TERADYNE

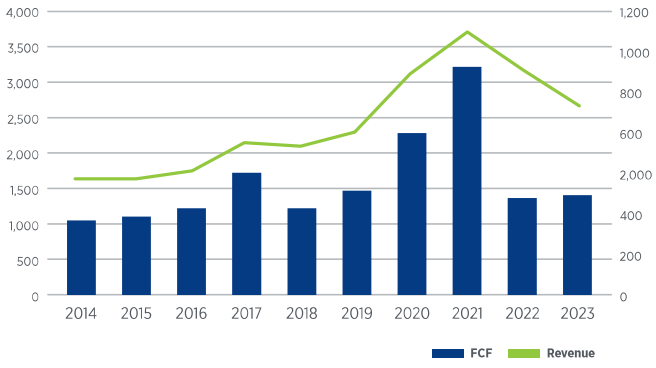
Gregory Smith
Chief Executive Officer & President
Teradyne, Inc.

Fellow Shareholders,

Teradyne is committed to delivering value to shareholders, customers, and employees by profitably growing our Test businesses while investing to drive high long-term growth in our Robotics business. We execute this strategy through a focus on our core values – Customers Count on us, Honesty and Integrity and A Company Without Doors – and a flexible operating model. Our operating model enables us to deliver strong profitability and positive cash flow through market cycles, and importantly, it insulates our R&D and customer support investments from short-term market changes.

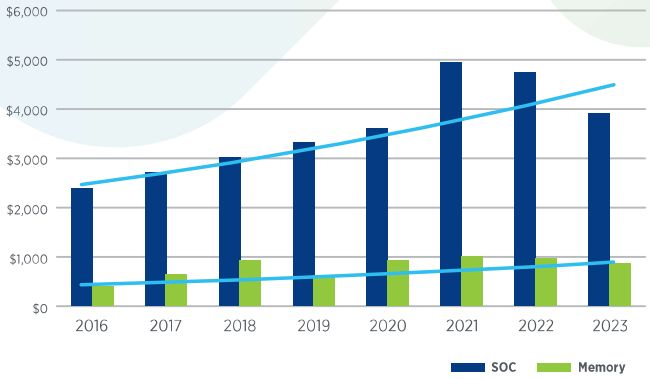
In 2023 we experienced the second consecutive year of lower cyclical demand, as the test industry continued to digest the pandemic-fueled capacity additions and the robotics industry experienced weak industrial demand. Company sales were $2.7 billion, down 15% compared to 2022, but our flexible operating model enabled us to deliver a 20% pre-tax operating margin and $2.93 in non-GAAP earnings per share.

Revenue & FCF Over 10 Years



We operate our business with mid-term plans that balance long-term historical trends and anticipated future demand drivers. In any given year, results will land above or below trend, but that trend line has provided a reliable baseline for planning. As expected, 2023 was below trend line as shown in the next Figure, but the underlying demand drivers across the markets we serve remain firmly in place. We are confident in our plans to deliver sustainable, profitable growth in the future.

Semiconductor Test Equipment Long-Term Growth Trends



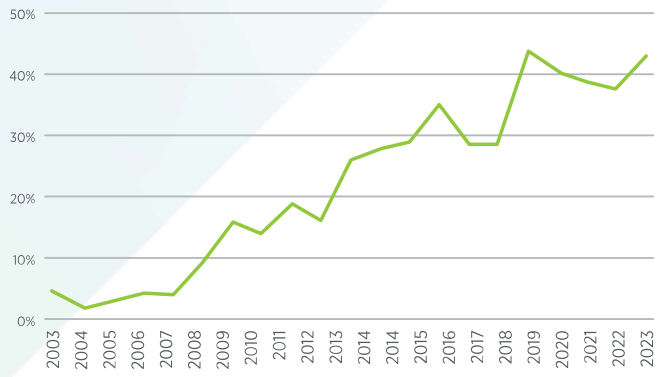
Test revenues in 2023 declined 16% from 2022 as the industry digested 2020 and 2021's record shipments. This was most evident in the smart phone portion of the semiconductor test market, a traditional stronghold for Teradyne, which has declined approximately 40% in 2023 and over 50% from its 2021 level. Test demand for automotive and industrial-related chip test equipment, an area of strength for Teradyne, was steady while the industry experienced explosive growth of Graphics Processing Unit (GPU) based cloud AI chip test demand, a market where we have lower System-on-a -chip (SOC) share.

Our strategy is to target Vertically Integrated Producers (VIPs), large AI focused hyperscalers that have begun to develop in-house chips to support growing AI demand. We expect share growth as recent design wins in these VIPs ramp into volume production. In Memory Test, Teradyne has benefited from that AI driven chip demand where we are well positioned in the fast-growing High Bandwidth Memory (HBM) segment. We have continued to make progress in our Memory Test business since acquiring Nextest in 2008, growing market share from 4% in 2007 to 43% in 2023.

Non-GAAP Operating Results[1]

	GAAP Revenue ($M)	Operating Income ($M)	Operating Margin	Net Income ($M)	Earnings per Share	Diluted Share Count	# of Employees
2023	2,676	547	20%	479	$2.93	164	6,500
2022	3,155	868	28%	713	$4.25	168	6,500
2021	3,703	1,232	33%	1,050	$5.98	176	5,900

Teradyne Memory Market Share Growth



Source: Teradyne Market Estimates

Cyclical end market weakness affected our Wireless and System Test businesses in 2023 as well with revenue declines in both segments for the year. However, the Defense and Aerospace business' past program design wins contributed to growth in production test demand.

Despite these cyclical headwinds, the resilient operating model of our Test businesses delivered strong profitability, while maintaining strategic investments in R&D to support future growth.

Robotics revenues contracted 7% in 2023. A significant factor in this result was softness in the European industrial markets, our largest region, combined with lower sales in China. Another factor is the realignment of our go-to-market strategy for UR and MiR. This realignment complements our existing channel with OEM solution providers, and direct sales coverage of large accounts to deliver the highest value to their respective end customers.

Building these channels has impacted short term results in order to position us for higher long-term growth, and we made excellent progress in 2023. OEM sales grew nearly 10% in 2023 as we added more than 50 new OEM partners serving a wide range of markets including welding, palletizing and machine tending.

We also introduced products that expand our served market. Specifically, we ramped production of the new UR20 and UR30 cobots with higher payloads and performance, opening up entirely new markets and applications. These product introductions helped power solid Robotics revenue growth in the second half of the year with fourth quarter revenues growing 17% from the fourth quarter of 2022.

In 2023, we also significantly strengthened our robotics leadership team, with industry veterans Ujjwal Kumar taking the reins of the Robotics Group and Jean Pierre Hathout becoming President of MiR. Looking ahead, we are increasingly confident in Teradyne's ability to profitably grow in the nascent advanced robotics market.

Thank you for your continued support,

Greg S. Smith
Chief Executive Officer and President
Teradyne, Inc.
March 2024

1 Non-GAAP financial measures. Please see the attached appendix for explanations of why we use these Non-GAAP measures and the reconciliation to the most comparable GAAP financial measures.

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Appendix A to Shareholder Letter – March 31, 2023
Reconciliation of GAAP Measures to Non-GAAP Measures

The non-GAAP performance measures discussed in this shareholder letter may not be comparable to similarly titled measures used by other companies. The presentation of non-GAAP measures is not meant to be considered in isolation, as a substitute for, or superior to, financial measures or information provided in accordance with GAAP. In addition to disclosing results that are determined in accordance with GAAP, Teradyne also discloses non-GAAP results of operations that exclude certain income items and charges. These results are provided as a complement to results provided in accordance with GAAP. Non-GAAP income from operations and non-GAAP net income exclude acquired intangible assets amortization, non-cash convertible debt interest, pension actuarial gains and losses, discrete income tax adjustments, fair value inventory step-up, and restructuring and other, and includes the related tax impact on non-GAAP adjustments. GAAP requires that these items be included in determining income from operations and net income. Non-GAAP income from operations, non-GAAP net income, non-GAAP income from operations as a percentage of revenue, non-GAAP net income as a percentage of revenue, and non-GAAP net income per share are non-GAAP performance measures presented to provide meaningful supplemental information regarding Teradyne's baseline performance before gains, losses or other charges that may not be indicative of Teradyne's current core business or future outlook. These non-GAAP performance measures are used to make operational decisions, to determine employee compensation, to forecast future operational results, and for comparison with Teradyne's business plan, historical operating results and the operating results of Teradyne's competitors. Non-GAAP gross margin excludes fair value inventory step-up. GAAP requires that this item be included in determining gross margin. Non-GAAP gross margin dollar amount and percentage are non-GAAP performance measures that management believes provide useful supplemental information for management and the investor. Management uses non-GAAP gross margin as a performance measure for Teradyne's current core business and future outlook and for comparison with Teradyne's business plan, historical gross margin results and the gross margin results of Teradyne's competitors. Non-GAAP diluted shares include the impact of Teradyne's call option on its shares. Management believes each of these non-GAAP performance measures provides useful supplemental information for investors, allowing greater transparency to the information used by management in its operational decision making and in the review of Teradyne's financial and operational performance, as well as facilitating meaningful comparisons of Teradyne's results in the current period compared with those in prior and future periods. A reconciliation of each available GAAP to non-GAAP financial measure discussed in this shareholder letter is contained in this Appendix A and on the Teradyne website at www.teradyne.com by clicking on "Investor Relations" and then selecting "Financials" and the "GAAP to Non-GAAP Reconciliation" link.

TERADYNE

	Twelve Months Ended							
	December 31, 2022	% of Net Revenues			December 31, 2021	% of Net Revenues		
Net Revenues	$ 3,155.0				$ 3,702.9			
Gross profit GAAP and non-GAAP	$ 1,867.2	59.2%			$ 2,206.7	59.6%		
Income from operations - GAAP	$ 831.9	26.4%			$ 1,200.7	32.4%		
Restructuring and other (1)	17.2	0.5%			9.3	0.3%		
Acquired intangible assets amortization	19.3	0.6%			21.5	0.6%		
Income from operations - non-GAAP	$ 868.4	27.5%			$ 1,231.5	33.3%		
			Net Income per Common Share				Net Income per Common Share	
	December 31, 2022	% of Net Revenues	Basic	Diluted	December 31, 2021	% of Net Revenues	Basic	Diluted
Net income - GAAP	$ 715.5	22.7%	$ 4.52	$ 4.22	$ 1,014.6	27.4%	$ 6.15	$ 5.53
Restructuring and other (1)	17.2	0.5%	0.11	0.10	9.3	0.3%	0.06	0.05
Acquired intangible assets amortization	19.3	0.6%	0.12	0.11	21.5	0.6%	0.13	0.12
Loss on convertible debt conversions (2)	—	—	—	—	28.8	0.8%	0.17	0.16
Interest and other (2)	—	—	—	—	10.3	0.3%	0.06	0.06
Pension mark-to-market adjustment (2)	(25.6)	-0.8%	(0.16)	(0.15)	(2.2)	-0.1%	(0.01)	(0.01)
Exclude discrete tax adjustments	(12.1)	-0.4%	(0.08)	(0.07)	(28.6)	-0.8%	(0.17)	(0.16)
Non-GAAP tax adjustments	(1.4)	0.0%	(0.01)	(0.01)	(3.4)	-0.1%	(0.02)	(0.02)
Convertible share adjustment (3)	—	—	—	0.05	—	—	—	0.24
Net income - non-GAAP	$ 712.9	22.6%	$ 4.50	$ 4.25	$ 1,050.3	28.4%	$ 6.37	$ 5.98
GAAP and non-GAAP weighted average common shares - basic	158.4				165.0			
GAAP weighted average common shares - diluted	169.7				183.6			
Exclude dilutive shares from convertible note	(1.8)				(7.4)			
Non-GAAP weighted average common shares - diluted	167.9				176.2			

(1) Restructuring and other consists of:

	Twelve Months Ended	
	December 31, 2022	December 31, 2021
Litigation settlement	$ 14.7	$ 12.0
Employee severance	2.9	1.5
Gain on sale of asset	(3.4)	—
Contingent consideration fair value adjustment	—	(7.2)
Other	3.0	3.0
	$ 17.2	$ 9.3

(2) For the twelve months ended December 31, 2021, adjustment to exclude loss on convertible debt conversions. For the twelve months ended December 31, 2021, Interest and other included non-cash convertible debt interest expense. For the twelve months ended December 31, 2022 and December 31, 2021, adjustment to exclude actuarial gain recognized under GAAP in accordance with Teradyne's mark-to-market pension accounting.

(3) For the twelve months ended December 31, 2022 and December 31, 2021, the non-GAAP diluted EPS calculation adds back $1.0 million and $3.7 million, respectively, of convertible debt interest expense to non-GAAP net income. For the twelve months ended December 31, 2022 and December 31, 2022, non-GAAP weighted average diluted common shares include 8.8 million and 10.0 million shares, respectively, related to the convertible debt hedge transaction.

(4) Currency exchange rates are used to convert the operating results for countries where the functional currency is not the U.S. dollar into U.S. dollars. We calculate the effect of changes in currency exchange rates as the difference between period activity translated using the period's currency exchange rates and the rates as of December 31, 2021.

	Twelve Months Ended	
	December 31, 2020	% of Net Revenues
Net Revenues	$ 3,121.5	
Gross profit GAAP	$ 1,785.7	57.2%
Inventory step-up	0.4	0.0%
Gross profit non-GAAP	$ 1,786.1	57.2%
Income from operations - GAAP	$ 928.4	29.7%
Acquired intangible assets amortization	30.8	1.0%
Restructuring and other (1)	(13.2)	-0.4%
Inventory step-up	0.4	0.0%
Equity modification charge	0.8	0.0%
Income from operations - non-GAAP	$ 947.2	30.3%

			Net Income per Common Share	
	December 31, 2020	% of Net Revenues	Basic	Diluted
Net income - GAAP	$ 784.1	25.1%	$ 4.72	$ 4.28
Acquired intangible assets amortization	30.8	1.0%	0.19	0.17
Interest and other (2)	14.4	0.5%	0.09	0.08
Pension mark-to-market adjustments (2)	10.3	0.3%	0.06	0.06
Restructuring and other (1)	(13.2)	-0.4%	(0.08)	(0.07)
Inventory step-up	0.4	0.0%	0.00	0.00
Equity modification charge	0.8	0.0%	0.00	0.00
Exclude discrete tax adjustments (3)	(15.2)	-0.5%	(0.09)	(0.08)
Non-GAAP tax adjustments	(11.9)	-0.4%	(0.07)	(0.07)
Convertible share adjustment (4)	-	-	-	0.25
Net income - non-GAAP	$ 800.5	25.6%	$ 4.82	$ 4.62
GAAP and non-GAAP weighted average common shares - basic	166.1			
GAAP weighted average common shares - diluted	183.0			
Exclude dilutive shares from convertible note	(8.5)			
Non-GAAP weighted average common shares - diluted	174.5			

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

FORM 10-K

ANNUAL REPORT
PURSUANT TO SECTIONS 13 OR 15(d)
OF THE SECURITIES EXCHANGE ACT OF 1934

(MARK ONE)

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

For the fiscal year ended December 31, 2023

OR

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

Commission file number 001-06462

TERADYNE, INC.
(Exact Name of Registrant as Specified in Its Charter)

MASSACHUSETTS **(State or Other Jurisdiction of Incorporation or Organization)**	**04-2272148** **(I.R.S. Employer Identification Number)**
600 RIVERPARK DRIVE **NORTH READING, MASSACHUSETTS** **(Address of Principal Executive Offices)**	**01864** **(Zip Code)**

Registrant's telephone number, including area code: (978) 370-2700

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, par value $0.125 per share	**TER**	**Nasdaq Stock Market LLC**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act. Yes ☐ No ☒

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 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 ☐

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to § 240.10D-1(b). ☐

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

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. Yes ☒ No ☐

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

The aggregate market value of the voting stock held by non-affiliates of the registrant as of July 2, 2023, was approximately $11.0 billion based upon the closing price of the registrant's Common Stock on the Nasdaq Stock Market on that date.

The number of shares outstanding of the registrant's only class of Common Stock as of February 16, 2024, was 153,080,607 shares.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement in connection with its 2024 annual meeting of shareholders are incorporated by reference into Part III of this Form 10-K.

TERADYNE, INC.

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TERADYNE, INC.

FORM 10-K

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains “forward-looking statements” regarding Teradyne's future business prospects, financial performance or position and results of operations. When used herein, the words such as “anticipate,” “expect,” “plan,” “could,” “may,” “will,” “believe,” “estimate,” “goal,” or other comparable terms are intended to identify forward-looking statements although not all forward-looking statements contain these identifying words. Forward-looking statements involve risks and uncertainties, including, but not limited to, those discussed in the section entitled “Risk Factors” of this Annual Report on Form 10-K and elsewhere, and in our other filings with the Securities and Exchange Commission (“SEC”). Readers are cautioned not to place undue reliance on these forward-looking statements which reflect management’s analysis only as of the date hereof and are subject to risks and uncertainties that could cause actual results to differ materially from those stated or implied. Teradyne assumes no obligation to update these forward-looking statements for any reason, except as may be required by law.

PART I

Item 1: *Business*

Teradyne, Inc. (“Teradyne”) was founded in 1960 and is a leading global supplier of automated test equipment and robotics solutions.

We design, develop, manufacture and sell automated test systems and robotics products. Our automated test systems are used to test semiconductors, wireless products, data storage and complex electronics systems in many industries including consumer electronics, wireless, automotive, industrial, computing, communications, and aerospace and defense industries. Our robotics products include collaborative robotic arms and autonomous mobile robots (“AMRs”) used by global manufacturing, logistics and industrial customers to improve quality, increase manufacturing and material handling efficiency and decrease manufacturing and logistics costs. Our automated test equipment and robotics products and services include:

- semiconductor test (“Semiconductor Test”) systems;
- storage and system level test (“Storage Test”) systems, defense/aerospace (“Defense/Aerospace”) test instrumentation and systems, and circuit-board test and inspection (“Production Board Test”) systems (collectively these products represent “System Test”);
- wireless test (“Wireless Test”) systems; and
- robotics (“Robotics”) products.

The market for our test products is concentrated with a limited number of significant customers accounting for a substantial portion of the purchases of test equipment. A few customers drive significant demand for our products both through direct sales and sales to the customer’s supply partners. We expect that sales of our test products will continue to be concentrated with a limited number of significant customers for the foreseeable future.

In 2023, the demand in our Semiconductor Test business continued to be impacted by a correction cycle driven by excess semiconductor inventory, primarily in the mobility segment of the market. The depth of this slowdown and the timing of the recovery are uncertain, however, strong automotive and image sensor demand partially offset these declines. The growth of DDR5 and High Bandwidth Memory ("HBM") devices for data center applications continued to drive demand for our products in the memory market in 2023. Over the midterm, we expect the ramp of 3 nanometer and gate-all-around process technology, increasing multichip packaging, additional device complexity and unit growth will drive additional demand for Semiconductor Test.

Our Robotics segment consists of Universal Robots A/S (“UR”), a leading supplier of collaborative robotic arms, and Mobile Industrial Robots A/S (“MiR”), a leading maker of AMRs for industrial automation. The market for our Robotics segment products is dependent on the adoption of new automation technologies by large manufacturers as well as small and medium enterprises (“SMEs”) throughout the world. Demand in the fourth quarter of 2023 increased, tied to introduction of new products and seasonally high demand in Robotics after market softness and the impact of our channel transformation resulted in a weaker than forecasted first half of 2023.

On November 7, 2023, Teradyne and Technoprobe S.p.A (“Technoprobe”), a leader in the design and production of probe cards, announced the establishment of a strategic partnership that will seek to accelerate growth for both companies and enable higher performance semiconductor test interfaces for customers worldwide. As part of the partnership, Teradyne will make an investment of 481.0 million Euros in exchange for a 10% equity investment in Technoprobe and Technoprobe will acquire 100% of Teradyne’s Device Interface Solutions ("DIS") business in exchange for $85.0 million. The transaction is expected to close during the first half of 2024.

In 2023, inflation had minimal effect on our results. While both our test and robotics businesses may continue to be influenced by supply constraints, which could impact our revenue and costs, we do not anticipate that supply chain constraints will have a material impact on our financial results in 2024.

Our financial statements are denominated in U.S. dollars. While the majority of our revenues are in U.S. dollars, approximately 70 percent of our Robotics sales are denominated in foreign currencies. There was no material impact to our 2023 results due to changes in foreign exchange rates, however, in 2022, the strengthening of the U.S. dollar was a factor in lower than forecasted revenues in our Robotics segment. Strengthening of the U.S. dollar would adversely affect Robotics revenue growth in 2024.

Our corporate strategy continues to focus on profitably gaining market share in our test businesses through the introduction of differentiated products that target expanding segments and accelerating growth through continued investment in our Robotics businesses. We plan to continue investing in our growth while balancing capital allocations between stock repurchases and dividends and using capital for acquisitions.

Investor Information

We are a Massachusetts corporation incorporated on September 23, 1960. We are subject to the informational requirements of the Securities Exchange Act of 1934 ("Exchange Act"). We file periodic reports, proxy statements and other information with the SEC. The SEC maintains an internet site (http://www.sec.gov) that contains reports, proxy and information statements and other information regarding issuers that file documents electronically.

You can access financial and other information, including the charters of our Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee, our Corporate Governance Guidelines and Code of Conduct, by clicking the Investors link on our web site at www.teradyne.com. We make available, free of charge, copies of our filings with the SEC, including our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act through our web site as soon as reasonably practicable after filing such material electronically or otherwise furnishing it to the SEC.

Products

Semiconductor Test

We design, manufacture, sell and support Semiconductor Test products and services on a worldwide basis. The test systems we provide are used both for wafer level and device package testing of semiconductor devices. These devices are used in automotive, industrial, communications, consumer, smartphones, cloud, computer and electronic game applications, among others. Semiconductor devices span a broad range of functionality, from very simple low-cost devices such as appliance microcontrollers, operational amplifiers or voltage regulators to complex digital signal processors, Artificial Intelligence/Machine Learning ("AI/ML") training, high performance computing and microprocessors as well as memory devices. Semiconductor Test products and services are sold to integrated device manufacturers ("IDMs") that integrate the fabrication of silicon wafers into their business, "Fabless" companies that outsource the manufacturing of silicon wafers, "Foundries" that cater to the processing and manufacturing of silicon wafers, and semiconductor assembly and test providers ("OSATs") that provide test and assembly services for the final packaged devices to both Fabless companies and IDMs. Fabless companies perform the design of integrated circuits without manufacturing capabilities and use Foundries for wafer manufacturing and OSATs for test and assembly. These customers obtain the overall benefit of comprehensively testing devices and reducing the total costs associated with testing by using our Semiconductor Test systems to:

- improve and control product quality;
- measure and improve product performance;
- reduce time to market; and
- increase production yields.

Our FLEX Test Platform architecture advances our core technologies to produce test equipment that is designed for high efficiency multi-site testing. Multi-site testing involves the simultaneous testing of many devices in parallel. Leading semiconductor manufacturers are using multi-site testing to significantly improve their "Cost of Test" economics. The FLEX Test Platform architecture addresses customer requirements through the following key capabilities:

- A high efficiency multi-site architecture that reduces tester overhead such as instrument setup, synchronization and data movement, and signal processing;
- The IG-XL™ software operating system which provides fast program development, including instant conversion from single to multi-site test; and
- Broad technology coverage by instruments designed to cover the range of test parameters, coupled with a universal slot test head design that allows easy test system reconfiguration to address changing test needs.

FLEX Test Platform purchases are made by IDMs, OSATs, Foundries and Fabless customers. The FLEX Test Platform has become a widely used test solution at OSATs by providing versatile testers that can handle the widest range of devices, allowing OSATs to leverage their capital investments. The broad consumer, automotive and broadband markets have historically driven most of the device volume growth in the semiconductor industry. These markets include mobile phones and tablets, PCs, servers, networking

and automotive electronics. These end use markets continue to be drivers for the FLEX Test Platform family of products because they require a wide range of technologies and instrument coverage. In 2019, we introduced our next generation UltraFLEXPlus tester, the newest member of the UltraFLEX family, UltraFLEXPlus uses the new PACE™ architecture to deliver superior economics and fast time to market for complex digital devices.

Our J750™ test system shares the IG-XL software environment with the family of FLEX Test Platform systems. The J750 is designed to handle high volume semiconductor devices, such as microcontrollers, that are central to the functionality of almost every consumer electronics product, from small appliances to automobiles. J750 test systems combine compact packaging, high throughput and ease of production test. We extended the J750 platform technology to create the IP750 Image Sensor™ test system. The IP750 is focused on testing image sensor devices used in smartphones, automobiles and other imaging products. We have continued to invest in the J750 platform with new instrument releases that bring new capabilities to existing market segments and expand the J750 platform to new devices that include high end microcontrollers and the latest generation of image sensors.

Our Magnum platform addresses the requirements of mass production test of memory devices for flash and DRAM memory. Flash and DRAM memory are widely used core building blocks in modern electronic products finding wide application in consumer, industrial, and computing equipment. Magnum 7, the newest member of the family introduced at the end of 2021, is a next generation memory test solution designed for parallel memory test in the flash, DRAM and multi-chip package markets. In 2019, we introduced a high-speed DRAM test version of our Magnum platform called Magnum EPIC giving us full product coverage of the memory test market.

Our ETS platform is used by semiconductor manufacturers and assembly and test subcontractors, primarily in the analog/mixed signal markets that cover more cost sensitive applications. Our proprietary SmartPin™ technology enables high efficiency multi-site testing, on an individual test system, permitting greater test throughput. Semiconductors tested by ETS platform systems are incorporated into a wide range of products in historically high-growth markets, including mobile devices, automotive electronics, computer peripherals, and notebook and desktop computers. The Eagle platform includes the ETS-88, a high performance multi-site production test system designed to test a wide variety of high volume power and precision devices, including Silicon Carbide (SiC) and Gallium Nitride (GaN) power devices used in vehicle electrification, and the ETS-800, a high performance multi-site production test system, is used to test high complexity power devices in automotive, industrial and consumer applications.

System Test

Our System Test segment is comprised of three business units: Storage Test, Defense/Aerospace, and Production Board Test.

Storage Test

The Storage Test business unit addresses the high throughput, automated manufacturing test requirements of hard disk drive ("HDD") and semiconductor manufacturers. Our HDD products address the client and enterprise storage markets. The client market is driven by the needs of desktop, laptop, and external HDD storage products. The enterprise market is driven by the needs of data centers and cloud storage. Our system level test product for the semiconductor production market is used to test devices following wafer and package test. The business unit's products lead in addressing customer requirements related to factory density, throughput and thermal performance.

Defense/Aerospace

We are a leading provider of high performance test systems, subsystems, instruments and service for the defense and aerospace markets. Our test products are used to ensure the readiness of military and commercial aerospace electronics systems. New programs, such as tactical aircraft and missile systems, as well as upgrade programs, continue to fuel the demand for high performance test systems in this market. Our test products are well-suited to the demands of defense/aerospace electronics manufacturers and repair depots worldwide. Our leadership in this market is underscored by our success with major Department of Defense programs across all U.S. military service branches and many allied defense services worldwide.

Production Board Test

Our test systems are used by electronics manufacturers and OEMs worldwide to perform In-Circuit-Test ("ICT") and device programming of printed circuit board assemblies. Fast, accurate and cost-effective test capabilities are hallmark features of our Test Station product families. We offer the Test Station in off-line and automated in-line configurations. The automated in-line configurations address the growing requirements for automating production lines for high volume applications, such as automotive electronics, computing, and communications.

Wireless Test

Our Wireless Test segment is a business unit run under the LitePoint brand name providing wireless test solutions for silicon validation, wireless module manufacturing, and wireless end device manufacturing. The world's leading makers of smartphones, laptops, access points, and Internet-of-Things ("IoT") devices rely on LitePoint equipment to ensure their products get into consumer's hands with high quality and high efficiency.

LitePoint wireless test systems span design verification to high volume manufacturing and are deployed across the entire production chain from wireless chipset suppliers to consumer brands. Design verification involves comprehensive automated testing of small quantities of devices in an R&D lab to ensure the device meets its design targets over a wide range of conditions and scenarios. High Volume manufacturing involves the calibration and testing of each wireless device to ensure the product will deliver the intended customer experience. This ensures all the products perform identically in terms of their wireless characteristics.

LitePoint equipment serves an ever-expanding number of wireless standards in three segments: connectivity, cellular, and secure ranging. Connectivity encompasses numerous short range unlicensed communication standards. Cellular includes standards operating in licensed spectrum from a few GHz to 10s of GHz (mmWave). Finally, secure ranging uses Ultra Wideband (UWB) technology to provide centimeter level positioning with secure data transactions for applications such as "digital keys" and item location (tag type trackers).

LitePoint serves these wireless segments with multiple product families. The LitePoint IQxel-MX and IQxel-MW7G series provide leading edge measurement performance for both design validation and high volume manufacturing of connectivity products. The LitePoint IQxstream-5G and IQgig-5G families combine support for 4G and 5G technologies across a wide range of frequencies to serve all the needs of both end user (smartphones) and network infrastructure (small cells and O-RAN) equipment. Finally, the IQgig-UWB+ provides comprehensive certification and manufacturing test support for UWB (802.15.14) products used for secure ranging.

Robotics

Our Robotics segment is comprised of two business units: Universal Robots and Mobile Industrial Robots.

Universal Robots

Universal Robots is a leading provider of collaborative robots (cobots) used across various industries, including automotive, food & beverage, metal & machining, electronics, pharmaceutical, and in education. Founded in 2005 and headquartered in Odense, Denmark, Universal Robots aims to create a world where people work with robots, not like robots. Its mission is simple: "*Automation for anyone. Anywhere.*"

Since introducing the world's first commercially viable cobot in 2008, Universal Robots has sold over 75,000 cobots worldwide and has developed a product portfolio reflecting a range of reaches and payloads, including the UR3e, UR5e, UR10e, UR16e, UR20 and UR30 robots. All models are robust, built to withstand a wide range of industrial environments, and can be easily integrated into existing production setups, providing a number of game-changing benefits:

- **Straightforward programming** – UR's intuitive software, PolyScope, enables users to program a cobot easily and have an application up and running within a few hours.
- **High return on investment** – cobots require a lower initial investment than traditional robotics and have an average payback time of 12-18 months.
- **Versatile deployment** – cobots' high degree of flexibility allows customers to change the task and pace of the cobot according to production demands.
- **Collaborative-capable safety functions** – following a risk assessment, most cobots can seamlessly operate alongside employees, assisting with dull, dirty, and dangerous tasks.
- **Cutting-edge precision engineering** – UR's global team of talented engineers creatively tackles customer challenges, ensuring our cobots are rigorously tested and built for demanding industrial tasks.

An extensive ecosystem has grown around the company's cobot technology creating innovation, choice for customers and a wide range of components, kits and solutions to suit every application. UR also provides an all-encompassing customer experience including UR Academy - an award-winning training program, available both online and in person in more than 120 training centers worldwide, and three tiers of service offerings carefully designed to accelerate customer success.

Universal Robots has recently established global Centers of Excellence for Welding, Palletizing, and Machine Tending applications. These centers, led by subject matter experts, serve as knowledge hubs, offering expert recommendations and guidance on the latest trends in the field to UR partners and key customers worldwide.

Mobile Industrial Robots

MiR is a leading provider of autonomous mobile robots (AMRs) for the manufacturing and logistics segments. The MiR AMRs enhance productivity, offering a high return on investment by streamlining workforce efficiency, reducing lead times, and improving workplace safety. These AMRs operate autonomously, eliminating the need for traditional guidance infrastructure. MiR currently offers three models—MiR250, MiR600, and MiR1350—each with varying payload capacities, all managed by our unified fleet management software, MiR Fleet. Launched in fall 2021, MiR600 and MiR1350 are industrial-grade robots with IP52 rating, compliant with ISO 3691-4 safety standards, and TÜV certified.

All models can be easily integrated into existing production environments. MiR's products are differentiated by their:

- **Ease of Use and Speed of Deployment:** Our robots are designed for quick deployment and flexibility, allowing customers to adapt tasks based on changing demands.
- **Safe Operations:** Equipped with 360 safety coverage, our robots navigate around static and dynamic obstacles, ensuring safety in busy environments.
- **Reliable Autonomous Navigation:** The MiR robots demonstrate consistent, reliable navigation across large manufacturing and warehouse areas.
- **Short Payback Period:** With an average payback period of 12–24 months, MiR's products provide a swift return on investment.

Sales and Distribution

In 2023, revenues from Texas Instruments Inc., a customer of our Semiconductor Test segment, accounted for 10% of our consolidated revenues. In 2021, revenues from Taiwan Semiconductor Manufacturing Company Ltd., a customer of our Semiconductor Test segment, accounted for 12% of our consolidated revenues. In each of the years, 2023, 2022 and 2021, our five largest direct customers in aggregate accounted for 32%, 26% and 33% of our consolidated revenues, respectively.

OSAT customers, such as Taiwan Semiconductor Manufacturing Company Ltd., often purchase our test systems based upon recommendations from OEMs, IDMs and Fabless companies. In all cases when an OSAT customer purchases a test system from us, we consider the OSAT as the customer since credit risk, title and risk of loss, among other things, are between Teradyne and the OSAT. We estimate consolidated revenues driven by Qualcomm, a customer of our Semiconductor Test, System Test, and Wireless Test segments, combining direct and indirect sales, accounted for approximately 11% of our consolidated revenues in 2022. We estimate consolidated revenues driven by one OEM customer, of our Semiconductor Test and Wireless Test segments, combining direct sales to that customer with sales to the customer's OSATs (which include Taiwan Semiconductor Manufacturing Company Ltd.), accounted for approximately 19% of our consolidated revenues in 2021. The loss of, or significant decrease in demand from this OEM customer or any of our five largest direct customers, could have a material adverse effect on our business, results of operations and financial condition.

We have sales and service offices located throughout North America, Central America, Asia and Europe. We sell in these areas predominantly through a direct sales force, except for Robotics products, which are sold principally through distributors. Our manufacturing activities for our test businesses are primarily conducted through subcontractors and outsourced contract manufacturers with significant operations in China and Malaysia. The manufacturing activities for our Robotics businesses are done primarily in our production facilities in Denmark and the U.S.

Sales to customers outside the United States were 84%, 85%, and 89%, respectively, of our consolidated revenues in 2023, 2022 and 2021. Sales are attributed to geographic areas based on the location of the customer site.

See also "Item 1A: Risk Factors" and Note T: "Operating Segment, Geographic and Significant Customer Information" in Notes to Consolidated Financial Statements.

Competition

We face significant competition throughout the world in each of our reportable segments. Competitors in the Semiconductor Test segment include, among others, Advantest Corporation and Cohu, Inc.

Competitors in the System Test segment include, among others, Keysight Technologies, Inc., Advantest Corporation, Test Research, Inc. SPEA S.p.A. and Astronics Corporation.

Competitors in our Wireless Test segment include, among others, Rohde & Schwarz GmbH & Co. KG, Anritsu Company, Keysight Technologies, Inc., National Instruments Corporation, Welzek and iTest.

Competitors in our Robotics segment include manufacturers of traditional industrial robots such as KUKA Robotics Corporation, ABB, FANUC, Staubli and Yaskawa Electric Corporation, companies with emerging collaborative robot offerings such as Techman, Doosan, Jaka, and AUBO Robotics, and manufacturers of autonomous mobile robots in the material handling space such as Omron, Rockwell Automation, Junion, HikRobot, Agilox, and KION.

Some of our competitors may have greater financial and other resources to pursue engineering, manufacturing, marketing, and distribution of their products. We also face competition from emerging Asian companies and from internal suppliers at several of our customers. Some of our competitors have introduced or announced new products with certain performance characteristics which may be considered equal or superior to those we currently offer. We expect our competitors to continue to improve the performance of their current products and to introduce new products or new technologies that provide improved cost of ownership and performance characteristics. See also “Item 1A: Risk Factors.”

