Cadence's condensed consolidated income statements related to equity securities still held at the end of the period were as follows:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In thousands)			
Net gains (losses) recognized on equity securities	$ 25,351	$ (647)	$ 80,749	$ (525)
Less: Net gains (losses) recognized on equity securities sold	—	—	(20,367)	—
Net gains (losses) recognized on equity securities still held	$ 25,351	$ (647)	$ 60,382	$ (525)

Investments in Debt Securities

The following is a summary of Cadence's available-for-sale debt securities recorded within prepaid expenses and other on its condensed consolidated balance sheets:

	As of June 30, 2024			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
	(In thousands)			
Available-for-sale debt securities				
Mortgage-backed and asset-backed securities	$ 50,624	$ 165	$ (612)	$ 50,177
Total available-for-sale securities	$ 50,624	$ 165	$ (612)	$ 50,177

	As of December 31, 2023			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
	(In thousands)			
Available-for-sale debt securities				
Mortgage-backed and asset-backed securities	$ 49,653	$ 375	$ (243)	$ 49,785
Total available-for-sale securities	$ 49,653	$ 375	$ (243)	$ 49,785

Gross unrealized gains and losses are recorded as a component of accumulated other comprehensive loss on Cadence's condensed consolidated balance sheets.

As of June 30, 2024, the fair values of available-for-sale debt securities, by remaining contractual maturity, were as follows:

	(In thousands)
Due within 1 year	$ —
Due after 1 year through 5 years	11,227
Due after 5 years through 10 years	15,827
Due after 10 years	23,123
Total	$ 50,177

As of June 30, 2024, Cadence did not intend to sell any of its available-for-sale debt securities in an unrealized loss position, and it was more likely than not that Cadence will hold the securities until maturity or a recovery of the cost basis.

NOTE 12. FAIR VALUE

Inputs to valuation techniques are observable or unobservable. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect Cadence's market assumptions. These two types of inputs have created the following fair value hierarchy:

- Level 1 – Quoted prices for identical instruments in active markets;
- Level 2 – Quoted prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, and model-derived valuations in which all significant inputs and significant value drivers are observable in active markets; and
- Level 3 – Valuations derived from valuation techniques in which one or more significant inputs or significant value drivers are unobservable.

This hierarchy requires Cadence to minimize the use of unobservable inputs and to use observable market data, if available, when determining fair value. Cadence recognizes transfers between levels of the hierarchy based on the fair values of the respective financial instruments at the end of the reporting period in which the transfer occurred. There were no transfers between levels of the fair value hierarchy during the six months ended June 30, 2024.

On a quarterly basis, Cadence measures at fair value certain financial assets and liabilities. The fair value of financial assets and liabilities was determined using the following levels of inputs as of June 30, 2024 and December 31, 2023:

	Fair Value Measurements as of June 30, 2024			
	Total	Level 1	Level 2	Level 3
	(In thousands)			
Assets				
Cash equivalents:				
Money market funds	$ 403,454	$ 403,454	$ —	$ —
Marketable securities:				
Marketable equity securities	119,551	119,551	—	—
Mortgage-backed and asset-backed securities	50,177	—	50,177	—
Securities held in NQDC trust	85,295	85,295	—	—
Total Assets	$ 658,477	$ 608,300	$ 50,177	$ —

	Total	Level 1	Level 2	Level 3
	(In thousands)			
Liabilities				
Foreign currency exchange contracts	$ 11	$ —	$ 11	$ —
Total Liabilities	$ 11	$ —	$ 11	$ —

	Fair Value Measurements as of December 31, 2023			
	Total	Level 1	Level 2	Level 3
	(In thousands)			
Assets				
Cash equivalents:				
Money market funds	$ 490,983	$ 490,983	$ —	$ —
Marketable securities:				
Marketable equity securities	80,575	80,575	—	—
Mortgage-backed and asset-backed securities	49,785	—	49,785	—
Securities held in NQDC trust	75,671	75,671	—	—
Foreign currency exchange contracts	9,327	—	9,327	—
Total Assets	$ 706,341	$ 647,229	$ 59,112	$ —

As of December 31, 2023, Cadence did not have any financial liabilities requiring a recurring fair value measurement.

Level 1 Measurements

Cadence's cash equivalents held in money market funds, marketable equity securities and the trading securities held in Cadence's NQDC trust are measured at fair value using Level 1 inputs.

Level 2 Measurements

The valuation techniques used to determine the fair value of Cadence's investments in marketable debt securities, foreign currency forward exchange contracts and 2024 Notes are classified within Level 2 of the fair value hierarchy. For additional information relating to Cadence's debt arrangements, see Note 4 in the notes to condensed consolidated financial statements.

Level 3 Measurements

During the six months ended June 30, 2024, Cadence acquired intangible assets of $364.0 million, primarily through its acquisitions of BETA CAE and Invecas. The fair value of the intangible assets acquired was determined using variations of the income approach that utilizes unobservable inputs classified as Level 3 measurements.

For existing technology, the fair value was determined by applying the relief-from-royalty method. This method is based on the application of a royalty rate to forecasted revenue to quantify the benefit of owning the intangible asset rather than paying a royalty for use of the asset. To estimate royalty savings over time, Cadence projected revenue from the acquired existing technology over the estimated remaining life of the technology, including the effect of assumed technological obsolescence, before applying an assumed royalty rate. Cadence assumed technological obsolescence at a rate of 10% annually, before applying an assumed royalty rate of 30%.

For agreements and relationships, the fair value was determined by using the multi-period excess earnings method. This method reflects the present value of the projected cash flows that are expected to be generated from existing customers, less charges representing the contribution of other assets to those cash flows. Projected income from existing customer relationships was determined using customer retention rates between 85% and 92%. The present value of operating cash flows from existing customers was determined using discount rates between 10% and 14%.

NOTE 13. INVENTORY

Cadence's inventory balances as of June 30, 2024 and December 31, 2023 were as follows:

	As of	
	June 30, 2024	December 31, 2023
	(In thousands)	
Inventories:		
Raw materials	$ 146,449	$ 162,754
Work-in-process	2,033	—
Finished goods	23,026	18,907
Total inventories	$ 171,508	$ 181,661

NOTE 14. COMMITMENTS AND CONTINGENCIES

Legal Proceedings

From time to time, Cadence is involved in various disputes and litigation that arise in the ordinary course of business. These include disputes and legal proceedings related to intellectual property, indemnification obligations, mergers and acquisitions, licensing, contracts, customers, products, distribution and other commercial arrangements and employee relations matters. Cadence is also subject from time to time to inquiries, investigations and regulatory proceedings involving governments and regulatory agencies in the jurisdictions in which Cadence operates. At least quarterly, Cadence reviews the status of each significant matter and assesses its potential financial exposure. If the potential loss from any claim or legal proceeding is considered probable and the amount or the range of loss can be estimated, Cadence accrues a liability for the estimated loss. Legal proceedings are subject to uncertainties, and the outcomes are difficult to predict. Because of such uncertainties, accruals are based on Cadence's judgments using the best information available at the time. As additional information becomes available, Cadence reassesses the potential liability related to pending claims and litigation matters and may revise estimates.

Tax Proceedings

In December 2022, Cadence received a tax audit assessment of approximately $49 million from the Korea taxing authorities for years 2017-2019. The tax audit assessment is primarily related to value-added taxes. Cadence was required to pay these assessed taxes, prior to being allowed to contest or litigate the assessment in administrative and judicial proceedings. The assessment was paid by Cadence in January 2023 and recorded as a component of other assets in the condensed consolidated balance sheets. Payment of this amount is not an admission that Cadence is subject to such taxes, and Cadence continues to defend its position vigorously. Cadence did not record a reserve for this contingency as of June 30, 2024 or December 31, 2023 as Cadence does not believe a loss is probable. The entire dispute resolution process may take up to eight years.

Other Contingencies

Cadence provides its customers with a warranty on sales of hardware products, generally for a 90-day period. Cadence did not incur any significant costs related to warranty obligations during the three and six months ended June 30, 2024 and June 30, 2023.

Cadence's product license and services agreements typically include a limited indemnification provision for claims from third parties relating to Cadence's intellectual property. If the potential loss from any indemnification claim is considered probable and the amount or the range of loss can be estimated, Cadence accrues a liability for the estimated loss.

Cadence did not incur any material losses from indemnification claims during the three and six months ended June 30, 2024 and June 30, 2023.

NOTE 15. ACCUMULATED OTHER COMPREHENSIVE LOSS

Cadence's accumulated other comprehensive loss is comprised of the aggregate impact of foreign currency translation gains and losses, changes in defined benefit plan liabilities and unrealized gains and losses on investments, and is presented in Cadence's condensed consolidated statements of comprehensive income.

Accumulated other comprehensive loss was comprised of the following as of June 30, 2024 and December 31, 2023:

	As of	
	June 30, 2024	December 31, 2023
	(In thousands)	
Foreign currency translation loss	$ (104,645)	$ (90,678)
Changes in defined benefit plan liabilities	(4,085)	(4,208)
Unrealized gains (losses) on investments	(447)	132
Total accumulated other comprehensive loss	$ (109,177)	$ (94,754)

For the three and six months ended June 30, 2024 and June 30, 2023, there were no significant amounts related to foreign currency translation loss, changes in defined benefit plan liabilities or unrealized gains and losses on investments reclassified from accumulated other comprehensive loss to net income.