Backlog

At December 31, 2023 and 2022, our backlog of unfilled orders in our four reportable segments was as follows:

	2023	2022
	(in millions)	
Semiconductor Test	$ 822.8	$ 879.6
System Test	223.8	253.0
Robotics	42.3	42.6
Wireless Test	35.7	60.0
	$ 1,124.6	$ 1,235.2

Customers may delay delivery of products or cancel orders suddenly and without advanced notice, subject to possible cancellation penalties. Due to possible customer changes in delivery schedules and cancellation of orders, our backlog at any particular date is not necessarily indicative of the actual sales for any succeeding period. Delays in delivery schedules or cancellations of backlog during any particular period could have a material adverse effect on our business, financial condition or results of operations.

Raw Materials

Our products contain electronic and mechanical components that are provided by a wide range of suppliers. Some of these components are standard products, while others are manufactured to our specifications. We have experienced delays in obtaining timely delivery of certain components. These delays have impacted and may continue to impact the manufacturing of certain products and the timing of delivery of those products to our customers. While the majority of our components are available from multiple suppliers, certain items are obtained from sole sources. We may experience a temporary adverse impact if any of our sole source suppliers delay or cease to deliver products.

Intellectual Property and Licenses

The development of our products, both hardware and software, is based in significant part on proprietary information, our brands and technology. We protect our rights in proprietary information, brands and technology through various methods, such as:

- patents;
- copyrights;
- trademarks;

- trade secrets;
- standards of business conduct and related business practices; and
- technology license agreements, software license agreements, non-disclosure agreements, employment agreements, and other agreements.

However, these protections might not be effective in all circumstances. Competitors might independently develop similar technology or exploit our proprietary information and our brands in countries where we lack enforceable intellectual property rights or where enforcement of such rights through the legal system provides an insufficient deterrent. Also, intellectual property protections can lapse or be invalidated through appropriate legal processes. We do not believe that any single piece of intellectual property or proprietary rights is essential to our business.

Human Capital

We believe that our future success depends upon our continued ability to attract, develop, and retain a high-performance workforce, comprised of people with shared values. As of December 31, 2023, we employed approximately 6,500 employees, of whom approximately 2,000 were employed in the United States and approximately 4,500 were employed outside of the United States. Our largest non-US employee populations are in the Philippines (18%), Denmark (12%), China (10%), Taiwan (7%) and Costa Rica (6%). We also leverage contractors to provide flexibility for our business and manufacturing needs. As of December 31, 2023, we worked with approximately 300 contractors globally. Since the inception of our business, we have experienced no work stoppages or other labor disturbances.

Corporate Culture

Our core values are conducting business with honesty and integrity, collaborating with our colleagues as a company without doors, and partnering with our customers every step of the way, because customers count on us.

We strive to foster a positive work environment that helps employees thrive. It is a priority for us to ensure that our people feel inspired, supported, safe and able to achieve their personal best. We are committed to equality through nondiscrimination, harassment prevention and pay equity policies. We value a diverse, inclusive and respectful work environment where all employees enjoy challenging assignments, development opportunities and a safe, positive culture.

We are committed to conducting business in a responsible manner, with strategic operational policies, procedures and values that support transparency, sustainability and legal compliance. We ensure ethical operations and business commitments through robust governance of the company's code of conduct and global environmental, health and safety programs.

Competitive Pay and Benefits

The primary objective of our compensation program is to provide a compensation and benefits package that will continue to attract, retain, motivate and reward high performing employees who operate in a highly competitive and technologically challenging environment. We seek to achieve this objective by linking a meaningful portion of compensation to company and business unit performance. We enable employees worldwide to share in the success of the company through various programs including a stock purchase program, equity compensation, profit sharing and bonus plans. We seek competitiveness and fairness in total compensation with reference to peer comparisons and internal equity.

In addition to providing our employees with competitive compensation packages, we offer benefits designed to meet the needs of employees and their families worldwide, including paid time off, parental leave, bereavement leave, health insurance coverage, flexible work arrangements, contributions to retirement savings, and access to employee assistance and work-life programs.

Employee Development and Training

We believe that employee development and training is a key factor in attracting, motivating, improving and retaining a strong, competitive global workforce. We provide continual development to our employees focused on developing their job skills and competencies. Examples include new manager competencies like giving feedback and coaching, and training in software development tools and project management. Our employees worldwide also receive annual performance reviews and are involved in setting goals for their own development and performance. Employees and managers look back on the previous year, review career development plans and create goals for the next year. In 2022, we implemented a new learning management system integrated with our human resource system. This enabled our business to more easily create and offer business training courses.

We are committed to recruiting and developing talent at the collegiate level to help advance Science, Technology, Engineering and Mathematics ("STEM") education for the future generation. For example, our paid internships and entry-level positions offer real-world experience, and our co-op program offers higher education students a unique learning opportunity as students alternate one semester in a work assignment and one semester in the classroom. Additionally, we offer reimbursement for educational courses related to an employee's work or as part of a degree program, including tuition, lab fees and books. We also offer a scholarship program for employees with college-age children, step-children and grandchildren. In 2023, approximately half of the scholarship recipients were outside of the United States.

Employee Engagement

We conduct regular employee surveys to check in with our global workforce and obtain input on a number of topics. The feedback we receive from these surveys helps us assess employee sentiment, identify areas of improvement and guides our decision-making as it relates to people management. In addition, our CEO and other executives meet with employees worldwide on a frequent basis through exchange meetings and quarterly webcasts. The exchange meetings allow the executives to directly interact with a small group of employees, while the global webcasts enable all employees to engage with senior leaders and ask questions in an open Q&A session.

We also offer employees worldwide an opportunity to network and connect with colleagues who share similar interests. This includes global groups such as New Employees to Teradyne, Woman's Affinity Group, Veterans, Blue and Green (for team members that are committed to the environment), Runner's affinity group and LGBTQ+ advocates.

Diversity and Inclusion

We believe in fostering a diverse workforce and equitable and inclusive culture in order to build a stronger and more resilient company for our customers, our investors, our employees and our communities worldwide. To support this effort, we have a Diversity and Inclusion Charter which was developed by our Diversity, Equity and Inclusion ("DEI") executive sub-committee and designed to ensure that we build diversity across our workforce. Since 2021, we have had a DEI program manager to steer our DEI efforts and maintain an internal DEI website for employees. We have established programs for recruiting and hiring candidates from various backgrounds and experiences. We have policies regarding gender pay equity and regularly conduct audits of pay equity in the United States. We conduct mandatory DEI-related training for our employees worldwide and offer a wide variety of optional DEI-related training courses as well. We are an equal opportunity and affirmative action employer committed to making employment decisions without regard to race, religion, ethnicity or national origin, gender, sexual orientation, gender identity or expression, age, disability, protected veteran status or any other characteristics protected by law.

We have a tradition of amplifying the charitable actions of our employees and responding to the needs of the communities where we work. To make it easier for employees to support charitable activities and magnify the impact of support, we established a formal matching gift program, "Teradyne Gives." The program matches up to $1,000 per year of an employee's donations to charities of their choosing, selected from a wide range of qualified non-profit organizations.

Additionally, advancing education for future generations is a primary initiative at Teradyne. We seek to increase the diversity of STEM graduates worldwide through our support of STEM programs at the middle, high school and collegiate level. We also donate test equipment and robots to colleges, universities, and vocational programs.

Health and Safety

The health and safety of our employees worldwide is our highest priority. We are committed to complying with all applicable regulatory health and safety requirements wherever we operate. We conduct internal audits, regular reviews and monitoring of regulations to ensure compliance with laws and regulations at the local, state, province and country levels. We ensure workers are provided with the knowledge to perform their jobs safely by deploying mandatory environmental, health and safety training. We also require contractors to complete safety training prior to working at any Teradyne site. We monitor, track and report common safety metrics such as accidents, near misses and illness. Our injury and illness rate is below the industry average. We also provide our employees with a flexible and adjustable workspace, which includes reviewing ergonomics issues in the workplace, educating employees to self-identify risks and ensuring they have the work environment they need to do their jobs safely and effectively.

Regulatory Environment

We are subject to various federal, state, and local government laws and regulations relating to international trade, business conduct, the protection of employee health and safety and the environment.

We accrue for all known environmental liabilities when it becomes probable that we will incur cleanup costs and those costs can reasonably be estimated. Estimated environmental costs are not expected to materially affect the financial position or results of our operations in future periods. However, estimates of future costs are subject to change due to protracted cleanup periods and changing environmental remediation laws and regulations.

We are subject to U.S. laws and regulations that limit and restrict the export of some of our products and services and may restrict our transactions with certain customers, business partners and other persons. In certain circumstances, export control and economic sanctions regulations prohibit the export of certain products, services, and technologies, and in other circumstances we are required to obtain an export license before exporting the controlled item. For example, we must comply with current U.S. Department of Commerce export control regulations restricting transactions with certain customers in China. We must also comply with export restrictions and laws imposed by other countries affecting trade and investments. We maintain an export compliance program but there are risks that the compliance controls could be circumvented, exposing us to legal liabilities. Compliance with these laws has limited our sales and likely will continue to limit sales to certain customers in the future. Changes in, and responses to, U.S. trade policy could reduce the competitiveness of our products and cause our sales to drop, which could have a material adverse effect on our business, financial condition or results of operations.

Item 1A: *Risk Factors*

The risks described below are not the only risks that we face. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our business, financial condition and/or operating results.

Risks Associated with Teradyne's Markets

Our business is impacted by global and industry-specific economic cycles, which are difficult to predict, and actions we have taken or may take to offset these cycles may not be sufficient.

Capital equipment providers in the electronics, semiconductor industries and robotics, such as Teradyne, have, in the past, been negatively impacted by both sudden slowdowns in the global economies and recurring cyclicality within those industries. These cycles have resulted in periods of over-supply; a trend we believe will continue to occur. Our business and results of operations depend, in significant part, upon capital expenditures of manufacturers of semiconductors electronics and other industrial products, which in turn depend upon the current and anticipated market demand for those products. Disruption or deterioration in economic conditions may reduce customer purchases of our products, thereby reducing our revenues and earnings. In addition, such adverse changes in economic conditions, and resulting slowdowns in the market for our products, may, among other things, result in increased price competition for our products, increased risk of excess and obsolete inventories, increased risk in the collectability of our accounts receivable from our customers, potential reserves for credit losses and write-offs of accounts receivable, increased risk of restructuring charges, and higher operating costs as a percentage of revenues, which, in each case and together, adversely affect our operating results. We are unable to predict the likely duration, frequency and severity of disruptions in financial markets, credit availability, and adverse economic conditions throughout the world, and we cannot ensure that the level of revenues or new orders for a fiscal quarter will be sustained in subsequent quarters. We have taken actions to address the effects of general economic variability and recurring industry cyclicality, including implementing cost control and reduction measures. We cannot predict whether these measures will be sufficient to offset global or market-specific disruptions that might affect our businesses and we may need to take additional or different measures in the future.

We are subject to intense competition.

We face significant competition throughout the world in each of our reportable segments. Some of our competitors have substantial financial and other resources to pursue engineering, manufacturing, marketing and distribution of their products. In addition, we are subject to trade regulations imposed by the United States government, which may not impact some of our competitors. We also face competition from emerging Asian companies and internal development at several of our customers. Some of our competitors have introduced or announced new products with certain performance characteristics that may be considered equal or superior to those we currently offer. We expect our competitors to continue to improve the performance of their current products and to introduce new products or new technologies that provide improved cost of ownership and performance characteristics. New product introductions by competitors could cause a decline in revenues or loss of market acceptance of our products.

The market for our products is concentrated, and our business depends, in part, on obtaining orders from a few significant customers.

The market for our products is concentrated with a limited number of significant customers accounting for a substantial portion of the purchases of test equipment. In each of the years, 2023, 2022 and 2021, our five largest direct customers in aggregate accounted for 32%, 26% and 33% of consolidated revenues, respectively.

We estimate consolidated revenues driven by one OEM customer, of our Semiconductor Test and Wireless Test segments, combining direct sales to that customer with sales to the customer's OSATs (which include Taiwan Semiconductor Manufacturing Company Ltd.), accounted for 19% of our consolidated revenues in 2021.

Customer consolidation could affect our operating results.

There has been a trend toward customer consolidation in the semiconductor industry through business combinations, including mergers, asset acquisitions and strategic partnerships. If this trend continues, it could make us more dependent on fewer customers who may be able to exert increased pressure on our prices and other contract terms and could increase the portion of our total sales concentration for any single customer. Customer consolidation activity could also reduce the demand for our products and services if such customers streamline research and development or operations, reduce purchases or delay purchasing decisions. These outcomes could negatively impact our operating results and financial condition.

If we fail to develop new technologies to adapt to our customers' needs or if our customers fail to accept our new products, our revenues will be adversely affected.

We believe that our technological position depends primarily on the technical competence and creative ability of our engineers. In a rapidly evolving market, such as ours, the development or acquisition of new technologies, commercialization of those technologies into products and market acceptance and customer demand for those products are critical to our success. Successful product development or acquisition, introduction and acceptance depend upon a number of factors, including:

- new product selection;
- ability to meet customer requirements including with respect to safety and cyber security;
- development of competitive products by competitors;
- timely and efficient completion of product design;
- timely and efficient implementation of manufacturing and manufacturing processes;
- timely remediation of product performance issues, if any, identified during testing;
- assembly processes and product performance at customer locations;
- differentiation of our products from our competitors' products;
- management of customer expectations concerning product capabilities and product life cycles;
- transition of customers to new product platforms;
- compliance with product safety regulations;
- ability to protect products from cyber attacks when used by our customers;
- ability to attract and retain technical talent; and
- innovation that does not infringe on the intellectual property rights of third parties.

Risks Associated with Operating a Global Business

We are subject to risks of operating internationally.

A significant portion of our consolidated revenues is derived from customers outside the United States. Our international sales and operations are subject to significant risks and difficulties, including:

- unexpected changes in legal and regulatory requirements affecting international markets;
- cost increases due to inflation;
- changes in tariffs and exchange rates;
- social, political and economic instability, acts of terrorism and international conflicts;

- disruption caused by health pandemics;
- difficulties in protecting intellectual property;
- difficulties in accounts receivable collection;
- cultural differences in the conduct of business;
- difficulties in staffing and managing international operations;
- compliance with anti-corruption laws;
- compliance with data privacy regulations;
- compliance with customs and trade regulations; and
- compliance with international tax laws and regulations.

In addition, an increasing portion of our products and the products we purchase from our suppliers are sourced or manufactured in foreign locations, including China, Malaysia and Denmark, and a large portion of the devices our products test are fabricated and tested by foundries and subcontractors in Taiwan, China, Korea and other parts of Asia. As a result, we are subject to a number of economic and other risks, particularly during times of political, health or financial instability in these regions. Disruption of manufacturing or supply sources in these international locations could materially adversely impact our ability to fill customer orders and potentially result in lost business.

We are subject to risks associated with doing business in China.

In addition to the risks associated with the tariffs and trade regulations detailed below, we are subject to the following risks associated with doing business in China:

- adverse changes in Chinese political, economic or social conditions or Chinese laws, regulations or policies, including the imposition of unexpected or confiscatory taxation, restrictions on currency conversion, imports and sources of supply, devaluations of currency, the nationalization or other expropriation of private enterprises, or the reversal of economic reform policies that encourage private economic activity, foreign investments and greater economic decentralization;
- differing economic practices compared to most developed countries, including with respect to the amount of government involvement, control of foreign exchange and allocation of resources;
- uncertainties presented by the Chinese legal system, which is not fully integrated and continues to rapidly evolve, impeding our ability to interpret certain Chinese laws and regulations, predict and evaluate the outcome of administrative and court proceedings and the level of legal protection to enforce contracts we have entered into in China; and Chinese controls on the convertibility of Renminbi into foreign currencies and, in certain cases, the remittance of currency out of China, restricting our ability to remit sufficient foreign currency to pay dividends or make other payments to us, or otherwise satisfy foreign currency-denominated obligations.

The foregoing risks and the ongoing geopolitical tensions and economic uncertainty between the United States and China and the unknown impact of current and future Chinese rules and regulations, may cause increased costs, as well as restrictions on our ability to sell, or a decreased demand from customers to purchase, our products, which could harm our business, financial condition and operating results.

The Israel-Hamas conflict may have a material impact on our Business

The Israel-Hamas conflict could have a negative impact on our future revenue and supply chain, either of which could adversely affect our business and financial results. Our customers in Israel may experience delays in product releases due to impacts to their labor force and impacts on their suppliers because of the conflict, which could materially impact demand for our products. Similarly, our suppliers in Israel may experience delays in providing us with parts due to the conflict. In addition, the global economic uncertainty following the start of the conflict could impact demand for our products.

Risks Related to Teradyne's Finances

We may not fully realize the benefits of our acquisitions or strategic alliances.

In June 2015, we acquired Universal Robots, in 2018, we acquired Energid and MiR and, in 2019, we acquired Lemsys and AutoGuide. In November 2023, we announced entering into strategic partnership agreement with Technoprobe which included

Teradyne acquiring 10% of the equity in Technoprobe. We may not be able to realize the benefits of acquiring or successfully growing these businesses. We may continue to acquire additional businesses, form strategic alliances, or create joint ventures with third parties that we believe will complement or augment our existing businesses. We may not be able to realize the expected synergies and cost savings from the integration with our existing operations of other businesses or technologies that we may acquire. In addition, the integration process for our acquisitions may be complex, costly and time consuming and include unanticipated issues, expenses, and liabilities. We may have difficulty in developing, manufacturing, and marketing the products of a newly acquired company in a manner that enhances the performance of our combined businesses or product lines and allows us to realize value from expected synergies. Following an acquisition, we may not achieve the revenue or net income levels that justify the acquisition. Acquisitions may also result in one-time charges (such as acquisition-related expenses, write-offs or restructuring charges) or in the future, impairment of goodwill or acquired intangible assets, or adjustments to contingent consideration liabilities that adversely affect our operating results. Additionally, we may fund acquisitions of new businesses, strategic alliances, or joint ventures by utilizing our cash, incurring debt, issuing shares of our common stock, or by other means. Additionally, we may face restrictions pursuant to the terms of an acquisition or strategic alliance agreement, such as the three year restriction on the transfer or disposition of the Technoprobe shares upon closing of the agreement, subject to certain early termination events.

We may incur higher tax rates than we expect and may have exposure to additional international tax liabilities and costs.

We are subject to paying income taxes in the United States and other countries where we operate. Our effective tax rate is dependent on where our earnings are generated and the tax regulations and the interpretation and judgment of administrative tax or revenue authorities in the United States and other countries. We have pursued a global tax strategy that could be adversely affected by the mix of earnings and tax rates in the countries where we operate, changes to tax laws, tax regulations or an adverse tax ruling by administrative authorities. We are also subject to tax audits in the countries where we operate. Any material change in our tax liability resulting from changes in tax laws, tax regulations, administrative rulings or audits from an administrative tax or revenue authority could negatively affect our financial results.

As a multinational corporation, we are subject to income taxes as well as non-income-based taxes, in both the United States and various foreign jurisdictions. In certain foreign jurisdictions, we qualify for tax incentives and tax holidays based on our ability to meet, on a continuing basis, various tests relating to our employment levels, research and development expenditures and other qualification requirements in a particular foreign jurisdiction. While we intend to operate in such a manner to maintain and maximize our tax incentives and tax holidays, no assurance can be given that we have so qualified or that we will so qualify for any particular year or jurisdiction. If we fail to qualify or fail to remain qualified for certain foreign tax incentives and tax holidays, we may be subject to further taxation or an increase in our effective tax rate which would adversely impact our financial results. In November 2020, we entered into an agreement with the Singapore Economic Development Board which extended our Singapore tax holiday under substantially similar terms to the agreement which expired on December 31, 2020. The new tax holiday is scheduled to expire on December 31, 2025.

The tax savings attributable to the Singapore tax holiday for the years ended December 31, 2023, 2022 and 2021 were $1.4 million or $0.01 per diluted share, $16.0 million or $0.09 per diluted share, and $33.3 million or $0.18 per diluted share, respectively. These tax savings may not be achievable in subsequent years due to changes in Singapore's tax laws, issuance of new global minimum tax laws, or the expiration of the tax holiday.

In addition, we may incur additional costs, including headcount expenses, in order to maintain or obtain a foreign tax incentive or tax holiday in a particular foreign jurisdiction.

We have significant guarantees, indemnification, and customer confidentiality obligations.

From time to time, we make guarantees to customers regarding the delivery, price and performance of our products and guarantee certain indebtedness, performance obligations or lease commitments of our subsidiary and affiliate companies. We also have agreed to provide indemnification to our officers, directors, employees and agents, to the extent permitted by law, arising from certain events or occurrences, while the officer, director, employee or agent, is or was serving at our request in such capacity. Additionally, we have confidentiality obligations to certain customers and if breached would require the payment of significant penalties. If we become liable under any of these obligations, it could materially and adversely affect our business, financial condition or operating results. For additional information see Note M: "Commitments and Contingencies-Guarantees and Indemnification Obligations" in Notes to Consolidated Financial Statements.

We may discontinue or reduce our quarterly cash dividend or share repurchase program.

In January 2014, our Board of Directors initiated a quarterly cash dividend. Since 2014, the Board of Directors has increased our quarterly cash dividend from $0.06 per share to $0.12 per share. Holders of our common stock are only entitled to receive dividends when and if they are declared by our Board of Directors.

In January 2021, our Board of Directors approved a $2.0 billion share repurchase program. In 2022 and 2021, we repurchased $752.1 million, and $600.0 million, respectively of common stock. In January 2023, our Board of Directors cancelled the 2021 repurchase program and approved a new $2.0 billion share repurchase program. In 2023, we repurchased $400.5 million of common stock. We intend to repurchase up to $90.0 million in 2024. Under the share repurchase program, we may repurchase outstanding shares of our common stock from time to time in the open market and through privately negotiated transactions. Unless terminated earlier by resolution of our Board of Directors, the repurchase program will expire when we have repurchased all shares authorized for repurchase under the share repurchase program.

Future cash dividends and share repurchases are subject to the discretion of our Board of Directors and will depend, among other things, upon our earnings, capital requirements and financial condition. While we have declared a quarterly cash dividend on our common stock and authorized a share repurchase program, we are not required to do either and may reduce or eliminate our cash dividend or share repurchase program in the future. The reduction or elimination of our cash dividend or our share repurchase program could adversely affect the market price of our common stock.

We have incurred indebtedness and may incur additional indebtedness.

On May 1, 2020, we entered into a three-year, senior secured revolving credit facility of up to $400.0 million. On December 10, 2021, the credit agreement was amended to extend the maturity date of the credit facility to December 10, 2026. On October 5, 2022, the credit agreement was amended to increase the amount of the credit facility to $750.0 million from $400.0 million. The amended credit agreement provides that, subject to customary conditions, we may seek to obtain from existing or new lenders the available incremental amount under the credit facility, not to exceed the greater of $200.0 million or 15% of consolidated EBIDTA. We could borrow funds under this credit facility at any time for general corporate purposes and working capital. As of February 22, 2024, we have not borrowed any funds under this credit facility.

Our outstanding and any additional indebtedness, among other things, could:

- make it difficult to make payments on this indebtedness and our other obligations;
- make it difficult to obtain any necessary future financing for working capital, capital expenditures, debt service requirements or other purposes;
- require the dedication of a substantial portion of any cash flows from operations to service for indebtedness, thereby reducing the amount of cash flows available for other purposes, including capital expenditures, and
- limit our flexibility in planning for or reacting to changes in our business and the industries in which we complete.

Restrictive covenants in the agreement governing our senior secured revolving credit facility may restrict our ability to pursue business strategies.

The agreement governing our senior secured revolving credit facility limits our ability, among other things, to incur additional secured indebtedness; sell, transfer, license or dispose of assets; consolidate or merge; enter into transactions with our affiliates; and incur liens. In addition, our senior secured revolving credit facility contains financial and other restrictive covenants that limit our ability to engage in activities that may be in our long-term best interest, such as, subject to permitted exceptions, making capital expenditures in excess of certain thresholds, making investments, loans and other advances, and prepaying any additional indebtedness while our indebtedness under our senior secured revolving credit facility is outstanding. Our failure to comply with financial and other restrictive covenants could result in an event of default, which if not cured or waived, could result in the lenders requiring immediate payment of all outstanding borrowings or foreclosing on collateral pledged to them to secure the indebtedness.[3]

Our warrant transactions could impact the value of our stock.

On December 12, 2016, we completed a private offering of $460.0 million aggregate principal amount of 1.25% convertible senior unsecured notes (the “Notes”) that matured on December 15, 2023. Concurrent with the offering of the Notes, we entered into convertible note hedge transactions with the initial purchasers or their affiliates (the “Option Counterparties”). Separately and concurrent with the pricing of the Notes, we entered into warrant transactions with the Option Counterparties (the “Warrant Transactions”) in which we sold net-share-settled (or, at our election subject to certain conditions, cash-settled) warrants to the Option Counterparties. The Warrant Transactions, which expire between March 18, 2024 and July 10, 2024, cover, subject to customary anti-

dilution adjustments, approximately 14.7 million shares of our common stock. The strike price of the warrants is $39.40 per share. The Warrant Transactions could result in increased common stock outstanding to the extent that the market price per share of our common stock, as measured under the terms of the Warrant Transactions, exceeds the applicable strike price of the warrants.

We may not be able to pay our debt and other obligations.

If our cash flows are inadequate to meet our obligations, we could face substantial liquidity problems. If we are unable to generate sufficient cash flows or otherwise obtain funds necessary to make required payments on our senior secured revolving credit facility or certain of our other obligations, we would be in default under the terms thereof, which would permit the holders of those obligations to accelerate their maturity and also could cause defaults under future indebtedness we may incur. Any such default could have a material adverse effect on our business, prospects, financial position and operating results.

Foreign currency exchange rates and fluctuations in those rates may affect the Company's ability to realize projected growth rates in its sales and earnings.

Our financial statements are denominated in U.S. dollars. While the majority of our revenues are in U.S. dollars, approximately 70% of our Robotics revenue in 2023 was denominated in foreign currencies. Correspondingly, our results of operations and our ability to realize projected growth rates in sales and earnings in Robotics could be adversely affected if the U.S. dollar strengthens significantly against foreign currencies.

Adverse developments affecting the financial services industry, including events or risks involving liquidity, defaults or non-performance by financial institutions, could have a material adverse effect on our business, financial condition or results of operations.

On March 10, 2023, *Silicon Valley Bank* (SVB), who is a lender in our revolving credit facility and where we maintain certain accounts and cash deposits, was placed into receivership with the Federal Deposit Insurance Corporation (FDIC), which resulted in all funds held at SVB being temporarily inaccessible by SVB's customers. As of March 13, 2023, access to our cash and cash equivalents at SVB was fully restored. Although our cash balances at SVB are insignificant and we do not expect further developments at SVB to have a material impact on our cash and cash equivalents, we do hold cash balances in several large financial institutions significantly in excess of FDIC and global insurance limits. If other banks and financial institutions with whom we have banking relationships enter receivership or become insolvent in the future, we may be unable to access, and we may lose, some or all of our existing cash, cash equivalents and investments to the extent those funds are not insured or otherwise protected by the FDIC.

Our stock price has been subject to fluctuations, and will likely continue to be subject to fluctuations, which may be volatile and due to factors beyond our control.

The market price of our common stock is subject to wide fluctuations in response to various factors, some of which are beyond our control. In addition to the factors discussed in this "Risk Factors" section and elsewhere in this report, factors that could cause fluctuations in the market price of our common stock include the following:

- ratings changes by any securities analysts who follow our company;
- announcements by us or our competitors of significant technical innovations, acquisitions, strategic partnerships, joint ventures, or capital commitments;
- changes in operating performance and stock market valuations of other technology companies generally, or those in our industry in particular;
- changes in accounting standards, policies, guidelines, interpretations, or principles;
- actual or anticipated developments in our business or our competitors' businesses or the competitive landscape generally;
- developments or disputes concerning our intellectual property or our products and platform capabilities, or third-party proprietary rights;
- cybersecurity attacks or incidents;
- announced or completed acquisitions of businesses or technologies by us or our competitors;
- changes in our board of directors or management;
- announced or completed equity or debt transactions involving our securities;

- sales of shares of our common stock by us, our officers, directors, or other stockholders; and
- other events or factors, including those resulting from global and macroeconomic conditions, including heightened inflation, rising interest rates, bank failures, and a potential recession, and speculation regarding the same, as well as public health crises, geopolitical tension, incidents of terrorism, or responses to these events.

In addition, the market for technology stocks and the stock markets in general have experienced extreme price and volume fluctuations. Stock prices of many technology companies have fluctuated in a manner unrelated or disproportionate to the operating performance of those companies. In the past, stockholders have instituted securities class action litigation following periods of market volatility. If we were to become involved in securities litigation, it could subject us to substantial costs, divert resources and the attention of management from our business, and adversely affect our business, results of operations, financial condition, and cash flows. A decline in the value of our common stock, including as a result of one or more factors set forth above, may result in substantial losses for our stockholders.

Risks Related to Operations

Our operating results are likely to fluctuate significantly.

Our operating results are affected by a wide variety of factors that could materially adversely affect revenues or profitability. The following factors could impact future operations:

- a worldwide economic slowdown or disruption in the global financial or industrial markets;
- cost increases from inflation on materials, employee wages, third party labor, and contract manufacturing;
- competitive pressures on selling prices;
- our ability to introduce, and the market acceptance of, new products;
- changes in product revenues mix resulting from changes in customer demand;
- the level of orders received which can be shipped in a quarter because of the tendency of customers to wait until late in a quarter to commit to purchase due to capital expenditure approvals and constraints occurring at the end of a quarter, or the hope of obtaining more favorable pricing from a competitor seeking the business;
- engineering and development investments relating to new product introductions, and the expansion of manufacturing, outsourcing and engineering operations in Asia;
- provisions for excess and obsolete inventory relating to the lack of demand for and the discontinuance of products;
- impairment charges for certain long-lived and intangible assets, and goodwill;
- an increase in the leasing of our products to customers;
- disruption caused by health pandemics, such as the coronavirus;
- the success of sales channel expansion in Robotics;
- our ability to expand our global distribution channel for our collaborative and mobile robots;
- parallel or multi-site testing which could lead to a decrease in the ultimate size of the market for our semiconductor and electronic test products; and
- the ability of our suppliers and subcontractors to meet product quality or delivery requirements needed to satisfy customer orders for our products, especially if consolidated revenues increase.

As a result of the foregoing and other factors, we have experienced and may continue to experience material fluctuations in future operating results on a quarterly or annual basis which could materially and adversely affect our business, financial condition, operating results or stock price.

If our suppliers do not meet product or delivery requirements, we could have reduced revenues and earnings.

If any of our suppliers were to cancel contracts or commitments or fail to meet the quality or delivery requirements needed to satisfy customer orders for our products, we could lose time-sensitive customer orders, have significantly decreased revenues and earnings and be subject to contractual penalties, which would have a material adverse effect on our business, results of operations and financial condition. In addition, we rely on contract manufacturers for certain of our products, and our ability to meet customer orders

for those products depends upon the timeliness and quality of the work performed by these subcontractors, over whom we do not exercise any control.

To a certain extent, we are dependent upon the ability of our suppliers and contract manufacturers to help meet increased product or delivery requirements. It may be difficult for certain suppliers to meet delivery requirements in a period of rapid growth, therefore impacting our ability to meet our customers' demands.

Our suppliers are subject to trade regulations, including tariffs and export restrictions imposed by the United States Government and by the governments of other countries. These regulations could impact our suppliers' ability to provide us with components for our products or could increase the price of those components.

We rely on the financial strength of our suppliers. The loss of suppliers either as a result of financial viability, bankruptcy or otherwise could have a material adverse effect on our business, results of operations or financial condition.

The global supply shortage of electrical components and inflationary cost increases has impacted our ability to meet customer demand and could adversely affect our business and financial results.

The global supply shortage of electrical components, including semiconductor chips, continued to impact our supply chain in 2023. As a result, we have experienced, and may experience in the future, increases in our lead times and costs for certain components for certain products and delays in the delivery of some orders placed by our customers. In addition, in 2023, inflationary pressures contributed to increased costs for product components and wage inflation, which had minimal impact on our cost of products, gross margin and profit for the year. Our supply chain team, and our suppliers, continue to manage numerous supply, production and logistics obstacles. In an effort to mitigate these risks, in some cases, we have incurred higher costs due to investment in supply chain resiliency and to secure available inventory or have extended or placed non-cancellable purchase commitments with semiconductor suppliers, which introduces inventory risk if our forecasts and assumptions prove inaccurate. We have also sourced components from additional suppliers and multi-sourced and pre-ordered components and finished goods inventory in some cases in an effort to reduce the impact of the adverse supply chain conditions we have experienced. However, if we are unable to secure manufacturing capacities from our current or new suppliers and contract manufacturers, on acceptable terms or at all, or successfully manage our purchase commitments and inventory for components, our ability to deliver our products to our customers in the desired quantities, at competitive prices or in a timely manner may be negatively impacted for 2024. Also, our suppliers and contract manufacturers have increased their prices, which increased our cost of products. We also have been, and may continue to attempt to, offset the effect of these inflationary pressures by increasing the prices of our products. However, we may not be fully able to pass additional costs on to our customers, which could have a negative impact on our results of operations and financial condition.

Our operations may be adversely impacted if our outsourced contract manufacturers or service providers fail to perform.

We depend on Flex Ltd. ("Flex") to manufacture and test our FLEX and J750 family of products from its facility in Malaysia; Plexus Corp. ("Plexus") to manufacture and test our Magnum products from its facilities in Malaysia and also Thailand and ETS family of products from its facility in Malaysia; SAM Meerkat to manufacture and test our storage test family of products from its facilities in Malaysia and Thailand and on other contract manufacturers to manufacture other products. If for any reason these contract manufacturers cannot provide us with these products in a timely fashion, or at all, we may not be able to sell these products to our customers until we enter a similar arrangement with an alternative contract manufacturer.

If we experience a problem with our supply of products from Flex, Plexus, SAM Meerkat, or our other contract manufacturers, it may take us significant time to either manufacture the product or find an alternate contract manufacturer, which could result in substantial expense and disruption to our business.

We have also outsourced certain general and administrative functions to reputable service providers, many of which are in foreign countries, sometimes impacting communication with them because of language and time differences. Their presence in foreign countries also increases the risk they could be exposed to political and cybersecurity risk. Additionally, there may be difficulties encountered in coordinating the outsourced operations with existing functions and operations. If we fail in successfully coordinating and managing the outsourced service providers, it may cause an adverse effect on our operations which could have a material adverse effect on our business, results of operations or financial condition.

Our business may suffer if we are unable to attract and retain key employees.

Competition for employees with skills we require is intense in the high technology industry. We expect intense competition for employees to continue in 2024. Our success will depend on our ability to attract and retain key technical employees. The loss of one or

more key or other employees, a decrease in our ability to attract additional qualified employees, or the delay in hiring key personnel could each have a material adverse effect on our business, results of operations or financial condition.

Our operations, and the operations of our customers and suppliers, are subject to risks of natural catastrophic events, severe weather, widespread health epidemics, acts of war, terrorist attacks and the threat of domestic and international terrorist attacks, any one of which could result in cancellation of orders, delays in deliveries or other business activities, or loss of customers and could negatively affect our business and results of operations.

Our business is international in nature, with our sales, service and administrative personnel and our customers and suppliers located in numerous countries throughout the world. Our operations, and those of our customers and suppliers, are subject to disruption for a variety of reasons, including work stoppages, acts of war, terrorism, health epidemics, fires, earthquakes, hurricanes, typhoons, volcanic eruptions, energy shortages, telecommunication failures, tsunamis, flooding or other natural disasters. Such disruption could materially increase our costs and expenses as well as cause delays in, among other things, shipments of products to our customers, our ability to perform services requested by our customers, or the installation and acceptance of our products at customer sites. Any of these conditions could have a material adverse effect on our business, financial condition or results of operations.

Global climate change can result in natural disasters occurring more frequently, with greater intensity and with less predictability. For example, in December 2021, our operations in Cebu, Philippines experienced a devastating typhoon. Our employees in Cebu succeeded in restoring most of our operations within days despite the severity of the damage in the region. The long-term effects of climate change on the global economy and the semiconductor industry in particular are unclear but could be severe.

Risks Related to Intellectual Property ("IP") and Cybersecurity

Third parties may claim we are infringing their intellectual property and we could suffer significant litigation costs, licensing expenses or be prevented from selling our products.

We have been sued for patent infringement and receive notifications from time to time that we may be in violation of patents held by others. An assertion of patent infringement against us, if successful, could have a material adverse effect on our ability to sell our products or it could force us to seek a license to the intellectual property rights of others or alter such products so that they no longer infringe the intellectual property rights of others. A license could be very expensive to obtain or may not be available at all. Similarly, changing our products or processes to avoid infringing the rights of others may be costly or impractical. Additionally, patent litigation could require a significant use of management resources and involve a lengthy and expensive defense, even if we eventually prevail. If we do not prevail, we might be forced to pay significant damages, obtain licenses, modify our products, or stop making our products; each of which could have a material adverse effect on our financial condition, operating results or cash flows.

If we are unable to protect our IP, we may lose a valuable asset or may incur costly litigation to protect our rights.

We protect the technology that is incorporated in our products in several ways, including through patent, copyright, trademark and trade secret protection and by contractual agreement. However, even with these protections, our IP may still be challenged, invalidated or subject to other infringement actions. While we believe that our IP has value in the aggregate, we do not believe that any single element of our IP is in itself essential. If a significant portion of our IP is invalidated or ineffective, our business could be materially adversely affected.

A breach of our operational or security systems could negatively affect our business and results of operations.

We rely on various information technology networks and systems to process, transmit and store electronic information, including proprietary and confidential data, and to carry out and support a variety of business activities, including manufacturing, research and development, supply chain management, sales and accounting. We have experienced several attempted cyber-attacks of our network. None of the attempted attacks have caused a disruption to our operations or had a material adverse effect on our business or financial results. As a result of the attempts, we have taken further preventive security measures to protect our systems. Despite these preventative security measures we have implemented, we may continue to be vulnerable to attempts by third parties to gain unauthorized access to our networks or sabotage our systems. These attempts, which might be related to criminal hackers, industrial espionage or state-sponsored intrusions, include trying to covertly introduce malware to our computers, networks and systems and impersonating authorized users. In addition, third party suppliers and service providers that we rely on to manage our networks and systems and process and store our proprietary and confidential data, including the data of our customers and suppliers, may also be subject to similar attacks. Employees and contractors may also attempt to gain unauthorized access to our systems and steal proprietary and confidential data. Such attempts could result in the misappropriation, theft, misuse, disclosure or loss or destruction of

the intellectual property, or the proprietary, confidential or personal information, of Teradyne or our employees, customers, suppliers or other third parties, as well as damage to or disruptions in our information technology networks and systems. These threats are constantly evolving and expanding, such as through the increased use of artificial intelligence in our products and expanding remote work opportunities for our employees, thereby increasing the difficulty of defending against them or implementing adequate preventative measures. While we seek to detect and investigate all security incidents and to prevent their recurrence, attempts to gain unauthorized access to our information technology networks and systems may be successful, and in some cases, we might be unaware of an incident or its magnitude and effects. A failure in or a breach of our operational or security systems or infrastructure, or those of our suppliers and other service providers, including as a result of cyber-attacks, could have a material adverse effect on our business or financial results, disrupt our business, result in the disclosure or misuse of proprietary or confidential information, damage our reputation, cause losses and increase our costs. We expect to continue to devote significant resources to the security of our information technology networks and systems.

A breach of the security of our products could negatively affect our business and results of operations.

We may be subject to security breaches of certain of our products caused by viruses, illegal break-ins or hacking, sabotage, or acts of vandalism by third parties or our employees or contractors. A breach of our product security systems could have a material adverse effect on our business or financial results, disrupt our business, result in the disclosure or misuse of proprietary or confidential information, damage our reputation, cause losses, and increase our costs. We expect to continue to devote significant resources to the security of our products.

Risks Related to Legal and Regulatory Compliance

The implementation of tariffs on our products may have a material impact on our business.

Our business operations and supply chain are global and may be disrupted by the implementation of tariffs.

In 2018, the United States Trade Representative imposed a 25% tariff on many lists of products, including certain Teradyne products that are made in China and imported into the United States. We have implemented operational changes that mitigate the impact of the 25% tariff on the import of our impacted products into the United States. As a result, the existing tariff has not had a material adverse effect on our business, financial condition or results of operations. The implementation of additional tariffs by the United States could have a material adverse effect on our business, financial condition or results of operations.

In addition to the actions taken by the United States, China has implemented retaliatory tariffs on products made in the United States and imported into China, including certain Teradyne products. We have implemented, if appropriate, operational changes that would mitigate the impact of the retaliatory tariffs. However, notwithstanding our efforts, the retaliatory tariffs or other trade restrictions implemented by China could disrupt our business operations, sales and supply chain and, therefore, have a material adverse effect on our business, financial condition or results of operations.

Trade regulations and restrictions impact our ability to manufacture certain products and to sell products to and support certain customers, which may materially adversely affect our sales and results of operations.

We are subject to U.S. laws and regulations that limit and restrict the export of some of our products and services and may restrict our transactions with certain customers, business partners and other persons. In certain circumstances, export control and economic sanctions regulations prohibit the export of certain products, services and technologies, and in other circumstances are required to obtain an export license before exporting the controlled item. We must also comply with export restrictions and laws imposed by other countries affecting trade and investments. We maintain an export compliance program but there are risks that the compliance controls could be circumvented, exposing us to legal liabilities. Compliance with these laws has not significantly limited our sales but could significantly limit them in the future. Changes in, and responses to, U.S. trade policy could reduce the competitiveness of our products and cause our sales to drop, which could have a material adverse effect on our business, financial condition or results of operations.

The U.S. government from time to time has issued export restrictions that prohibit U.S. companies from exporting U.S. manufactured products, foreign manufactured products with more than 25% controlled U.S. content, as well as U.S. origin technology. For example, the U.S. Department of Commerce has restricted the access of U.S. origin technologies to certain Chinese semiconductor companies by adding those companies to the Entity List under U.S. Export Administration Regulations ("EAR"). The addition of certain of these companies to the entity list has had and will continue to have an adverse impact on our business with these customers. We will take appropriate actions, including filing for licenses with the U.S. Department of Commerce to attempt to minimize the impact of the restrictions on our business.

On May 16, 2019, Huawei and 68 of its affiliates, including HiSilicon, were added to the U.S. Department of Commerce Entity List under the EAR. This action by the U.S. Department of Commerce imposed new export licensing requirements on exports, re-exports, and in-country transfers of all U.S. regulated products, software and technology to the designated Huawei entities. On August 17, 2020, the U.S. Department of Commerce published final regulations expanding the scope of the U.S. EAR to include additional products that would become subject to export restrictions relating to Huawei entities including HiSilicon. These new regulations restrict the sale to Huawei and the designated Huawei entities of certain non-U.S. made items, such as semiconductor devices, manufactured for or sold to Huawei entities including HiSilicon under specific, detailed conditions set forth in the new regulations. These new regulations have impacted our sales to Huawei, HiSilicon and their suppliers. We are taking appropriate actions, including filing license applications and obtaining licenses from the U.S. Department of Commerce. However, we do not expect these actions will mitigate the impact of the regulations on our sales to Huawei, HiSilicon and other suppliers. As a result, the regulations will continue to have an adverse impact on our business and financial results. It is uncertain the extent these new regulations and any additional regulations that may be implemented by the U.S. Department of Commerce or other government agency may have on our business with other customers or potential customers. Also, our controls related to Entity List compliance could be circumvented, exposing us to legal liabilities.

On April 28, 2020, the U.S. Department of Commerce published new export control regulations for certain U.S. products and technology sold to military end users or for military end-use in China, Russia and Venezuela. The definition of military end user is broad. The regulations went into effect on June 29, 2020. In December 2020, the U.S. Department of Commerce issued a list of companies in China and other countries that it considered to be military end users. Compliance with the new export controls has impacted our ability to sell products to certain customers in China. In addition, while we maintain an export compliance program, our compliance controls could be circumvented, exposing us to legal liabilities. We will continue to assess the impact of these export controls on our business and operations and take appropriate actions, including filing for licenses with the U.S. Department of Commerce, to minimize any disruption. However, we cannot be certain that the actions we take will mitigate all the risks associated with the export controls that may impact our business.

On October 7, 2022, the U.S. Department of Commerce published regulations restricting the export to China of advanced semiconductors, supercomputer technology, equipment for the manufacturing of advanced semiconductors and components and technology for the manufacturing in China of certain semiconductor manufacturing equipment. The restrictions impacted our sales to certain companies in China and our manufacturing and development operations in China. We mitigated the impact of these restrictions on our business by obtaining licenses from the U.S. Department of Commerce. On October 17, 2023, the U.S. Department of Commerce released new rules updating the export controls issued on October 7, 2022. The new rules, which took effect on November 17, 2023, significantly limit the impact of the October 7, 2022 restrictions on our business. However, the regulations may continue to have an adverse impact on certain actual or potential customers and on the global semiconductor industry. To the extent the regulations impact actual and potential customers or disrupt the global semiconductor industry, our business and revenues will be adversely impacted.

In response to the regulations issued by the U.S. Department of Commerce, the Chinese government has passed new laws, including blocking legislation, which may impact our business activities in China. The Company is assessing the potential impact of these new Chinese laws and monitoring relevant laws and regulations issued by the Chinese government. The impact of these new Chinese laws on our business activities in China remains uncertain at this time.

We may be subject to product recalls and warranty and product liability claims.

We invest significant resources in the design, manufacturing and testing of our products. However, from time to time, we discover design or manufacturing defects in our products after they have been shipped and, as a result, we have incurred development and remediation costs and settled warranty and product liability claims. In addition, when our products contain defects or have reliability, quality or safety issues, we have conducted a product recall which resulted in significant repair or replacement costs and substantial delays in product shipments and may damage our reputation which could make it more difficult to sell our products. We could continue to have warranty and product liability claims or product recalls in the future. Any of these results could have a material adverse effect on our business, results of operations or financial condition.

We may incur significant costs of complying with present and future environmental regulations and may incur significant liabilities if we fail to comply with such environmental regulations.

We are subject to both domestic and international environmental regulations and statutory strict liability relating to the use, storage, discharge, site cleanup and disposal of hazardous chemicals used in our manufacturing processes. In addition, future regulations in response to global climate change may affect us, our suppliers, and our customers. Such regulations could cause us to incur additional direct costs for compliance, as well as increased indirect costs resulting from our customers, suppliers, or both incurring additional compliance costs that are passed on to us. Future climate change regulations could result in decreased demand for

our products. If we fail to comply with present and future regulations, or are required to perform site remediation, we could be subject to future liabilities or cost, including penalties or the suspension of production. Present and future regulations may also:

- restrict our ability to expand facilities;
- restrict our ability to ship certain products;
- require us to modify our operations logistics;
- require us to acquire costly equipment; or
- require us to incur other significant costs and expenses.

Pursuant to present regulations and agreements, we are conducting groundwater and subsurface assessment and monitoring and are implementing remediation and corrective action plans for facilities located in Massachusetts and New Hampshire which are no longer conducting manufacturing operations. As of December 31, 2023, we have not incurred material costs as a result of the monitoring and remediation steps taken at the Massachusetts and New Hampshire sites.

The directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (the "RoHS Directive") and the directive on Waste Electrical and Electronic Equipment (the "WEEE Directive") altered the form and manner in which electronic equipment is imported, sold and handled in the European Union. Other jurisdictions, such as China, have followed the European Union's lead in enacting legislation with respect to hazardous substances and waste removal. Ensuring compliance with the RoHS Directive, the WEEE Directive and similar legislation in other jurisdictions, and integrating compliance activities with our suppliers and customers could result in additional costs and disruption to operations and logistics and thus, could have a negative impact on our business, operations or financial condition.

We currently are, and in the future may be, subject to litigation or regulatory proceedings that could have an adverse effect on our business.

From time to time, we may be subject to litigation or other administrative, regulatory or governmental proceedings, including tax audits and resulting claims that could require significant management time and resources and cause us to incur expenses and, in the event of an adverse decision, pay damages or incur costs in an amount that could have a material adverse effect on our financial position or results of operations.

We may face risks associated with shareholder activism.

We may become subject to campaigns by shareholders advocating corporate actions such as financial restructuring, increased borrowing, special dividends, stock repurchases or divestitures. Such activities could interfere with our ability to execute our business plans, be costly and time-consuming, disrupt our operations, divert the attention of management, or result in our initiating borrowing or increasing our share repurchase plan or dividend, any of which could have an adverse effect on our business or stock price.

Provisions of our charter and by-laws and Massachusetts law may make a takeover of Teradyne more difficult.

There are provisions in our basic corporate documents and under Massachusetts law that could discourage, delay or prevent a change in control, even if a change in control may be regarded as beneficial to some or all of our stockholders.

Item 1B: ***Unresolved Staff Comments***

None.

Item 1C: ***Cybersecurity***

We believe cybersecurity is critical to supporting our vision and enabling our strategy. As a producer of leading-edge electronic testing products and maker of advanced robotics, we face a multitude of cybersecurity threats that range from attacks common to most industries, such as ransomware and denial-of-service, to attacks from more advanced, persistent, and highly organized adversaries, including nation state actors, that may target us for our role in critical infrastructure sectors. Our customers, suppliers, and partners face similar cybersecurity threats and, while we have not been materially affected to date, a cybersecurity incident impacting us or any of these entities could materially adversely affect our operations, performance, and results of operations. These cybersecurity threats and related risks make it imperative that we maintain a strong focus on cybersecurity.

Governance

The Board of Directors oversees management's processes for identifying and mitigating risks, including cybersecurity risks, to help align our risk exposure with our strategic objectives. Senior leadership, including our Chief Information Security Officer ("CISO"), regularly brief the Audit Committee of the Board of Directors on our cybersecurity and information security posture.

The corporate information security organization, under the CISO, has implemented a governance structure and processes to assess, identify, manage, and report cybersecurity risks. The CISO chairs management's Cybersecurity Steering Committee, in which current cyber threats, program performance, and ongoing risk mitigations are regularly reviewed. Cybersecurity related risks are also integrated into our overall enterprise risk management ("ERM") process. These risks are included in the risk universe that the ERM function evaluates to assess top enterprise risks on an annual basis and is reviewed and evaluated by the Board of Directors. The Board of Directors is also apprised of cybersecurity issues or incidents deemed to have a moderate or higher business impact as they arise, even if considered immaterial.

In the event of a significant incident, we intend to follow our detailed incident response playbooks, which outline the steps to be followed from incident detection through mitigation, recovery and notification, including escalation to functional areas (e.g., legal), and escalation to senior leadership via the Cybersecurity Steering Committee. Upon escalation, the Cybersecurity Steering Committee will review all inputs, assess the materiality of the incident, and then brief the Board of Directors on the determination and on how management intends to respond.

Risk management and strategy

Our global information security organization, led by our CISO, is responsible for our overall information security strategy, policy, security engineering, operations, and cyber threat detection and response. Our CISO is an experienced cybersecurity senior executive with more than 25 years of experience building and leading cybersecurity, risk management and information technology teams. The information security organization manages and continually enhances a robust enterprise security structure with the goal of preventing cybersecurity incidents to the extent feasible, while simultaneously increasing system resilience and deploying highly proficient detection and response capabilities in an effort to minimize the business impact should an incident occur.

Central to this organization is our global cyber operations team, which is responsible for the protection, detection, and response capabilities used in the defense of critical data and enterprise computing services. We also have a corporate-wide insider threat detection program to proactively identify external and internal threats and mitigate those threats in a timely manner. Our broader Teradyne employee community also has a key role in our cybersecurity defenses and is immersed in a comprehensive training and awareness curriculum to build and promote a corporate culture supportive of security.

Third parties also play a role in our cybersecurity. We engage third-party services to provide 24x7x365 monitoring, escalation, and response to cyber events. In addition to consulting on best practices, we leverage third parties for independent evaluations of our security controls through penetration testing and independent audits. These evaluations include testing both the design and operational effectiveness of security controls. We also share and receive threat intelligence with our industry peers, cybersecurity associations, and our cyber controls vendors.

We rely on contract manufacturing organizations and distributors to deliver our products to our customers, and a cybersecurity incident at one of these organizations or a key supplier could materially adversely impact us. We assess third party and supply chain cybersecurity controls through risk monitoring services tailored to align with our risk policy. Notwithstanding the extensive approach we take to cybersecurity, we may not be successful in preventing or mitigating a cybersecurity incident that could have a material adverse effect on us, either directly within our managed environment or indirectly via a third-party partner or supply chain vendor. Periodically we have a recognized independent security expert firm to assess our cyber security maturity along with risks and provide feedback on where we should continue to improve to mitigate exposures. We share this review with our Board and develop a security roadmap which incorporates this feedback.

Additionally, for our business that supports the defense and aerospace sector, we must comply with extensive regulations, including requirements imposed by the Defense Federal Acquisition Regulation Supplement ("DFARS") related to adequately safeguarding controlled unclassified information ("CUI") and reporting cybersecurity incidents to the DoD. We have implemented cybersecurity policies and frameworks based on industry and governmental standards to align closely with DoD requirements, instructions, and guidance. Moreover, we are pursuing the necessary controls to support the Cybersecurity Maturity Model Certification ("CMMC") program, DoD's program to ensure members of the defense industrial base meet cybersecurity requirements for handling CUI and federal contract information. We believe we are well positioned to meet the requirements of the CMMC and are preparing for certification once the requirements are effective.

Item 2: ***Properties***

We conduct manufacturing, engineering, sales and marketing, service, corporate administration and other operations in various leased and owned facilities throughout the world. We own approximately 720,000 square feet of office space and lease approximately 1,500,000 square feet of office space. Our corporate headquarters is in North Reading, Massachusetts, in buildings that we own consisting of approximately 422,000 square feet. We believe our existing facilities and planned expansions noted below are adequate to meet our current and reasonably foreseeable requirements. We regularly evaluate our expected facility needs and periodically make adjustments based on these evaluations. In 2019, we purchased land in Denmark, approximately 200,000 square feet, to construct a new building for our Robotics operations. The new building construction is expected to be completed by the first half of 2024.

Item 3: ***Legal Proceedings***

We are subject to legal proceedings, claims and investigations that arise in the ordinary course of business such as, but not limited to, patent, employment, commercial and environmental matters. We believe that we have meritorious defenses against all pending claims and intend to vigorously contest them. While it is not possible to predict or determine the outcomes of any pending claims or to provide possible ranges of losses that may arise, we believe the potential losses associated with all these actions are unlikely to have a material adverse effect on our results of operations, financial condition or cash flows.

Item 4: ***Mine Safety Disclosure***

Not Applicable.

PART II

Item 5: ***Market for Registrant's Common Equity, Related Shareholder Matters and Issuer Purchases of Equity Securities***

Our common stock is traded on the Nasdaq Global Select Market under the trading symbol "TER." As of February 22, 2024, there were approximately 1,148 holders of record of shares of our common stock.

See "Item 7: Management's Discussion and Analysis of Financial Condition and Results of Operations," for information on the frequency and amounts of our quarterly cash dividends, equity compensation plans and performance graph.

The following table includes information with respect to repurchases we made of our common stock during the three months ended December 31, 2023 (in thousands except per share price):

Period	(a) Total Number of Shares (or Units) Purchased	(b) Average Price Paid per Share (or Unit)	(c) Total Number of Shares (or Units) Purchased as Part of Publicly Announced Plans or Programs	(d) Maximum Number (or Approximate Dollar Value) of Shares (or Units) that may Yet Be Purchased Under the Plans or Programs
October 2, 2023 – October 29, 2023	363	$ 97.65	362	$ 1,615,390
October 30, 2023 – November 26, 2023	185	85.97	185	1,599,497
November 27, 2023 – December 31, 2023	1	93.70	—	1,599,497
	549 (1)	$ 93.70 (1)	547	

(1) Includes approximately two thousand shares at an average price of $94.13 withheld from employees for the payment of taxes.

(2) As of January 1, 2023, share repurchases net of share issuances are subject to a 1% excise tax under the Inflation Reduction Act. Excise tax incurred is included as part of the cost basis of shares repurchased in the Condensed Consolidated Statements of Convertible Common Shares and Stockholders' Equity.

(3) In January 2023, the Board of Directors cancelled the 2021 repurchase program and approved a new $2.0 billion of common stock. Unless terminated by resolution of our Board of Directors, the repurchase program will expire when we have repurchased all shares authorized for repurchase under the share repurchase program.

We satisfy U.S. federal and state minimum withholding tax obligations due upon the vesting and the conversion of restricted stock units into shares of our common stock, by automatically withholding from the shares being issued, a number of shares with an aggregate fair market value on the date of such vesting and conversion that would satisfy the minimum withholding amount due.

Item 6: ***(Reserved)***

Item 7: ***Management's Discussion and Analysis of Financial Condition and Results of Operations***

Overview

We are a leading global supplier of automated test equipment and robotics products. We design, develop, manufacture and sell automated test systems and robotics products. Our automated test systems are used to test semiconductors, wireless products, data storage and complex electronics systems in many industries including consumer electronics, wireless, automotive, industrial, computing, communications, and aerospace and defense industries. Our Robotics products include collaborative robotic arms and autonomous mobile robots ("AMRs") used by global manufacturing, logistics and industrial customers to improve quality, increase manufacturing and material handling efficiency and decrease manufacturing and logistics costs. Our automated test equipment and robotics products and services include:

- semiconductor test ("Semiconductor Test") systems;
- storage and system level test ("Storage Test") systems, defense/aerospace ("Defense/Aerospace") test instrumentation and systems and circuit-board test and inspection ("Production Board Test") systems (collectively these products represent "System Test");
- wireless test ("Wireless Test") systems; and
- robotics ("Robotics") products.

The market for our test products is concentrated with a limited number of significant customers accounting for a substantial portion of the purchases of test equipment. A few customers drive significant demand for our products both through direct sales and sales to the customer's supply partners. We expect that sales of our test products will continue to be concentrated with a limited number of significant customers for the foreseeable future.

In 2023, the demand in our Semiconductor Test business continued to be impacted by a correction cycle driven by excess semiconductor inventory, primarily in the mobility segment of the market. The depth of this slowdown and the timing of the recovery are uncertain, however, strong automotive and image sensor demand partially offset these declines. The growth of DDR5 and High Bandwidth Memory ("HBM") devices for data center applications continued to drive demand for our products in the memory market in 2023. Over the midterm, we expect the ramp of 3 nanometer and gate-all-around process technology, increasing multichip packaging, additional device complexity and unit growth will drive additional demand for Semiconductor Test.

Our Robotics segment consists of Universal Robots A/S ("UR"), a leading supplier of collaborative robotic arms, and Mobile Industrial Robots A/S ("MiR"), a leading maker of AMRs for industrial automation. The market for our Robotics segment products is dependent on the adoption of new automation technologies by large manufacturers as well as small and medium enterprises ("SMEs") throughout the world. Demand in the fourth quarter of 2023 increased, tied to introduction of new products and seasonally high demand in Robotics after market softness and the impact of our channel transformation resulted in a weaker than forecasted first half of 2023.

On November 7, 2023, Teradyne and Technoprobe S.p.A, ("Technoprobe"), a leader in the design and production of probe cards, announced establishment of a strategic partnership that will seek to accelerate growth for both companies and enable higher performance semiconductor test interfaces for customers worldwide. As part of the partnership, Teradyne will make an investment of 481.0 million Euros in exchange for a 10% equity investment in Technoprobe and Technoprobe will acquire 100% of Teradyne's Device Interface Solutions ("DIS") business in exchange for $85.0 million. The transaction is expected to close during the first half of 2024.

In 2023, inflation had minimal effect on our results. While both our test and robotics businesses may continue to be influenced by supply constraints, which could impact our revenue and costs, We do not anticipate that supply chain constraints will have a material impact on our financial results in 2024.

Our financial statements are denominated in U.S. dollars. While the majority of our revenues are in U.S. dollars, approximately 70 percent of our Robotics revenue is denominated in foreign currencies. There was no material impact to our 2023 results due to changes in foreign exchange rates, however, in 2022, the strengthening of the U.S. dollar was a factor in lower than forecasted revenues in our Robotics segment. Continued strengthening of the U.S. dollar would adversely affect Robotics revenue growth in 2024.

Our corporate strategy continues to focus on profitably gaining market share in our test businesses through the introduction of differentiated products that target expanding segments and accelerating growth through continued investment in our Robotics businesses. We plan to continue investing in our growth while balancing capital allocations between stock repurchases and dividends and using capital for acquisitions.

Supply Chain Constraints and Inflationary Pressures

The global supply shortage of electrical components, including semiconductor chips, impacted our supply chain in the first half of 2023. In the second half of 2023, we saw improvements related to supply constraints and, consequently, did not experience material increases in our lead times and costs for components. In addition, in the 2023, inflationary pressures contributed to increased costs for product components and wage inflation, which had a minimal impact on our cost of products, gross margin and profit for the year. Our supply chain team, and our suppliers, continue to manage numerous supply, production, and logistics obstacles. In an effort to mitigate these risks, in some cases, we have incurred higher costs due to investment in supply chain resiliency and to secure available inventory or have extended or placed non-cancellable purchase commitments with semiconductor suppliers, which introduces inventory risk if our forecasts and assumptions prove inaccurate. We have also sourced components from additional suppliers and multi-sourced and pre-ordered components and finished goods inventory in some cases in an effort to reduce the impact of the adverse supply chain conditions we have experienced. Though these mitigation efforts have not had a material impact on our financial results, our continuing efforts may not be successful. While our businesses could be impacted by supply constraints in the future, we do not anticipate supply chain constraints will have a material impact on our financial results in 2024.

Impact of the Israel-Hamas conflict on our Business

The recent Israel-Hamas conflict could have a negative impact on our future revenue and supply chain, either of which could adversely affect our business and financial results. Our customers in Israel may experience delays in product releases due to impacts to their labor force and impacts on their suppliers because of the conflict, which could materially impact demand for our products. Similarly, our suppliers in Israel may experience delays in providing us with parts due to the conflict. In addition, the global economic uncertainty following the start of the conflict could impact demand for our products.

Impact of October 7, 2022 and October 17, 2023 U.S. Department of Commerce Regulations on our Business

On October 7, 2022, the U.S. Department of Commerce published new regulations restricting the export to China of advanced semiconductors, supercomputer technology, equipment for the manufacturing of advanced semiconductors and components and technology for the manufacturing in China of certain semiconductor manufacturing equipment. As previously disclosed, the restrictions impacted Teradyne's sales to certain companies in China and Teradyne's manufacturing and development operations in China. Teradyne mitigated the impact of these restrictions on its business by obtaining licenses from the Department of Commerce. On October 17, 2023, the Department of Commerce released new rules updating the exporting controls issued on October 7, 2022. The new rules which took effect on November 17, 2023 significantly limit the impact of the October 7, 2022 restrictions on Teradyne's business. However, the regulations may continue to have an adverse impact on certain actual or potential customers of Teradyne and on the global semiconductor industry. To the extent the regulations impact actual and potential customers or disrupt the global semiconductor industry, Teradyne's business and revenues will be adversely impacted.

See Part II—Item 1A, "Risk Factors," included herein for updates to our risk factors regarding risks associated with supply chain issues, international conflicts, and legal and regulatory compliance.

Critical Accounting Policies and Estimates

We have identified the policies and estimates discussed below as critical to understanding our business and our results of operations and financial condition. The impact and any associated risks related to these estimates on our business operations is discussed throughout Management's Discussion and Analysis of Financial Condition and Results of Operations where such policies affect our reported and expected financial results. For a full description of our accounting policies related to the below items refer to Note B. Accounting Policies, included in the Notes to Consolidated Financial Statements in this Annual Report.

Critical accounting estimates are complex and may require significant judgment by management. Changes to the underlying assumptions may have a material impact on our financial condition and results of operations. These estimates may change, as new events occur, and additional information is obtained. Actual results could differ significantly from these estimates under different assumptions or conditions.

Revenue Recognition

In accordance with ASC 606, "*Revenue from Contracts with Customers" ("ASC 606")*, we recognize revenues, when or as control is transferred to a customer. Our determination of revenue requires judgment in the determination of performance obligations and allocation of the transaction price to performance obligations. We often sell bundled orders that include both product and services or multiple different products within the same order. We evaluate each of the deliverables to determine if it meets the definition of a performance obligation, which requires that it is capable of being distinct and distinct within the context of the contract. This

determination is based on an assessment of contractual rights of the contract and the ability of the performance obligation to perform on its own or with readily available resources. In bundled transactions we estimate the standalone selling price of each identified performance obligation and use that estimate to allocate the transaction price among said performance obligations. The estimated standalone selling price is determined using all information reasonably available to us, including standalone transactions, market information and other observable inputs.

Inventories

Inventories are stated at the lower of cost using a standard costing system which approximates cost based on a first-in, first-out basis or net realizable value. On a quarterly basis, we evaluate all inventories for net realizable value. This quarterly process identifies obsolete and excess inventory. Obsolete inventory, which represents items for which there is no demand, is fully reserved. Excess inventory, which represents inventory items that are not expected to be consumed within the forecasted demand window, is written down to estimated net realizable value. Forecasted demand information is obtained from the sales and marketing groups and incorporates factors such as backlog and future revenues. The demand forecast is based on assumptions around the product life and customer and market expectations.

Retirement and Postretirement Plans

We recognize net actuarial gains and losses and the change in the fair value of the plan assets in our operating results in the year in which they occur or upon any interim remeasurement of the plans. Discount rate and expected return on assets are two assumptions which are important elements of pension plan expense and asset/liability measurement. We evaluate our discount rate and expected rate of return on assets assumptions annually on a plan and country specific basis. We evaluate other assumptions related to demographic factors, such as retirement age, mortality and turnover periodically, and update them to reflect our experience and expectations for the future.

In developing the expected return on U.S. Qualified Pension Plan ("U.S. Plan") assets assumption, we evaluated input from our investment manager and pension consultants, including their forecast of asset class return expectations. We believe that 4.75% was an appropriate rate of return on assets to use for 2023. The December 31, 2023 asset allocation for our U.S. Plan was 94% invested in fixed income securities, 5% invested in equity securities, and 1% invested in other securities. Our investment manager regularly reviews the actual asset allocation and periodically rebalances the portfolio to ensure alignment with our target allocations.

The discount rate that we utilized for determining future pension obligations for the U.S. Plan is based on the FTSE Pension Index adjusted for the U.S. Plan's expected cash flows and was 4.75% at December 31, 2023, down from 4.95% at December 31, 2022. We estimate that in 2024 we will recognize approximately $0.2 million of pension expense for the U.S. Plan. The U.S. Plan pension expense estimate for 2024 is based on a 4.75% discount rate and a 4.65% return on assets. Future pension expense or income will depend on future investment performance, changes in future discount rates and various other factors related to the employee population participating in our pension plans.

Goodwill, Intangible and Long-Lived Assets

We assess goodwill for impairment at least annually in the fourth quarter, as of December 31, on a reporting unit basis, or more frequently, when events and circumstances occur indicating that the recorded goodwill may be impaired. We review intangible and long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. Goodwill impairment will be the amount by which a reporting unit's carrying value exceeds its fair value, not to exceed the carrying amount of goodwill. Impairment of intangible and long-lived assets would result in the asset being written down to its estimated fair value. The calculated fair value of a reporting unit or intangible or long-lived asset is dependent upon discounted cash flow ("DCF") models, discount rates, and market multiples. DCF models rely on our forecasted mid-term plans which are subjective based on customer or market conditions and can change materially. We utilize third party specialists when determining discount rates and selected market multiples. A change in any of these key assumptions could result in a reporting unit, intangible asset, or long-lived asset being impaired in a future period.

Convertible Debt

We adopted Accounting Standards Update ("ASU") ASU 2020-06 – "Debt—Debt with Conversion and Other Options and Derivatives and Hedging—Contracts in Entity's Own Equity," on January 1, 2022 using the modified retrospective method of adoption. As a result of adoption, we recorded an increase of $1.4 million to current debt for unsettled shares, an increase of $1.8 million to deferred tax assets, an increase of $6.6 million to long-term debt for unamortized debt discount, and an increase to retained earnings of $94.6 million for the reclassification of the equity component. Mezzanine equity representing unsettled shares value was reduced to zero and additional paid-in capital was reduced by $100.8 million. In accordance with ASU 2020-06, we account for a

convertible debt instrument as a single liability measured at its amortized cost, as long as no other features require bifurcation and recognition as derivatives. Unsettled shares are recorded in current debt, and there is no recognition of a debt discount, which was previously amortized to interest expense. Settled shares reduce the outstanding debt balance in an amount equal to the cash paid, but do not result in any gain or loss on extinguishment. We use the if-converted method in the diluted EPS calculation for convertible instruments.

Income Taxes

Deferred tax assets and liabilities are determined based on differences between financial reporting and tax basis of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. The measurement of deferred tax assets is reduced by a valuation allowance if it is more likely than not that some or all of the deferred tax assets will not be realized. Evaluating the positive and negative evidence regarding the realization of the net deferred tax assets in accordance with ASC 740, "*Accounting for Income Taxes*" is a key judgment in the valuation of income taxes. This assessment included the evaluation of scheduled reversals of deferred tax liabilities, estimates of projected future taxable income and tax-planning strategies. Although realization is not assured, based on our assessment, we concluded that it is more likely than not that such assets, net of the existing valuation allowance, will be realized.

Results of Operations

Information pertaining to fiscal year 2021 results of operations, including a year-to-year comparison against fiscal year 2022, was included in our Annual Report on Form 10-K for the year ended December 31, 2022 under Part II, Item 7, "Management's Discussion and Analysis of Financial Position and Results of Operations," which was filed with the SEC on February 22, 2023. This information is incorporated by reference herein.

The following table sets forth the percentage of total net revenues included in our consolidated statements of operations:

	Years Ended December 31,	
	2023	2022
Percentage of revenues:		
Revenues:		
Products	78.3%	82.1%
Services	21.7	17.9
Total revenues	100.0	100.0
Cost of revenues:		
Cost of products	33.0	33.0
Cost of services	9.6	7.8
Total cost of revenues (exclusive of acquired intangible assets amortization shown separately below)	42.6	40.8
Gross profit	57.4	59.2
Operating expenses:		
Selling and administrative	21.6	17.7
Engineering and development	15.6	14.0
Acquired intangible assets amortization	0.7	0.6
Restructuring and other	0.8	0.5
Total operating expenses	38.7	32.8
Income from operations	18.7	26.4
Non-operating (income) expenses:		
Interest income	(1.0)	(0.2)
Interest expense	0.1	0.1
Other (income) expense, net	—	(0.2)
Income before income taxes	19.6	26.6
Income tax provision	2.9	4.0
Net income	16.8%	22.7%

Revenues

Revenues for our reportable segments were as follows:

	2023	2022	2022-2023 Dollar Change
		(in millions)	
Semiconductor Test	$ 1,818.6	$ 2,080.6	$ (262.0)
Robotics	375.2	403.1	(27.9)
System Test	338.2	469.3	(131.1)
Wireless Test	144.3	201.7	(57.4)
Corporate and Eliminations	—	0.3	(0.3)
	$ 2,676.3	$ 3,155.0	$ (478.7)

The decrease in Semiconductor Test revenues of $262.0 million, or 12.6%, was driven primarily by lower tester sales for compute and mobility applications. The decrease in Robotics revenues of $27.9 million, or 6.9%, was driven primarily by softening demand due to slowing global industrial activity and macro-economic headwinds and the impact of the transformation of Universal Robots' sales channel. The decrease in System Test revenues of $131.1 million, or 27.9%, was primarily due to lower sales in Storage Test of system level and hard disk drive testers. The decrease in Wireless Test revenues of $57.4 million, or 28.5%, was primarily due to a decrease in sales of connectivity test products.