NOTE 16. SEGMENT REPORTING

Segment reporting is based on the “management approach,” following the method that management organizes the company’s reportable segments for which separate financial information is made available to, and evaluated regularly by, the chief operating decision maker in allocating resources and in assessing performance. Cadence’s chief operating decision maker is its CEO, who reviews Cadence’s consolidated results as one operating segment. In making operating decisions, the CEO primarily considers consolidated financial information, accompanied by disaggregated information about revenues by geographic region.

Outside the United States, Cadence markets and supports its products and services primarily through its subsidiaries. Revenue is attributed to geography based upon the country in which the product is used, or services are delivered. Long-lived assets are attributed to geography based on the country where the assets are located.

The following table presents a summary of revenue by geography for the three and six months ended June 30, 2024 and June 30, 2023:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In thousands)			
Americas:				
United States	$ 507,169	$ 385,595	$ 942,692	$ 819,941
Other Americas	11,660	15,966	39,007	32,084
Total Americas	518,829	401,561	981,699	852,025
Asia:				
China	127,809	174,116	245,038	351,672
Other Asia	197,928	176,894	406,459	360,856
Total Asia	325,737	351,010	651,497	712,528
Europe, Middle East and Africa	152,521	166,804	321,577	321,074
Japan	63,594	57,204	115,011	112,642
Total	$ 1,060,681	$ 976,579	$ 2,069,784	$ 1,998,269

The following table presents a summary of long-lived assets by geography as of June 30, 2024 and December 31, 2023:

	As of	
	June 30, 2024	December 31, 2023
	(In thousands)	
Americas:		
United States	$ 406,512	$ 383,807
Other Americas	8,436	10,219
Total Americas	414,948	394,026
Asia:		
China	26,239	29,598
Other Asia	84,905	71,365
Total Asia	111,144	100,963
Europe, Middle East and Africa	67,132	56,449
Japan	1,569	2,572
Total	$ 594,793	$ 554,010

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following discussion should be read in conjunction with the condensed consolidated financial statements and notes thereto included in this Quarterly Report on Form 10-Q (this "Quarterly Report") and in conjunction with our Annual Report on Form 10-K for the fiscal year ended December 31, 2023 (our "Annual Report"). This Quarterly Report contains statements that are not historical in nature, are predictive, or that depend upon or refer to future events or conditions or contain other forward-looking statements. Statements including, but not limited to, statements regarding the extent, timing and mix of future revenues and customer demand; the deployment of our products and services; the impact of the macroeconomic and geopolitical environment, including but not limited to, expanded trade control laws and regulations, the conflicts in and around Ukraine, the Middle East and other areas of the world, volatility in foreign currency exchange rates, inflation and the rise in interest rates; the impact of government actions; future costs, expenses, tax rates and uses of cash; pending legal, administrative and tax proceedings; restructuring actions and associated benefits; pending acquisitions, the accounting for acquisitions and the integration of acquired businesses; and other statements using words such as "anticipates," "believes," "could," "estimates," "expects," "forecasts," "intends," "may," "plans," "projects," "should," "targets," "will" and "would," and words of similar import and the negatives thereof, constitute forward-looking statements. These statements are predictions based upon our current expectations about future events. Actual results could vary materially as a result of certain factors, including, but not limited to, those expressed in these statements. We refer you to the "Results of Operations," "Quantitative and Qualitative Disclosures About Market Risk," "Liquidity and Capital Resources" and "Risk Factors" sections contained in this Quarterly Report, the "Risk Factors" section contained in our Annual Report, and the risks discussed in our other Securities and Exchange Commission ("SEC") filings, which identify important risks and uncertainties that could cause actual results to differ materially from those contained in the forward-looking statements.

We urge you to consider these factors carefully in evaluating the forward-looking statements contained in this Quarterly Report. All subsequent written or oral forward-looking statements attributable to our company or persons acting on our behalf are expressly qualified in their entirety by these cautionary statements. The forward-looking statements included in this Quarterly Report are made only as of the date of this Quarterly Report. We disclaim any obligation to update these forward-looking statements, except as required by law.

Business Overview

Cadence is a leading pioneer in electronic system design software and intellectual property ("IP"), building upon more than 35 years of computational software expertise. Since our inception, we have been at the forefront of technology innovation, solving highly complex challenges in the semiconductor and electronic systems industries. We are a global company that provides computational software, special-purpose computational hardware, IP and services to multiple vertical sectors including automotive, artificial intelligence ("AI"), aerospace and defense, high-performance and mobile computing, hyperscalers, wireless communications, industrial internet of things and life sciences.

Our Intelligent System Design™ strategy allows us to deliver essential computational software, hardware and IP that our customers use to turn their design concepts into reality. Our customers include many of the world's most innovative companies that design and build highly sophisticated semiconductor and electronic systems found in products used in everyday life. Our Intelligent System Design strategy allows us to quickly adapt to our customers' dynamic design requirements. Our products and services enable our customers to develop complex and innovative semiconductor and electronic systems, so demand for our technology and expertise is driven by increasing complexity and our customers' need to invest in new designs and products that are highly differentiated. Historically, the industry that provided the tools used by IC engineers was referred to as Electronic Design Automation ("EDA"). Today, our offerings include and extend beyond EDA.

We group our products into categories related to major design activities:

- Custom IC Design and Simulation;
- Digital IC Design and Signoff;
- Functional Verification;
- IP; and
- System Design and Analysis.

For additional information about our products, see the discussion in Item 1, "Business," under the heading "Products and Product Categories," in our Annual Report.

Management uses certain performance indicators to manage our business, including revenue, certain elements of operating expenses and cash flow from operations, and we describe these items further below under the headings "Results of Operations" and "Liquidity and Capital Resources."

Recent Acquisitions

Consistent with our Intelligent System Design strategy, during the first quarter of fiscal 2024, we completed our acquisition of Invecas, Inc. ("Invecas"), a leading provider of design engineering, embedded software and system-level solutions. We believe the addition of a skilled engineering team with vast experience in delivering end-to-end system solutions with deep expertise in advanced nodes, mixed-signal, verification, embedded software, packaging and turnkey custom silicon production will enhance our ability to pursue attractive opportunities in the markets we serve. Revenue and cost of revenue associated with contracts assumed with our acquisition of Invecas is primarily classified as services revenue and cost of services in our condensed consolidated income statements.

During the second quarter of fiscal 2024, we completed our acquisition of BETA CAE Systems International AG (“BETA CAE”), a system analysis platform provider of multi-domain, engineering simulation solutions. The acquisition of BETA CAE expands our multiphysics system analysis suite with highly complementary products, enabling us to offer a more comprehensive portfolio to customers in the automotive sector and at companies in the aerospace, industrial and healthcare industries. Revenue associated with contracts assumed with our acquisition of BETA CAE is primarily classified as product and maintenance revenue in our System Design and Analysis product category. Cost of revenue associated with these contracts is primarily classified as cost of product and maintenance in our condensed consolidated income statements.

Macroeconomic and Geopolitical Environment

Because we operate globally, our business is subject to the effects of economic downturns or recessions in the regions in which we do business, volatility in foreign currency exchange rates relative to the U.S. dollar, the rise in interest rates, expanded trade control laws and regulations, and geopolitical conflicts.

We have been impacted by the continued expansion of trade control laws and regulations, including certain export control restrictions concerning advanced node IC production in China, the inclusion of additional Chinese technology companies on the Bureau of Industry and Security “Entity List” and regulations governing the sale of certain technologies. Based on our current assessments, we expect the impact of these expanded trade control laws and regulations on our business to be limited.

We also continuously monitor geopolitical conflicts around the world, including the ongoing conflict between Russia and Ukraine and the conflict in the Middle East, and assess their impact on our business. These conflicts have not materially limited our ability to develop or support our products and have not had a material impact on our results of operations, financial condition, liquidity or cash flows.

While our business model provides some resilience against these factors, we will continue to monitor the direct and indirect impacts of these or similar circumstances on our business and financial results. For additional information on the potential impact of other macroeconomic and geopolitical conditions on our business, see the “Risk Factors” section in our Annual Report. For additional information on the potential impact of foreign currency exchange rates and interest rates on our business, see the “Quantitative and Qualitative Disclosures About Market Risk” section of this Quarterly Report.

Critical Accounting Estimates

In preparing our condensed consolidated financial statements, we make assumptions, judgments and estimates that can have a significant impact on our revenue, operating income and net income, as well as on the value of certain assets and liabilities on our condensed consolidated balance sheets. We base our assumptions, judgments and estimates on historical experience and various other factors that we believe to be reasonable under the circumstances. Actual results could differ materially from these estimates under different assumptions or conditions. At least quarterly, we evaluate our assumptions, judgments and estimates, and make changes as deemed necessary.

For additional information about our critical accounting estimates, see the discussion in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” under the heading “Critical Accounting Estimates” in our Annual Report.