Our reportable segments accounted for the following percentages of consolidated revenues:

	2023	2022
Semiconductor Test	68%	66%
Robotics	14	13
System Test	13	15
Wireless Test	5	6
	100%	100%

Revenues by country as a percentage of total revenues were as follows (1):

	2023	2022
United States	16%	15%
Korea	15	17
Taiwan	14	20
China	12	16
Japan	11	5
Europe	10	9
Philippines	7	4
Singapore	4	3
Thailand	3	4
Malaysia	3	5
Rest of the World	5	2
	100%	100%

(1) Revenues attributable to a country are based on the location of the customer site.

The breakout of product and service revenues was as follows:

	2023	2022	2022-2023 Dollar Change
		(in millions)	
Product revenues	$ 2,096.3	$ 2,591.6	$ (495.3)
Service revenues	580.0	563.5	16.5
	$ 2,676.3	$ 3,155.0	$ (478.8)

Our product revenues decreased $495.3 million, or 19.1%, primarily due to lower tester sales in Semiconductor Test for compute and mobility applications, a decrease in sales in Storage Test of system level and hard disk drive testers, and a decrease in Wireless Test sales of connectivity test products. Our service revenues increased $16.5 million, or 2.9%, primarily in Semiconductor Test and Storage Test.

In 2023, revenues from Texas Instruments Inc., a customer of our Semiconductor Test segment, accounted for 10% of our consolidated revenues. In 2021, revenues from Taiwan Semiconductor Manufacturing Company Ltd., a customer of our Semiconductor Test segment, accounted for 12% of our consolidated revenues. In 2023 and 2022, our five largest direct customers in aggregate accounted for 32% and 26% of our consolidated revenues, respectively. We estimate consolidated revenues driven by Qualcomm, a customer of our Semiconductor Test, System Test and Wireless Test segments, combining direct and indirect sales, accounted for approximately 11% of our consolidated revenues in 2022.

Gross Profit

	2023	2022	2022-2023 Dollar / Point Change
		(in millions)	
Gross profit	$ 1,536.7	$ 1,867.2	$ (330.5)
Percent of total revenues	57.4%	59.2%	(1.8)

Gross profit as a percent of total revenues decreased by 1.8 points, primarily due to a lower volume, higher spending to strengthen our supply chain, and product mix.

The breakout of product and service gross profit was as follows:

	2023	2022	2022-2023 Dollar / Point Change
		(in millions)	
Product gross profit	$ 1,213.4	$ 1,549.0	$ (335.6)
Percent of product revenues	57.9%	59.8%	(1.9)
Service gross profit	$ 323.4	$ 318.1	$ 5.3
Percent of service revenues	55.7%	56.5%	(0.8)

Product revenues gross profit percentage decreased by 1.9 points, primarily due to lower volume, higher spending to strengthen our supply chain, and product mix.

We assess the carrying value of our inventory on a quarterly basis by estimating future demand and comparing that demand against on-hand and on-order inventory positions. Forecasted revenues information is obtained from the sales and marketing groups and incorporates factors such as backlog and future revenues. This quarterly process identifies obsolete and excess inventory. Obsolete inventory, which represents items for which there is no demand, is fully reserved. Excess inventory, which represents inventory items that are not expected to be consumed within the forecasted demand window, is written down to estimated net realizable value.

During the year ended December 31, 2023, we recorded an inventory provision of $28.4 million included in cost of revenues, primarily due to downward revisions to previously forecasted demand levels for certain products. Of the $28.4 million of total excess and obsolete provisions, $22.5 million was related to Semiconductor Test, $2.3 million was related to Robotics, $1.9 million was related to System Test, and $1.7 million was related to Wireless Test.

During the year ended December 31, 2022, we recorded an inventory provision of $31.5 million included in cost of revenues, primarily due to downward revisions to previously forecasted demand levels for certain products. Of the $31.5 million of total excess and obsolete provisions, $21.5 million was related to Semiconductor Test, $4.6 million was related to Wireless Test, $3.7 million was related to Robotics, and $1.7 million was related to System Test.

During the years ended December 31, 2023 and 2022, we scrapped $26.4 million and $8.8 million of inventory, respectively, and sold $5.2 million and $1.8 million of previously written-down or written-off inventory, respectively. As of December 31, 2023, we had inventory related reserves for amounts which had been written-down or written-off totaling $136.0 million. We have no pre-determined timeline to scrap the remaining inventory.

Selling and Administrative

Selling and administrative expenses were as follows:

	2023	2022	2022-2023 Change
		(in millions)	
Selling and administrative	$ 577.3	$ 558.1	$ 19.2
Percent of total revenues	21.6%	17.7%	

The increase of $19.2 million in selling and administrative expenses was primarily due to the charge of $5.9 million related to the modification of Teradyne's chief executive officer's outstanding equity awards in connection with his retirement and higher sales and marketing spending in Robotics and Semiconductor Test.

Engineering and Development

Engineering and development expenses were as follows:

	2023	2022	2022-2023 Change
		(in millions)	
Engineering and development	$ 418.1	$ 440.6	$ (22.5)
Percent of total revenues	15.6%	14.0%	

The decrease of $22.5 million in engineering and development expenses was due to lower variable compensation and lower spending in Semiconductor Test, partially offset by higher spending in Robotics.

Restructuring and Other

During the year ended December 31, 2023, we recorded $14.7 million of severance charges related to headcount reductions of 215 people primarily in Semiconductor Test and Robotics, which included charges related to a voluntary early retirement program for employees meeting certain conditions, $3.1 million of acquisition and divestiture expenses related to the Technoprobe transaction, a $1.5 million contract termination charge, and a charge of $1.1 million for an increase in environmental liability.

During the year ended December 31, 2022, we recorded a charge of $14.7 million related to the arbitration claim filed against Teradyne and AutoGuide related to an earn-out dispute which was settled on March 25, 2022 for $26.7 million, $2.9 million of severance charges primarily in Robotics, and a charge of $2.7 million for an increase in environmental and legal liabilities, partially offset by a $3.4 million gain on sale of an asset.

Interest and Other

	2023	2022	2022-2023 Change
		(in millions)	
Interest income	$ (27.3)	$ (6.4)	$ (20.9)
Interest expense	3.8	3.7	0.1
Other (income) expense, net	(1.0)	(5.8)	4.8

Interest income increased by $20.9 million due to higher interest rates in 2023. Other (income) expense, net decreased by $4.8 million primarily due to the change in pension actuarial gains/losses, from a $25.6 million gain in 2022 to a $2.7 million loss in 2023, partially offset by the change in unrealized gains/losses on equity securities, from a $9.7 million loss in 2022 to a $7.2 million gain in 2023, and a $7.5 million unrealized gain on our call option purchased in connection with our agreement to acquire a 10% investment in Technoprobe S.p.A.

Income (Loss) Before Income Taxes

	2023	2022	2022-2023 Change
		(in millions)	
Semiconductor Test	$ 453.3	$ 634.5	$ (181.2)
System Test	94.1	166.9	(72.8)
Wireless Test	30.6	66.8	(36.2)
Robotics	(54.3)	(16.2)	(38.1)
Corporate and Eliminations (1)	1.9	(11.6)	13.5
	$ 525.6	$ 840.4	$ (314.8)

(1) Included in Corporate and Eliminations are interest income, interest expense, net foreign exchange gains (losses), intercompany eliminations, employee severance, pension and postretirement plan actuarial gains (losses), legal and environmental fees, acquisition and divestiture related expenses, contract termination settlement charge, and an expense for the modification of Teradyne's former chief executive officer's outstanding equity awards.

The decrease in income before income taxes in Semiconductor Test was driven primarily by lower tester sales for compute and mobility applications. The decrease in income before income taxes in System Test was primarily due to lower sales in Storage Test of system level and hard disk drive testers. The decrease in income before income taxes in Wireless Test was driven primarily by a decrease in sales of connectivity test products. The decrease in income before income taxes in Robotics was driven primarily by softening demand due to slowing global industrial activity and macro-economic headwinds and the impact of the transformation of Universal Robots sales channel. The increase in income before income taxes in Corporate and Eliminations was primarily due to legal settlement charges in 2022 related to litigation for the earn-out dispute in connection with the AutoGuide acquisition, changes in unrealized gains/losses on equity securities and higher interest income.

Income Taxes

Income tax expense for 2023 and 2022 totaled $76.8 million and $124.9 million, respectively. The effective tax rate for 2023 and 2022 was 14.6% and 14.9%, respectively.

The decrease in the effective tax rate from 2022 to 2023 is primarily attributable to increases in benefit from tax credits and the U.S. foreign derived intangible income deduction. These decreases in expense were partially offset by a shift in the geographic distribution of income, which increased the income subject to taxation in higher tax rate jurisdictions relative to lower tax rate jurisdictions and a reduction in benefit from equity compensation.

We qualify for a tax holiday in Singapore by fulfilling the requirements of an agreement with the Singapore Economic Development Board under which certain headcount and spending requirements must be met. The tax savings attributable to the Singapore tax holiday for the years ended December 31, 2023 and 2022 were $1.4 million or $0.01 per diluted share and $16.0 million or $0.09 per diluted share, respectively. In November 2020, we entered into an agreement with the Singapore Economic Development Board which extended our Singapore tax holiday under substantially similar terms to the agreement which expired on December 31, 2020. The new tax holiday is scheduled to expire on December 31, 2025.

Capital Resources and Material Cash Requirements

Our cash, cash equivalents and marketable securities balance decreased by $68.0 million in 2023 to $937.2 million. Cash decreased due to stock repurchases in the amount of $397.2 million, quarterly cash dividend payments in the amount of $67.9 million, and payments of convertible debt principal in the amount of $50.3 million, partially offset by cash generated by our global operations.

Operating activities during 2023 provided cash of $585.2 million. Changes in operating assets and liabilities used cash of $9.6 million. This was due to a $33.2 million decrease in operating assets and a $42.8 million decrease in operating liabilities.

The decrease in operating assets was due to a $71.0 million decrease in accounts receivable due to lower sales and a $5.3 million decrease in inventories, partially offset by a $43.1 million increase in prepayments and other assets due to prepayments to our contract manufacturers.

The decrease in operating liabilities was due to a $57.2 million decrease in deferred revenue and customer advance payments, a $26.9 million decrease in income taxes, a $21.2 million decrease in accrued employee compensation, and $5.5 million of retirement plan contributions, partially offset by a $45.0 million increase in accounts payable, and a $23.0 million increase in other accrued liabilities.

Investing activities during 2023 used cash of $179.6 million, due to $161.9 million used for purchases of marketable securities, $159.6 million used for purchases of property, plant and equipment, and $5.0 million used for issuance of convertible loan, partially offset by $85.0 million and $61.4 million in proceeds from maturities and sales of marketable securities, respectively, and $0.5 million in proceeds from the cancellation of Teradyne owned life insurance policies related to the cash surrender value.

Financing activities during 2023 used cash of $501.9 million, due to $397.2 million used for the repurchase of 3.9 million shares of common stock at an average price of $102.47 per share, $67.9 million used for dividend payments, $50.3 million used for the payments of convertible debt principal, and $20.8 million used for payments related to net settlement of employee stock compensation awards, partially offset by $34.3 million from the issuance of common stock under employee stock purchase and stock option plans.

Operating activities during 2022 provided cash of $577.9 million. Changes in operating assets and liabilities used cash of $272.6 million. This was due to a $170.9 million increase in operating assets and a $101.7 million decrease in operating liabilities.

The increase in operating assets was due to a $140.7 million increase in prepayments and other assets due to prepayments to our contract manufacturers, and an $80.8 million increase in inventories, partially offset by a $50.6 million decrease in accounts receivable due to lower sales.

The decrease in operating liabilities was due to a $40.3 million decrease in accrued employee compensation, a $29.8 million decrease in income taxes, a $10.8 million decrease in accounts payable, a $9.3 million decrease in other accrued liabilities, a $6.2 million decrease in deferred revenue and customer advance payments, and $5.1 million of retirement plan contributions.

Investing activities during 2022 provided cash of $43.8 million, due to $268.1 million and $222.9 million in proceeds from sales and maturities of marketable securities, respectively, $3.4 million due to sale of an asset, partially offset by $287.4 million used for purchases of marketable securities and $163.2 million used for purchases of property, plant and equipment.

Financing activities during 2022 used cash of $893.0 million, due to $752.1 million used for the repurchase of 7.3 million shares of common stock at an average price of $103.69 per share, $69.7 million used for dividend payments, $66.8 million used for the payments of convertible debt principal, and $33.2 million used for payments related to net settlement of employee stock compensation awards, partially offset by $28.7 million from the issuance of common stock under employee stock purchase and stock option plans.

In January 2023, May 2023, August 2023 and November 2023, our Board of Directors declared a quarterly cash dividend of $0.11 per share. Total dividend payments in 2023 were $67.9 million. In January 2022, May 2022, August 2022 and November 2022, our Board of Directors declared a quarterly cash dividend of $0.11 per share. Total dividend payments in 2022 were $69.7 million.

In January 2023, our Board of Directors cancelled the 2021 repurchase program and approved a new repurchase program for up to $2.0 billion of common stock. In 2023, we repurchased 3.9 million shares of common stock for $397.2 million, which excludes related excise tax, at an average price of $102.47 per share. In 2022, we repurchased 7.3 million shares of common stock for $752.1 million at an average price of $103.69 per share against the 2021 repurchase program. The cumulative repurchases as of December 31, 2022, under the 2021 repurchase program, were 12.0 million shares of common stock for $1,352.1 million at an average price per share of $112.44. In 2024 we intend to repurchase up to $90.0 million.

While we declared a quarterly cash dividend and authorized a share repurchase program, we may reduce or eliminate the cash dividend or share repurchase program in the future. Future cash dividends and stock repurchases are subject to the discretion of our Board of Directors, which will consider, among other things, our earnings, capital requirements and financial condition.

On November 7, 2023, Teradyne announced a strategic partnership with Technoprobe S.p.A including Teradyne's agreement to acquire a 10% equity investment in Technoprobe for 481.0 million Euros. Teradyne will face a three year restriction on the transfer or disposition of the Technoprobe shares upon closing of the agreement, subject to certain early termination events.

On May 1, 2020, we entered into a credit agreement providing a three-year, senior secured revolving credit facility of $400 million. On December 10, 2021, the credit agreement was amended to extend the senior secured revolving credit facility to December 10, 2026. On October 5, 2022, the credit agreement was amended to increase the amount of the credit facility to $750.0 million from $400.0 million. As of February 22, 2023, we have not borrowed any funds under the credit facility.

We expect operations to continue to be the primary source of cash to operate the business and meet material cash commitments, including any payments of convertible debt principal, our stock repurchase program, our quarterly dividends, our office lease obligations, contractual obligations related to inventory purchases and the construction of new facilities. We believe our cash, cash equivalents and marketable securities balance will be sufficient to pay our quarterly dividend and meet our working capital and expenditure needs for at least the next twelve months. Inflation has not had a significant long-term impact on earnings.

At December 31, 2023, our future contractual obligations were related to debt, leases, retirement plan liabilities, deferred tax benefits, and purchase obligations. See Note J. "Debt", Note I. "Leases", Note P. "Retirement Plans", and Note S. "Income Taxes" of Notes to Consolidated Financial Statements in this Annual Report for information about those obligations, which Notes are incorporated by reference into this section. Our purchase obligations were approximately $414.4 million, with $379.1 million expected to be paid within twelve months.

Retirement Plans

ASC 715-20, "*Compensation—Retirement Benefits—Defined Benefit Plans,*" requires an employer with defined benefit plans or other postretirement benefit plans to recognize an asset or a liability on its balance sheet for the overfunded or underfunded status of the plans as defined by ASC 715-20. The pension asset or liability represents the difference between the fair value of the pension plans' assets and the projected benefit obligation as of December 31. For other postretirement benefit plans, the liability is the difference between the fair value of the plan's assets and the accumulated postretirement benefit obligation as of December 31.

For the year ended December 31, 2023, our pension expense, which includes the U.S. Qualified Pension Plan ("U.S. Plan"), certain qualified plans for non-U.S. subsidiaries, and a U.S. Supplemental Executive Defined Benefit Plan, was approximately $6.8 million. Pension expense is calculated based upon a number of actuarial assumptions. Discount rate and expected return on assets are two assumptions which are important elements of pension plan expense and asset/liability measurement. We evaluate our discount rate and expected rate of return on assets assumptions annually on a plan and country specific basis. We evaluate other assumptions related to demographic factors, such as retirement age, mortality and turnover periodically, and update them to reflect our experience and expectations for the future.

In developing the expected return on U.S. Plan assets assumption, we evaluated input from our investment manager and pension consultants, including their forecast of asset class return expectations. We believe that 4.75% was an appropriate rate of return on assets to use for 2023. The December 31, 2023 asset allocation for our U.S. Plan was 94% invested in fixed income securities, 5% invested in equity securities, and 1% invested in other securities. Our investment manager regularly reviews the actual asset allocation and periodically rebalances the portfolio to ensure alignment with our target allocations.

We recognize net actuarial gains and losses and the change in the fair value of plan assets in our operating results in the year in which they occur or upon any interim remeasurement of the plans. We calculate the expected return on plan assets using the fair value of the plan assets. Actuarial gains and losses are generally measured annually as of December 31 and, accordingly, recorded during the fourth quarter of each year or upon any interim remeasurement of the plans.

The discount rate that we utilized for determining future pension obligations for the U.S. Plan is based on the FTSE Pension Index adjusted for the U.S. Plan's expected cash flows and was 4.75% at December 31, 2023, down from 4.95% at December 31, 2022. We estimate that in 2024, we will recognize approximately $0.2 million of pension expense for the U.S. Plan. The U.S. Plan pension expense estimate for 2024 is based on a 4.75% discount rate and a 4.65% return on assets. Future pension expense or income will depend on future investment performance, changes in future discount rates and various other factors related to the employee population participating in our pension plans.

As of December 31, 2023, our pension plans had no unrecognized pension prior service cost.

The assets of the U.S. Plan consist substantially of fixed income securities. U.S. Plan assets have increased from $111.8 million at December 31, 2022 to $112.6 million at December 31, 2023, while the U.S. Plan's liability increased from $100.0 million at December 31, 2022 to $101.1 million at December 31, 2023.

Our funding policy is to make contributions to our pension plans in accordance with local laws and to the extent that such contributions are tax deductible. During 2023, we made contributions of $3.1 million to the U.S. supplemental executive defined benefit pension plan, and $1.0 million to certain qualified plans for non-U.S. subsidiaries. In 2024, we expect to contribute approximately $3.1 million to the U.S. supplemental executive defined benefit pension plan. Contributions to be made in 2024 to certain qualified plans for non-U.S. subsidiaries are based on local statutory requirements and are estimated at approximately $1.4 million.

Equity Compensation Plans

In addition to our 1996 Employee Stock Purchase Plan discussed in Note Q: "Stock-Based Compensation" in Notes to Consolidated Financial Statements, we have a 2006 Equity and Cash Compensation Incentive Plan (the "2006 Equity Plan") under which equity securities are authorized for issuance. The 2006 Equity Plan was initially approved by stockholders on May 25, 2006.

At our annual meeting of stockholders held May 21, 2013, our stockholders approved an amendment to the 2006 Equity Plan to increase the number of shares issuable thereunder by 10.0 million, for an aggregate of 32.0 million shares issuable thereunder, and our stockholders also approved an amendment to our 1996 Employee Stock Purchase Plan to increase the number of shares issuable thereunder by 5.0 million, for an aggregate of 30.4 million shares issuable thereunder. At our annual meeting of stockholders held May 12, 2015, our stockholders approved an amendment to the 2006 Equity Plan to extend its term until May 12, 2025. At our annual meeting of stockholders held May 7, 2021, our stockholders approved an amendment to our 1996 Employee Stock Purchase Plan to increase the number of shares issuable thereunder by 3.0 million, for an aggregate of 33.4 million shares issuable thereunder.

The following table presents information about these plans as of December 31, 2023 (share numbers in thousands):

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights		Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column one)	
Equity plans approved by shareholders	1,548	(1)	$ 94.85	7,863	(2)

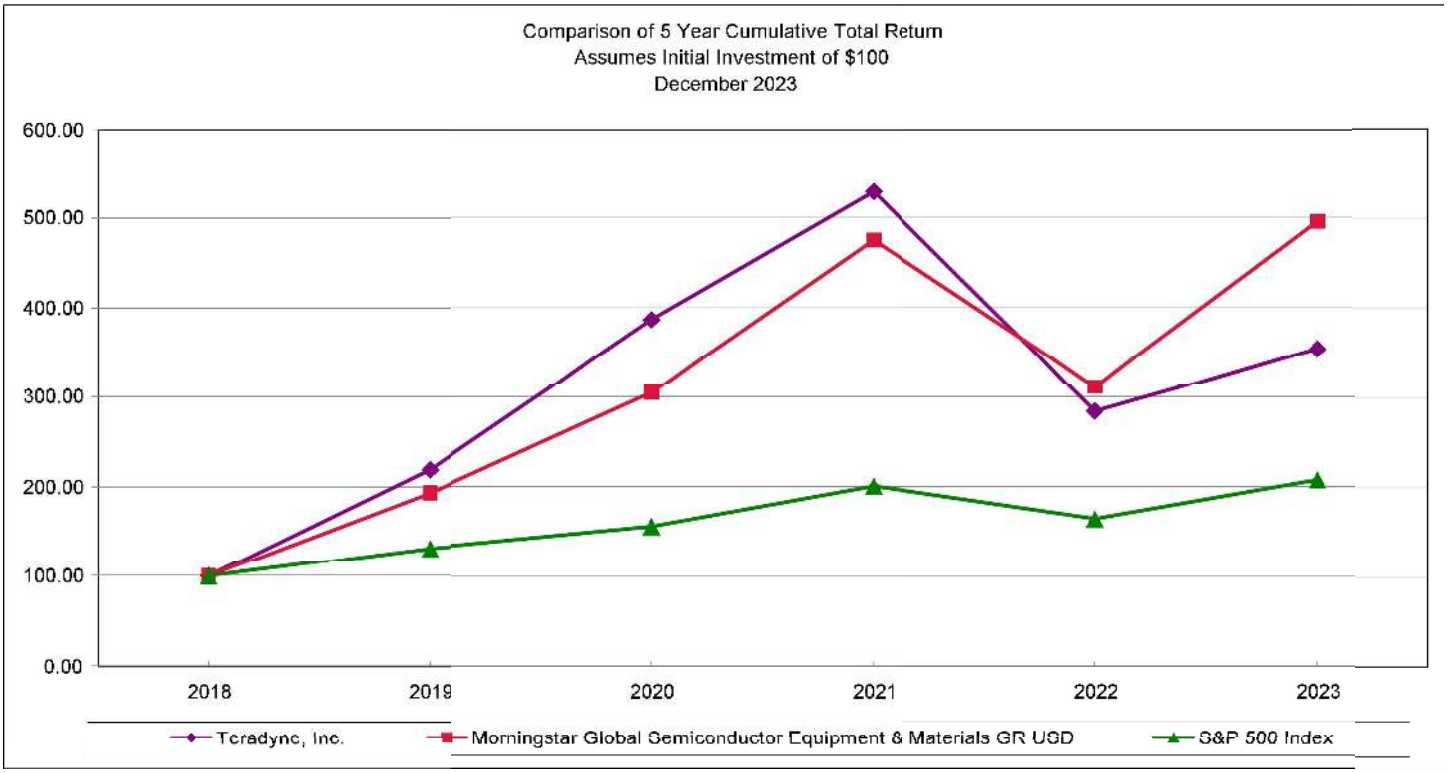
(1) Includes 1,377,662 shares of restricted stock units that are not included in the calculation of the weighted average exercise price.
(2) Consists of 4,352,428 securities available for issuance under the 2006 Equity Plan and 3,510,784 of securities available for issuance under the Employee Stock Purchase Plan.

The purpose of the 2006 Equity Plan is to motivate employees, officers and directors by providing equity ownership and compensation opportunities in Teradyne. The aggregate number of shares available under the 2006 Equity Plan as of December 31, 2023 was 4,352,428 shares of our common stock. The 2006 Equity Plan authorizes the grant of stock-based awards in the form of (1) non-qualified and incentive stock options, (2) stock appreciation rights, (3) restricted stock awards and restricted stock unit awards, (4) phantom stock, and (5) other stock-based awards. Awards may be tied to time-based vesting schedules and/or performance-based vesting measured by reference to performance criteria chosen by the Compensation Committee of the Board of Directors, which administers the 2006 Equity Plan. Awards may be made to any employee, officer, consultant and advisor of Teradyne and our subsidiaries, as well as to our directors. The maximum number of shares of stock-based awards that may be granted to one participant during any one fiscal year is 2,000,000 shares of common stock.

As of December 31, 2023, total unrecognized compensation expense related to non-vested restricted stock units and options was $73.7 million and is expected to be recognized over a weighted average period of 2.5 years.

Performance Graph

The following graph compares the change in our cumulative total shareholder return in our common stock with (i) the Standard & Poor's 500 Index and (ii) the Morningstar Global Semiconductor Equipment & Materials GR USD Industry Group. The comparison assumes $100.00 was invested on December 31, 2018 in our common stock and in each of the foregoing indices and assumes reinvestment of dividends, if any. Historic stock price performance is not necessarily indicative of future price performance.



Recently Issued Accounting Pronouncements

In November 2023, the Financial Accounting Standards Board ("FASB") issued Accounting Standard Update ("ASU") No. 2023-07, *"Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures"*, which will require us to disclose significant segment expenses and other segment items used by the Chief Operating Decision Maker ("CODM") on an annual and interim basis as well as provide in interim periods all disclosures about a reportable segment's profit or loss and assets that are currently required annually. Additionally, we will be required to disclose the title and position of the CODM. The new standard is effective for fiscal years beginning after December 15, 2023, and interim periods within fiscal years beginning after December 15, 2024, with early adoption permitted. This ASU will have no impact on our results of operations, cash flows or financial condition. Upon adoption, we will apply the amendments in this ASU retrospectively to all prior period disclosures presented in the financial statements.

In December 2023, FASB issued ASU 2023-09 – *"Income Taxes (Topic 740): Improvements to Income Tax Disclosures"*, which requires expanded disclosures relating to the tax rate reconciliation, income taxes paid, income (loss) before income tax expense (benefit) and income tax expense (benefit), requiring a greater disaggregation of information for each. The provisions of ASU 2023-09 are effective for fiscal years beginning after December 15, 2024. The amendments in this update should be applied on a prospective basis, but retrospective application is permitted. We are currently evaluating the impact of this new standard.

Item 7A: ***Quantitative and Qualitative Disclosures about Market Risks***

Concentration of Credit Risk

Financial instruments which potentially subject us to concentrations of credit risk consist principally of cash equivalents, marketable securities, forward currency contracts and accounts receivable. Our cash equivalents consist primarily of money market funds invested in U.S. Treasuries and government agencies. Our fixed income available-for-sale marketable securities have a minimum rating of AA by one or more of the major credit rating agencies. We place forward currency contracts with high credit-quality financial institutions in order to minimize credit risk exposure. Concentrations of credit risk with respect to accounts receivable

are limited due to the large number of geographically dispersed customers. We perform ongoing credit evaluations of our customers' financial condition and from time to time may require customers to provide a letter of credit from a bank to secure accounts receivable. As of December 31, 2023, a customer of our Semiconductor Test segment, Texas Instruments Inc., accounted for 18% of our accounts receivable balance. There were no customers who accounted for more than 10% of our accounts receivable balance as of December 31, 2022.

Exchange Rate Risk Management

We regularly enter into foreign currency forward contracts to hedge the value of our monetary assets and liabilities in Japanese Yen, British Pound, Korean Won, Taiwan Dollar, Singapore Dollar, Euro, Philippine Peso, Chinese Yuan, and Danish Krone. These foreign currency forward contracts have maturities of approximately one month. These contracts are used to minimize the effect of exchange rate fluctuations associated with the remeasurement of monetary assets and liabilities.

We also enter into foreign currency forward contracts to hedge the impact of exchange rates on our revenues in Japanese Yen and Taiwan Dollar. These contracts have maturities of less than one year. We do not engage in currency speculation.

On November 7, 2023, in connection with our agreement to acquire 10% investment in Technoprobe S.p.A, we purchased a call option to buy 481.0 million Euros. The expiration date of the option is April 26, 2024. Since the transaction price was agreed to in Euros, this option contract reduces the impact to the purchase price of changes in the Euro to U.S. Dollar exchange rate.

We performed a sensitivity analysis assuming a hypothetical 10% fluctuation in foreign exchange rates to the hedging contracts and the underlying exposures described above. As of December 31, 2023 and 2022, the analysis indicated that these hypothetical market movements would not have a material effect on our consolidated financial position, results of operations or cash flows.

Interest Rate Risk Management

We are exposed to potential losses due to changes in interest rates. Our interest rate exposure is primarily related to short-term and long-term marketable securities.

In order to estimate the potential loss due to interest rate risk, a fluctuation in interest rates of 25 basis points was assumed. Market risk for the short and long-term marketable securities was estimated as the potential change in the fair value resulting from a hypothetical change in interest rates for securities contained in the investment portfolio. The potential change in the fair value from changes in interest rates is immaterial as of December 31, 2023 and 2022.

Item 8: ***Financial Statements and Supplementary Data***

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Teradyne, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Teradyne, Inc. and its subsidiaries (the "Company") as of December 31, 2023 and 2022, and the related consolidated statements of operations, comprehensive income, convertible common shares and shareholders' equity and cash flows for each of the three years in the period ended December 31, 2023, including the related notes and schedule of valuation and qualifying accounts for each of the three years in the period ended December 31, 2023 appearing under Item 15(c) (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2023, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2023 and 2022, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2023 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2023, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Changes in Accounting Principles

As discussed in Note B to the consolidated financial statements, the Company changed the manner in which it accounts for convertible debt in 2022.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in

accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Revenue Recognition - Certain Product Revenue

As described in Note B to the consolidated financial statements, the Company recognizes revenue for transactions that do not meet the criteria for over time recognition at a point in time when shipped or delivered based on contractual terms. The transaction price is the amount of consideration the Company expects to be entitled to in exchange for such products, which is generally at contractually stated prices. The Company's total product revenue was $2.1 billion for the year ended December 31, 2023, of which a majority relates to certain product revenue.

The principal consideration for our determination that performing procedures relating to revenue recognition for certain product revenue is a critical audit matter is a high degree of auditor effort in performing procedures related to revenue recognition for certain of the Company's product revenue.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the recognition process for certain product revenue. These procedures also included, among others (i) testing the completeness, accuracy, and occurrence of revenue recognized for a sample of certain product revenue transactions by obtaining and inspecting source documents, such as purchase orders, invoices, and proof of shipment or delivery; (ii) testing the cut off of revenue recognized for a sample of certain product revenue transactions near period end by obtaining and inspecting source documents, such as purchase orders, invoices and proof of shipment or delivery; and (iii) confirming a sample of outstanding customer invoice balances as of December 31, 2023 and, for confirmations not returned, obtaining and inspecting source documents, such as purchase orders, invoices, proof of shipment or delivery, and subsequent cash receipts.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 22, 2024

We have served as the Company's auditor since 1968.

TERADYNE, INC.

CONSOLIDATED BALANCE SHEETS

	December 31, 2023	December 31, 2022
	(in thousands, except per share amount)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 757,571	$ 854,773
Marketable securities	62,154	39,612
Accounts receivable, less allowance for credit losses of $1,988 and $1,955 in 2023 and 2022, respectively	422,124	491,145
Inventories, net	309,974	325,019
Prepayments	548,970	532,962
Other current assets	37,992	14,404
Current assets held for sale	23,250	—
Total current assets	2,162,035	2,257,915
Property, plant and equipment, net	445,492	418,683
Operating lease right-of-use assets, net	73,417	73,734
Marketable securities	117,434	110,777
Deferred tax assets	175,775	142,784
Retirement plans assets	11,504	11,761
Other assets	38,580	28,925
Acquired intangible assets, net	35,404	53,478
Goodwill	415,652	403,195
Long-term assets held for sale	11,531	—
Total assets	$ 3,486,824	$ 3,501,252
LIABILITIES		
Current liabilities:		
Accounts payable	$ 180,131	$ 139,722
Accrued employees' compensation and withholdings	191,750	212,266
Deferred revenue and customer advances	99,804	148,285
Other accrued liabilities	114,712	112,271
Operating lease liabilities	17,522	18,594
Income taxes payable	48,653	65,010
Current debt	—	50,115
Current liabilities held for sale	7,379	—
Total current liabilities	659,951	746,263
Retirement plans liabilities	132,090	116,005
Long-term deferred revenue and customer advances	37,282	45,131
Deferred tax liabilities	183	3,267
Long-term other accrued liabilities	19,998	15,981
Long-term operating lease liabilities	65,092	64,176
Long-term income taxes payable	44,331	59,135
Long-term liabilities held for sale	2,000	—
Total liabilities	960,927	1,049,958
Commitments and contingencies (Note M)		
SHAREHOLDERS' EQUITY		
Common stock, $0.125 par value, 1,000,000 shares authorized, 152,698 and 155,759 shares issued and outstanding at December 31, 2023 and 2022, respectively	19,087	19,470
Additional paid-in capital	1,827,274	1,755,963
Accumulated other comprehensive loss	(26,978)	(49,868)
Retained earnings	706,514	725,729
Total shareholders' equity	2,525,897	2,451,294
Total liabilities, convertible common shares and shareholders' equity	$ 3,486,824	$ 3,501,252

The accompanying notes are an integral part of the consolidated financial statements.

TERADYNE, INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

	Years Ended December 31,		
	2023	2022	2021
	(in thousands, except per share amount)		
Revenues:			
Products	$ 2,096,286	$ 2,591,572	$ 3,196,575
Services	580,012	563,473	506,306
Total revenues	2,676,298	3,155,045	3,702,881
Cost of revenues:			
Cost of products	882,892	1,042,555	1,300,106
Cost of services	256,658	245,339	196,119
Total cost of revenues (exclusive of acquired intangible assets amortization shown separately below)	1,139,550	1,287,894	1,496,225
Gross profit	1,536,748	1,867,151	2,206,656
Operating expenses:			
Selling and administrative	577,315	558,103	547,559
Engineering and development	418,089	440,591	427,609
Acquired intangible assets amortization	18,999	19,333	21,456
Restructuring and other	21,277	17,185	9,312
Total operating expenses	1,035,680	1,035,212	1,005,936
Income from operations	501,068	831,939	1,200,720
Non-operating (income) expenses:			
Interest income	(27,348)	(6,379)	(2,627)
Interest expense	3,806	3,719	17,820
Other (income) expense, net	(962)	(5,786)	24,572
Income before income taxes	525,572	840,385	1,160,955
Income tax provision	76,820	124,884	146,366
Net income	$ 448,752	$ 715,501	$ 1,014,589
Net income per common share:			
Basic	$ 2.91	$ 4.52	$ 6.15
Diluted	$ 2.73	$ 4.22	$ 5.53
Weighted average common shares—basic	154,310	158,434	164,960
Weighted average common shares—diluted	164,304	169,734	183,625

The accompanying notes are an integral part of the consolidated financial statements.

TERADYNE, INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Years Ended December 31,		
	2023	2022	2021
		(in thousands)	
Net income	$ 448,752	$ 715,501	$ 1,014,589
Other comprehensive income (loss), net of tax:			
Foreign currency translation adjustment, net of tax of $0, $0, $0, respectively	17,407	(29,031)	(36,207)
Available-for-sale marketable securities:			
Unrealized gains (losses) on marketable securities arising during period, net of tax of $568, $(3,388), ($578), respectively	2,423	(12,666)	(2,255)
Less: Reclassification adjustment for losses (gains) included in net income, net of tax of $12, $25, $(277), respectively	44	301	(995)
	2,467	(12,365)	(3,250)
Cash flow hedges:			
Unrealized gains (losses) arising during period, net of tax of $1,537, $(708), $0, respectively	5,464	(2,517)	—
Less: Reclassification adjustment for losses included in net income, net of tax of $(686), $0, $0, respectively	(2,441)	—	—
	3,023	(2,517)	—
Defined benefit post-retirement plan:			
Amortization of prior service credit, net of tax $(2), $(2), $(2), respectively	(7)	(7)	(7)
Other comprehensive income (loss)	22,890	(43,920)	(39,464)
Comprehensive income	$ 471,642	$ 671,581	$ 975,125

The accompanying notes are an integral part of the consolidated financial statements.

TERADYNE, INC.

CONSOLIDATED STATEMENTS OF CONVERTIBLE COMMON SHARES AND SHAREHOLDERS' EQUITY

		Shareholders' Equity					
	Convertible Common Shares Value	Common Stock Shares	Common Stock Par Value	Additional Paid-in Capital	Accumulated Other Comprehensive Income (loss)	Retained Earnings	Total Shareholders' Equity
				(in thousands)			
Year Ended December 31, 2020	$ 3,787	166,123	$ 20,765	$ 1,765,323	$ 33,516	$ 387,414	2,207,018
Net issuance of common stock under stock-based plans		899	113	(225)			(112)
Stock-based compensation expense				45,632			45,632
Repurchase of common stock		(4,771)	(597)			(599,403)	(600,000)
Cash dividends ($0.40 per share)						(66,034)	(66,034)
Settlements of convertible notes		8,148	1,018	984,622			985,640
Exercise of convertible notes hedge call options		(8,148)	(1,018)	(986,082)			(987,100)
Convertible common shares	(2,275)			2,275			2,275
Net income						1,014,589	1,014,589
Other comprehensive loss					(39,464)		(39,464)
Year Ended December 31, 2021	$ 1,512	162,251	$ 20,281	$ 1,811,545	$ (5,948)	$ 736,566	$ 2,562,444
Net issuance of common stock under stock-based plans		761	96	(4,471)			(4,375)
Stock-based compensation expense				48,466			48,466
Repurchase of common stock		(7,253)	(907)			(751,175)	(752,082)
Cash dividends ($0.44 per share)						(69,763)	(69,763)
Settlements of convertible notes		1,495	187	(442)			(255)
Exercise of convertible notes hedge call options		(1,495)	(187)	187			—
Convertible common shares	(1,512)			1,512			1,512
Cumulative-effect of change in accounting principle related to convertible debt				(100,834)		94,600	(6,234)
Net income						715,501	715,501
Other comprehensive loss					(43,920)		(43,920)
Year Ended December 31, 2022	$ —	155,759	$ 19,470	$ 1,755,963	$ (49,868)	$ 725,729	$ 2,451,294
Net issuance of common stock under stock-based plans		848	106	13,371			13,477
Stock-based compensation expense				57,940			57,940
Repurchase of common stock		(3,909)	(489)			(400,040)	(400,529)
Cash dividends ($0.44 per share)						(67,927)	(67,927)
Settlements of convertible notes		1,072	133	(133)			—
Exercise of convertible notes hedge call options		(1,072)	(133)	133			—
Net income						448,752	448,752
Other comprehensive income					22,890		22,890
Year Ended December 31, 2023	$ —	152,698	$ 19,087	$ 1,827,274	$ (26,978)	$ 706,514	$ 2,525,897

The accompanying notes are an integral part of the consolidated financial statements.

TERADYNE, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2023	2022	2021
		(in thousands)	
Cash flows from operating activities:			
Net income	$ 448,752	$ 715,501	$ 1,014,589
Adjustments to reconcile net income from operations to net cash provided by operating activities:			
Depreciation	92,118	90,763	91,073
Stock-based compensation	57,682	48,228	45,643
Provision for excess and obsolete inventory	28,358	31,452	15,475
Amortization	18,768	19,912	34,412
Retirement plans actuarial losses (gains)	2,703	(25,584)	(2,217)
Deferred taxes	(37,642)	(38,693)	(17,305)
(Gains) losses on investments	(14,915)	9,985	(6,410)
Gains on sale of asset	—	(3,410)	—
Loss on convertible debt conversion	—	—	28,828
Contingent consideration fair value adjustment	—	—	(7,227)
Other	(955)	2,353	271
Changes in operating assets and liabilities, net of businesses acquired:			
Accounts receivable	70,977	50,628	(57,778)
Inventories	5,327	(80,809)	6,495
Prepayments and other assets	(43,101)	(140,713)	(175,846)
Accounts payable and other accrued expenses	46,782	(60,507)	129,499
Deferred revenue and customer advances	(57,210)	(6,233)	9,873
Retirement plan contributions	(5,492)	(5,116)	(5,405)
Income taxes	(26,921)	(29,834)	(5,604)
Net cash provided by operating activities	585,231	577,923	1,098,366
Cash flows from investing activities:			
Purchases of property, plant and equipment	(159,642)	(163,249)	(132,472)
Purchases of marketable securities	(161,906)	(287,409)	(661,781)
Proceeds from maturities of marketable securities	85,042	222,941	660,148
Proceeds from sales of marketable securities	61,401	268,058	266,466
Proceeds from insurance	460	—	—
Issuance of convertible loan	(5,000)	—	—
Proceeds from sale of asset	—	3,410	—
Purchase of investment and acquisition of business	—	—	(12,000)
Net cash (used for) provided by investing activities	(179,645)	43,751	120,361
Cash flows from financing activities:			
Repurchase of common stock	(397,241)	(752,082)	(600,000)
Dividend payments	(67,878)	(69,711)	(65,977)
Payments of convertible debt principal	(50,264)	(66,759)	(342,990)
Payments related to net settlement of employee stock compensation awards	(20,788)	(33,170)	(32,303)
Issuance of common stock under stock purchase and stock option plans	34,259	28,733	32,686
Net cash used for financing activities	(501,912)	(892,989)	(1,008,584)
Effects of exchange rate changes on cash and cash equivalents	(876)	3,889	(2,065)
(Decrease) increase in cash and cash equivalents	(97,202)	(267,426)	208,078
Cash and cash equivalents at beginning of year	854,773	1,122,199	914,121
Cash and cash equivalents at end of year	$ 757,571	$ 854,773	$ 1,122,199
Supplementary disclosure of cash flow information:			
Cash paid for:			
Interest	$ 296	$ 1,498	$ 4,236
Income taxes	$ 140,239	$ 193,246	$ 172,134
Non-cash investing activities:			
Capital expenditures incurred but not yet paid:	$ 2,735	$ 1,826	$ 1,973

The accompanying notes are an integral part of the consolidated financial statements.

A. THE COMPANY

Teradyne, Inc. ("Teradyne") is a leading global supplier of automated test equipment and robotics solutions. Teradyne designs, develops, manufactures and sells automated test systems and robotics products. Teradyne's automated test systems are used to test semiconductors, wireless products, data storage and complex electronics systems in many industries including consumer electronics, wireless, automotive, industrial, computing, communications, and aerospace and defense industries. Teradyne's robotics products include collaborative robotic arms, autonomous mobile robots, and advanced robotic control software used by global manufacturing, logistics and industrial customers to improve quality, increase manufacturing and material handling efficiency and decrease manufacturing and logistics costs. Teradyne's automated test equipment and robotics products and services include:

- semiconductor test ("Semiconductor Test") systems;
- storage and system level test ("Storage Test") systems, defense/aerospace ("Defense/Aerospace") test instrumentation and systems, and circuit-board test and inspection ("Production Board Test") systems (collectively these products represent "System Test");
- wireless test ("Wireless Test") systems; and
- robotics ("Robotics") products.

B. ACCOUNTING POLICIES

The consolidated financial statements include the accounts of Teradyne and its wholly owned subsidiaries. All significant intercompany balances and transactions are eliminated. Certain prior years' amounts were reclassified to conform to the current year presentation.

Preparation of Financial Statements and Use of Estimates

The preparation of consolidated financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent liabilities. On an on-going basis, management evaluates its estimates, including those related to inventories, investments, goodwill, intangible and other long-lived assets, accounts receivable, income taxes, deferred tax assets and liabilities, pensions, warranties, contingent consideration liabilities, and loss contingencies. Management bases its estimates on historical experience and on appropriate and customary assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Management 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 the date of issuance of this Annual Report on Form 10-K. These estimates may change, as new events occur and additional information is obtained. Actual results may differ significantly from these estimates under different assumptions or conditions.

Revenue Recognition

Revenue from Contracts with Customers

In accordance with ASC 606, Teradyne recognizes revenues, when or as control is transferred to a customer. Teradyne's determination of revenue is dependent upon a five-step process outlined below.

- Teradyne accounts for a contract with a customer when there is written approval, the contract is committed, the rights of the parties, including payment terms, are identified, the contract has commercial substance and consideration is probable of collection.
- Teradyne periodically enters into contracts with customers in which a customer may purchase a combination of goods and services, such as products with extended warranty obligations. Teradyne determines performance obligations by assessing whether the products or services are distinct from the other elements of the contract. In order to be distinct, the product or service must perform either on its own or with readily available resources and must be separate within the context of the contract.

- Teradyne determines the transaction price to be the amount of consideration to which Teradyne expects to be entitled to, which is generally at contractually stated prices.
- Transaction price is allocated to each individual performance obligation based on the standalone selling price of that performance obligation. Teradyne uses standalone transactions when available to value each performance obligation. If standalone transactions are not available, Teradyne will estimate the standalone selling price through market assessments or cost plus a reasonable margin analysis. Any discounts from standalone selling price are spread proportionally to each performance obligation.
- In order to determine the appropriate timing for revenue recognition, Teradyne first determines if the transaction meets any of three criteria for over time recognition. If the transaction meets the criteria for over time recognition, Teradyne recognizes revenue as the good or service is delivered. Teradyne uses input variables such as hours or months utilized or costs incurred to determine the amount of revenue to recognize in a given period. Input variables are used as they best align consumption with benefit to the customer. For transactions that do not meet the criteria for over time recognition, Teradyne will recognize revenue at a point in time based on an assessment of the five criteria for transfer of control. Teradyne has concluded that revenue should be recognized when shipped or delivered based on contractual terms. Typically, acceptance of Teradyne's products and services is a formality as Teradyne delivers similar systems, instruments and robots to standard specifications. In cases where acceptance is not deemed a formality, Teradyne will defer revenue recognition until customer acceptance.

Performance Obligations

Products

Teradyne products consist primarily of semiconductor test systems and instruments, defense/aerospace test instrumentation and systems, storage test systems and instruments, circuit-board test and inspection systems and instruments, wireless test systems and robotics products. Teradyne's hardware is typically recognized at a point in time upon transfer of control to the customer.

Services

Teradyne services consist of extended warranties, training and application support, service agreements, post contract customer support ("PCS") and replacement parts. Each service is recognized based on relative standalone selling price. Extended warranty, training and support, service agreements and PCS are recognized over time based on the period of service. Replacement parts are recognized at a point in time upon transfer of control to the customer.

Teradyne does not allow customer returns or provide refunds to customers for any products or services. Teradyne products include a standard 12-month warranty. This warranty is not considered a distinct performance obligation because it does not obligate Teradyne to provide a separate service to the customer and it cannot be purchased separately. Cost related to warranties are included in cost of revenues when product revenues are recognized.

As of December 31, 2023 and 2022, deferred revenue and customer advances consisted of the following and are included in the short and long-term deferred revenue and customer advances:

	2023	2022
	(in thousands)	
Maintenance, service and training	$ 66,458	$ 78,089
Customer advances, undelivered elements and other	35,731	59,147
Extended warranty	34,897	56,180
Total deferred revenue and customer advances	$ 137,086	$ 193,416

Product Warranty

Teradyne generally provides a one-year warranty on its products, commencing upon installation, acceptance or shipment. A provision is recorded upon revenue recognition to cost of revenues for estimated warranty expense based on historical experience. Related costs are charged to the warranty accrual as incurred. The balance below is included in other accrued liabilities:

	Amount (in thousands)
Balance at December 31, 2020	$ 16,633
Accruals for warranties issued during the period	35,727
Accruals related to pre-existing warranties	(6,846)
Settlements made during the period	(20,937)
Balance at December 31, 2021	24,577
Accruals for warranties issued during the period	21,851
Accruals related to pre-existing warranties	(5,618)
Settlements made during the period	(26,629)
Balance at December 31, 2022	14,181
Accruals for warranties issued during the period	21,644
Accruals related to pre-existing warranties	(1,576)
Settlements made during the period	(18,551)
Balance at December 31, 2023	$ 15,698

When Teradyne receives revenue for extended warranties, beyond one year, it is deferred and recognized on a straight-line basis over the contract period. Related costs are expensed as incurred. The balance below is included in short and long-term deferred revenue and customer advances:

	Amount (in thousands)
Balance at December 31, 2020	$ 51,929
Deferral of new extended warranty revenue	43,597
Recognition of extended warranty deferred revenue	(31,358)
Balance at December 31, 2021	64,168
Deferral of new extended warranty revenue	33,686
Recognition of extended warranty deferred revenue	(41,674)
Balance at December 31, 2022	56,180
Deferral of new extended warranty revenue	14,330
Recognition of extended warranty deferred revenue	(35,613)
Balance at December 31, 2023	$ 34,897

Accounts Receivable and Allowance for Credit Losses

Trade accounts receivable are recorded at the invoiced amount and do not bear interest. Teradyne maintains allowances for estimated losses resulting from the inability of its customers to make required payments. Estimated allowances for credit losses are reviewed periodically taking into account the customer's recent payment history, the customer's current financial statements and other information regarding the customer's creditworthiness. Account balances are written off against the allowance when it is determined the receivable will not be recovered.

Teradyne sells certain trade accounts receivables on a non-recourse basis to third-party financial institutions pursuant to factoring agreements. Teradyne accounts for these transactions as sales of receivables and presents cash proceeds as a cash provided by operating activities in the consolidated statements of cash flows. Total trade accounts receivable sold under the factoring agreements were $243.5 million and $93.9 million during 2023 and 2022, respectively. Factoring fees for the sales of receivables are recorded in interest expense and are not material.

Inventories

Inventories are stated at the lower of cost (first-in, first-out basis) or net realizable value. On a quarterly basis, Teradyne uses consistent methodologies to evaluate all inventories for net realizable value. Teradyne records a provision for both excess and obsolete inventory when such write-downs or write-offs are identified through the quarterly review process. The inventory valuation is based upon assumptions about future demand, product mix and possible alternative uses.

Investments

Teradyne accounts for its investments in debt and equity securities in accordance with the provisions of ASC 320-10, "*Investments—Debt and Equity Securities*." ASC 320-10 requires that certain debt and equity securities be classified into one of three categories; trading, available-for-sale or held-to-maturity securities. On a quarterly basis, Teradyne reviews its investments to identify and evaluate those that have an indication of a potential other-than-temporary impairment. Factors considered in determining whether a loss is other-than-temporary include:

- The length of time and the extent to which the market value has been less than cost;
- The financial condition and near-term prospects of the issuer; and
- The intent and ability to retain the investment in the issuer for a period of time sufficient to allow for any anticipated recovery in market value.

Teradyne uses the market and income approach techniques to value its financial instruments and there were no changes in valuation techniques during the twelve months ended December 31, 2023 and 2022.

Teradyne measures its debt and equity investments at fair value, in accordance with ASC 820-10, "*Fair Value Measurements and Disclosures.*" ASC 820-10 defines fair value as the price that would be received from the sale of an asset or paid to transfer a liability in an orderly transaction between market participants and requires that assets and liabilities carried at fair value be classified and disclosed in one of the following three categories:

Level 1: Quoted prices in active markets for identical assets as of the reporting date;

Level 2: Inputs other than Level 1, that are observable either directly or indirectly as of the reporting date. For example, a common approach for valuing fixed income securities is the use of matrix pricing. Matrix pricing is a mathematical technique used to value securities by relying on the securities' relationship to other benchmark quoted prices, and is considered a Level 2 input; or

Level 3: Unobservable inputs that are not supported by market data. Unobservable inputs are developed based on the best information available, which might include Teradyne's own data.

Teradyne's debt investments are classified as Level 2, and equity investments are classified as Level 1. Acquisition-related contingent consideration is classified as Level 3. Teradyne determines the fair value of acquisition-related contingent consideration using a Monte Carlo simulation model. Assumptions utilized in the model include forecasted revenues, revenue volatility, earnings before interest and taxes, and discount rate.

Financial Assets and Financial Liabilities

Teradyne records changes in fair value of equity securities directly in earnings and unrealized gains and losses in other (income) expense, net, in accordance with ASU 2016-01, "*Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities*."

Prepayments

Prepayments consist of the following:

	2023 [1]	2022
	(in thousands)	
Contract manufacturer and supplier prepayments	$ 502,257	$ 491,105
Prepaid maintenance and other services	17,592	14,545
Prepaid taxes	16,083	18,625
Other prepayments	13,038	8,687
Total prepayments	$ 548,970	$ 532,962

(1) Excludes $5.3 million of contract manufacturer and supplier prepayments, classified as assets held for sale. See Note E: "Assets held for sale" for additional information.

Retirement and Postretirement Plans

Teradyne recognizes net actuarial gains and losses and the change in the fair value of the plan assets in its operating results in the year in which they occur or upon any interim remeasurement of the plans. Teradyne calculates the expected return on plan assets using the fair value of the plan assets. Actuarial gains and losses are generally measured annually as of December 31 and, accordingly, recorded during the fourth quarter of each year or upon any interim remeasurement of the plans.

Teradyne reports net periodic pension cost and net periodic postretirement benefit costs in accordance with ASU 2017-07, "*Compensation—Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost*." The service cost component of net benefit costs is reported in the same line item in the consolidated statement of operations as other employee compensation costs. The non-service components of net benefit costs such as interest cost, expected return on assets, amortization of prior service cost, and actuarial gains or losses, are reported within other (income) expense, net.

Goodwill, Intangible and Long-Lived Assets

Teradyne accounts for goodwill and intangible assets in accordance with ASC 350-10, "*Intangibles-Goodwill and Other.*" Intangible assets are amortized over their estimated useful economic life and are carried at cost less accumulated amortization. Goodwill is assessed for impairment at least annually in the fourth quarter, as of December 31, on a reporting unit basis, or more frequently when events and circumstances occur indicating that the recorded goodwill may be impaired.

In accordance with ASC 350-10, Teradyne has the option to perform a qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If Teradyne determines this is the case, Teradyne is required to perform a quantitative goodwill impairment test to identify potential goodwill impairment and measure the amount of goodwill impairment loss to be recognized. If Teradyne determines that it is more likely than not that the fair value of the reporting unit is greater than its carrying amounts, a quantitative goodwill impairment test is not required.

In accordance with ASC 360-10, "*Impairment or Disposal of Long-Lived Assets,*" Teradyne reviews long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. Each impairment test is based on a comparison of the estimated undiscounted cash flows to the recorded value of the asset. If impairment is indicated, the asset is written down to its estimated fair value based on a discounted cash flows analysis. The cash flows estimates used to determine the impairment, if any, contain management's best estimates using appropriate assumptions and projections at that time.

Business Combination

Teradyne recognizes the tangible and intangible assets acquired and liabilities assumed based on their estimated fair values at the date of acquisition. The fair value of identifiable intangible assets is based on detailed cash flows valuations that use information and assumptions provided by management. Teradyne estimates the fair value of contingent consideration at the time of the acquisition using all pertinent information known to us at the time to assess the probability of payment of contingent amounts or through the use of a Monte Carlo simulation model. Teradyne allocates any excess purchase price over the fair value of the net tangible and intangible assets acquired and liabilities assumed to goodwill. The assumptions used in the valuations for our acquisitions may differ materially from actual results depending on performance of the acquired businesses and other factors. While Teradyne believes the assumptions used were appropriate, different assumptions in the valuation of assets acquired and liabilities assumed could have a material impact on the timing and extent of impact on our statements of operations. Goodwill is assigned to reporting units as of the date of the related acquisition.

Property, Plant and Equipment

Property, plant and equipment are stated at cost and depreciated over the estimated useful lives of the assets. Leasehold improvements and major renewals are capitalized and included in property, plant and equipment accounts, while expenditures for maintenance and repairs and minor renewals are charged to expense. When assets are retired, the assets and related accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in the consolidated statements of operations.

Teradyne provides for depreciation of its assets principally on the straight-line method with the cost of the assets being charged to expense over their useful lives as follows:

Buildings	40 years
Building improvements	5 to 10 years
Leasehold improvements	Lesser of lease term or 10 years
Furniture and fixtures	10 years
Test systems manufactured internally	6 years
Machinery, equipment and software	3 to 5 years

Test systems manufactured internally are used by Teradyne for customer evaluations and manufacturing and support of its customers. Teradyne depreciates the test systems manufactured internally over a six-year life to cost of revenues, engineering and development, and selling and administrative expenses. Teradyne often sells internally manufactured test equipment to customers. Upon the sale of an internally manufactured test system, the net book value of the system is transferred to inventory and expensed as cost of revenues. The net book value of internally manufactured test systems sold in the years ended December 31, 2023, 2022, and 2021 was $2.8 million, $6.6 million, and $16.6 million, respectively.

Convertible Debt

Teradyne adopted Accounting Standards Update ("ASU") ASU 2020-06 – "Debt—Debt with Conversion and Other Options and Derivatives and Hedging—Contracts in Entity's Own Equity," on January 1, 2022 using the modified retrospective method of adoption. As a result of adoption, Teradyne recorded an increase of $1.4 million to current debt for unsettled shares, an increase of $1.8 million to deferred tax assets, an increase of $6.6 million to long-term debt for unamortized debt discount, and an increase to retained earnings of $94.6 million for the reclassification of the equity component. Mezzanine equity representing unsettled shares value was reduced to zero and additional paid-in capital was reduced by $100.8 million. In accordance with ASU 2020-06, Teradyne accounts for a convertible debt instrument as a single liability measured at its amortized cost, as long as no other features require bifurcation and recognition as derivatives. Unsettled shares are recorded in current debt, and there is no recognition of a debt discount, which was previously amortized to interest expense. Settled shares reduce the outstanding debt balance in an amount equal to the cash paid, but do not result in any gain or loss on extinguishment. We use the if-converted method in the diluted EPS calculation for convertible instruments.

Leases

Under ASC 842, a contract is or contains a lease when Teradyne has the right to control the use of an identified asset. Teradyne determines if an arrangement is a lease at inception of the contract, which is the date on which the terms of the contract are agreed to and the agreement creates enforceable rights and obligations. The commencement date of the lease is the date that the lessor makes an underlying asset available for use by Teradyne. As of December 31, 2023, Teradyne does not have material leases that have not yet commenced.

Teradyne determines if the lease is an operating or finance lease at the lease commencement date based upon the terms of the lease and the nature of the asset. The lease term used to calculate the lease liability includes options to extend or terminate the lease when it is reasonably certain that the option will be exercised.

The lease liability is measured at the present value of future lease payments, discounted using the discount rate for the lease at the commencement date. As Teradyne is typically unable to determine the implicit rate, Teradyne uses an incremental borrowing rate based on the lease term and economic environment at commencement date. Teradyne initially measures payments based on an index by using the applicable rate at lease commencement. Variable payments that do not depend on an index are not included in the lease liability and are recognized as they are incurred. The right-of-use ("ROU") asset is initially measured as the amount of lease liability, adjusted for any initial lease costs, prepaid lease payments, and reduced by any lease incentives.

Teradyne's contracts often include non-lease components such as common area maintenance. Teradyne elected the practical expedient to account for the lease and non-lease components as a single lease component. For leases with a term of one year or less, Teradyne has elected not to record the lease asset or liability. The lease payments are recognized in the consolidated statement of earnings on a straight-line basis over the lease term. Teradyne includes lease costs within cost of revenues and operating expenses. See Note I: "Leases."

Engineering and Development Costs

Teradyne's products are highly technical in nature and require a large and continuing engineering and development effort. Software development costs incurred prior to the establishment of technological feasibility are charged to expense. Software development costs incurred subsequent to the establishment of technological feasibility are capitalized until the product is available for release to customers. To date, the period between achieving technological feasibility and general availability of the product has been short and software development costs eligible for capitalization have not been material. Engineering and development costs are expensed as incurred and consist primarily of salaries, contractor fees including non-recurring engineering charges related to product design, allocated facility costs, depreciation, and tooling costs.

Stock Compensation Plans and Employee Stock Purchase Plan

Stock-based compensation expense is based on the grant-date fair value estimated in accordance with the provisions of ASC 718-10, "*Compensation-Stock Compensation*." Teradyne elects to account for forfeitures by applying an estimated forfeiture rate and recognizes compensation costs only for those stock-based compensation awards expected to vest. Under its stock compensation plans, Teradyne has granted stock options, restricted stock units and performance-based restricted stock units, and employees are eligible to purchase Teradyne's common stock through its Employee Stock Purchase Plan ("ESPP").

Excess tax benefits or tax deficiencies are recognized as a discrete tax benefit or discrete tax expense to the current income tax provision in Teradyne's consolidated statements of operations, all excess tax benefits related to share-based payments are reported as cash flows from operating activities, and all cash payments made to taxing authorities on the employees' behalf for withheld shares are presented as financing activities on the statement of cash flows.

Income Taxes

Deferred tax assets and liabilities are determined based on differences between financial reporting and tax basis of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. The measurement of deferred tax assets is reduced by a valuation allowance if it is more likely than not that some or all of the deferred tax assets will not be realized. Teradyne performed the required assessment of positive and negative evidence regarding the realization of the net deferred tax assets in accordance with ASC 740, *"Accounting for Income Taxes."* This assessment included the evaluation of scheduled reversals of deferred tax liabilities, estimates of projected future taxable income and tax-planning strategies. Although realization is not assured, based on its assessment, Teradyne concluded that it is more likely than not that such assets, net of the existing valuation allowance, will be realized.

Advertising Costs

Teradyne expenses all advertising costs as incurred. Advertising costs were $15.5 million, $17.3 million and $13.4 million in 2023, 2022 and 2021, respectively.

Translation of Non-U.S. Currencies

The functional currency for all non-U.S. subsidiaries is the U.S. dollar, except for Universal Robots, MiR and Lemsys for which the local currency is its functional currency. All foreign currency denominated monetary assets and liabilities are remeasured on a monthly basis into the functional currency using exchange rates in effect at the end of the period. All foreign currency denominated non-monetary assets and liabilities are remeasured into the functional currency using historical exchange rates. Net foreign exchange gains and losses resulting from remeasurement are included in other (income) expense, net. For Universal Robots, MiR and Lemsys, assets and liabilities are translated into U.S. dollars using exchange rates in effect at the end of the period. Revenues and expense amounts are translated using an average of exchange rates in effect during the period. Translation adjustments are recorded within accumulated other comprehensive income (loss) on the balance sheet.

Net foreign exchange gains and losses resulting from remeasurement are included in other (income) expense, net. For the years ended December 31, 2023, 2022 and 2021, losses (gains) from the remeasurement of the monetary assets and liabilities denominated in foreign currencies were $10.9 million, $10.8 million, and $(2.1) million, respectively.

These amounts do not reflect the corresponding (gains) losses from foreign exchange contracts. See Note H: “Financial Instruments” regarding foreign exchange contracts.

Net Income per Common Share

Basic net income per common share is calculated by dividing net income by the weighted average number of common shares outstanding during the period. Except where the result would be anti-dilutive, diluted net income per common share is calculated by dividing net income by the sum of the weighted average number of common shares plus common stock equivalents, if applicable.

With respect to its convertible debt issued in 2016, Teradyne is required to settle the principal of the convertible debt in cash; accordingly, the principal amount is excluded from the determination of diluted earnings per share. As a result, Teradyne is accounting for the conversion spread using the treasury stock method.

Comprehensive Income

Comprehensive income includes net income, unrealized pension and postretirement prior service costs and benefits, unrealized gains and losses on investments in debt marketable securities, unrealized gains and losses on cash flow hedge and foreign currency translation adjustment.

C. RECENTLY ISSUED ACCOUNTING PRONOUNCEMENTS

In November 2023, the Financial Accounting Standards Board ("FASB") issued Accounting Standard Update ("ASU") No. 2023-07, *"Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures"*, which will require us to disclose significant segment expenses and other segment items used by the Chief Operating Decision Maker ("CODM") on an annual and interim basis as well as provide in interim periods all disclosures about a reportable segment’s profit or loss and assets that are currently required annually. Additionally, we will be required to disclose the title and position of the CODM. The new standard is effective for fiscal years beginning after December 15, 2023, and interim periods within fiscal years beginning after December 15, 2024, with early adoption permitted. This ASU will have no impact on Teradyne’s results of operations, cash flows or financial condition. Upon adoption, Teradyne will apply the amendments in this ASU retrospectively to all prior period disclosures presented in the financial statements.

In December 2023, FASB issued ASU 2023-09 –*“Income Taxes (Topic 740): Improvements to Income Tax Disclosures”*, which requires expanded disclosures relating to the tax rate reconciliation, income taxes paid, income (loss) before income tax expense (benefit) and income tax expense (benefit), requiring a greater disaggregation of information for each. The provisions of ASU 2023-09 are effective for fiscal years beginning after December 15, 2024. The amendments in this update should be applied on a prospective basis, but retrospective application is permitted. Teradyne is currently evaluating the impact of this new standard.

D. REVENUE

Disaggregation of Revenue

The following table provides information about disaggregated revenue by timing of revenue recognition, primary geographical market, and major product lines.

	Semiconductor Test			Robotics				
	System-on-a-chip	Memory	System Test	Universal Robots	Mobile Industrial Robots	Wireless Test	Corporate and Eliminations	Total
	(in thousands)							
For the Year Ended December 31, 2023 (1)								
Timing of Revenue Recognition								
Point in Time	$ 1,141,882	$ 356,417	$ 268,379	$ 296,252	$ 66,986	$ 129,399	$ —	$ 2,259,315
Over Time	290,739	29,598	69,818	7,540	4,405	14,883	—	416,983
Total	$ 1,432,621	$ 386,015	$ 338,197	$ 303,792	$ 71,391	$ 144,282	$ —	$ 2,676,298
Geographical Market								
Asia Pacific	$ 1,214,322	$ 366,151	$ 153,387	$ 63,312	$ 10,424	$ 85,415	$ —	$ 1,893,011
Americas	117,728	11,367	151,579	111,761	36,191	50,770	—	479,396
Europe, Middle East and Africa	100,571	8,497	33,231	128,719	24,776	8,097	—	303,891
Total	$ 1,432,621	$ 386,015	$ 338,197	$ 303,792	$ 71,391	$ 144,282	$ —	$ 2,676,298
For the Year Ended December 31, 2022 (1)								
Timing of Revenue Recognition								
Point in Time	$ 1,445,238	$ 344,693	$ 402,074	$ 317,514	$ 73,812	$ 189,040	$ 251	$ 2,772,622
Over Time	261,646	29,013	67,272	8,218	3,594	12,680	—	382,423
Total	$ 1,706,884	$ 373,706	$ 469,346	$ 325,732	$ 77,406	$ 201,720	$ 251	$ 3,155,045
Geographical Market								
Asia Pacific	$ 1,514,964	$ 360,176	$ 294,350	$ 73,930	$ 15,724	$ 140,767	$ —	$ 2,399,911
Americas	122,575	11,987	146,040	112,203	35,213	47,350	251	475,619
Europe, Middle East and Africa	69,345	1,543	28,956	139,599	26,469	13,603	—	279,515
Total	$ 1,706,884	$ 373,706	$ 469,346	$ 325,732	$ 77,406	$ 201,720	$ 251	$ 3,155,045
For the Year Ended December 31, 2021 (1)								
Timing of Revenue Recognition								
Point in Time	$ 1,989,979	$ 365,441	$ 409,383	$ 305,512	$ 60,884	$ 204,247	$ —	$ 3,335,446
Over Time	256,751	30,171	58,356	5,670	3,839	12,648	—	367,435
Total	$ 2,246,730	$ 395,612	$ 467,739	$ 311,182	$ 64,723	$ 216,895	$ —	$ 3,702,881
Geographical Market								
Asia Pacific	$ 2,076,647	$ 381,444	$ 306,812	$ 81,456	$ 12,919	$ 172,103	$ —	$ 3,031,381
Americas	102,702	10,665	135,230	94,897	26,069	36,173	—	405,736
Europe, Middle East and Africa	67,381	3,503	25,697	134,829	25,735	8,619	—	265,764
Total	$ 2,246,730	$ 395,612	$ 467,739	$ 311,182	$ 64,723	$ 216,895	$ —	$ 3,702,881

(1) Includes $5.2 million, $8.2 million and $13.2 million in 2023, 2022 and 2021, respectively, for leases of Teradyne's systems recognized outside of ASC 606: *"Revenue from Contracts with Customers."*

Contract Balances

For the years ended December 31, 2023, 2022 and 2021, Teradyne recognized $108.1 million, $112.4 million and $102.5 million, respectively, that was included within the deferred revenue and customer advances balances at the beginning of the period. This revenue primarily relates to undelivered hardware, extended warranties, training, application support, and post contract support. Each of these represents a distinct performance obligation. As of December 31, 2023, Teradyne had $1,124.6 million of unsatisfied performance obligations. Teradyne expects to recognize 90% of the remaining performance obligation in the next 12 months, 9% in 1-3 years, and 1% thereafter.

E. ASSETS HELD FOR SALE

On November 7, 2023, Teradyne entered into a definitive agreement to sell Teradyne's Device Interface Solutions ("DIS") business, a component of the Semiconductor Test segment, to Technoprobe S.p.A. for $85.0 million in cash. As a result, the related assets and liabilities met the criteria and were classified as held-for-sale in Teradyne's consolidated balance sheet as of December 31, 2023. The transaction, which does not qualify as a strategic shift required for discontinued operations treatment, is expected to close in the first half of 2024.

Assets held-for-sale comprise of the following as of December 31, 2023:

	December 31, 2023 (in thousands)
Current assets:	
Inventories, net	$ 17,952
Prepayments	5,298
Total current assets held for sale	23,250
Property, plant and equipment, net	8,986
Operating lease right-of-use assets, net	2,545
Total assets held for sale	$ 34,781
Current liabilities:	
Accounts payable	$ 6,356
Other accrued liabilities	552
Operating lease liabilities	471
Total current liabilities held for sale	7,379
Long-term operating lease liabilities	2,000
Total liabilities held for sale	$ 9,379
Net assets held for sale	$ 25,402

F. INVENTORIES

Inventories, net consisted of the following at December 31, 2023 and 2022:

	2023 [1]	2022
	(in thousands)	
Raw material	$ 258,422	$ 256,065
Work-in-process	26,851	37,982
Finished goods	24,701	30,972
	$ 309,974	$ 325,019

(1) Excludes $18.0 million of primarily work-in-process inventories, net classified as assets held for sale. See Note E: “Assets held for sale” for additional information.

G. PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment, net consisted of the following at December 31, 2023 and 2022:

	2023 [1]	2022
	(in thousands)	
Land	$ 19,487	$ 18,481
Buildings	127,705	128,991
Machinery, equipment and software	1,047,235	1,059,880
Furniture and fixtures	28,093	29,929
Leasehold improvements	66,777	64,631
Construction in progress	54,799	22,470
	1,344,096	1,324,382
Less: accumulated depreciation	898,604	905,699
	$ 445,492	$ 418,683

(1) Excludes $9.0 million of property, plant and equipment, net classified as assets held for sale. See Note E: “Assets held for sale” for additional information.

Depreciation of property, plant and equipment for the years ended December 31, 2023, 2022, and 2021 was $92.1 million, $90.8 million, and $91.1 million, respectively. As of December 31, 2023 and 2022, the gross book value included in machinery and equipment for internally manufactured test systems being leased by customers was $5.1 million and $5.8 million, respectively. As of December 31, 2023 and 2022, the accumulated depreciation on these test systems was $4.9 million and $5.6 million, respectively.

H. FINANCIAL INSTRUMENTS

Cash Equivalents

Teradyne considers all highly liquid investments with maturities of three months or less at the date of acquisition to be cash equivalents.

Marketable Securities

Teradyne's equity and debt mutual funds are classified as Level 1 and available-for-sale debt securities are classified as Level 2. Contingent consideration is classified as Level 3. The vast majority of Level 2 securities are fixed income securities priced by third party pricing vendors. These pricing vendors utilize the most recent observable market information in pricing these securities or, if specific prices are not available, use other observable inputs like market transactions involving identical or comparable securities.