New Accounting Standards

For additional information about the adoption of new accounting standards, see Note 1 in the notes to condensed consolidated financial statements.

Results of Operations

Financial results for the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, reflect the following:

- Growth in revenue from our software, services and IP offerings;
- Decreased revenue from our emulation and prototyping hardware offerings;
- Continued investment in research and development activities and technical sales support, including headcount from acquisitions;
- Incremental costs for professional services associated with acquisitions; and
- Gains from our investments in equity securities.

Revenue

We primarily generate revenue from licensing our software and IP, selling or leasing our emulation and prototyping hardware technology, providing maintenance for our software, hardware and IP, providing engineering services and earning royalties generated from the use of our IP. The timing of our revenue is significantly affected by the mix of software, hardware and IP products generating revenue in any given period and whether the revenue is recognized over time or at a point in time, upon completion of delivery.

Recurring revenue includes revenue recognized over time from our software arrangements, services, royalties, maintenance on IP licenses and hardware, and operating leases of hardware. Recurring revenue also includes revenue recognized at varying points in time over the term of other arrangements with non-cancelable commitments, whereby the customer commits to a fixed dollar amount over a specified period of time that can be used to purchase from a list of products or services.

The remainder of our revenue is recognized at a point in time and is characterized as up-front revenue. Up-front revenue is primarily generated by our sales of emulation and prototyping hardware, individual IP licenses and certain software licenses. The percentage of our recurring and up-front revenue and fluctuations in revenue within our geographies in any single fiscal period are primarily impacted by delivery of hardware and IP products to our customers.

The following table shows the percentage of our revenue that is classified as recurring or up-front for the three and six months ended June 30, 2024 and June 30, 2023:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
Revenue recognized over time	85 %	82 %	86 %	79 %
Revenue from arrangements with non-cancelable commitments	3 %	3 %	3 %	3 %
Recurring revenue	88 %	85 %	89 %	82 %
Up-front revenue	12 %	15 %	11 %	18 %
Total	100 %	100 %	100 %	100 %

The percentage of revenue characterized as recurring compared to revenue characterized as up-front may vary between fiscal quarters. On an annual basis, or over the course of twelve consecutive months, the overall mix of revenue has historically been relatively consistent, but we expect revenue characterized as up-front to increase as a percentage of total annual revenue due to growth from arrangements where revenue is recognized at a point in time. The following table shows the percentage of recurring revenue for the twelve-month periods ending concurrently with our five most recent fiscal quarters:

	Trailing Twelve Months Ended				
	June 30, 2024	March 31, 2024	December 31, 2023	September 30, 2023	June 30, 2023
Recurring revenue	87 %	87 %	84 %	84 %	84 %
Up-front revenue	13 %	13 %	16 %	16 %	16 %
Total	100 %	100 %	100 %	100 %	100 %

For additional information about the fluctuations in our revenue, see the discussion under the heading “Revenue by Period” below.

Revenue by Period

The following table shows our revenue for the three months ended June 30, 2024 and June 30, 2023 and the change in revenue between periods:

	Three Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
Product and maintenance	$ 960.5	$ 922.8	$ 37.7	4 %
Services	100.2	53.8	46.4	86 %
Total revenue	$ 1,060.7	$ 976.6	$ 84.1	9 %

The following table shows our revenue for the six months ended June 30, 2024 and June 30, 2023 and the change in revenue between periods:

	Six Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
Product and maintenance	$ 1,873.9	$ 1,886.5	$ (12.6)	(1) %
Services	195.9	111.8	84.1	75 %
Total revenue	$ 2,069.8	$ 1,998.3	$ 71.5	4 %

Our revenue in any given period is significantly affected by the mix of software, hardware and IP products generating revenue and whether the revenue is recognized over time or at a point in time, primarily upon completion of delivery. During the three and six months ended June 30, 2023, hardware installations were relatively high in comparison to historical levels due to increased production capacity and our ability to fulfill customer orders that had been subject to longer than normal lead times. As a result, up-front revenue from our emulation and prototyping offerings classified as product and maintenance revenue decreased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023.

During the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, the decrease in up-front revenue from our emulation and prototyping hardware offerings was offset by growth in revenue from our software and IP offerings driven by new and existing customers' continued investment in complex designs for their products.

Services revenue increased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, primarily due to increased revenue from our design service offerings, which were supplemented by our acquisition of Invecas. Services revenue may fluctuate from period to period based on the timing of fulfillment of our services and IP performance obligations.

No single customer accounted for 10% or more of total revenue during the three and six months ended June 30, 2024 or June 30, 2023.

Revenue by Product Category

The following table shows the percentage of revenue contributed by each of our five product categories and services for the past five consecutive quarters:

	Three Months Ended				
	June 30, 2024	March 31, 2024	December 31, 2023	September 30, 2023	June 30, 2023
Custom IC Design and Simulation	21 %	22 %	22 %	22 %	22 %
Digital IC Design and Signoff	27 %	29 %	29 %	28 %	27 %
Functional Verification, including Emulation and Prototyping Hardware	25 %	25 %	24 %	26 %	27 %
IP	13 %	12 %	13 %	11 %	11 %
System Design and Analysis	14 %	12 %	12 %	13 %	13 %
Total	100 %	100 %	100 %	100 %	100 %

Revenue by product category fluctuates from period to period based on demand for our products and services, our available resources and our ability to deliver and support them. For example, during the first half of fiscal 2023, we experienced growth in our Functional Verification product category due to increased production capacity and our ability to fulfill ongoing customer demand for our emulation and prototyping hardware. Certain of our licensing arrangements allow customers the ability to remix among software products. Additionally, we have arrangements with customers that include a combination of our products, with the actual product selection and number of licensed users to be determined at a later date. For these arrangements, we estimate the allocation of the revenue to product categories based upon the expected usage of our products. The actual usage of our products by these customers may differ and, if that proves to be the case, the revenue allocation in the table above would differ.

Revenue by Geography

	Three Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
United States	$ 507.2	$ 385.6	$ 121.6	32 %
Other Americas	11.7	16.0	(4.3)	(27) %
China	127.8	174.1	(46.3)	(27) %
Other Asia	197.9	176.9	21.0	12 %
Europe, Middle East and Africa (“EMEA”)	152.5	166.8	(14.3)	(9) %
Japan	63.6	57.2	6.4	11 %
Total revenue	$ 1,060.7	$ 976.6	$ 84.1	9 %

	Six Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
United States	$ 942.7	$ 819.9	$ 122.8	15 %
Other Americas	39.0	32.1	6.9	21 %
China	245.0	351.7	(106.7)	(30) %
Other Asia	406.5	360.9	45.6	13 %
EMEA	321.6	321.1	0.5	— %
Japan	115.0	112.6	2.4	2 %
Total revenue	$ 2,069.8	$ 1,998.3	$ 71.5	4 %

During the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, revenue in the United States increased as the result of growth in revenue from our hardware, IP and software offerings, while revenue growth in Other Asia was primarily driven by growth in revenue from our software and IP offerings. Revenue in China decreased primarily due to a decrease in revenue from our hardware offerings.

Revenue by Geography as a Percent of Total Revenue

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
United States	48 %	39 %	45 %	41 %
Other Americas	1 %	2 %	2 %	2 %
China	12 %	18 %	12 %	17 %
Other Asia	19 %	18 %	20 %	18 %
EMEA	14 %	17 %	15 %	16 %
Japan	6 %	6 %	6 %	6 %
Total	100 %	100 %	100 %	100 %

Most of our revenue is transacted in the U.S. dollar. However, certain revenue transactions are denominated in foreign currencies. For an additional description of how changes in foreign exchange rates affect our condensed consolidated financial statements, see the discussion under Item 3, “Quantitative and Qualitative Disclosures About Market Risk – Foreign Currency Risk.”

Cost of Revenue

	Three Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
Cost of product and maintenance	$ 94.4	$ 74.2	$ 20.2	27 %
Cost of services	44.9	22.6	22.3	99 %

	Six Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
Cost of product and maintenance	$ 169.8	$ 174.5	$ (4.7)	(3) %
Cost of services	94.7	46.9	47.8	102 %

Cost of Product and Maintenance

Cost of product and maintenance includes costs associated with the sale and lease of our emulation and prototyping hardware and licensing of our software and IP products, certain employee salary and benefits and other employee-related costs, cost of our customer support services, amortization of technology-related and maintenance-related acquired intangibles, costs of technical documentation and royalties payable to third-party vendors. Cost of product and maintenance depends primarily on our hardware product sales in any given period, but is also affected by employee salary and benefits and other employee-related costs, reserves for inventory, and the timing and extent to which we acquire intangible assets, license third-party technology or IP, and sell our products that include such acquired or licensed technology or IP.