During the years ended December 31, 2023 and 2022, there were no transfers in or out of Level 1, Level 2, or Level 3 financial instruments.

Realized gains recorded in 2023, 2022, and 2021 were $0.6 million, $0.8 million, and $3.1 million, respectively. Realized losses recorded in 2023 and 2022 were $0.3 million and $1.0 million, respectively. No realized losses were recorded in 2021. Realized gains and losses are included in other (income) expense, net.

Unrealized gains on equity securities recorded during the years ended December 31, 2023, 2022 and 2021 were $8.9 million, $1.9 million and $5.1 million, respectively. Unrealized losses on equity securities recorded during the years ended December 31, 2023, 2022, and 2021 were $1.7 million, $11.6 million and $1.8 million, respectively. Unrealized gains and losses on equity securities are included in other (income) expense, net. Unrealized gains and losses on available-for-sale debt securities are included in accumulated other comprehensive income (loss) on the balance sheet.

The cost of securities sold is based on average cost.

The following table sets forth by fair value hierarchy Teradyne's financial assets and liabilities that were measured at fair value on a recurring basis as of December 31, 2023 and 2022:

	December 31, 2023			
	Quoted Prices in Active Markets for Identical Instruments (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
	(in thousands)			
Assets				
Cash	$ 298,156	$ —	$ —	$ 298,156
Cash equivalents	453,298	6,117	—	459,415
Available for sale securities:				
Corporate debt securities	—	52,734	—	52,734
U.S. Treasury securities	—	41,808	—	41,808
Commercial paper	—	1,667	—	1,667
Debt mutual funds	8,773	—	—	8,773
U.S. government agency securities	—	4,892	—	4,892
Certificates of deposit and time deposits	—	21,772	—	21,772
Non-U.S. government securities	—	810	—	810
Equity securities:				
Mutual funds	47,132	—	—	47,132
Total	$ 807,359	$ 129,800	$ —	$ 937,159
Derivative assets	—	18,746	—	18,746
Total	$ 807,359	$ 148,546	$ —	$ 955,905
Liabilities				
Derivative liabilities	—	2,545	—	2,545
Total	$ —	$ 2,545	$ —	$ 2,545

Reported as follows:

	(Level 1)	(Level 2)	(Level 3)	Total
	(in thousands)			
Assets				
Cash and cash equivalents	$ 751,454	$ 6,117	$ —	$ 757,571
Marketable securities	—	62,154	—	62,154
Long-term marketable securities	55,905	61,529	—	117,434
Other current assets	—	18,746	—	18,746
Total	$ 807,359	$ 148,546	$ —	$ 955,905
Liabilities				
Other current liabilities	$ —	$ 2,545	$ —	$ 2,545
Total	$ —	$ 2,545	$ —	$ 2,545

	December 31, 2022			
	Quoted Prices in Active Markets for Identical Instruments (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
	(in thousands)			
Assets				
Cash	$ 632,417	$ —	$ —	$ 632,417
Cash equivalents	161,767	60,589	—	222,356
Available for sale securities:				
Corporate debt securities	—	50,856	—	50,856
U.S. Treasury securities	—	39,649	—	39,649
Commercial paper	—	7,159	—	7,159
Debt mutual funds	6,580	—	—	6,580
U.S. government agency securities	—	6,352	—	6,352
Certificates of deposit and time deposits	—	1,740	—	1,740
Non-U.S. government securities	—	535	—	535
Equity securities:				
Mutual funds	37,518	—	—	37,518
Total	$ 838,282	$ 166,880	$ —	$ 1,005,162
Derivative assets	—	86	—	86
Total	$ 838,282	$ 166,966	$ —	$ 1,005,248
Liabilities				
Derivative liabilities	—	4,215	—	4,215
Total	$ —	$ 4,215	$ —	$ 4,215

Reported as follows:

	(Level 1)	(Level 2)	(Level 3)	Total
	(in thousands)			
Assets				
Cash and cash equivalents	$ 794,184	$ 60,589	$ —	$ 854,773
Marketable securities	—	39,612	—	39,612
Long-term marketable securities	44,098	66,679	—	110,777
Other current assets	—	86	—	86
Total	$ 838,282	$ 166,966	$ —	$ 1,005,248
Liabilities				
Other current liabilities	$ —	$ 4,215	$ —	$ 4,215
Total	$ —	$ 4,215	$ —	$ 4,215

The carrying amounts and fair values of Teradyne's financial instruments at December 31, 2023 and 2022 were as follows:

	December 31, 2023		December 31, 2022	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(in thousands)			
Assets				
Cash and cash equivalents	$ 757,571	$ 757,571	$ 854,773	$ 854,773
Marketable securities	179,588	179,588	150,389	150,389
Derivative assets	18,746	18,746	86	86
Liabilities				
Derivative liabilities	2,545	2,545	4,215	4,215
Convertible debt (1)	—	—	50,115	139,007

(1) The carrying value represents the bifurcated debt component only, while the fair value is based on quoted market prices for the convertible note which includes the equity conversion features.

The fair values of accounts receivable, net and accounts payable approximate the carrying amount due to the short-term nature of these instruments.

The following tables summarize the composition of available-for-sale marketable securities at December 31, 2023 and 2022:

	December 31, 2023				
	Available-for-Sale				
	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
			(in thousands)		
Corporate debt securities	$ 56,458	$ 201	$ (3,925)	$ 52,734	$ 44,263
U.S. Treasury securities	45,725	14	(3,931)	41,808	35,080
Certificates of deposit and time deposits	21,772	—	—	21,772	—
Debt mutual funds	9,081	—	(308)	8,773	3,303
U.S. government agency securities	4,898	—	(6)	4,892	4,892
Commercial paper	1,633	34	—	1,667	—
Non-U.S. government securities	810	—	—	810	—
	$ 140,377	$ 249	$ (8,170)	$ 132,456	$ 87,538

Reported as follows:

	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
			(in thousands)		
Marketable securities	$ 62,385	$ 36	$ (267)	$ 62,154	$ 34,844
Long-term marketable securities	77,992	213	(7,903)	$ 70,302	52,694
	$ 140,377	$ 249	$ (8,170)	$ 132,456	$ 87,538

	December 31, 2022				
	Available-for-Sale				
	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
			(in thousands)		
Corporate debt securities	$ 57,006	$ 3	$ (6,153)	$ 50,856	$ 50,667
U.S. Treasury securities	44,030	—	(4,381)	39,649	39,649
Commercial paper	7,089	70	—	7,159	—
Debt mutual funds	6,997	—	(417)	6,580	3,095
U.S. government agency securities	6,442	—	(90)	6,352	6,352
Certificates of deposit and time deposits	1,740	—	—	1,740	—
Non-U.S. government securities	535	—	—	535	—
	$ 123,839	$ 73	$ (11,041)	$ 112,871	$ 99,763

Reported as follows:

	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
			(in thousands)		
Marketable securities	$ 39,950	$ 70	$ (408)	$ 39,612	$ 30,713
Long-term marketable securities	83,889	3	(10,633)	$ 73,259	69,050
	$ 123,839	$ 73	$ (11,041)	$ 112,871	$ 99,763

As of December 31, 2023, the fair market value of investments with unrealized losses less than one year and greater than one year totaled $22.3 million and $65.2 million, respectively.

As of December 31, 2022, the fair market value of investments with unrealized losses less than one year and greater than one year totaled $66.3 million and $33.4 million, respectively.

Teradyne reviews its investments to identify and evaluate investments that have an indication of possible impairment. Based on this review, Teradyne determined that the unrealized losses related to these investments at December 31, 2023 and 2022 were not other than temporary.

The contractual maturities of investments in available-for-sale marketable securities held at December 31, 2023 were as follows:

	Cost	Fair Value
	(in thousands)	
Due within one year	$ 62,385	$ 62,154
Due after 1 year through 5 years	23,703	23,319
Due after 5 years through 10 years	6,049	5,735
Due after 10 years	39,159	32,475
Total	$ 131,296	$ 123,683

Contractual maturities of investments in available-for-sale marketable securities held at December 31, 2023 exclude debt mutual funds with the fair market value of $8.8 million as they do not have a contractual maturity date.

Derivatives

Teradyne conducts business in various foreign countries, with certain transactions denominated in local currencies. As a result, Teradyne is exposed to risks relating to changes in foreign currency exchange rates. Teradyne's foreign currency risk management objective is to minimize the effect of exchange rate fluctuations associated with the remeasurement of monetary assets and liabilities denominated in foreign currencies, and changes in its cash inflows attributable to the forecasted cash flows from certain foreign currency denominated revenues.

To minimize the effect of exchange rate fluctuations associated with the remeasurement of monetary assets and liabilities denominated in foreign currencies, Teradyne enters into foreign currency forward contracts. The change in fair value of these derivatives is recorded directly in earnings and is used to offset the change in value of monetary assets and liabilities denominated in foreign currencies.

Teradyne also enters into foreign currency forward and option contracts designated as cash flow hedges to hedge the risk of changes in its cash inflows attributable to changes in foreign currency exchange rates. The cash flow hedges have maturities of less than six months and mature in the period of revenue recognition for certain products and services in backlog and forecasted to be recognized in a future period. Teradyne evaluates cash flow hedges for effectiveness at inception based on the critical terms match method. The hedges are not expected to incur any ineffectiveness however a quarterly qualitative assessment of effectiveness is done to determine if the critical terms match method remains appropriate to use. The change in fair value of the contracts is recorded in accumulated other comprehensive income (loss) and reclassified to earnings at maturity date.

Teradyne does not use derivative financial instruments for speculative purposes.

At December 31, 2023 and 2022, to hedge certain of its local currency balance sheet assets and liabilities, Teradyne had the following contracts to buy and sell non-U.S. currencies for U.S. dollars and other non-U.S. currencies with the following notional amounts:

	Net Notional Value	
	December 31, 2023	December 31, 2022
	(in millions)	
Currency Hedged (Buy/Sell)		
U.S. dollar/Taiwan dollar	$ 42.7	$ 29.2
U.S. dollar/Danish krone	36.0	—
U.S. dollar/Japanese yen	11.0	37.1
U.S. dollar/Korean won	7.2	6.4
U.S. dollar/British pound sterling	1.5	1.2
Euro/U.S. dollar	25.3	38.4
Singapore dollar/U.S. dollar	16.6	33.5
Philippine peso/U.S. dollar	10.1	2.7
Chinese yuan/U.S. dollar	1.0	2.2
Danish krone/U.S. dollar	0.7	—
Total	152.1	150.7

The change in the fair value of the outstanding contracts was a loss of $1.8 million and $0.9 million, respectively, at December 31, 2023 and 2022.

Unrealized gains and losses on foreign currency forward contracts and foreign currency remeasurement gains and losses on monetary assets and liabilities are included in other (income) expense, net.

At December 31, 2023 and 2022, Teradyne had the following cash flow hedge contracts to buy and sell non-U.S. currencies for U.S. dollars with the following notional amounts:

	Net Notional Value	
	December 31, 2023	December 31, 2022
	(in millions)	
Currency Hedged (Buy/Sell)		
U.S. dollar/Japanese yen	$ 35.5	$ 61.2
U.S. dollar/Taiwan dollar	—	10.9
Japanese yen/U.S. dollar	—	23.4
Taiwan dollar/U.S. dollar	—	5.5
Total	$ 35.5	$ 101.0

The change in the fair value of the outstanding cash flow hedge contracts was a gain of $0.6 million at December 31, 2023 and a loss of $3.2 million at December 31, 2022.

Unrealized gains and losses on foreign currency cash flow hedge contracts are included in accumulated other comprehensive income (loss). At maturity, the gains or losses associated with cash flow hedge contracts are recorded to revenue.

On November 7, 2023, in connection with our agreement to acquire 10% investment in Technoprobe S.p.A we purchased a call option to buy 481.0 million Euros. The expiration date of the option is April 26, 2024. At December 31, 2023, the fair value of the outstanding contract was $17.4 million and an unrealized gain of $7.5 million was recorded in other (income) expense, net.

The following table summarizes the fair value of derivative instruments as of December 31, 2023 and 2022:

	Balance Sheet Location	December 31, 2023	December 31, 2022
		(in thousands)	
Derivatives not designated as hedging instruments:			
Foreign exchange forward contracts	Other current assets	$ 733	$ 86
Foreign exchange option contracts	Other current assets	17,364	—
Foreign exchange forward contracts	Other current liabilities	(2,545)	(990)
Derivatives designated as hedging instruments:			
Foreign exchange forward contracts	Other current assets	648	—
Foreign exchange option contracts	Other current liabilities	—	(3,225)
Total derivatives		$ 16,200	$ (4,129)

The following table summarizes the effect of derivative instruments in the statements of operations recognized for the years ended December 31, 2023, 2022, and 2021:

	Location of (Gains) Losses Recognized in Statement of Operations	December 31, 2023	December 31, 2022	December 31, 2021
			(in thousands)	
Derivatives not designated as hedging instruments:				
Foreign exchange forward contracts (1)	Other (income) expense, net	$ (1,843)	$ (2,482)	$ 6,488
Foreign exchange option contracts	Other (income) expense, net	(7,464)	—	—
Derivatives designated as hedging instruments:				
Foreign exchange forward and option contracts	Revenue	(3,127)	(251)	—
Total derivatives		$ (12,434)	$ (2,733)	$ 6,488

(1) The table does not reflect the corresponding gains and losses from the remeasurement of the monetary assets and liabilities denominated in foreign currencies. For the years ended December 31, 2023, 2022 and 2021, net losses (gains) from remeasurement of monetary assets and liabilities denominated in foreign currencies were $10.9 million, $10.8 million, and $(2.1) million, respectively.

See Note J: “Debt” regarding derivatives related to the convertible senior notes.

Concentration of Credit Risk

Financial instruments which potentially subject Teradyne to concentrations of credit risk consist principally of cash equivalents, marketable securities, forward currency contracts and accounts receivable. Teradyne’s cash equivalents consist primarily of money market funds invested in U.S. Treasuries and government agencies. Teradyne’s fixed income available-for-sale marketable securities have a minimum rating of AA by one or more of the major credit rating agencies. Teradyne places foreign currency forward contracts with high credit-quality financial institutions in order to minimize credit risk exposure. Concentrations of credit risk with respect to accounts receivable are limited due to the large number of geographically dispersed customers. Teradyne performs ongoing credit evaluations of its customers’ financial condition and from time to time may require customers to provide a letter of credit from a bank to secure accounts receivable. As of December 31, 2023, one customer of our Semiconductor Test segment, Texas Instruments Inc., accounted for 18% of our accounts receivable balance. There were no customers who accounted for more than 10% of our accounts receivable balance as of December 31, 2022.

I. LEASES

Teradyne has facility and auto leases, which are accounted for as operating leases. Teradyne’s facility leases are primarily used for administrative functions, research and development, manufacturing, and storage and distribution. Remaining lease terms range from less than one year to twelve years.

For the years ended December 31, 2023, 2022 and 2021, total lease expense was $42.7 million, $40.1 million, and $39.2 million respectively, and included $15.5 million, $14.1 million, and $12.6 million, respectively, of variable lease costs and $1.3 million, $2.0 million, and $1.8 million, respectively, of costs related to short-term leases, which are not recorded on the consolidated balance sheets.

At December 31, 2023, the weighted average remaining lease term and weighted average discount rate for operating leases was 6.3 years and 5.2%, respectively. At December 31, 2022, the weighted average remaining lease term and weighted average discount rate for operating leases was 5.9 years and 4.7%, respectively.

Supplemental cash flows information related to leases was as follows:

	For the Years Ended		
	December 31, 2023	December 31, 2022	December 31, 2021
		(in thousands)	
Cash paid for amounts included in the measurement of lease liabilities included in operating cash flows:	$ 26,059	$ 20,775	$ 24,593
Right-of-use assets obtained in exchange for new lease obligations	17,987	26,149	34,246

Maturities of lease liabilities as of December 31, 2023 were as follows:

	Operating Lease (1)
	(in thousands)
2024	$ 21,045
2025	18,755
2026	15,074
2027	11,733
2028	7,622
Thereafter	23,906
Total lease payments	98,135
Less imputed interest	(15,521)
Total lease liabilities	$ 82,614

(1) Excludes $2.5 million of lease liabilities classified as liabilities held for sale. See Note E: "Assets held for sale" for additional information.

J. DEBT

Convertible Senior Notes

On December 12, 2016, Teradyne completed a private offering of $460.0 million aggregate principal amount of 1.25% convertible senior unsecured notes (the "Notes") and received net proceeds, after issuance costs, of approximately $450.8 million, $33.0 million of which was used to pay the net cost of the convertible note hedge transactions and $50.1 million of which was used to repurchase 2.0 million shares of Teradyne's common stock under its existing stock repurchase program from purchasers of the Notes in privately negotiated transactions effected through one of the initial purchasers or its affiliates conducted concurrently with the pricing of the Note offering. The Notes bore interest at a rate of 1.25% per year payable semiannually in arrears on June 15 and December 15 of each year. The notes matured on December 15, 2023. Substantially all of the Notes were converted as of December 15, 2023.

During 2023, twenty three debt holders elected to convert $50.2 million of debt principal. The conversion of the debt was settled in cash for principal amount and in shares for the excess of conversion value over principal amount. The 1.1 million shares issued to the debt holders were received from exercising the convertible notes hedge call options.

Concurrent with the offering of the Notes, Teradyne entered into convertible note hedge transactions (the "Note Hedge Transactions") with the initial purchasers or their affiliates (the "Option Counterparties"). The Note Hedge Transactions cover, subject to customary anti-dilution adjustments, the number of shares of the common stock that underlie the Notes.

Separately and concurrent with the pricing of the Notes, Teradyne entered into warrant transactions with the Option Counterparties (the "Warrant Transactions") in which it sold net-share-settled (or, at its election subject to certain conditions, cash-settled) warrants to the Option Counterparties. These transactions have been accounted for as an adjustment to our shareholders equity. The Warrant Transactions, which expire between March 18, 2024 and July 10, 2024, currently cover, subject to customary anti-dilution adjustments, approximately 14.7 million shares of common stock. As of December 31, 2023, the strike price of the warrants was approximately $39.40 per share. The strike price is subject to adjustment under certain circumstances. The Warrant Transactions could result in additional shares of Teradyne's common stock being issued to the extent that the market price per share of Teradyne's common stock, as measured under the terms of the Warrant Transactions, exceeds the applicable strike price of the warrants.

The net cost of the Note Hedge Transactions, after being partially offset by the proceeds from the sale of the warrants, was approximately $33.0 million.

In connection with establishing their initial hedge of these convertible note hedge and warrant transactions, the Option Counterparties have entered into various derivative transactions with respect to Teradyne's common stock and/or purchased shares of Teradyne's common stock or other securities, including the Notes, concurrent with, or shortly after, the pricing of the Notes. In addition, the Option Counterparties may modify their hedge positions by entering into or unwinding various derivative transactions with respect to Teradyne's common stock or by selling Teradyne's common stock or other securities, including the Notes, in secondary market transactions (and may do so during any observation period related to the conversion of the Notes). These activities could adversely affect the value of Teradyne's common stock and the Notes.

Originally, Teradyne allocated $100.8 million of the $460.0 million principal amount of the Notes to the equity component, which represented a discount to the debt and was amortized to interest expense using the effective interest method through December 2023. Effective January 1, 2022, Teradyne adopted ASC 2020-06 using the modified retrospective method of transition and accounts for the debt as a single liability measured at its amortized cost. As a result of the adoption, Teradyne recorded an increase of $1.4 million to current debt for unsettled shares, an increase of $1.8 million to deferred tax assets, an increase of $6.6 million to long-term debt for unamortized debt discount, and an increase to retained earnings of $94.6 million for the reclassification of the equity component. Mezzanine equity representing unsettled shares value was reduced to zero and additional paid-in capital was reduced by $100.8 million.

The below tables represent the key components of Teradyne's convertible senior notes:

	For the Years Ended December 31, 2023	December 31, 2022
	(in thousands)	
Debt principal	$ —	$ 50,228
Unamortized debt issuance fees	—	113
Net carrying amount of convertible debt	$ —	$ 50,115

	For the Years Ended December 31, 2023	December 31, 2022
	(in thousands)	
Contractual interest expense on the coupon	$ 312	$ 732
Amortization of the issuance fees recognized as interest expense	113	209
Total interest expense on the convertible debt	$ 425	$ 941

Revolving Credit Facility

On May 1, 2020, Teradyne entered into a credit agreement (the "Credit Agreement") with Truist Bank, as administrative agent and collateral agent, and the lenders party thereto. The Credit Agreement provides for a three-year, senior secured revolving credit facility of $400.0 million (the "Credit Facility").

On December 10, 2021, the Credit Agreement was amended to extend maturity date of the Credit Facility to December 10, 2026. On October 5, 2022, the Credit Agreement was amended to increase the amount of the Credit Facility to $750.0 million from $400.0 million.

The Credit Agreement provides that, subject to customary conditions, Teradyne may seek to obtain from existing or new lenders the available incremental amount under the Credit Facility, not to exceed the greater of $200.0 million or 15% of consolidated EBIDTA. The interest rate applicable to loans under the Credit Facility are, at Teradyne's option, equal to either a base rate plus a margin ranging from 0.00% to 0.75% per annum or SOFR plus a margin ranging from 1.10% to 1.85% per annum, based on the consolidated leverage ratio of Teradyne. In addition, Teradyne will pay a commitment fee on the unused portion of the commitments under the Credit Facility ranging from 0.15% to 0.25% per annum, based on the then applicable consolidated leverage ratio.

Teradyne is not required to repay any loans under the Credit Facility prior to maturity, subject to certain customary exceptions. Teradyne is permitted to prepay all or any portion of the loans under the Credit Facility prior to maturity without premium or penalty, other than customary SOFR breakage costs.

The Credit Agreement contains customary events of default, representations, warranties and affirmative and negative covenants that, among other things, limit Teradyne's ability to sell assets, grant liens on assets, incur other secured indebtedness and make certain investments and restricted payments, all subject to exceptions set forth in the Credit Agreement. The Credit Agreement also requires Teradyne to satisfy two financial ratios measured as of the end of each fiscal quarter; a consolidated leverage ratio and an interest coverage ratio.

The Credit Facility is guaranteed by certain of Teradyne's domestic subsidiaries and collateralized by assets of Teradyne and such subsidiaries, including a pledge of 65% of the capital stock of certain foreign subsidiaries.

As of February 22, 2024, the Credit Agreement was undrawn and Teradyne was in compliance with all covenants under the Credit Agreement.

K. ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

Changes in accumulated other comprehensive income (loss), which is presented net of tax, consist of the following:

	Foreign Currency Translation Adjustment	Unrealized Gains (Losses) on Marketable Securities	Unrealized (Losses) Gains on Cash Flow Hedges	Retirement Plans Prior Service Credit	Total
			(in thousands)		
Balance at December 31, 2021, net of tax of $0, $1,055, $0, $(1,128), respectively	$ (10,818)	$ 3,704	$ —	$ 1,166	$ (5,948)
Other comprehensive loss before reclassifications, net of tax of $0, $(3,388), $(708), $0, respectively	(29,031)	(12,666)	(2,517)	—	(44,214)
Amounts reclassified from accumulated other comprehensive income (loss), net of tax of $0, $25, $0, $(2), respectively	—	301	—	(7)	294
Net current period other comprehensive loss, net of tax of $0, $(3,363), $(708), $(2), respectively	(29,031)	(12,365)	(2,517)	(7)	(43,920)
Balance at December 31, 2022, net of tax of $0, $(2,308), $(708), $(1,130), respectively	$ (39,849)	$ (8,661)	$ (2,517)	$ 1,159	$ (49,868)
Other comprehensive gain before reclassifications, net of tax of $0, $568, $1,537, $0, respectively	17,407	2,423	5,464	—	25,294
Amounts reclassified from accumulated other comprehensive income (loss), net of tax of $0, $12, $(686), $(2), respectively	—	44	(2,441)	(7)	(2,404)
Net current period other comprehensive gain (loss), net of tax of $0 $580, $851, $(2), respectively	17,407	2,467	3,023	(7)	22,890
Balance at December 31, 2023, net of tax of $0, $(1,728), $143, $(1,132), respectively	$ (22,442)	$ (6,194)	$ 506	$ 1,152	$ (26,978)

Reclassifications out of accumulated other comprehensive income (loss) to the statements of operations for the years ended December 31, 2023, 2022, and 2021, were as follows:

Details about Accumulate Other Comprehensive Income (Loss) Components	For the years ended December 31, 2023	For the years ended December 31, 2022	For the years ended December 31, 2021	Affected Line Item in the Statements of Operations
	(in thousands)			
Available-for-sale marketable securities				
Unrealized (losses) gains, net of tax of $(12), $(25), $277, respectively	$ (44)	$ (301)	$ 995	Other (income) expense, net
Cash flow hedges:				
Unrealized gains, net of tax of $686, $0, $0, respectively	2,441	—	—	Revenue
Defined benefit pension and postretirement plans:				
Amortization of prior service benefit, net of tax of $2, $2, $2, respectively	7	7	7	(a)
Total reclassifications, net of tax of $676, $(23), $279, respectively	$ 2,404	$ (294)	$ 1,002	Net income

(a) The amortization of prior service credit is included in the computation of net periodic pension cost and postretirement benefit; see Note P: "Retirement Plans."

L. GOODWILL AND INTANGIBLE ASSETS

Goodwill

Teradyne performs its annual goodwill impairment test as required under the provisions of ASC 350-10, "*Intangibles—Goodwill and Other,*" on December 31 of each fiscal year unless interim indicators of impairment exist. Goodwill is considered to be impaired when the net book value of a reporting unit exceeds its estimated fair value.

Teradyne has the option to perform a qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If Teradyne determines this is the case, Teradyne is required to perform a quantitative goodwill impairment test to identify potential goodwill impairment and measure the amount of goodwill impairment loss to be recognized. If Teradyne determines that it is more likely than not that the fair value of the reporting unit is greater than its carrying amounts, the quantitative goodwill impairment test is not required. In performing the quantitative goodwill impairment test, Teradyne determines the fair value of a reporting unit using the results derived from an income approach and a market approach, weighting the fair value determined under each approach to determine an estimated fair value for a reporting unit. The income approach is estimated through the discounted cash flows ("DCF") analysis. Determining fair value requires the exercise of significant judgment, including judgments about appropriate discount rates, perpetual growth rates, and the amount and timing of expected future cash flows. Discount rates are based on a weighted average cost of capital ("WACC"), which represents the average rate a business must pay its providers of debt and equity, plus a risk premium. The WACC used to test goodwill is derived from a group of comparable companies. The cash flows employed in the DCF analysis are derived from internal forecasts and external market forecasts. The market approach estimates the fair value of the reporting unit by utilizing the market comparable method which is based on revenue and earnings multiples from comparable companies. If the estimated fair value of a reporting unit exceeds its carrying amount, goodwill of the reporting unit is not impaired. If the carrying amount of a reporting unit exceeds its estimated fair value, then the goodwill is written down by the amount that carrying value exceeds the fair value of the reporting unit, but not below zero.

In the fourth quarter of 2023, Teradyne performed the annual goodwill impairment test, completing a quantitative assessment for the Robotics reporting unit and a qualitative assessment for the Wireless Test and System Test reporting units. There was no impairment as a result of the annual test performed in the fourth quarter of 2023. Key assumptions in the goodwill valuation model are forecasted revenues, discount rate, earnings before interest and taxes, and revenue multiples from comparable companies. A change in any of these key assumptions could result in the reporting unit being impaired in a future period.

In the fourth quarter of 2022, Teradyne performed the annual goodwill impairment test, completing a quantitative assessment for the Robotics reporting unit and a qualitative assessment for the Wireless Test and System Test reporting units. There was no impairment as a result of the annual test performed in the fourth quarter of 2022. Key assumptions in the goodwill valuation model are forecasted revenues, discount rate, earnings before interest and taxes, and revenue multiples from comparable companies.

The changes in the carrying amount of goodwill by reportable segments for the years ended December 31, 2023 and 2022 are as follows:

	Robotics	Wireless Test	Semiconductor Test	System Test	Total
			(in thousands)		
Balance at December 31, 2021:					
Goodwill	$ 405,971	$ 361,819	$ 262,101	$ 158,699	$ 1,188,590
Accumulated impairment losses	—	(353,843)	(260,540)	(148,183)	(762,566)
	405,971	7,976	1,561	10,516	426,024
Foreign currency translation adjustment	(22,805)	—	(24)	—	(22,829)
Balance at December 31, 2022:					
Goodwill	383,166	361,819	262,077	158,699	1,165,761
Accumulated impairment losses	—	(353,843)	(260,540)	(148,183)	(762,566)
	383,166	7,976	1,537	10,516	403,195
Foreign currency translation adjustment	12,297	—	160	—	12,457
Balance at December 31, 2023:					
Goodwill	395,463	361,819	262,237	158,699	1,178,218
Accumulated impairment losses	—	(353,843)	(260,540)	(148,183)	(762,566)
	$ 395,463	$ 7,976	$ 1,697	$ 10,516	$ 415,652

Intangible Assets

Teradyne reviews long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate.

There were no events or circumstances indicating that the carrying value of intangible and long-lived assets may not be recoverable in 2023, 2022 and 2021.

Amortizable intangible assets consist of the following and are included in intangible assets, net on the balance sheets:

	December 31, 2023			
	Gross Carrying Amount (1)	Accumulated Amortization (1)	Foreign Currency Translation Adjustment	Net Carrying Amount
		(in thousands)		
Developed technology	$ 267,706	$ (243,191)	$ (5,343)	$ 19,172
Customer relationships	52,109	(47,850)	232	4,491
Tradenames and trademarks	59,007	(46,021)	(1,245)	11,741
Total intangible assets	$ 378,822	$ (337,062)	$ (6,356)	$ 35,404

	December 31, 2022			
	Gross Carrying Amount (1)	Accumulated Amortization (1)	Foreign Currency Translation Adjustment	Net Carrying Amount
		(in thousands)		
Developed technology	$ 270,967	$ (234,208)	$ (5,935)	$ 30,824
Customer relationships	57,739	(51,186)	172	6,725
Tradenames and trademarks	59,387	(41,930)	(1,528)	15,929
Total intangible assets	$ 388,093	$ (327,324)	$ (7,291)	$ 53,478

(1) In 2023 and 2022, $9.3 million and $1.6 million, respectively, of amortizable intangible assets became fully amortized and have been eliminated from the gross carrying amount and accumulated amortization.

Aggregate intangible assets amortization expense for the years ended December 31, 2023, 2022, and 2021, was $19.0 million, $19.3 million, and $21.5 million, respectively. Estimated intangible assets amortization expense for each of the five succeeding fiscal years is as follows:

Year	Amortization Expense (in thousands)
2024	$ 18,983
2025	11,402
2026	2,390
2027	1,173
2028	1,092
Thereafter	364

M. COMMITMENTS AND CONTINGENCIES

Purchase Commitments

As of December 31, 2023, Teradyne had entered into non-cancelable purchase commitments for certain components and materials. The purchase commitments covered by the agreements aggregate to approximately $414.4 million, of which $379.1 million is for less than one year.

Legal Claims

Teradyne is subject to various legal proceedings and claims which have arisen in the ordinary course of business such as, but not limited to, patent, employment, commercial and environmental matters. Teradyne believes that it has meritorious defenses against all pending claims and intends to vigorously contest them. While it is not possible to predict or determine the outcomes of any pending claims or to provide possible ranges of losses that may arise, Teradyne believes the potential losses associated with all of these actions are unlikely to have a material adverse effect on its business, financial position or results of operations.

On March 8, 2021, Industrial Automation LLC, sellers of AutoGuide, submitted a demand for arbitration against Teradyne and AutoGuide in Wilmington, Delaware alleging that Teradyne and AutoGuide breached certain provisions of the Membership Interests Purchase Agreement (the “Purchase Agreement”), dated as of October 18, 2019, among Industrial Automation LLC, Teradyne and AutoGuide. The arbitration demand sought full acceleration of the maximum earn-out amount payable under the Purchase Agreement, or $106.9 million, for the alleged breach of the earn-out provisions of the Purchase Agreement. On March 25, 2022, the arbitration claim was settled for $26.7 million. As a result, Teradyne has no remaining earn-out obligations.

Guarantees and Indemnification Obligations

Teradyne provides indemnification, to the extent permitted by law, to its officers, directors, employees and agents for liabilities arising from certain events or occurrences, while the officer, director, employee, or agent, is or was serving, at Teradyne’s request in such capacity. Teradyne may enter into indemnification agreements with certain of its officers and directors. With respect to acquisitions, Teradyne provides indemnifications to or assumes indemnification obligations for the current and former directors, officers and employees of the acquired companies in accordance with the acquired companies’ by-laws and charter. As a matter of practice, Teradyne has maintained directors’ and officers’ liability insurance coverage including coverage for directors and officers of acquired companies.

Teradyne enters into agreements in the ordinary course of business with customers, resellers, distributors, integrators and suppliers. Most of these agreements require Teradyne to defend and/or indemnify the other party against intellectual property infringement claims brought by a third party with respect to Teradyne’s products. From time to time, Teradyne also indemnifies customers and business partners for damages, losses and liabilities they may suffer or incur relating to personal injury, personal property damage, product liability, breach of confidentiality obligations and environmental claims relating to the use of Teradyne’s products and services or resulting from the acts or omissions of Teradyne, its employees, authorized agents or subcontractors. On occasion, Teradyne has also provided guarantees to customers regarding the delivery and performance of its products in addition to the warranty described below.

As a matter of ordinary course of business, Teradyne warrants that its products will substantially perform in accordance with its standard published specifications in effect at the time of delivery. Most warranties have a one-year duration commencing from installation. A provision is recorded upon revenue recognition to cost of revenues for estimated warranty expense based upon historical experience. When Teradyne receives revenue for extended warranties beyond the standard duration, the revenue is deferred

and recognized on a straight-line basis over the contract period. Related costs are expensed as incurred. As of December 31, 2023 and 2022, Teradyne had a product warranty accrual of $15.7 million and $14.2 million, respectively, included in other accrued liabilities, and revenue deferrals related to extended warranties of $34.9 million and $56.2 million, respectively, included in short and long-term deferred revenue and customer advances.

In addition, in the ordinary course of business, Teradyne provides minimum purchase guarantees to certain vendors to ensure continuity of supply against the market demand. Although some of these guarantees provide penalties for cancellations and/or modifications to the purchase commitments as the market demand decreases, most of the guarantees do not. Therefore, as the market demand decreases, Teradyne re-evaluates these guarantees and determines what charges, if any, should be recorded.

With respect to its agreements covering product, business or entity divestitures and acquisitions, Teradyne provides certain representations, warranties and covenants to purchasers and agrees to indemnify and hold such purchasers harmless against breaches of such representations, warranties and covenants. Many of the indemnification claims have a definite expiration date while some remain in force indefinitely. With respect to its acquisitions, Teradyne may, from time to time, assume the liability for certain events or occurrences that took place prior to the date of acquisition.

As a matter of ordinary course of business, Teradyne occasionally guarantees certain indebtedness obligations of its subsidiary companies, limited to the borrowings from financial institutions, purchase commitments to certain vendors, and lease commitments to landlords.

Based on historical experience and information known as of December 31, 2023, and 2022, except for product warranty, Teradyne has not recorded any liabilities for these guarantees and obligations because the amount would be immaterial.

N. NET INCOME PER COMMON SHARE

The following table sets forth the computation of basic and diluted net income per common share:

	2023	2022	2021
	(in thousands, except per share amounts)		
Net income for basic and diluted net income per share	$ 448,752	$ 715,501	$ 1,014,589
Weighted average common shares-basic	154,310	158,434	164,960
Effect of dilutive potential common shares:			
Convertible note hedge warrant shares (1)	8,897	8,806	9,956
Incremental shares from assumed conversion of convertible notes (2)	633	1,763	7,435
Restricted stock units	423	657	1,180
Stock options	34	52	86
Employee stock purchase rights	7	22	8
Dilutive potential common shares	9,994	11,300	18,665
Weighted average common shares-diluted	164,304	169,734	183,625
Net income per common share-basic	$ 2.91	$ 4.52	$ 6.15
Net income per common share-diluted	$ 2.73	$ 4.22	$ 5.53

(1) Convertible notes hedge warrant shares were calculated using the difference between the average Teradyne stock price for the period and the warrant price, multiplied by the number of warrant shares. The result of this calculation, representing the total intrinsic value of the warrant, was divided by the average Teradyne stock price for the period.

(2) Incremental shares from the assumed conversion of the convertible notes was calculated using the difference between the average Teradyne stock price for the period and the conversion price, multiplied by the number of convertible notes shares. The result of this calculation, representing the total intrinsic value of the convertible debt, was divided by the average Teradyne stock price for the period.

The computation of diluted net income per common share for 2023 excludes the effect of the potential exercise of stock options to purchase approximately 0.1 million shares and restricted stock units to purchase approximately 0.1 million shares because the effect would have been anti-dilutive. The computation of diluted net income per common share for 2022 excludes the effect of the potential exercise of stock options to purchase approximately 0.1 million shares and restricted stock units to purchase approximately 0.4 million shares because the effect would have been anti-dilutive.

O. RESTRUCTURING AND OTHER

During the year ended December 31, 2023, Teradyne recorded $14.7 million of severance charges related to headcount reductions of 215 people primarily in Semiconductor Test and Robotics, which included charges related to a voluntary early retirement program for employees meeting certain conditions, a $3.1 million of acquisition and divestiture expenses related to Technoprobe transaction, a $1.5 million contract termination charge, and a charge of $1.1 million for an increase in environmental liability.

During the year ended December 31, 2022, Teradyne recorded a charge of $14.7 million related to the arbitration claim filed against Teradyne and AutoGuide related to an earn-out dispute, which was settled on March 25, 2022 for $26.7 million, $2.9 million of severance charges primarily in Robotics, and a charge of $2.7 million for an increase in environmental and legal liabilities, partially offset by a $3.4 million gain on sale of asset.

During the year ended December 31, 2021, Teradyne recorded a charge of $12.0 million related to the arbitration claim filed against Teradyne and AutoGuide related to an earn-out dispute, $1.5 million of severance charges primarily in Robotics, $0.5 million of acquisition related compensation and expenses, and $2.5 million for other expenses, offset by a $7.2 million gain for the decrease in the fair value of the AutoGuide contingent consideration liability.

P. RETIREMENT PLANS

ASC 715, "*Compensation—Retirement Benefits,*" requires an employer with defined benefit plans or other postretirement benefit plans to recognize an asset or a liability on its balance sheet for the overfunded or underfunded status of the plans as defined by ASC 715. The pension asset or liability represents a difference between the fair value of the pension plan's assets and the projected benefit obligation at December 31. Teradyne uses a December 31 measurement date for all of its plans.

Defined Benefit Pension Plans

Teradyne has defined benefit pension plans covering a portion of domestic employees and employees of certain non-U.S. subsidiaries. Benefits under these plans are based on employees' years of service and compensation. Teradyne's funding policy is to make contributions to the plans in accordance with local laws and to the extent that such contributions are tax deductible. The assets of these plans consist primarily of fixed income and equity securities. In addition, Teradyne has an unfunded supplemental executive defined benefit plan in the United States to provide retirement benefits in excess of levels allowed by the Employment Retirement Income Security Act ("ERISA") and the Internal Revenue Code (the "IRC"), as well as unfunded qualified foreign plans.

In 2023, Teradyne's projected benefit obligations increased primarily due to actuarial losses of approximately $6.0 million across all pension plans from increases in discount rates, and approximately $1.0 million of losses from foreign exchange effects for foreign plans. In 2022, Teradyne's projected benefit obligations decreased primarily due to actuarial gains of approximately $59.1 million across all pension plans from increases in discount rates, and approximately $3.1 million gain from foreign exchange effects for foreign plans.

The December 31 balances of these defined benefit pension plans assets and obligations are shown below:

	2023		2022	
	United States	Foreign	United States	Foreign
	(in thousands)			
Assets and Obligations				
Change in benefit obligation:				
Projected benefit obligation:				
Beginning of year	$ 143,814	$ 29,935	$ 192,472	$ 45,774
Service cost	1,063	446	1,588	784
Interest cost	6,888	1,057	4,886	482
Actuarial loss (gain)	3,229	2,738	(45,932)	(13,181)
Benefits paid	(10,807)	(947)	(9,200)	(863)
Liability (gain) loss due to settlement	—	(254)	—	—
Non-U.S. currency movement	—	1,009	—	(3,061)
End of year	144,187	33,984	143,814	29,935
Change in plan assets:				
Fair value of plan assets:				
Beginning of year	111,760	2,087	149,578	2,017
Actual return on plan assets	8,613	43	(31,835)	153
Company contributions	3,051	1,028	3,217	949
Benefits paid	(10,807)	(947)	(9,200)	(863)
Settlements gain	—	(254)	—	—
Non-U.S. currency movement	—	(28)	—	(169)
End of year	112,617	1,929	111,760	2,087
Funded status	$ (31,570)	$ (32,055)	$ (32,054)	$ (27,848)

The following table provides amounts recorded within the account line items of the statements of financial position as of December 31:

	2023		2022	
	United States	Foreign	United States	Foreign
	(in thousands)			
Retirement plans assets	$ 11,504	$ —	$ 11,761	$ —
Accrued employees' compensation and withholdings	(3,110)	(1,255)	(3,055)	(1,191)
Retirement plans liabilities	(39,964)	(30,800)	(40,760)	(26,657)
Funded status	$ (31,570)	$ (32,055)	$ (32,054)	$ (27,848)

The accumulated benefit obligation for the United States defined benefit pension plans was $142.2 million and $140.6 million at December 31, 2023 and 2022, respectively. The accumulated benefit obligation for foreign defined benefit pension plans was $32.6 million and $28.6 million at December 31, 2023 and 2022, respectively.

Information for pension plans with an accumulated benefit obligation in excess of plan assets as of December 31:

	2023		2022	
	United States	Foreign	United States	Foreign
	(in millions)			
Projected benefit obligation	$ 43.1	$ 34.0	$ 43.8	$ 29.9
Accumulated benefit obligation	42.6	32.5	42.3	28.6
Fair value of plan assets	—	1.9	—	2.1

Expense

For the years ended December 31, 2023, 2022, and 2021, Teradyne's net periodic pension cost (income) was comprised of the following:

	2023		2022		2021	
	United States	Foreign	United States	Foreign	United States	Foreign
			(in thousands)			
Components of Net Periodic Pension Cost (Income):						
Service cost	$ 1,063	$ 446	$ 1,588	$ 784	$ 1,784	$ 941
Interest cost	6,888	1,057	4,886	482	4,427	337
Expected return on plan assets	(5,194)	(45)	(2,927)	(75)	(3,858)	(67)
Net actuarial loss (gain)	18	2,735	(11,170)	(13,259)	643	(2,223)
Settlement (gain) loss	(209)	5	—	—	(204)	—
Total net periodic pension cost (income)	$ 2,566	$ 4,198	$ (7,623)	$ (12,068)	$ 2,792	$ (1,012)

Weighted Average Assumptions to Determine Net Periodic Pension Cost at January 1:

	2023		2022		2021	
	United States	Foreign	United States	Foreign	United States	Foreign
Discount rate	3.5%	3.5%	2.5%	1.1%	2.2%	0.7%
Expected return on plan assets	4.8	1.8	2.0	4.0	2.4	3.5
Salary progression rate	2.4	2.1	2.4	2.2	2.4	2.3

Weighted Average Assumptions to Determine Pension Obligations at December 31:

	2023		2022	
	United States	Foreign	United States	Foreign
Discount rate	4.7%	3.0%	4.9%	3.5%
Salary progression rate	2.5	2.4	2.5	2.1

In developing the expected return on plan assets assumption, Teradyne evaluates input from its investment manager and pension consultants, including their forecast of asset class return expectations. Teradyne believes that 4.75% was an appropriate rate to use for fiscal year 2023 for the U.S. Qualified Pension Plan ("U.S. Plan").

Teradyne recognizes net actuarial gains and losses and the change in the fair value of the plan assets in its operating results in the year in which they occur or upon any interim remeasurement of the plans. Teradyne calculates the expected return on plan assets using the fair value of the plan assets. Actuarial gains and losses are generally measured annually as of December 31 and, accordingly, recorded during the fourth quarter of each year or upon any interim remeasurement of the plans.

The discount rate utilized to determine future pension obligations for the U.S. Plan is based on FTSE Pension Index adjusted for the plan's expected cash flows and was 4.7% at December 31, 2023, down from 4.9% at December 31, 2022.

Plan Assets

As of December 31, 2023, the fair value of Teradyne's pension plans' assets totaled $114.5 million, of which $112.6 million was related to the U.S. Plan and $1.9 million was related to the Taiwan defined benefit pension plan. Substantially all of Teradyne's pension plans' assets are held in individual trusts, which were established for the investment of assets of Teradyne's sponsored retirement plans.

The following table provides weighted average pension asset allocation by asset category at December 31, 2023 and 2022:

	2023		2022	
	United States	Foreign	United States	Foreign
Fixed income securities	94.0%	—%	94.0%	—%
Equity securities	5.0	—	5.0	—
Other	1.0	100.0	1.0	100.0
	100.0%	100.0%	100.0%	100.0%

The assets of the U.S. Plan are overseen by the Teradyne Fiduciary Committee which is comprised of members of senior management drawn from appropriate diversified levels of the management team. The Fiduciary Committee is responsible for setting the policy that provides the framework for management of the U.S. Plan assets. In accordance with its responsibilities, the Fiduciary Committee meets on a regular basis to review the performance of the U.S. Plan assets and compliance with the investment policy. The policy sets forth an investment structure for managing U.S. Plan assets, including setting the asset allocation ranges, which are expected to provide an appropriate level of overall diversification required to maximize the long-term return on plan assets for a prudent and reasonable level of risk given prevailing market conditions, total investment return over the long term, and preservation of capital, while maintaining sufficient liquidity to pay the benefits of the U.S. Plan. The investment portfolio will not, at any time, have a direct investment in Teradyne stock. It may have indirect investment in Teradyne stock, if one of the funds selected by the investment manager invests in Teradyne stock. In developing the asset allocation ranges, third party asset allocation studies are periodically performed that consider the current and expected positions of the plan assets and funded status. Based on this study and other appropriate information, the Fiduciary Committee establishes asset allocation ranges taking into account acceptable risk targets and associated returns. The investment return objectives are to avoid excessive volatility and produce a rate of return that at least matches the Policy Index identified below. The manager's investment performance is reviewed at least annually. Results for the total portfolio and for each major category of assets are evaluated in comparison with appropriate market indices and the Policy Index.

The target asset allocation and the index for each asset category for the U.S. Plan, per the investment policy, are as follows:

Asset Category:	Policy Index:	Target Allocation
U.S. corporate fixed income	Bloomberg U.S. Corporate A or Better Index, 20+ Year Index	43%
U.S. corporate fixed income	Bloomberg U.S. Corporate A or Better Index, 5- 20 Year Index	32
U.S. government fixed income	Bloomberg U.S. 3 - 10 year Treasury Bond Index	14
Global equity	MSCI World Index	5
High yield fixed income	ICE BofA BB-B U.S. High Yield Constrained Index	5
Cash	ICE BofA 3-Month Treasury Bill Index	1

Teradyne's U.S. Plan invests primarily in common trust funds. Units held in the common trust funds are valued at the unit price as reported by the investment manager based on the asset value of the underlying investments; underlying investments in equity securities are valued at the last reported sales price, and underlying investments in fixed-income securities are generally valued using methods based upon market transactions for comparable securities.

During the years ended December 31, 2023 and December 31, 2022, there were no transfers of pension assets in or out of Level 1, Level 2, and Level 3.

The fair value of pension plan assets by asset category and by level at December 31, 2023 and December 31, 2022 were as follows:

	December 31, 2023							
	United States				Foreign			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
	(in thousands)							
Fixed income securities:								
Corporate debt securities	$ —	$ 89,971	$ —	$ 89,971	$ —	$ —	$ —	$ —
U.S. government securities	—	15,817	—	15,817	—	—	—	—
Global equity	—	5,691	—	5,691	—	—	—	—
Other	—	—	—	—	—	1,929	—	1,929
Cash and cash equivalents	1,138	—	—	1,138	—	—	—	—
Total	$ 1,138	$ 111,479	$ —	$ 112,617	$ —	$ 1,929	$ —	$ 1,929

	December 31, 2022							
	United States				Foreign			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
	(in thousands)							
Fixed income securities:								
Corporate debt securities	$ —	$ 89,403	$ —	$ 89,403	$ —	$ —	$ —	$ —
U.S. government securities	—	15,631	—	15,631	—	—	—	—
Global equity	—	5,579	—	5,579	—	—	—	—
Other	—	—	—	—	—	2,087	—	2,087
Cash and cash equivalents	1,147	—	—	1,147	—	—	—	—
Total	$ 1,147	$ 110,613	$ —	$ 111,760	$ —	$ 2,087	$ —	$ 2,087

Contributions

Teradyne's funding policy is to make contributions to the plans in accordance with local laws and to the extent that such contributions are tax deductible. During 2023, Teradyne contributed $3.1 million to the U.S. supplemental executive defined benefit pension plan and $1.0 million to certain qualified plans for non-U.S. subsidiaries. During 2022, Teradyne contributed $3.2 million to the U.S. supplemental executive defined benefit pension plan and $0.9 million to certain qualified plans for non-U.S. subsidiaries. In 2024, contributions to the U.S. supplemental executive defined benefit pension plan and certain qualified plans from non-U.S. subsidiaries will be approximately $3.1 million and $1.4 million, respectively.

Contributions to the U.S. supplemental executive defined benefit pension plan and certain non-U.S. subsidiaries qualified plans will be approximately $6.6 million and $2.3 million, respectively, in 1 to 3 years, $7.1 million and $2.5 million, respectively, in 3 to 5 years and $16.9 million and $7.9 million, respectively, thereafter.

Expected Future Pension Benefit Payments

Future benefit payments are expected to be paid as follows:

	United States	Foreign
	(in thousands)	
2024	$ 10,210	$ 1,312
2025	9,720	1,068
2026	9,863	1,191
2027	10,792	1,301
2028	10,795	1,238
2029-2032	51,857	8,832

Postretirement Benefit Plans

In addition to receiving pension benefits, U.S. Teradyne employees who meet early retirement eligibility requirements as of their termination dates may participate in Teradyne's Welfare Plan, which includes medical and dental benefits up to age 65. Death benefits provide a fixed sum to retirees' survivors and are available to all retirees. Substantially all of Teradyne's current U.S. employees could become eligible for these benefits, and the existing benefit obligation relates primarily to those employees. During the twelve months ended December 31, 2023, Teradyne recorded special termination benefit charges associated with a voluntary early retirement program.

The December 31 balances of the postretirement assets and obligations are shown below:

	2023	2022
	(in thousands)	
Assets and Obligations		
Change in benefit obligation:		
Projected benefit obligation:		
Beginning of year	$ 5,345	$ 7,210
Service cost	34	64
Interest cost	299	177
Actuarial loss (gain)	155	(1,155)
Benefits paid	(1,413)	(950)
Special termination benefits	2,513	—
End of year	6,933	5,345
Change in plan assets:		
Fair value of plan assets:		
Beginning of year	—	—
Company contributions	1,413	950
Benefits paid	(1,413)	(950)
End of year	—	—
Funded status	$ (6,933)	$ (5,345)

The following table provides amounts recorded within the account line items of financial position as of December 31:

	2023	2022
	(in thousands)	
Accrued employees' compensation and withholdings	$ (1,508)	$ (853)
Retirement plans liabilities	(5,425)	(4,492)
Funded status	$ (6,933)	$ (5,345)

The following table provides amounts recognized in accumulated other comprehensive income (loss) as of December 31:

	2023	2022
	(in thousands)	
Prior service credit, before tax	$ (23)	$ (31)
Deferred taxes	(1,691)	(1,689)
Total recognized in other comprehensive income (loss), net of tax	$ (1,714)	$ (1,720)

Expense

For the years ended December 31, 2023, 2022, and 2021, Teradyne's net periodic postretirement benefit cost (income) was comprised of the following:

	2023	2022	2021
		(in thousands)	
Components of Net Periodic Postretirement Benefit Cost (income):			
Service cost	$ 34	$ 64	$ 64
Interest cost	299	177	170
Amortization of prior service credit	(9)	(9)	(9)
Net actuarial loss (gain)	155	(1,155)	(433)
Special termination benefits	2,513	—	—
Total net periodic postretirement benefit cost (income)	2,992	(923)	(208)
Changes in Plan Assets and Benefit Obligations Recognized in Other Comprehensive Income:			
Reversal of amortization items:			
Prior service credit	9	9	9
Total recognized in other comprehensive income	9	9	9
Total recognized in net periodic postretirement cost (income) and other comprehensive income	$ 3,001	$ (914)	$ (199)

Weighted Average Assumptions to Determine Net Periodic Postretirement Benefit Income as of January 1:

	2023	2022	2021
Discount rate	5.0%	2.6%	2.2%
Initial health care cost trend rate	7.2	7.3	7.3
Ultimate health care cost trend rate	4.5	4.5	4.5
Year in which ultimate health care cost trend rate is reached	2032	2029	2029

Weighted Average Assumptions to Determine Postretirement Benefit Obligation as of December 31:

	2023	2022	2021
Discount rate	4.7%	5.0%	2.6%
Initial health care trend	7.7	7.2	7.3
Ultimate health care trend	4.5	4.5	4.5
Medical cost trend rate decrease to ultimate rate in year	2033	2032	2029

Contributions

Contributions to the U.S. postretirement benefit plan will be approximately $1.5 million in 2024, $1.6 million in 1 to 3 years, $1.2 million in 3 to 5 years and $2.0 million, thereafter.

Expected Future Benefit Payments

Future benefit payments are expected to be paid as follows:

	Benefit Payments (in thousands)
2024	$ 1,508
2025	924
2026	701
2027	637
2028	568
2029-2032	2,004

Q. STOCK-BASED COMPENSATION

Stock Compensation Plans

On February 1, 2023 (the "Retirement Date"), Mark E. Jagiela retired as Chief Executive Officer of Teradyne and a member of Teradyne's Board of Directors, and Teradyne entered into an agreement (the "Retirement Agreement") with Mr. Jagiela. Under the Retirement Agreement, Mr. Jagiela's unvested time-based restricted stock units and stock options granted prior to his Retirement Date were modified to allow continued vesting; and any vested options or options that vest during that period may be exercised for the remainder of the applicable option term. During 2023, Teradyne recorded a stock-based compensation expense of $5.9 million related to the Retirement Agreement.

Under Teradyne's stock compensation plans, Teradyne grants time-based restricted stock units, performance-based restricted stock units, and stock options, and employees are eligible to purchase Teradyne's common stock through its Employee Stock Purchase Plan ("ESPP").

Service-based restricted stock unit awards granted to employees vest in equal annual installments over four years. Restricted stock unit awards granted to non-employee directors vest after a one-year period, with 100% of the award vesting on the earlier of (a) the first anniversary of the grant date or (b) the date of the following year's Annual Meeting of Shareholders. Teradyne expenses the cost of the restricted stock unit awards subject to time-based vesting, which is determined to be the fair market value of the shares at the date of grant, ratably over the period during which the restrictions lapse.

Performance-based restricted stock units ("PRSUs") granted to Teradyne's executive officers may have a performance metric based on relative total shareholder return ("TSR"). Teradyne's three-year TSR performance is measured against the New York Stock Exchange ("NYSE") Composite Index. The final number of TSR PRSUs that vest will vary based upon the level of performance achieved from 0% to 200% of the target shares. The TSR PRSUs will vest upon the three-year anniversary of the grant date. The TSR PRSUs are valued using a Monte Carlo simulation model. The number of units expected to be earned, based upon the achievement of the TSR market condition, is factored into the grant date Monte Carlo valuation. Compensation expense is recognized on a straight-line basis over the shorter of the three-year service period or the period from the grant to the date described in the retirement provisions below. Compensation expense for executive officers meeting the retirement provisions prior to the grant date is recognized during the year following the grant. Compensation expense is recognized regardless of the eventual number of units that are earned based upon the market condition, provided the executive officer remains an employee at the end of the three-year period. Compensation expense is reversed if at any time during the three-year service period the executive officer is no longer an employee, subject to the retirement and termination eligibility provisions noted below.

PRSUs granted to Teradyne's executive officers may also have a performance metric based on three-year cumulative non-GAAP profit before interest and tax ("PBIT") as a percent of Teradyne's revenue. Non-GAAP PBIT is a financial measure equal to GAAP income from operations less restructuring and other, net; amortization of acquired intangible assets; acquisition and divestiture related charges or credits; pension actuarial gains and losses; non-cash convertible debt interest expense; and other non-recurring gains and charges. The final number of PBIT PRSUs that vest will vary based upon the level of performance achieved from 0% to 200% of the target shares. The PBIT PRSUs will vest upon the three-year anniversary of the grant date. Compensation expense is recognized on a straight-line basis over the shorter of the three-year service period or the period from the grant date to the date described in the retirement provisions below. Compensation expense for executive officers meeting the retirement provisions prior to the grant date is recognized during the year following the grant. Compensation expense is recognized based on the number of units that are earned based upon the three-year Teradyne PBIT as a percent of Teradyne's revenue, provided the executive officer remains an employee at the end of the three-year period subject to the retirement and termination eligibility provisions noted below.

If a PRSU recipient's employment ends prior to the determination of the performance percentage due to (1) permanent disability or death or (2) retirement or termination other than for cause, after attaining both at least age sixty and at least ten years of service, then all or a portion of the recipient's PRSUs (based on the actual performance percentage achieved on the determination date) will vest on the date the performance percentage is determined. Except as set forth in the preceding sentence, no PRSUs will vest if the executive officer is no longer an employee at the end of the three-year period. Stock options to purchase Teradyne's common stock at 100% of the fair market value on the grant date vest in equal annual installments over four years from the grant date and have a maximum term of seven years.

During 2023, 2022 and 2021, Teradyne granted 0.5 million, 0.4 million and 0.3 million of service-based restricted stock unit awards to employees at a weighted average grant date fair value of $102.45, $109.42, and $114.16, respectively.

During 2023, 2022 and 2021, Teradyne granted 0.1 million of service-based restricted stock unit awards to non-employee directors at a weighted average grant date fair value of $90.50, $105.93, and $128.70, respectively.

During 2023, 2022 and 2021, Teradyne granted 0.1 million of PBIT PRSUs with a grant date fair value of $102.91, $110.84 and $113.65, respectively.

During 2023, 2022 and 2021, Teradyne granted 0.1 million TSR PRSUs, with a grant date fair value of $139.04, $101.06, and $125.02, respectively. The fair value was estimated using the Monte Carlo simulation model with the following assumptions:

	2023	2022	2021
Risk-free interest rate	4.0%	1.4%	0.2%
Teradyne volatility-historical	49.7%	47.1%	43.9%
NYSE Composite Index volatility-historical	24.1%	22.7%	22.9%
Dividend yield	0.4%	0.4%	0.4%

Expected volatility was based on the historical volatility of Teradyne's stock and the NYSE Composite Index for each of the 2023, 2022 and 2021 grants over the most recent three-year period. The risk-free interest rate was determined using the U.S. Treasury yield curve in effect at the time of each of the grants. Dividend yield was based upon an estimated annual dividend amount of $0.44 per share for 2023, $0.44 per share for 2022, and $0.40 per share for 2021, divided by Teradyne's stock price on the grant date of $104.12 for the 2023 grants, $112.12 for the 2022 grants, and $113.48 for the 2021 grants.

During 2023, 2022 and 2021, Teradyne granted 0.1 million of service-based stock options to executive officers at a weighted average grant date fair value of $41.23, $39.01, and $36.60, respectively.

The fair value of stock options was estimated using the Black-Scholes option-pricing model with the following assumptions:

	2023	2022	2021
Expected life (years)	4.0	4.0	5.0
Risk-free interest rate	3.8%	1.6%	0.4%
Volatility-historical	46.6%	43.7%	37.8%
Dividend yield	0.4%	0.4%	0.4%

Teradyne determined the stock options' expected life based upon historical exercise data for executive officers, the age of the executive officers and the terms of the stock option grant. Volatility was determined using historical volatility for a period equal to the expected life. The risk-free interest rate was determined using the U.S. Treasury yield curve in effect at the time of grant. Dividend yield was based upon an estimated annual dividend amount of $0.44 per share divided by Teradyne's stock on the grant date of $104.15 for the 2023 grant, and $112.12 for the 2022 grant, and $0.40 per share divided by Teradyne's stock price on the grant date of $113.48 for the 2021 grants.

Stock compensation plan activity for the years 2023, 2022 and 2021, is as follows:

	2023	2022	2021
		(in thousands)	
Restricted Stock Units:			
Non-vested at January 1	1,317	1,417	1,789
Awarded	728	660	447
Vested	(609)	(709)	(749)
Forfeited	(58)	(51)	(70)
Non-vested at December 31	1,378	1,317	1,417
Stock Options:			
Outstanding at January 1	188	171	216
Granted	41	42	34
Exercised	(56)	(25)	(78)
Forfeited	(2)	—	(1)
Expired	—	—	—
Outstanding at December 31	171	188	171
Vested and expected to vest at December 31	171	188	171
Exercisable at December 31	68	69	30

Total shares available for the years 2023, 2022 and 2021:

	2023	2022	2021
		(in thousands)	
Shares available:			
Available for grant at January 1	5,062	5,713	6,123
Options granted	(41)	(42)	(34)
Options forfeited	2	—	1
Restricted stock units awarded	(728)	(660)	(447)
Restricted stock units forfeited	58	51	70
Available for grant at December 31	4,353	5,062	5,713

Weighted average restricted stock unit award date fair value information for the years 2023, 2022 and 2021, is as follows:

	2023	2022	2021
Non-vested at January 1	$ 88.71	$ 67.97	$ 47.84
Awarded	105.05	108.74	115.51
Vested	75.55	54.27	43.99
Forfeited	102.12	85.71	65.52
Non-vested at December 31	$ 101.00	$ 88.71	$ 67.97

Restricted stock unit awards aggregate intrinsic value information at December 31 for the years 2023, 2022 and 2021 is as follows:

	2023	2022	2021
		(in thousands)	
Vested	$ 62,001	$ 95,408	$ 101,679
Outstanding	149,504	115,087	231,763
Expected to vest	135,238	108,666	231,246

Restricted stock units weighted average remaining contractual terms (in years) information at December 31 for the years 2023, 2022 and 2021 is as follows:

	2023	2022	2021
Outstanding	1.13	0.99	0.89
Expected to vest	1.13	0.99	0.89

Weighted average stock options exercise price information for the year ended December 31, 2023 is as follows:

	2023
Outstanding at January 1	$ 76.52
Options granted	104.15
Options exercised	39.71
Options forfeited	112.57
Options cancelled	113.03
Outstanding at December 31	94.85
Exercisable at December 31	81.53

The total cash received from employees as a result of employee stock options exercised during the years ended December 31, 2023, 2022 and 2021, was $2.2 million, $0.9 million, and $3.1 million, respectively. In connection with these exercises, the tax benefit realized by Teradyne for the years ended December 31, 2023, 2022 and 2021, was $0.2 million, $0.1 million, and $0.4 million, respectively.

Stock option aggregate intrinsic value information for the years ended December 31, 2023, 2022 and 2021 is as follows:

	2023	2022	2021
		(in thousands)	
Exercised	$ 3,901	$ 2,030	$ 6,345
Outstanding	2,647	3,963	17,356
Expected to vest	696	1,583	13,500
Vested and exercisable	1,950	2,380	3,856

Stock options weighted average remaining contractual terms (in years) information at December 31, for the years 2023, 2022 and 2021 is as follows:

	2023	2022	2021
Outstanding	4.4	4.2	4.4
Expected to vest	5.1	4.8	4.8
Vested and exercisable	3.4	3.1	2.5

As of December 31, 2023, total unrecognized expense related to non-vested restricted stock unit awards and stock options was $73.7 million and is expected to be recognized over a weighted average period of 2.5 years.

Employee Stock Purchase Plan

Under the ESPP, eligible employees may purchase shares of common stock through regular payroll deductions of up to 10% of their compensation, to a maximum of shares with a fair market value of $25,000 per calendar year, not to exceed 6,000 shares. Under the plan, the price paid for the common stock is equal to 85% of the stock price on the last business day of the six-month purchase period.

In July 2023, 0.2 million shares of common stock were issued to employees who participated in the plan during the first half of 2023 at the price of $94.64 per share. In January 2024, Teradyne issued 0.2 million shares of common stock to employees who participated in the plan during the second half of 2023 at the price of $92.25 per share.

In July 2022, 0.2 million shares of common stock were issued to employees who participated in the plan during the first half of 2022 at the price of $76.12 per share. In January 2023, Teradyne issued 0.2 million shares of common stock to employees who participated in the plan during the second half of 2022 at the price of $74.25 per share.

In July 2021, 0.1 million shares of common stock were issued to employees who participated in the plan during the first half of 2021 at the price of $113.87 per share. In January 2022, Teradyne issued 0.1 million shares of common stock to employees who participated in the plan during the second half of 2021 at the price of $139.00 per share.

As of December 31, 2023, there were 3.5 million shares available for grant under the ESPP.

The following table provides the effect to income from operations for recording stock-based compensation for the years ended December 31, 2023, 2022, and 2021:

	2023	2022	2021
		(in thousands)	
Cost of revenues	$ 4,208	$ 4,050	$ 4,196
Engineering and development	10,659	9,992	9,783
Selling and administrative	42,815	34,186	31,664
Stock-based compensation	57,682	48,228	45,643
Income tax benefit	(10,397)	(11,493)	(14,389)
Total stock-based compensation expense after income taxes	$ 47,285	$ 36,735	$ 31,254

R. SAVINGS PLAN

Teradyne sponsors a defined contribution employee retirement savings plan ("Savings Plan") covering substantially all U.S. employees. Under the Savings Plan, employees may contribute up to 20% of their compensation (subject to Internal Revenue Service limitations). The Savings Plan provides for a discretionary employer match that is determined each year. In 2023, 2022 and 2021,

Teradyne matched 100% of eligible employee contributions up to 4% of their compensation for employees not accruing benefits in the U.S. Qualified Pension Plan. There was no match for employees still actively accruing benefits in the U.S. Qualified Pension Plan. Teradyne's contributions vest 25% per year for the first four years of employment, and contributions for those employees with four years of service vest immediately.

In addition, Teradyne sponsors an unfunded U.S. Supplemental Savings Plan to provide savings benefits in excess of those allowed by the Employee Retirement Income Security Act of 1974 and the Internal Revenue Code. The provisions of this plan are the same as the Savings Plan. The liability for the U.S. Supplemental Savings Plan at December 31, 2023 and 2022, was $55.9 million and $44.1 million, respectively, and is included in retirement plan liabilities. Teradyne contributes to defined contributions savings plans for its foreign employees. Under Teradyne's savings plans, amounts charged to the statements of operations for the years ended December 31, 2023, 2022, and 2021 were $30.5 million, $30.1 million, and $26.9 million, respectively.

S. INCOME TAXES

The components of income before income taxes and the provision (benefit) for income taxes as shown in the consolidated statements of operations were as follows:

	2023	2022	2021
		(in thousands)	
Income before income taxes:			
U.S.	$ 307,997	$ 385,968	$ 403,451
Non-U.S.	217,575	454,417	757,504
	$ 525,572	$ 840,385	$ 1,160,955
Provision (benefit) for income taxes:			
Current:			
U.S. Federal	$ 58,063	$ 86,692	$ 58,218
Non-U.S.	54,037	74,204	105,153
State	2,362	2,681	300
	114,462	163,577	163,671
Deferred:			
U.S. Federal	(27,459)	(36,739)	(15,106)
Non-U.S.	(8,584)	1,232	(4,300)
State	(1,599)	(3,186)	2,101
	(37,642)	(38,693)	(17,305)
Total provision for income taxes:	$ 76,820	$ 124,884	$ 146,366

Income tax expense for 2023, 2022 and 2021 totaled $76.8 million, $124.9 million, and $146.4 million, respectively. The effective tax rate for 2023, 2022 and 2021 was 14.6%, 14.9% and 12.6%, respectively.

At December 31, 2023, Teradyne's remaining tax liability resulting from the U.S. one-time transition tax on the mandatory deemed repatriation of foreign earnings amounts to $59.1 million. Teradyne will pay approximately $14.8 million related to the transition tax in 2024, and $44.3 million in 1 to 3 years.

Teradyne has made an accounting policy election to account for global intangible low-taxed income ("GILTI") as a component of tax expense in the period in which Teradyne is subject to the rules and therefore did not provide any deferred tax impacts of GILTI in its consolidated financial statements.

On July 27, 2015, in Altera Corp. ("Altera") v. Commissioner, the U.S. Tax Court issued an opinion invalidating the regulations relating to the treatment of stock-based compensation expense in an intercompany cost-sharing arrangement. A final decision was issued by the Tax Court in December 2015. The IRS appealed the decision in June 2016. On July 24, 2018, the U.S. Court of Appeals for the Ninth Circuit ("Ninth Circuit") issued a decision that was subsequently withdrawn and a reconstituted panel conferred on the appeal. On June 7, 2019, the Ninth Circuit upheld the cost-sharing regulations. On November 12, 2019, the Ninth Circuit denied Altera's petition for rehearing of its case. Altera's application for certiorari to the Supreme Court was declined on June 22, 2020. In the fourth quarter of 2021, Teradyne recognized approximately $2.5 million of tax benefit related to the inclusion of stock-based compensation in its intercompany cost-sharing arrangement.

The decrease in the effective tax rate from 2022 to 2023 is primarily attributable to increases in benefit from tax credits and the U.S. foreign derived intangible income deduction. These decreases in expense were partially offset by a shift in the geographic distribution of income, which increased the income subject to taxation in higher tax rate jurisdictions relative to lower tax rate jurisdictions and a reduction in benefit from equity compensation.

The increase in the effective tax rate from 2021 to 2022 is primarily attributable to a shift in the geographic distribution of income, which increased the income subject to taxation in higher tax rate jurisdictions relative to lower tax rate jurisdictions, increases in expense from U.S. global low-taxed income and increases in expense from non-deductible officer compensation. These increases in expense were partially offset by increases in benefits from the U.S. foreign derived intangible income deduction and tax credits.

A reconciliation of the effective tax rate for the years 2023, 2022 and 2021 is as follows:

	2023	2022	2021
U.S. statutory federal tax rate	21.0%	21.0%	21.0%
Foreign taxes	2.5	(1.9)	(4.5)
Non-deductible officers' compensation	1.1	1.3	0.8
U.S. global intangible low-taxed income	0.8	1.2	0.6
State income taxes, net of federal tax benefit	0.1	(0.1)	0.2
U.S. research and development credit	(4.2)	(1.8)	(1.4)
U.S. foreign derived intangible income	(3.9)	(3.1)	(2.3)
Foreign tax credits	(3.3)	(1.0)	(0.5)
Equity compensation	(0.4)	(1.1)	(1.0)
Other, net	0.9	0.4	(0.3)
	14.6%	14.9%	12.6%

Teradyne qualifies for a tax holiday in Singapore by fulfilling the requirements of an agreement with the Singapore Economic Development Board under which certain headcount and spending requirements must be met. The tax savings attributable to the Singapore tax holiday for the years ended December 31, 2023, 2022 and 2021 were $1.4 million or $0.01 per diluted share, $16.0 million or $0.09 per diluted share, and $33.3 million or $0.18 per diluted share, respectively. In November 2020, Teradyne entered into an agreement with the Singapore Economic Development Board which extended our Singapore tax holiday under substantially similar terms to the agreement which expired on December 31, 2020. The new tax holiday is scheduled to expire on December 31, 2025. Teradyne does not anticipate entering into a similar tax holiday agreement with the Singapore Economic Development Board when the current agreement expires.