A summary of cost of product and maintenance is as follows:

	Three Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
Product and maintenance-related costs	$ 80.9	$ 63.6	$ 17.3	27 %
Amortization of acquired intangibles	13.5	10.6	2.9	27 %
Total cost of product and maintenance	$ 94.4	$ 74.2	$ 20.2	27 %

	Six Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
Product and maintenance-related costs	$ 145.0	$ 153.6	$ (8.6)	(6) %
Amortization of acquired intangibles	24.8	20.9	3.9	19 %
Total cost of product and maintenance	$ 169.8	$ 174.5	$ (4.7)	(3) %

The changes in product and maintenance-related costs for the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, were due to the following:

	Change	
	Three Months Ended	Six Months Ended
	(In millions)	
Emulation and prototyping hardware costs	$ 17.0	$ (8.8)
Other items	0.3	0.2
Total change in product and maintenance-related costs	$ 17.3	$ (8.6)

Costs associated with our emulation and prototyping hardware products include components, assembly, testing, applicable reserves and overhead. These costs make our cost of emulation and prototyping hardware products higher, as a percentage of revenue, than our cost of software and IP products. Emulation and prototyping hardware costs increased during the three months ended June 30, 2024, as compared to the three months ended June 30, 2023, primarily due to increased reserves for inventory. Emulation and prototyping hardware costs decreased during the six months ended June 30, 2024, as compared to the six months ended June 30, 2023, primarily due to decreased installations of emulation and prototyping hardware products, partially offset by an increase in reserves for inventory.

Amortization of acquired intangibles included in cost of product and maintenance may fluctuate from period to period depending on the timing of newly acquired assets relative to assets becoming fully amortized in any given period.

Cost of Services

Cost of services primarily includes employee salary, benefits and other employee-related costs to perform work on revenue-generating projects, costs to maintain the infrastructure necessary to manage a services organization, and direct costs associated with certain design services. Cost of services may fluctuate from period to period based on our utilization of design services engineers on revenue-generating projects rather than internal development projects and the timing of design service projects being completed.

Operating Expenses

Our operating expenses include marketing and sales, research and development, and general and administrative expenses. Factors that tend to cause our operating expenses to fluctuate include changes in the number of employees due to hiring and acquisitions, our annual merit compensation cycle, stock-based compensation, foreign exchange rate movements, acquisition-related costs, volatility in variable compensation programs that are driven by operating results, and charitable donations.

Many of our operating expenses are transacted in various foreign currencies. We recognize lower expenses in periods when the United States dollar strengthens in value against other currencies and we recognize higher expenses when the United States dollar weakens against other currencies. For an additional description of how changes in foreign exchange rates affect our condensed consolidated financial statements, see the discussion in Item 3, "Quantitative and Qualitative Disclosures About Market Risk – Foreign Currency Risk."

Our operating expenses for the three and six months ended June 30, 2024 and June 30, 2023 were as follows:

	Three Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
Marketing and sales	$ 186.7	$ 167.1	$ 19.6	12 %
Research and development	370.7	354.4	16.3	5 %
General and administrative	63.4	54.6	8.8	16 %
Total operating expenses	$ 620.8	$ 576.1	$ 44.7	8 %

	Six Months Ended		Change	
	June 30, 2024	June 30, 2023	Amount	Percentage
	(In millions, except percentages)			
Marketing and sales	$ 367.3	$ 333.7	$ 33.6	10 %
Research and development	749.7	704.7	45.0	6 %
General and administrative	132.2	108.1	24.1	22 %
Total operating expenses	$ 1,249.2	$ 1,146.5	$ 102.7	9 %

Our operating expenses, as a percentage of total revenue, for the three and six months ended June 30, 2024 and June 30, 2023 were as follows:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
Marketing and sales	18 %	17 %	18 %	17 %
Research and development	35 %	36 %	36 %	35 %
General and administrative	6 %	6 %	6 %	5 %
Total operating expenses	59 %	59 %	60 %	57 %

Marketing and Sales

The increase in marketing and sales expense for the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, was due to the following:

	Change	
	Three Months Ended	Six Months Ended
	(In millions)	
Salary, benefits and other employee-related costs	$ 12.7	$ 23.2
Facilities and other infrastructure costs	2.1	4.3
Professional services	2.9	3.7
Stock-based compensation	0.3	3.1
Other items	1.6	(0.7)
Total change in marketing and sales expense	$ 19.6	$ 33.6

Salary, benefits and other employee-related costs and stock-based compensation included in marketing and sales expense increased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, primarily due to our continued investment in attracting and retaining talent dedicated to technical sales support, including additional headcount from the acquisitions completed in both fiscal 2023 and the first half of fiscal 2024. Facilities and other infrastructure costs included in marketing and sales expense increased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, primarily due to our growing workforce. We expect to continue attracting and retaining talent dedicated to technical sales support through hiring and acquisitions.

Research and Development

The increase in research and development expense for the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, was due to the following:

	Change	
	Three Months Ended	Six Months Ended
	(In millions)	
Stock-based compensation	$ 9.7	$ 19.0
Salary, benefits and other employee-related costs	2.1	15.5
Facilities and other infrastructure costs	4.0	8.3
Professional services	1.6	3.4
Other items	(1.1)	(1.2)
Total change in research and development expense	$ 16.3	$ 45.0

Salary, benefits and other employee-related costs and stock-based compensation included in research and development expense increased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, primarily due to our continued investment in attracting and retaining talent for research and development activities, including additional headcount from the acquisitions completed in fiscal 2023 and the first half of fiscal 2024. Facilities and other infrastructure costs included in research and development expense increased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, primarily due to our growing workforce. We expect to continue attracting and retaining talent dedicated to research and development activities through hiring and acquisitions.

General and Administrative

The increase in general and administrative expense for the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, was due to the following:

	Change	
	Three Months Ended	Six Months Ended
	(In millions)	
Professional services	$ 9.3	$ 15.4
Foreign service tax	—	5.0
Salary, benefits and other employee-related costs	(0.9)	2.2
Other items	0.4	1.5
Total change in general and administrative expense	$ 8.8	$ 24.1

Professional services increased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, primarily due to increased legal and consulting services associated with acquisition-related activities. Also during the six months ended June 30, 2024, as compared to the six months ended June 30, 2023, we experienced an increase in foreign service tax, primarily because we did not benefit from foreign service tax refunds as we did during the same period in fiscal 2023.

Restructuring

We have initiated restructuring plans in recent years, most recently in fiscal 2023, to better align our resources with our business strategy. Because the restructuring charges and related benefits are derived from management's estimates made during the formulation of the restructuring plans, based on then-currently available information, our restructuring plans may not achieve the benefits anticipated on the timetable or at the level contemplated. Additional actions, including further restructuring of our operations, may be required in the future.

Operating Margin

Operating margin represents income from operations as a percentage of total revenue. Our operating margin for the three and six months ended June 30, 2024, and the three and six months ended June 30, 2023 was as follows:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
Operating margin	28 %	31 %	26 %	31 %

Operating margin decreased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, primarily due to the mix of products and services sold during each respective period. In addition, our acquisitions in fiscal 2023 and the first half of fiscal 2024 resulted in incremental expenses, including amortization of acquired intangibles, that exceeded incremental revenue during the three and six months ended June 30, 2024. We expect our operating margin to be impacted by our recent acquisitions because the incremental operating expenses, including amortization of the acquired intangibles, are expected to exceed the incremental revenue for the remainder of fiscal 2024.

Interest Expense

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In millions)			
Contractual cash interest expense:				
2024 Notes	3.8	3.8	$ 7.6	$ 7.6
2025 Term Loan	4.7	4.5	9.4	8.3
2026 Term Loan	4.0	—	4.0	—
2021 Credit Facility	0.4	0.4	0.4	1.7
Amortization of debt discount:				
2024 Notes	0.2	0.2	0.4	0.4
2025 Term Loan	0.1	0.2	0.1	0.2
Other	(0.3)	(0.2)	(0.3)	(0.1)
Total interest expense	$ 12.9	$ 8.9	$ 21.6	$ 18.1

Interest expense increased during the three and six months ended June 30, 2024, as compared to the three and six months ended June 30, 2023, primarily due to the interest expense related to the 2026 Term Loan, and an increase in interest expense for the 2025 Term Loan, which is subject to variable interest rates. We expect higher interest expense in fiscal 2024, as compared to fiscal 2023, primarily due to additional interest expense related to our 2026 Term Loan. For additional information relating to our debt arrangements, see Note 4 in the notes to condensed consolidated financial statements.

Income Taxes

The following table presents the provision for income taxes and the effective tax rate for the three and six months ended June 30, 2024 and June 30, 2023:

	Three Months Ended		Six Months Ended	
	June 30, 2024	June 30, 2023	June 30, 2024	June 30, 2023
	(In millions, except percentages)			
Provision for income taxes	$ 86.2	$ 77.3	$ 148.6	$ 157.0
Effective tax rate	27.3 %	25.9 %	23.7 %	25.3 %

Our provision for income taxes for the three and six months ended June 30, 2024 was primarily attributable to federal, state and foreign income taxes on our anticipated fiscal 2024 income. We also recognized tax benefits of $5.4 million and $28.2 million related to stock-based compensation that vested or was exercised during the respective periods.

In 2021, the Organisation for Economic Co-operation and Development announced Pillar Two Model Rules which call for the taxation of large multinational corporations, such as Cadence, at a global minimum tax rate of 15%. Many non-U.S. tax jurisdictions, including Ireland and Hungary, have either recently enacted legislation to adopt certain components of the Pillar Two Model Rules beginning in fiscal 2024 or announced their plans to enact legislation in future years. The currently enacted Pillar Two Model Rules did not have a material impact to our provision for income taxes for the three and six months ended June 30, 2024.

Our provision for income taxes for the three and six months ended June 30, 2023 was primarily attributable to federal, state and foreign income taxes on our then anticipated fiscal 2023 income. We also recognized tax benefits of $8.9 million and $25.8 million related to stock-based compensation that vested or was exercised during the respective periods.

In March 2024, we received a best judgment tax audit assessment of approximately $24.5 million from the Israel Tax Authority ("ITA") for the tax years 2017 and 2018. The best judgment tax audit assessment is primarily related to transfer pricing and withholding taxes. We disagree with the ITA's position and have appealed the tax assessment.

Our future effective tax rates may also be materially impacted by tax amounts associated with our foreign earnings at rates different from the United States federal statutory rate, research credits, the tax impact of stock-based compensation, accounting for uncertain tax positions, business combinations, closure of statutes of limitations or settlement of tax audits and changes in tax law. A significant amount of our foreign earnings is generated by our subsidiaries organized in Ireland and Hungary. Our future effective tax rates may be adversely affected if our earnings were to be lower in countries where we have lower statutory tax rates. We currently expect that our fiscal 2024 effective tax rate will be approximately 25.1%. We expect that our quarterly effective tax rates will vary from our fiscal 2024 effective tax rate as a result of recognizing the income tax effects of stock-based awards in the quarterly periods that the awards vest or are settled and other items that we cannot anticipate. For additional discussion about how our effective tax rate could be affected by various risks, see Part I, Item 1A, "Risk Factors," in our Annual Report.

Liquidity and Capital Resources

	As of		
	June 30, 2024	December 31, 2023	Change
	(In millions)		
Cash and cash equivalents	$ 1,059.0	$ 1,008.2	$ 50.8
Net working capital	662.7	385.4	277.3

Cash and Cash Equivalents

As of June 30, 2024, our principal sources of liquidity consisted of approximately $1,059.0 million of cash and cash equivalents as compared to $1,008.2 million as of December 31, 2023.

Our primary sources of cash and cash equivalents during the six months ended June 30, 2024 were proceeds from borrowings, cash generated from operations, proceeds from the issuance of common stock resulting from stock purchases under our employee stock purchase plan and stock options exercised during the period, and proceeds from the sale of investments.

Our primary uses of cash and cash equivalents during the six months ended June 30, 2024 were payments related to employee salaries and benefits, operating expenses, cash paid for acquired businesses, payment of employee taxes on vesting of restricted stock, repurchases of our common stock, purchases of inventory, and purchases of property, plant and equipment.

Approximately 74% of our cash and cash equivalents were held by our foreign subsidiaries as of June 30, 2024. Our cash and cash equivalents held by our foreign subsidiaries may vary from period to period due to the timing of collections and repatriation of foreign earnings. We expect that current cash and cash equivalent balances and cash flows that are generated from operations and financing activities will be sufficient to meet the needs of our domestic and international operating activities and other capital and liquidity requirements, including acquisitions, investments and share repurchases, for at least the next 12 months and thereafter for the foreseeable future.

Net Working Capital

Net working capital is comprised of current assets less current liabilities, as shown on our condensed consolidated balance sheets. Our net working capital varies from period to period due to changes in operating assets and liabilities and the timing of investing and financing activities.

Cash Flows from Operating Activities

	Six Months Ended		
	June 30, 2024	June 30, 2023	Change
	(In millions)		
Cash provided by operating activities	$ 409.2	$ 681.2	$ (272.0)

Cash flows from operating activities include net income, adjusted for certain non-cash items, as well as changes in the balances of certain assets and liabilities. Our cash flows provided by operating activities are significantly influenced by business levels and the payment terms set forth in our customer agreements. The decrease in cash flows from operating activities for the six months ended June 30, 2024, as compared to the six months ended June 30, 2023, was primarily due to the timing of cash receipts from our customers and an increase in disbursements for operating assets and liabilities.

Cash Flows Used for Investing Activities

	Six Months Ended		
	June 30, 2024	June 30, 2023	Change
	(In millions)		
Cash used for investing activities	$ (757.9)	$ (129.7)	$ (628.2)

Cash used for investing activities increased during the six months ended June 30, 2024, as compared to the six months ended June 30, 2023, primarily due to increases in payments for business combinations and purchases of property, plant and equipment, partially offset by an increase in proceeds from the sale and maturity of investments. We expect to continue our investing activities, including purchasing property, plant and equipment, purchasing intangible assets, acquiring other companies and businesses, and making investments.

Cash Flows Used for Financing Activities

	Six Months Ended		
	June 30, 2024	June 30, 2023	Change
	(In millions)		
Cash provided by (used for) financing activities	$ 415.4	$ (551.6)	$ 967.0

Cash from financing activities increased the six months ended June 30, 2024, as compared to the six months ended June 30, 2023, primarily due to an increase in net proceeds from borrowings, a decrease in repurchases of common stock and increased proceeds from the issuance of our common stock. These factors were partially offset by an increase in payments of employee taxes on vesting of restricted stock.

Other Factors Affecting Liquidity and Capital Resources

Revolving Credit Facility

In June 2021, we entered into a five-year senior unsecured revolving credit facility with a group of lenders led by Bank of America, N.A., as administrative agent, as amended in September 2022. The 2021 Credit Facility provides for borrowings up to $700.0 million, with the right to request increased capacity up to an additional $350.0 million upon receipt of lender commitments, for total maximum borrowings of $1.05 billion. The 2021 Credit Facility expires on June 30, 2026. Any outstanding loans drawn under the 2021 Credit Facility are due at maturity on June 30, 2026, subject to an option to extend the maturity date. Outstanding borrowings may be repaid at any time prior to maturity. Interest rates associated with the 2021 Credit Facility are variable, so interest expense is impacted by changes in the interest rates, particularly for periods when there are outstanding borrowings under the revolving credit facility. Interest is payable quarterly. As of June 30, 2024, there were no borrowings outstanding under the 2021 Credit Facility, and we were in compliance with all financial covenants associated with such credit facility.

2024 Notes

In October 2014, we issued a $350.0 million aggregate principal amount of 4.375% Senior Notes due October 15, 2024 (the "2024 Notes"). Interest is payable in cash semi-annually. The 2024 Notes are unsecured and rank equal in right of payment to all of our existing and future senior indebtedness. As of June 30, 2024, we were in compliance with all covenants associated with the 2024 Notes.

2025 Term Loan

In September 2022, we entered into a $300.0 million three-year senior non-amortizing term loan facility due on September 7, 2025 with a group of lenders led by Bank of America, N.A., as administrative agent (the "2025 Term Loan"). The 2025 Term Loan is unsecured and ranks equal in right of payment to all of our unsecured indebtedness. Interest rates associated with the 2025 Term Loan are variable, so interest expense is impacted by changes in interest rates. Interest is payable quarterly. As of June 30, 2024, we were in compliance with all financial covenants associated with the 2025 Term Loan.

2026 Term Loan

In May 2024, we entered into a $700.0 million two-year senior non-amortizing term loan facility due on May 30, 2026 with a group of lenders led by Bank of America, N.A., as administrative agent (the "2026 Term Loan"). The 2026 Term Loan is unsecured and ranks equal in right of payment to all of our unsecured indebtedness. Interest rates associated with the 2026 Term Loan are variable, so interest expense is impacted by changes in interest rates. Interest is payable quarterly. As of June 30, 2024, we were in compliance with all financial covenants associated with the 2026 Term Loan.

For additional information relating to our debt arrangements, see Note 4 in the notes to condensed consolidated financial statements.

Stock Repurchase Program

We are authorized to repurchase shares of our common stock under a publicly announced program that was most recently increased by our Board of Directors in August 2023. The actual timing and amount of repurchases are subject to business and market conditions, corporate and regulatory requirements, stock price, acquisition opportunities and other factors. Our repurchase authorization does not obligate us to acquire a minimum amount of shares, does not have an expiration date and may be modified, suspended or terminated without prior notice. As of June 30, 2024, approximately $1.1 billion of the share repurchase authorization remained available to repurchase shares of our common stock. See Part II, Item 2, “Unregistered Sales of Equity Securities and Use of Proceeds” for additional information on share repurchases.

California Legislation

In June 2024, the State of California enacted legislation that, for a three-year period beginning in fiscal 2024, will limit our utilization of California research and development tax credits to $5 million annually. We expect the California tax law change to increase our cash paid for income taxes for fiscal 2024 by approximately $36.1 million.

Other Liquidity Requirements

During the six months ended June 30, 2024, there were no material changes to our other liquidity requirements as reported in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” in our Annual Report.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

Foreign Currency Risk

A material portion of our revenue, expenses and business activities are transacted in the U.S. dollar. In certain foreign countries where we price our products and services in U.S. dollars, a decrease in value of the local currency relative to the U.S. dollar results in an increase in the prices for our products and services compared to those products of our competitors that are priced in local currency. This could result in our prices being uncompetitive in certain markets.

In certain countries where we may invoice customers in the local currency, our revenue benefits from a weaker dollar and is adversely affected by a stronger dollar. The opposite impact occurs in countries where we record expenses in local currencies. In those cases, our costs and expenses benefit from a stronger dollar and are adversely affected by a weaker dollar. The fluctuations in our operating expenses outside the United States resulting from volatility in foreign exchange rates are not generally moderated by corresponding fluctuations in revenue from existing contracts.

We enter into foreign currency forward exchange contracts to protect against currency exchange risks associated with existing assets and liabilities. A foreign currency forward exchange contract acts as a hedge by increasing in value when underlying assets decrease in value or underlying liabilities increase in value due to changes in foreign exchange rates. Conversely, a foreign currency forward exchange contract decreases in value when underlying assets increase in value or underlying liabilities decrease in value due to changes in foreign exchange rates. These forward contracts are not designated as accounting hedges, so the unrealized gains and losses are recognized in other income (expense), net, in advance of the actual foreign currency cash flows with the fair value of these forward contracts being recorded as accrued liabilities or other current assets.

We do not use forward contracts for trading purposes. Our forward contracts generally have maturities of 90 days or less. We enter into foreign currency forward exchange contracts based on estimated future asset and liability exposures, and the effectiveness of our hedging program depends on our ability to estimate these future asset and liability exposures. Recognized gains and losses with respect to our current hedging activities will ultimately depend on how accurately we are able to match the amount of foreign currency forward exchange contracts with actual underlying asset and liability exposures.

The following table provides information about our foreign currency forward exchange contracts as of June 30, 2024. The information is provided in U.S. dollar equivalent amounts. The table presents the notional amounts, at contract exchange rates, and the weighted average contractual foreign currency exchange rates expressed as units of the foreign currency per U.S. dollar, which in some cases may not be the market convention for quoting a particular currency. All of these forward contracts mature before or during August 2024.

	Notional Principal	Weighted Average Contract Rate
	(In millions)	
Forward Contracts:		
European Union euro	$ 173.1	0.93
British pound	150.2	0.80
Japanese yen	124.5	156.36
Israeli shekel	58.6	3.72
Swedish krona	41.7	10.65
South Korean won	40.4	1,362.06
Chinese renminbi	27.1	7.23
Indian rupee	25.6	83.70
Canadian dollar	25.4	1.37
Taiwan dollar	16.4	32.34
Singapore dollar	2.1	1.35
Total	$ 685.1	
Estimated fair value	$ —	

As of December 31, 2023, our foreign currency exchange contracts had an aggregate principal amount of $697.9 million, and an estimated fair value of $9.3 million.

We have performed sensitivity analyses as of June 30, 2024 and December 31, 2023, using a modeling technique that measures the change in the fair values arising from a hypothetical 10% change in the value of the U.S. dollar relative to applicable foreign currency exchange rates, with all other variables held constant. The foreign currency exchange rates we used in performing the sensitivity analysis were based on market rates in effect at each respective date. The sensitivity analyses indicated that a hypothetical 10% decrease in the value of the U.S. dollar would result in a decrease to the fair value of our foreign currency forward exchange contracts of $14.5 million and $18.4 million as of June 30, 2024 and December 31, 2023, respectively, while a hypothetical 10% increase in the value of the U.S. dollar would result in an increase to the fair value of our foreign currency forward exchange contracts of $16.9 million and $20.4 million as of June 30, 2024 and December 31, 2023, respectively.

We actively monitor our foreign currency risks, but our foreign currency hedging activities may not substantially offset the impact of fluctuations in currency exchange rates on our results of operations, cash flows and financial position.

Interest Rate Risk

Our exposure to market risk for changes in interest rates relates primarily to our portfolio of cash, cash equivalents, investments in debt securities and any balances outstanding on our 2021 Credit Facility, 2025 Term Loan and 2026 Term Loan. We are exposed to interest rate fluctuations in many of the world's leading industrialized countries, but our interest income and expense is most sensitive to fluctuations in the general level of United States interest rates. In this regard, changes in United States interest rates affect the interest earned on our cash and cash equivalents and the costs associated with foreign currency hedges. All highly liquid securities with a maturity of three months or less at the date of purchase are considered to be cash equivalents. The carrying value of our interest-bearing instruments approximated fair value as of June 30, 2024.

Our investments in debt securities had a fair value of approximately $50.2 million and $49.8 million as of June 30, 2024 and December 31, 2023, respectively, that may decline in value if market interest rates rise. Such variability in market interest rates may result in a negative impact on the results of our investment activities. As of June 30, 2024 and December 31, 2023, an increase in the market rates of interest of 1% would result in a decrease in the fair values of our marketable debt securities by approximately $2.4 million and $2.6 million, respectively.

Interest rates under our 2021 Credit Facility, 2025 Term Loan and 2026 Term Loan are variable, so interest expense could be adversely affected by changes in interest rates, particularly for periods when we maintain a balance outstanding under the revolving credit facility. As of June 30, 2024, there were no borrowings outstanding under our 2021 Credit Facility, $300.0 million of borrowings outstanding under our 2025 Term Loan and $700.0 million of borrowings outstanding under our 2026 Term Loan.

Interest rates for our 2021 Credit Facility, 2025 Term Loan and 2026 Term Loan can fluctuate based on changes in market interest rates and in interest rate margins that vary based on the credit ratings of our unsecured debt. Assuming all loans were fully drawn and we were to fully exercise our right to increase borrowing capacity under our 2021 Credit Facility and made no prepayments on our 2025 Term Loan or 2026 Term Loan, each quarter point change in interest rates would result in a $5.1 million change in annual interest expense on our indebtedness under our 2021 Credit Facility, 2025 Term Loan and 2026 Term Loan. For an additional description of the 2021 Credit Facility, 2025 Term Loan and 2026 Term Loan, see Note 4 in the notes to condensed consolidated financial statements.

Equity Price Risk

Equity Investments

We have a portfolio of equity investments that includes marketable equity securities and non-marketable investments. Our equity investments are made primarily in connection with our strategic investment program. Under our strategic investment program, from time to time, we make cash investments in companies with technologies that are potentially strategically important to us. For an additional description of our portfolio of equity investments, see Note 11 in the notes to condensed consolidated financial statements.

Item 4. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

As required by Rule 13a-15 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), under the supervision and with the participation of our management, including our Chief Executive Officer (“CEO”) and our Chief Financial Officer (“CFO”), we evaluated the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of June 30, 2024.

Based on their evaluation as of June 30, 2024, our CEO and CFO have concluded that our disclosure controls and procedures were effective as of the end of the period covered by this report to provide reasonable assurance that the information required to be disclosed by us in our reports filed or submitted under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms and is accumulated and communicated to our management, including the CEO and CFO, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting during the fiscal quarter ended June 30, 2024 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitations on Effectiveness of Controls

Our management, including our CEO and CFO, does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent or detect all errors and all fraud. Internal control over financial reporting, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of internal control are met. Further, the design of internal control must reflect the fact that there are resource constraints, and the benefits of the control must be considered relative to their costs. While our disclosure controls and procedures and internal control over financial reporting are designed to provide reasonable assurance of their effectiveness, because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within Cadence, have been detected.

PART II. OTHER INFORMATION

Item 1. Legal Proceedings

For information regarding pending legal proceedings, related matters and associated risks, see Note 14 in the notes to condensed consolidated financial statements under Part I, Item 1 in this Quarterly Report and the "Risk Factors" section in our Annual Report.

Item 1A. Risk Factors

Our operations and financial results are subject to various risks and uncertainties, including those described in the "Risk Factors" sections in our Annual Report, that could adversely affect our business, financial condition, results of operations, cash flows, liquidity, revenue, growth, prospects, demand, reputation, and the trading price of our common stock, and make an investment in us speculative or risky. We have updated below five of the risk factors in our Annual Report. The "Risk Factors" section in our Annual Report otherwise remains current in all material respects. The risk factors described in our Annual Report and this Quarterly Report do not include all of the risks that we face, and there may be additional risks or uncertainties that are currently unknown or not believed to be material that occur or become material.

We have experienced varied operating results, and our operating results for any particular fiscal period are affected by the timing of revenue recognition, particularly for our emulation and prototyping hardware, IP and certain software products.

Historical results of operations should not be viewed as reliable indicators of our future performance. Various factors affect our operating results, and some of them are not within our control. Our operating results for any period are affected by the mix of products and services sold in a given period and the timing of revenue recognition, particularly for our emulation and prototyping hardware, IP products and certain software licenses where revenue is recognized at a point in time rather than over time. In addition, we have recorded net losses in the past and may record net losses in the future. Also, our cash flows from operating activities have and will continue to fluctuate due to a number of factors, including the timing of our billings, collections, disbursements and tax payments.

A substantial portion of the product revenue related to our hardware business and our IP offerings is recognized upon delivery, and our forecasted revenue results are based, in part, on our expectations of hardware and IP to be delivered in a particular quarter. Therefore, changes in hardware and IP bookings or deliveries relative to expectations will have a more immediate impact on our revenue than changes in software or services bookings, for which revenue is generally recognized over time.

As we continue to expand our IP offerings, a portion of the revenue related to our IP bookings will be deferred until we complete and deliver the licensed IP to our customers. As a result, costs related to the research and development of IP may be incurred prior to the recognition of the related revenue.

Revenue related to our hardware and IP products is inherently difficult to predict because sales of our hardware and IP products depend on the commencement of new projects for the design and development of complex ICs and systems by our customers, our customers' willingness to expend capital to deploy our new and existing hardware or IP products in those projects and the availability of our new and existing hardware or IP products for delivery. Therefore, our hardware or IP sales may be delayed or may decrease if our customers delay or cancel projects because their spending is constrained or if there are problems or delays with the supply, delivery or installation of our hardware or IP products or our hardware suppliers. Moreover, the market environment for hardware and IP is highly competitive, and our customers may choose to purchase a competitor's hardware or IP product based on cost, performance or other factors. These factors may result in lower revenue, which would have an adverse effect on our business, results of operations and cash flows.

A substantial portion of our software licenses yield revenue recognized over time, which may make it difficult for us to rapidly increase our revenue in future fiscal periods and means that a decrease in orders in a given period would negatively affect our revenue in future periods.

We plan our operating expenses based on forecasted revenue, expected business needs and other factors such as inflation. These expenses and the effect of long-term commitments are relatively fixed in the short term. Bookings and the related revenue are harder to forecast in a difficult economic environment. If we experience a shortfall in bookings, our operating results could differ from our expectations because we may not be able to quickly reduce our expenses in response to short-term business changes. Our operating expenses are also impacted by economic conditions, such as inflation. Unexpected increases in inflation could cause our expenses to increase at a rate faster than our product pricing to recover such increases.

The methods, estimates and judgments that we use in applying our accounting policies have a significant impact on our results of operations (see "Critical Accounting Estimates" under Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Annual Report). Such methods, estimates and judgments are subject to substantial risks, uncertainties and assumptions, and factors may arise over time that may lead us to change our methods, estimates and judgments. Changes in those methods, estimates and judgments could significantly affect our results of operations.

As we continue to acquire and invest in companies or technologies, we may not realize the expected business or financial benefits and these acquisitions could prove difficult to integrate, disrupt our business, dilute stockholder value and adversely affect our operating results and the market value of our common stock.

As part of our business strategy, we invest in, and acquire complementary businesses, joint ventures, services and technologies and IP rights, some of which may be material to our financial condition and operating results. We continue to engage in investments and acquisitions and evaluate such opportunities and expect to continue to make such investments and acquisitions in the future. There can be no guarantee that we will be able to find and identify desirable investment or acquisition targets, and we may not be successful in entering into an agreement with any particular target.

Acquisitions and other transactions, arrangements and investments involve numerous risks and potential operating difficulties and expenditures, including:

• the failure to realize, or a delay in realizing, anticipated benefits or synergies, including as a result of any conditions placed upon approvals from governmental authorities;

• the failure to complete transactions on a timely basis or at all, including due to a failure to obtain required approvals on a timely basis, or at all, from governmental authorities;

• potential identified or unknown security vulnerabilities in acquired companies, technologies or products that expose us to additional security risks or delay our ability to integrate them into our organization and offerings;

• brand or reputational harm;

• in the case of acquisitions with large greenhouse gas emissions, the failure or perceived failure to achieve our publicly disclosed greenhouse gas emissions reduction target;

• the failure to understand, compete and operate effectively in markets where we have limited experience or where competitors may have stronger market positions;

• the failure to integrate, combine or manage acquired products, infrastructure, technologies and businesses effectively or to obtain customer acceptance of multiple platforms on a temporary or permanent basis;

• difficulties in integrating and assimilating acquired employees, which may lead to retention risk with respect to both acquired and existing employees;

• the need to integrate operations across different cultures and languages and to address the particular economic, currency, political and regulatory risks associated with specific countries;

• diversion of financial resources and management’s attention from day-to-day business;

• overlapping customers and product sets that impact our ability to maintain revenue at historical rates;

• unanticipated costs or assumed liabilities, including those related to an acquired company's disclosure controls and procedures, internal control over financial reporting, cybersecurity, taxes and other compliance programs, whether discovered during due diligence or thereafter;

• contingent payments in connection with acquisitions in the future where we may be required to make certain contingent payments without deriving the value we expect to derive from an acquisition in excess of such payments or at all;

• unwillingness of customers, suppliers or other business partners of an acquired business to continue licensing or do business with us, or delays in such activities;

• difficulties managing any strategic investment or collaboration that we do not control or for which we do not have sole decision-making authority;

• impairment charges or other adverse accounting outcomes related to acquisitions or strategic investments;

• the failure or cessation of operations by entities in which we made strategic investments or collaboration agreements;

• the loss of some or all of the value of our investment;

• additional stock-based compensation issued or assumed in connection with the acquisition, including the impact on stockholder dilution and our results of operations; and

• the tax effects of any such acquisitions including related integration and business operation changes, and assessment of the impact on the realizability of our future tax assets or liabilities

Any of these risks could harm our business or negatively impact our results of operations. In addition, to facilitate acquisitions or investments, we may seek additional equity or debt financing, which may not be available on terms favorable to us or at all, which may affect our ability to complete subsequent acquisitions or investments, and which may affect the risks of owning our common stock. For example, we have and may in the future finance acquisitions or investments by issuing equity or convertible securities, or use such securities as consideration, which have and may in the future cause our existing stockholders may be diluted. We also have and may in the future finance acquisitions or investments through debt financing, and we may face constraints related to the terms (including restrictive covenants) of, and repayment obligation related to, the incurrence of indebtedness. Acquisitions or investments may also require the expenditure of substantial cash resources. These arrangements may impact our liquidity, financial position and results of operations or increase dilution of our stockholders' equity interests in the company, all of which could adversely affect the market price of our common stock. Acquisitions are also often dilutive to margins and earnings, at least initially. In addition, in certain cases we may be required to consolidate one or more of our strategic investee's financial results into ours. Fluctuations in any such investee's financial results, due to general market conditions, bank failures or otherwise, could negatively affect our consolidated financial condition, results of operations, cash flows or the price of our common stock.

Our ability to acquire other businesses or technologies, make strategic investments or integrate acquired businesses effectively may be impaired by trade tensions and increased global scrutiny of foreign investments and acquisitions and investments in the technology sector. The United States and several other countries have adopted, or are considering adopting, restrictions on transactions involving foreign investments. Antitrust authorities in the United States and a number of countries have also reviewed acquisitions and investments in the technology industry with increased scrutiny. Governments may continue to adopt or tighten restrictions of this nature, some of which may apply to acquisitions, investments or integrations of businesses by us, and such restrictions or government actions could negatively impact our business and financial results.

Our debt obligations expose us to risks that could adversely affect our business, operating results or financial condition, and could prevent us from fulfilling our obligations under such indebtedness.

We have significant outstanding indebtedness, as well as the ability to access additional borrowings under our revolving credit facility. Subject to the limits contained in the credit agreement governing our revolving credit facility, the indenture that governs the 4.375% Senior Notes due October 15, 2024 (the "2024 Notes"), the loan agreement governing our senior non-amortizing term loan facility due September 7, 2025 (the "2025 Term Loan"), the loan agreement governing our senior non-amortizing term loan facility due May 30, 2026 (the "2026 Term Loan") and our other debt instruments, we may be able to incur substantial additional debt from time to time to finance working capital, capital expenditures, investments or acquisitions, share repurchases or for other purposes. If we do so, the risks related to our level of debt could intensify. As of June 30, 2024, both our 2024 Notes and 2025 Term Loan will mature in the next 15 months, which could require us to consume a significant portion of our liquidity or raise additional financing in adverse capital markets conditions.

Specifically, our level of debt could have important consequences, including the following:

- making it more difficult for us to satisfy our obligations to service our debt as described above;
- limiting our ability to obtain additional financing to fund future working capital, capital expenditures, acquisitions or other general corporate requirements;
- requiring a substantial portion of our cash flows (including U.S. cash) to be dedicated to debt service payments instead of other purposes, thereby reducing the amount of cash flows available for working capital, capital expenditures, acquisitions and other general corporate purposes and potentially requiring repatriation of cash from outside the U.S.;
- increasing our vulnerability to adverse economic and industry conditions;
- exposing us to the risk of increased interest rates as certain of our borrowings are at variable rates of interest;
- limiting our flexibility in planning for and reacting to changes in the industry in which we compete;
- placing us at a disadvantage compared to other, less leveraged competitors and competitors that have greater access to capital resources;
- limiting our interest deductions for U.S. income tax purposes; and
- increasing our cost of borrowing.

In addition, if we incur any additional indebtedness that ranks equally with the 2024 Notes, then subject to any collateral arrangements we may enter into, the holders of that debt will be entitled to share ratably in any proceeds distributed in connection with any insolvency, liquidation, reorganization, dissolution or other winding up of our company.

The terms of our debt agreements restrict our current and future operations, particularly our ability to respond to changes or to take certain actions.

The agreements governing our revolving credit facility, 2025 Term Loan, 2026 Term Loan and 2024 Notes contain a number of restrictive covenants that impose significant operating and financial restrictions on us and may limit our ability to engage in acts that may be in our long-term best interest, including restrictions on our ability to incur liens or additional indebtedness and guarantee indebtedness, enter into transactions with affiliates, alter the businesses we conduct, consolidate, merge or sell all or substantially all of our assets and to enter into sale and leaseback transactions. In addition, the restrictive covenants in the agreements governing our revolving credit facility, 2025 Term Loan and 2026 Term Loan require us to maintain specified financial ratios. Our ability to meet those financial ratios can be affected by events beyond our control, and we may be unable to meet them.

A breach of the covenants or restrictions under the agreements governing our revolving credit facility, 2025 Term Loan, 2026 Term Loan and 2024 Notes could result in an event of default under the applicable indebtedness. Such a default may allow the creditors to accelerate the related debt and may result in the acceleration of any other debt to which a cross-acceleration or cross-default provision applies. In addition, an event of default under the credit agreement governing our revolving credit facility would permit the lenders under our revolving credit facility to terminate all commitments to extend further credit. In the event our lenders or note holders accelerate the repayment of our borrowings, we may not have sufficient assets to repay that indebtedness.

As a result of these restrictions, we may be limited in how we conduct our business, unable to raise additional debt or equity financing to operate during general economic or business downturns or unable to compete effectively, take advantage of new business opportunities or otherwise grow in accordance with our strategy. In addition, our financial results, our substantial indebtedness and our credit ratings could adversely affect the availability and terms of our financing.

Our variable rate indebtedness subjects us to interest rate risk, which could cause our debt service obligations to increase significantly.

Borrowings under our revolving credit facility, 2025 Term Loan and 2026 Term Loan are at variable rates of interest and expose us to interest rate risk. When interest rates increase, our debt service obligations increase even though the amount borrowed remains the same, and our net income and cash flows, including cash available for servicing our indebtedness, could correspondingly decrease. We may enter into interest rate swaps that involve the exchange of floating for fixed rate interest payments in order to reduce interest rate volatility. However, we may not maintain interest rate swaps with respect to all of our variable rate indebtedness, and any swaps we enter into may not fully mitigate our interest rate risk.

Our revolving credit facility utilizes, at our option, either (1) Term Secured Overnight Financing Rate (“SOFR”), plus a margin between 0.750% and 1.250% per annum, plus a SOFR adjustment of 0.10% or (2) the base rate plus a margin between 0.000% and 0.250% per annum, to calculate the amount of accrued interest on any borrowings. The 2025 Term Loan utilizes, at our option, either (1) Term SOFR, plus a margin between 0.625% and 1.125% per annum, plus a SOFR adjustment of 0.10% or (2) base rate plus a margin between 0.000% and 0.125% per annum, to calculate the amount of accrued interest on borrowings. The 2026 Term Loan utilizes, at our option, either (1) Term SOFR, plus a margin of between 0.875% and 1.375% per annum, plus a SOFR adjustment of 0.10%, or (2) base rate plus a margin between 0.000% and 0.375% per annum, to calculate the amount of accrued interest on borrowings. In each case, the applicable margin within the specified ranges is determined by reference to the credit rating of our unsecured debt. Accordingly, a credit rating downgrade would increase the applicable interest rates. Assuming all loans were fully drawn and we were to fully exercise our right to increase borrowing capacity under our revolving credit facility and we made no prepayments on our 2025 Term Loan or our 2026 Term Loan, each quarter point change in interest rates would result in a $5.1 million change in annual interest expense.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

We are authorized to repurchase shares of our common stock under a publicly announced program that was most recently increased by our Board of Directors on August 2, 2023. Pursuant to this authorization, we may repurchase shares from time to time through open market repurchases, in privately negotiated transactions or by other means, including accelerated share repurchase transactions or other structured repurchase transactions, block trades or pursuant to trading plans intended to comply with Rule 10b5-1 of the Exchange Act. The actual timing and amount of repurchases are subject to business and market conditions, corporate and regulatory requirements, stock price, acquisition opportunities and other factors. Our repurchase authorization does not obligate us to acquire a minimum amount of shares, does not have an expiration date and may be modified, suspended or terminated without prior notice.

The following table presents repurchases made under our publicly announced repurchase authorizations and shares surrendered by employees to satisfy income tax withholding obligations during the three months ended June 30, 2024:

Period	Total Number of Shares Purchased (1)		Average Price Paid Per Share (2)	Total Number of Shares Purchased as Part of Publicly Announced Plan or Program (3)		Approximate Dollar Value of Shares that May Yet Be Purchased Under Publicly Announced Plan or Program (1) (In millions)
April 1, 2024 - April 30, 2024	149,072	$	297.82	137,641	$	1,211
May 1, 2024 - May 31, 2024	184,679	$	287.16	164,314	$	1,163
June 1, 2024 - June 30, 2024	131,195	$	304.93	121,498	$	1,127
Total	464,946	$	295.59	423,453		

(1) Shares purchased that were not part of our publicly announced repurchase programs represent shares of restricted stock surrendered by employees to satisfy employee income tax withholding obligations due upon vesting, and do not reduce the dollar value that may yet be purchased under our publicly announced repurchase programs.

(2) The weighted average price paid per share of common stock does not include the cost of commissions.

(3) Our publicly announced share repurchase program was originally announced on February 1, 2017 and most recently increased by an additional $1.0 billion on August 2, 2023.

Item 3. Defaults Upon Senior Securities

None.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

Insider Trading Arrangements

During the fiscal quarter ended June 30, 2024, our directors and officers (as defined in Rule 16a-1(f) under the Exchange Act) adopted or terminated the contracts, instructions or written plans for the purchase or sale of our securities set forth in the table below.

Name and Position	Action	Adoption/ Termination Date	Type of Trading Arrangement Rule 10b5-1*	Total Shares of Common Stock to be Sold	Expiration Date
Thomas P. Beckley, Senior Vice President and General Manager of the Custom IC and PBC Group	Adoption	5/1/2024	X	Up to 72,427	3/31/2025

* Contract, instruction or written plan intended to satisfy the affirmative defense conditions of Rule 10b5-1(c) under the Exchange Act.

Item 6. Exhibits

Exhibit Number		Exhibit Title	Incorporated by Reference				Provided Herewith
			Form	File No.	Exhibit No.	Filing Date	
3.1		The Registrant's Restated Certificate of Incorporation, as filed with the Secretary of State of the State of Delaware on May 3, 2024.	8-K	000-15867	3.1	5/6/2024	
3.2		The Registrant's Amended and Restated Bylaws, effective as of November 2, 2023.	8-K	000-15867	3.1	11/3/2023	
10.1	#	The Registrant's Amended and Restated Employee Stock Purchase Plan.	DEF 14A	000-15867	Appendix A	3/21/2024	
10.2	*#	Form of Incentive Stock Award Agreement for Non-Executive Employees and Consultants, as currently in effect under the Registrant's Omnibus Equity Incentive Plan.					X
10.3	*#	Form of Restricted Stock Unit Agreement for Non-Executive Employees and Consultants, as currently in effect under the Registrant's Omnibus Equity Incentive Plan.					X
10.4	*#	Transition and Release Agreement, dated May 2, 2024, between the Registrant and Neil Zaman.					X
10.5		Loan Agreement, dated May 30, 2024, by and among the Registrant, Bank of America, N.A. and the other lenders party thereto.	8-K	000-15867	10.1	6/3/2024	
31.1	*	Certification of the Registrant's Chief Executive Officer, Anirudh Devgan, pursuant to Rule 13a-14 of the Securities Exchange Act of 1934.					X
31.2	*	Certification of the Registrant's Chief Financial Officer, John M. Wall, pursuant to Rule 13a-14 of the Securities Exchange Act of 1934.					X
32.1	†	Certification of the Registrant's Chief Executive Officer, Anirudh Devgan, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
32.2	†	Certification of the Registrant's Chief Financial Officer, John M. Wall, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
101.INS	*	Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.					
101.SCH	*	Inline XBRL Taxonomy Extension Schema Document.					X
101.CAL	*	Inline XBRL Taxonomy Extension Calculation Linkbase Document.					X
101.DEF	*	Inline XBRL Definition Linkbase Document.					X

101.LAB	*	Inline XBRL Taxonomy Extension Label Linkbase Document.	X
101.PRE	*	Inline XBRL Taxonomy Extension Presentation Linkbase Document.	X
104		Cover Page Interactive Data File - The cover page from this Quarterly Report on Form 10-Q is formatted in Inline XBRL (included as Exhibit 101).	X

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*	Filed herewith.
†	Furnished herewith.
#	Indicates management contract or compensatory plan or arrangement covering executive officers or directors of the Registrant.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

CADENCE DESIGN SYSTEMS, INC.
(Registrant)

DATE:	July 23, 2024	By:	/s/ Anirudh Devgan Anirudh Devgan President and Chief Executive Officer
DATE:	July 23, 2024	By:	/s/ John M. Wall John M. Wall Senior Vice President and Chief Financial Officer