Significant components of Teradyne's deferred tax assets (liabilities) as of December 31, 2023 and 2022 were as follows:

	2023	2022
	(in thousands)	
Deferred tax assets:		
Tax credits	$ 112,571	$ 105,503
Research and development	82,571	47,760
Accruals	25,644	30,747
Pension liabilities	24,997	21,335
Lease liabilities	21,167	18,679
Inventory valuations	19,289	22,554
Deferred revenue	13,807	14,909
Equity compensation	7,179	6,578
Vacation accrual	6,096	5,856
Net operating loss carryforwards	5,737	1,857
Investment impairment	3,292	3,292
Intangible assets	2,323	350
Marketable securities	128	2,283
Other	953	2,520
Gross deferred tax assets	325,754	284,223
Less: valuation allowance	(109,251)	(103,807)
Total deferred tax assets	$ 216,503	$ 180,416
Deferred tax liabilities:		
Right of use assets	$ (19,016)	$ (16,607)
Depreciation	(16,681)	(19,078)
Contingent consideration	(5,214)	(5,214)
Total deferred tax liabilities	$ (40,911)	$ (40,899)
Net deferred assets	$ 175,592	$ 139,517

As of December 31, 2023 and 2022, Teradyne evaluated the likelihood that it would realize deferred income taxes to offset future taxable income and concluded that it is more likely than not that the majority of its deferred tax assets will be realized through consideration of both the positive and negative evidence. At December 31, 2023 and 2022, Teradyne maintained a valuation allowance for certain deferred tax assets of $109.3 million and $103.8 million, respectively, primarily related to state net operating losses and state tax credit carryforwards, due to the uncertainty regarding their realization. Adjustments could be required in the future if Teradyne estimates that the amount of deferred tax assets to be realized is more or less than the net amount recorded.

At December 31, 2023, Teradyne had tax effected operating loss carryforwards that expire in the following years:

	State Operating Loss Carryforwards	Foreign Operating Loss Carryforwards
	(in thousands)	
2024	$ 6	$ —
2025	4	—
2026	—	—
2027	—	—
2028	23	83
2029-2033	121	500
2034-2038	31	—
Beyond 2038	—	—
Non-expiring	30	4,939
Total	$ 215	$ 5,522

Teradyne has approximately $147.1 million of tax credit carryforwards including federal business tax credits of approximately $3.4 million which expire in 2028 through 2033, and state tax credits of $143.8 million, of which $76.5 million do not expire and the remainder expires in the years 2023 through 2043.

Teradyne's gross unrecognized tax benefits for the years ended December 31, 2023, 2022 and 2021 were as follows:

	2023	2022	2021
		(in thousands)	
Beginning balance as of January 1	$ 15,608	$ 14,465	$ 17,903
Additions:			
Tax positions for current year	—	1,398	1,417
Tax positions for prior years	3,024	13	30
Reductions:			
Tax positions for prior years	(26)	(56)	(1,639)
Expiration of statutes	—	(212)	(3,246)
Ending balance as of December 31	$ 18,606	$ 15,608	$ 14,465

Current year additions primarily relate to foreign transfer pricing and prior year reductions relate to state research credits.

Of the $18.6 million of unrecognized tax benefits as of December 31, 2023, $12.9 million would impact the consolidated income tax rate if ultimately recognized. The remaining $5.7 million would impact deferred taxes if recognized.

As of December 31, 2023, Teradyne estimates that it is reasonably possible that the balance of unrecognized tax benefits may decrease approximately $2.8 million in the next twelve months as a result of the resolution of an audit and a lapse of statutes of limitation. The estimated decrease relates to transfer pricing and state research credits.

Teradyne records all interest and penalties related to income taxes as a component of income tax expense. Accrued interest and penalties related to income tax items at December 31, 2023 and 2022 amounted to $1.3 million and $0.4 million, respectively. For the years ended December 31, 2023, 2022 and 2021, expense of $0.9 million, expense of $0.1 million, and benefit of $0.9 million, respectively, was recorded for interest and penalties related to income tax items.

Teradyne is subject to U.S. federal income tax, as well as income tax in multiple state, local and foreign jurisdictions. As of December 31, 2023, all material state and local income tax matters have been concluded through 2018, all material federal income tax matters have been concluded through 2017 and all material foreign income tax matters have been concluded through 2015. However, in some jurisdictions, including the United States, operating losses and tax credits may be subject to adjustment until such time as they are utilized and the year of utilization is closed to adjustment.

As of December 31, 2023, Teradyne is not permanently reinvested with respect to the unremitted earnings of non-U.S. subsidiaries to the extent that those earnings exceed local statutory and operational requirements. Remittance of those earnings is not expected to result in material income tax.

On August 16, 2022, the Inflation Reduction Act of 2022 ("IRA") was signed into law. The IRA introduced a 15% alternative minimum tax based on the financial statement income of certain large corporations ("CAMT"), effective January 1, 2023. Teradyne currently does not expect the CAMT to have a material impact on its financial results.

On December 15, 2022, the European Union ("EU") Member States formally adopted the EU's Pillar Two Directive, which generally provides for a minimum effective tax rate of 15%, as established by the Organization for Economic Co-operation and Development ("OECD") Pillar Two Framework. The EU's Pillar Two Directive effective dates are January 1, 2024, and January 1, 2025, for different aspects of the directive. On July 17, 2023, the OECD published Administrative Guidance proposing certain safe harbor rules that effectively extend certain effective dates to January 1, 2027. Certain EU Member States where Teradyne has a legal presence have recently enacted the directive and administrative guidance into their local tax legislation. Additionally, countries outside the EU where Teradyne has a legal presence have enacted similar language as the EU Members States in their local tax legislation. Teradyne is closely monitoring these developments and evaluating the potential financial impact on future periods. Based upon preliminary calculations for calendar year 2024, Teradyne anticipates it will meet the safe harbors in most jurisdictions, and any remaining tax under the rules should be immaterial.

T. OPERATING SEGMENT, GEOGRAPHIC AND SIGNIFICANT CUSTOMER INFORMATION

Teradyne has four reportable segments (Semiconductor Test, System Test, Wireless Test and Robotics). Each of the reportable segments represents an individual operating segment.

The Semiconductor Test segment includes operations related to the design, manufacturing and marketing of semiconductor test products and services. The System Test segment includes operations related to the design, manufacturing and marketing of products and services for storage and system level test, defense/aerospace instrumentation test, and circuit-board test. The Wireless Test segment includes operations related to the design, manufacturing and marketing of wireless test products and services. The Robotics segment includes operations related to the design, manufacturing and marketing of collaborative robotic arms, autonomous mobile robots and advanced robotic control software. Each operating segment has a segment manager who is accountable to and maintains regular contract with Teradyne's chief operating decision maker (Teradyne's chief executive officer) to discuss operating activities, financial results, forecasts, and plans for the segment.

Teradyne evaluates performance based on several factors, of which the primary financial measure is business segment income (loss) before income taxes. The accounting policies of the business segments are the same as those described in Note B: "Accounting Policies."

Segment information for the years ended December 31, 2023, 2022 and 2021 is as follows:

	Semiconductor Test	System Test	Robotics	Wireless Test	Segment Total	Corporate and Eliminations	Consolidated
				(in thousands)			
2023							
Revenues	$ 1,818,636	$ 338,197	$ 375,183	$ 144,282	$ 2,676,298	$ —	$ 2,676,298
Income (loss) before taxes (1)(2)	453,320	94,073	(54,251)	30,568	523,710	1,862	525,572
Total assets (3)	1,329,522	182,084	737,323	68,291	2,317,220	1,169,604	3,486,824
Property additions	113,415	3,643	40,739	1,845	159,642	—	159,642
Depreciation and amortization expense	77,745	3,801	25,527	4,043	111,116	(230)	110,886
2022							
Revenues	$ 2,080,590	$ 469,346	$ 403,138	$ 201,720	$ 3,154,794	$ 251	$ 3,155,045
Income (loss) before taxes (1)(2)	634,488	166,879	(16,244)	66,820	851,943	(11,558)	840,385
Total assets (3)	1,382,623	165,925	665,638	94,298	2,308,484	1,192,768	3,501,252
Property additions	126,898	7,275	25,712	3,364	163,249	—	163,249
Depreciation and amortization expense	76,532	3,235	25,339	4,991	110,097	578	110,675
2021							
Revenues	$ 2,642,342	$ 467,739	$ 375,905	$ 216,895	$ 3,702,881	$ —	$ 3,702,881
Income (loss) before taxes (1)(2)	976,988	163,064	(8,167)	83,543	1,215,428	(54,473)	1,160,955
Total assets (3)	1,245,596	170,954	701,196	107,513	2,225,259	1,584,166	3,809,425
Property additions	115,618	3,905	9,821	3,128	132,472	—	132,472
Depreciation and amortization expense	75,982	3,156	27,336	6,055	112,529	12,956	125,485

(1) Included in Corporate and Eliminations are interest income, interest expense, net foreign exchange gains (losses), intercompany eliminations, pension and postretirement plan actuarial gains (losses), legal and environmental fees, contingent consideration adjustments, acquisition and divestiture related expenses, contract termination settlement charge, an expense for the modification of Teradyne's former chief executive officer's outstanding equity awards, and loss on convertible debt conversions in 2021.

(2) Included in income (loss) before taxes are charges and credits related to restructuring and other, inventory charges and loss on convertible debt conversions in 2021.

(3) Total assets are attributable to each segment. Semiconductor Test includes $34.8 million of total assets classified as assets held for sale. See Note E: "Assets held for sale" for additional information. Corporate assets consist of cash and cash equivalents, marketable securities and certain other assets.

Included in each segment are charges and credits in the following line items in the statements of operations:

	For the Years Ended December 31,		
	2023	2022	2021
		(in thousands)	
Semiconductor Test:			
Cost of revenues—inventory charge	$ 22,482	$ 21,456	$ 6,661
Restructuring and other—employee severance	5,666	—	—
System Test:			
Cost of revenues—inventory charge	$ 1,855	$ 1,730	$ 641
Restructuring and other—employee severance	1,541	$ —	$ —
Robotics:			
Cost of revenues—inventory charge	$ 2,275	$ 3,668	$ 6,403
Restructuring and other—employee severance	3,707	2,115	1,210
Restructuring and other—acquisition & divestiture related expenses	—	—	1,000
Wireless:			
Cost of revenues—inventory charge	$ 1,746	$ 4,598	$ 1,770
Corporate and Eliminations:			
Selling and administrative—equity modification charge	$ 5,889	$ —	$ —
Restructuring and other—employee severance	3,599	—	—
Restructuring and other—acquisition & divestiture related expenses	3,562	—	(513)
Restructuring and other—contract termination	1,511	—	—
Restructuring and other—environmental and legal liabilities	1,100	2,700	1,971
Other (income) expense, net—gain on foreign exchange option	(7,464)	—	—
Restructuring and other—legal settlement charge	—	14,700	12,000
Restructuring and other—gain on sale of asset	—	(3,410)	—
Other (income) expense, net—loss on convertible debt conversion	—	—	28,828
Restructuring and other—AutoGuide contingent consideration adjustment	—	—	(7,227)

Information as to Teradyne's revenues by country is as follows:

	2023	2022	2021
		(in thousands)	
Revenues from customers (1):			
United States	$ 433,661	$ 469,948	$ 392,626
Korea	394,690	544,816	502,167
Taiwan	384,842	626,424	1,117,874
China	314,899	491,798	631,963
Japan	281,742	162,920	166,231
Europe	273,784	268,384	259,954
Philippines	189,419	124,107	166,838
Singapore	116,969	99,503	121,582
Thailand	91,818	137,356	138,812
Malaysia	89,197	142,203	136,774
Rest of the World	105,277	87,586	68,060
	$ 2,676,298	$ 3,155,045	$ 3,702,881

(1) Revenues attributable to a country are based on location of customer site.

In 2023, revenues from Texas Instruments Inc., a customer of our Semiconductor Test segment, accounted for 10% of our consolidated revenues. In 2021, revenues from Taiwan Semiconductor Manufacturing Company Ltd., a customer of Teradyne's Semiconductor Test segment, accounted for 12%, of Teradyne's consolidated revenues. Teradyne estimates consolidated revenues driven by Qualcomm, a customer of our Semiconductor Test, System Test, and Wireless Test segments, combining direct and indirect sales, accounted for approximately 11% of its consolidated revenues in 2022. Teradyne estimates consolidated revenues driven by one OEM customer, of our Semiconductor Test and Wireless Test segments, combining direct sales to that customer with sales to the customer's OSATs (which include Taiwan Semiconductor Manufacturing Company Ltd.), accounted for 19% in 2021.

Long-lived assets by geographic area:

	United States	Foreign (1)	Total
		(in thousands)	
December 31, 2023 (2)	$ 322,445	$ 207,995	$ 530,440
December 31, 2022	$ 328,341	$ 164,076	$ 492,417

(1) As of December 31, 2023 and December 31, 2022, long-lived assets attributable to Denmark were $78.1 million and $42.5 million, respectively.

(2) Includes $11.5 million of long-lived assets classified as assets held for sale. See Note E: "Assets held for sale" for additional information.

U. STOCK REPURCHASE PROGRAM

In January 2023, Teradyne's Board of Directors cancelled the January 2021 repurchase program and approved a new repurchase program for up to $2.0 billion of common stock. In 2023, Teradyne repurchased 3.9 million shares of common stock for a total cost of $400.5 million at an average price of $102.47 per share. In 2022, Teradyne repurchased 7.3 million shares of common stock for $752.1 million at an average price of $103.69 per share. The cumulative repurchases under the January 2021 repurchase program as of December 31, 2022 were 12.0 million shares of common stock for $1,352.1 million at an average price per share of $112.44.

The total cost of shares acquired includes commissions and, starting in 2023, related excise tax, and is recorded as a reduction to retained earnings.

V. SUBSEQUENT EVENTS

In January 2024, Teradyne's Board of Directors declared a 9% increase in the quarterly cash dividend to $0.12 per share to be paid on March 15, 2024 to shareholders of record as of February 16, 2024.

While Teradyne declared a quarterly cash dividend and authorized a share repurchase program, it may reduce or eliminate the cash dividend or share repurchase program in the future. Future cash dividends and stock repurchases are subject to the discretion of Teradyne's Board of Directors which will consider, among other things, Teradyne's earnings, capital requirements and financial condition.

SUPPLEMENTARY INFORMATION
(Unaudited)

Item 9: ***Changes in and disagreements with accountants on accounting and financial disclosure***

None.

Item 9A: ***Controls and procedures***

Disclosure Controls and Procedures

As of the end of the period covered by this report, our management, with the participation of our CEO and CFO, evaluated the effectiveness of our disclosure controls and procedures pursuant to Rule 13a-15(b) promulgated under the Exchange Act. Based upon that evaluation, our CEO and CFO concluded that, as of the end of the period covered by this report, our disclosure controls and procedures were effective in ensuring that material information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, including ensuring that such material information is accumulated and communicated to our management, including our CEO and CFO, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting during the fourth fiscal quarter ended December 31, 2023 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rule 13a-15(f). Under the supervision and with the participation of our management, including our CEO and CFO, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in *Internal Control—Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on our evaluation under the framework in *Internal Control—Integrated Framework* (2013), our management concluded that our internal control over financial reporting was effective as of December 31, 2023.

The effectiveness of our internal control over financial reporting as of December 31, 2023 has been audited by PricewaterhouseCoopers LLP, our independent registered public accounting firm, as stated in their report which is included under Item 8 of this Annual Report.

Inherent Limitations on Effectiveness of Controls

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Item 9B: ***Other Information***

Our officers (as defined in Rule 16a-1(f) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")) ("Section 16 Officers") and directors from time to time enter into contracts, instructions or written plans for the purchase or sale of our securities that are intended to satisfy the conditions specified in Rule 10b5-1(c) under the Exchange Act for an affirmative defense against liability for trading in securities on the basis of material nonpublic information. We refer to these contracts, instructions, and written plans as "Rule 10b5-1 trading plans" and each one as a "Rule 10b5-1 trading plan." During our fiscal quarter ended December 31, 2023, no Section 16 Officer or director adopted, modified or terminated a Rule 10b5-1 trading plan.

Item 9C: ***Disclosure Regarding Foreign Jurisdictions that Prevent Inspections***

Not applicable.

PART III

Item 10: ***Directors, Executive Officers and Corporate Governance***

The information required by this Item 10 will be included in our definitive Proxy Statement in connection with our 2024 Annual Meeting of Shareholders to be held on May 9, 2024. The Proxy Statement will be filed with the SEC not later than 120 days after the close of the fiscal year covered by this Annual Report and is incorporated herein by reference.

We have adopted a written code of business conduct that applies to all of our employees, officers and directors, including our principal executive officer, principal financial officer and principal accounting officer. Our Code of Conduct is available on our investor relations website at investors.teradyne.com under the section entitled "Governance Policies" in the "Governance" menu. If we make any substantive amendments to our Code of Conduct or grant any of our directors or executive officers any waiver, including any implicit waiver, from a provision of our Code of Conduct, we will disclose the nature of the amendment or waiver on our website or in a Current Report on Form 8-K.

Item 11: ***Executive Compensation***

The information required by this Item 11 will be included in our definitive Proxy Statement in connection with our 2024 Annual Meeting of Shareholders to be held on May 9, 2024. The Proxy Statement will be filed with the SEC not later than 120 days after the close of the fiscal year covered by this Annual Report and is incorporated herein by reference. For this purpose, the Compensation Committee Report included in such proxy statement is specifically not incorporated herein.

Item 12: ***Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters***

The information required by this Item 12 will be included in our definitive Proxy Statement in connection with our 2024 Annual Meeting of Shareholders to be held on May 9, 2024. The Proxy Statement will be filed with the SEC not later than 120 days after the close of the fiscal year covered by this Annual Report and is incorporated herein by reference. Also see “Item 7: Management’s Discussion and Analysis of Financial Condition and Results of Operations—Equity Compensation Plans.”

Item 13: ***Certain Relationships and Related Transactions, and Director Independence***

The information required by this Item 13 will be included in our definitive Proxy Statement in connection with our 2024 Annual Meeting of Shareholders to be held on May 9, 2024. The Proxy Statement will be filed with the SEC not later than 120 days after the close of the fiscal year covered by this Annual Report and is incorporated herein by reference.

Item 14: ***Principal Accountant Fees and Services***

The information required by this Item 14 will be included in our definitive Proxy Statement in connection with our 2024 Annual Meeting of Shareholders to be held on May 9, 2024. The Proxy Statement will be filed with the SEC not later than 120 days after the close of the fiscal year covered by this Annual Report and is incorporated herein by reference.

PART IV

Item 15: ***Exhibits and Financial Statement Schedule.***

15(a)(1) Financial Statements

The following consolidated financial statements are included in Item 8:

	Page
Report of Independent Registered Public Accounting Firm (PricewaterhouseCoopers LLP, PCAOB ID No 238)	38
Consolidated Balance Sheets as of December 31, 2023, and 2022	40
Consolidated Statements of Operations for the years ended December 31, 2023, 2022 and 2021	41
Consolidated Statements of Comprehensive Income for the years ended December 31, 2023, 2022 and 2021	42
Consolidated Statements of Convertible Common Shares and Shareholders' Equity for the years ended December 31, 2023, 2022 and 2021	43
Consolidated Statements of Cash Flows for the years ended December 31, 2023, 2022 and 2021	44

15(a)(2) Financial Statement Schedule

The following consolidated financial statement schedule is included in Item 15(c):

Schedule II—Valuation and Qualifying Accounts

Schedules other than those listed above have been omitted since they are either not required or information is otherwise included.

15(a)(3) Listing of Exhibits

The Exhibits which are filed with this report or which are incorporated by reference herein are set forth in the Exhibit Index.

15(c) Financial Statement Schedules

TERADYNE, INC.

SCHEDULE II—VALUATION AND QUALIFYING ACCOUNTS

Column A Description	Column B Balance at Beginning of Period	Column C Additions Charged to Cost and Expenses	Column D Other (in thousands)	Column E Deductions	Column F Balance at End of Period
Valuation reserve deducted in the balance sheet from the asset to which it applies:					
Accounts receivable:					
2023 Allowance for credit losses	$ 1,955	$ 301	$ 23	$ 291	$ 1,988
2022 Allowance for credit losses	$ 2,012	$ 500	$ (6)	$ 551	$ 1,955
2021 Allowance for credit losses	$ 2,034	$ 500	$ (27)	$ 495	$ 2,012

Column A Description	Column B Balance at Beginning of Period	Column C Additions Charged to Cost and Expenses	Column D Other (in thousands)	Column E Deductions	Column F Balance at End of Period
Valuation reserve deducted in the balance sheet from the asset to which it applies:					
Deferred taxes:					
2023 Valuation allowance	$ 103,807	$ 5,759	$ 59	$ 374	$ 109,251
2022 Valuation allowance	$ 97,170	$ 7,652	$ 21	$ 1,036	$ 103,807
2021 Valuation allowance	$ 84,962	$ 13,502	$ —	$ 1,294	$ 97,170

Item 16: ***Form 10-K Summary***

Not applicable.

EXHIBIT INDEX

The following designated exhibits are, as indicated below, either filed herewith or have heretofore been filed with the Securities and Exchange Commission and are referred to and incorporated by reference to such filings.

Exhibit No.	Description	SEC Document Reference
3.1	Restated Articles of Organization.	Exhibit 3.1 to Teradyne's Current Report on Form 8-K filed on May 13, 2021.
3.2	Amended and Restated By-laws, as amended.	Exhibit 3.1 to Teradyne's Current Report on Form 8-K filed on January 29, 2024.
4.1	Indenture dated as of December 12, 2016, between Teradyne, Inc. and Wilmington Trust, National Association, as trustee.	Exhibit 4.1 to Teradyne's Current Report on Form 8-K filed on December 12, 2016.
4.2	First Supplemental Indenture dated as of November 4, 2021 between Teradyne, Inc. and Wilmington Trust, National Association, as trustee.	Exhibit 4.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended October 3, 2021.
4.3	Description of Teradyne, Inc. Securities Registered under Section 12 of the Exchange Act.	Filed herewith.
10.1†	Standard Manufacturing Agreement entered into as of November 24, 2003 by and between Teradyne and Solectron.	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended September 30, 2007.
10.2†	Second Amendment to Standard Manufacturing Agreement, dated as of August 27, 2007, by and between Teradyne and Solectron.	Exhibit 10.3 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended September 30, 2007.
10.3†	Sixth Amendment to Standard Manufacturing Agreement, dated as of July 27, 2009, by and between Teradyne and Flextronics Corporation.	Exhibit 10.5 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2009.
10.4	Addendum to Standard Manufacturing Agreement (Authorized Purchase Agreement)—Revised July 1, 2010.	Exhibit 10.6 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2010.
10.5	Eighth Amendment to Standard Manufacturing Agreement, dated as of April 13, 2012, by and between Teradyne and Flextronics Sales & Marketing North Asia (L) LTD.	Exhibit 10.7 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.6†	Ninth Amendment to Standard Manufacturing Agreement, dated as of September 17, 2012, by and between Teradyne and Flextronics Sales & Marketing North Asia (L) LTD.	Exhibit 10.8 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.7	2006 Equity and Cash Compensation Incentive Plan, as amended. *	Exhibit 10.2 to Teradyne's Current Report on Form 8-K filed on May 13, 2021.
10.8	Danish Sub-Plan to the 2006 Equity and Cash Compensation Incentive Plan.	Exhibit 10.10 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2018.
10.9	Form of Performance-Based Restricted Stock Unit Agreement for Executive Officers under 2006 Equity and Cash Compensation Incentive Plan.*	Exhibit 10.9 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2020.
10.10	Form of Time-Based Restricted Stock Unit Agreement for Executive Officers under 2006 Equity and Cash Compensation Incentive Plan.*	Exhibit 10.10 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2020.
10.11	Form of Executive Officer Stock Option Agreement under 2006 Equity and Cash Compensation Incentive Plan, as amended. *	Exhibit 10.11 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2020.
10.12	Form of Restricted Stock Unit Agreement for Directors under 2006 Equity and Cash Compensation Incentive Plan.*	Exhibit 10.12 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2016.

10.13	1996 Employee Stock Purchase Plan, as amended.*	Exhibit 10.13 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2022.
10.14	Danish Sub-Plan to the 1996 Employee Stock Purchase Plan.	Exhibit 10.15 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2019
10.15	Deferral Plan for Non-Employee Directors, as amended.*	Exhibit 10.1 to Teradyne's Quarterly Report on form 10-Q for the quarter ended October 3, 2021.
10.16	Supplemental Savings Plan, as amended and restated.*	Exhibit 10.18 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2008.
10.17	Supplemental Executive Retirement Plan, as restated.*	Exhibit 10.19 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2008.
10.18	Agreement Regarding Termination Benefits dated January 31, 2023 between Teradyne and Gregory S. Smith.*	Exhibit 10.18 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2022.
10.19	Employment Agreement dated May 7, 2004 between Teradyne and Mark Jagiela.*	Exhibit 10.37 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended July 4, 2004.
10.20	Executive Officer Retirement Agreement dated July 17, 2019 between Teradyne and Gregory R. Beecher.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended June 30, 2019.
10.21	Executive Officer Agreement dated January 31, 2023 between Teradyne and Mark Jagiela.*	Exhibit 10.21 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2022.
10.22	Amended and Restated Executive Officer Change in Control Agreement dated May 26, 2009 between Teradyne and Charles J. Gray, as amended.*	Exhibit 10.30 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.23	Employment Agreement dated July 24, 2009 between Teradyne and Charles J. Gray.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended April 4, 2010.
10.24	Executive Officer Agreement dated January 25, 2024 between Teradyne and Charles J. Gray.*	Exhibit 10.1 to Teradyne's Current Reprot on Form 8-K/A filed January 29, 2024
10.25	Amended and Restated Executive Officer Change in Control Agreement dated June 30, 2012 between Teradyne and Walter G. Vahey, as amended.*	Exhibit 10.32 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.26	Employment Agreement dated February 6, 2013 between Teradyne and Walter G. Vahey.*	Exhibit 10.33 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.27	Executive Officer Change in Control Agreement dated September 1, 2014 between Teradyne, Inc. and Bradford Robbins.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended September 28, 2014.
10.28	Employment Agreement dated September 1, 2014 between Teradyne, Inc. and Bradford Robbins.*	Exhibit 10.2 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended September 28, 2014.
10.29	Executive Change in Control Agreement dated February 8, 2016 between Teradyne, Inc. and Gregory S. Smith.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended April 3, 2016.
10.30	Employment Agreement dated February 8, 2016 between Teradyne, Inc. and Gregory S. Smith.*	Exhibit 10.2 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended April 3, 2016.
10.31	Teradyne Offer of Employment dated February 8, 2019 for Sanjay Mehta.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019.
10.32	Executive Officer Change in Control Agreement dated April 25, 2019 between Teradyne, Inc. and Sanjay Mehta.*	Exhibit 10.2 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019.
10.33	Employment Agreement dated April 25, 2019 between Teradyne, Inc. and Sanjay Mehta.*	Exhibit 10.3 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019.
10.34	Agreement Regarding Termination Benefits dated April 25, 2019 between Teradyne, Inc. and Sanjay Mehta.*	Exhibit 10.4 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019.

10.35	Executive Officer Change in Control Agreement dated October 1, 2020 between Teradyne, Inc. and Richard Burns.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended September 27, 2020.
10.36	Executive Officer Change in Control Agreement dated August 21, 2023 between Teradyne, Inc. and Ujjwal Kumar.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended October 1, 2023.
10.37	Employment Agreement dated June 27, 2023 between Teradyne, Inc. and Ujjwal Kumar.*	Exhibit 10.2 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended October 1, 2023
10.38	Executive Officer Change in Control Agreement dated February 2, 2024 between Teradyne, Inc. and Ryan Driscoll.*	Filed herewith.
10.39	Employment Agreement dated October 1, 2020 between Teradyne, Inc. and Richard Burns.*	Exhibit 10.2 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended September 27, 2020.
10.40	Time-Based Restricted Stock Unit Agreement dated May 1, 2019 for Sanjay Mehta under 2006 Equity and Cash Compensation Plan.*	Exhibit 10.5 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended March 31, 2019.
10.41	Form of Indemnification Agreement.*	Exhibit 10.24 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2006.
10.42	LitePoint Corporation 2002 Stock Plan.	Exhibit 10.43 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2011.
10.43	Letter Agreement, dated December 6, 2016, between Barclays Bank PLC and Teradyne, Inc., regarding the Base Warrants.	Exhibit 10.1 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.44	Letter Agreement, dated December 6, 2016, between Bank of America, N.A., and Teradyne, Inc. regarding the Base Warrants.	Exhibit 10.2 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.45	Letter Agreement, dated December 6, 2016, between Wells Fargo Bank, National Association and Teradyne, Inc. regarding the Base Warrants.	Exhibit 10.3 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.46	Letter Agreement, dated December 6, 2016, between Barclays Bank PLC and Teradyne, Inc. regarding the Base Call Option Transaction.	Exhibit 10.4 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.47	Letter Agreement, dated December 6, 2016, between Bank of America, N.A. and Teradyne, Inc. regarding the Base Call Option Transaction.	Exhibit 10.5 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.48	Letter Agreement, dated December 6, 2016, between Wells Fargo Bank, National Association and Teradyne, Inc. regarding the Base Call Option Transaction.	Exhibit 10.6 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.49	Letter Agreement, dated December 9, 2016, between Barclays Bank PLC and Teradyne, Inc., regarding the Additional Warrants	Exhibit 10.7 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.50	Letter Agreement, dated December 9, 2016, between Bank of America, N.A., and Teradyne, Inc. regarding the Additional Warrants.	Exhibit 10.8 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.51	Letter Agreement, dated December 9, 2016, between Wells Fargo Bank, National Association and Teradyne, Inc. regarding the Additional Warrants.	Exhibit 10.9 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.52	Letter Agreement, dated December 9, 2016, between Barclays Bank PLC and Teradyne, Inc. regarding the Additional Call Option Transaction.	Exhibit 10.10 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.53	Letter Agreement, dated December 9, 2016, between Bank of America, N.A. and Teradyne, Inc. regarding the Additional Call Option Transaction	Exhibit 10.11 to Teradyne's Current Report on Form 8-K filed December 12, 2016.

10.54	Letter Agreement, dated December 9, 2016, between Wells Fargo Bank, National Association and Teradyne, Inc. regarding the Additional Call Option Transaction.	Exhibit 10.12 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.55	Credit Agreement dated May 1, 2020 among Teradyne, Inc., Truist Bank, as the administrative agent, issuing bank and swingline lender, and other lenders party thereto.	Exhibit 10.1 to Teradyne's Current Report on Form 8-K filed May 5, 2020.
10.56	First Amendment to Credit Agreement dated December 10, 2021 among Teradyne, Inc., Truist Bank, as the administrative agent, issuing bank and swingline lender, and other lenders party thereto.	Exhibit 10.52 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2021.
10.57	Second Amendment to Credit Agreement dated October 5, 2022 among Teradyne, Inc., Truist Bank, as the administrative agent, issuing bank and swingline lender, and other lenders party thereto.	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended October 2, 2022.
21.1	Subsidiaries of Teradyne.	Filed herewith.
23.1	Consent of PricewaterhouseCoopers LLP.	Filed herewith.
31.1	Rule 13a-14(a) Certification of Principal Executive Officer.	Filed herewith.
31.2	Rule 13a-14(a) Certification of Principal Financial Officer.	Filed herewith.
32.1	Section 1350 Certification of Principal Executive Officer.	Furnished herewith.
32.2	Section 1350 Certification of Principal Financial Officer.	Furnished herewith.
97.1	Policy for Recoupment of Incentive Compensation.	Filed herewith.
101	The following financial information from Teradyne, Inc.'s Annual Report on Form 10-K for the fiscal year ended December 31, 2023, formatted in Inline XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets as of December 31, 2023 and December 31, 2022, (ii) Consolidated Statements of Operations for the years ended December 31, 2023, 2022 and 2021, (iii) Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2023, 2022 and 2021 (iv) Consolidated Statements of Shareholders' Equity for the years ended December 31, 2023, 2022 and 2021, (v) Consolidated Statements of Cash Flows for the years ended December 31, 2023, 2022 and 2021, and (vi) the Notes to Consolidated Financial Statements.	
104	The cover page of the Annual Report on Form 10-K formatted in Inline XBRL (included in Exhibit 101).	

† -Confidential treatment granted.
* -Management contract or compensatory plan.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) 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 this 22nd day of February 2024.

TERADYNE, INC.

By: /S/ SANJAY MEHTA
Sanjay Mehta,
Vice President, Chief Financial Officer and Treasurer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/S/ PAUL J. TUFANO **Paul J. Tufano**	Chair of the Board	February 22, 2024
/S/ GREGORY SMITH **Gregory Smith**	Chief Executive Officer (Principal Executive Officer) and Director	February 22, 2024
/S/ SANJAY MEHTA **Sanjay Mehta**	Vice President, Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer)	February 22, 2024
/S/ TIMOTHY E. GUERTIN **Timothy E. Guertin**	Director	February 22, 2024
/S/ PETER HERWECK **Peter Herweck**	Director	February 22, 2024
/S/ MERCEDES JOHNSON **Mercedes Johnson**	Director	February 22, 2024
/S/ ERNEST E. MADDOCK **Ernest E. Maddock**	Director	February 22, 2024
/S/ MARILYN MATZ **Marilyn Matz**	Director	February 22, 2024
/S/ FOUAD TAMER **Fouad Tamer**	Director	February 22, 2024
/S/ BRIDGET VAN KRALINGEN **Bridget van Kralingen**	Director	February 22, 2024

Exhibit 4.3

DESCRIPTION OF COMMON STOCK

As of December 31, 2023, Teradyne, Inc. ("Teradyne" or the "Company") has its common stock as the only class of securities under Section 12 of the Securities Exchange Act of 1934, as amended.

The following is a description of the material terms and provisions of the Company's common stock and may not contain all the information that is important to you. Please refer to the Company's Restated Articles of Organization (the "Articles of Organization") and Amended and Restated Bylaws (the "Bylaws") for complete information.

Under the Company's Articles of Organization, it has authority to issue 1,000,000,000 shares of common stock, par value $0.125 per share. As of December 31, 2023, there were 152,889,750 shares of common stock outstanding.

Common Stock

Holders of Teradyne common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders. Since holders of Teradyne common stock do not have cumulative voting rights, the holders of more than 50% of Teradyne common stock can elect all the directors if they so choose. Holders of Teradyne common stock are entitled to receive ratably dividends, if any, as may be declared by the Teradyne board of directors out of funds legally available for payment of dividends. Upon the liquidation, dissolution or winding up of Teradyne, holders of Teradyne common stock are entitled to receive ratably the net assets of Teradyne available after the payment of all debts and other liabilities of Teradyne. Holders of Teradyne common stock have no preemptive, subscription, redemption or conversion rights, nor are they entitled to the benefit of any sinking fund. The outstanding shares of common stock are fully paid and non-assessable.

The transfer agent and registrar for the common stock is Broadridge Corporate Issuer Solutions, Inc., P.O. Box 1342, Brentwood, NY 11717. The common stock is listed on the Nasdaq Global Select Market under the trading symbol "TER."

Anti-Takeover Effects of Massachusetts Law and Provisions of our Charter Documents

Certain provisions in the Massachusetts General Laws, the Articles of Organization and the Bylaws may have the effect of delaying, deferring or preventing a change in control of Teradyne, including:

Special Meetings of Stockholders. Special meetings of our stockholders may be called only by the Chief Executive Officer, the President, by the directors or by the Secretary, or in case of the death, absence, incapacity or refusal of the Secretary, by any other officer, upon written application of one or more stockholders who hold at least a majority of the shares of our capital stock entitled to vote at such a meeting (or such lesser percentage in interest as shall be the maximum percentage permitted under Massachusetts law).

Advance Notice Procedures. The Bylaws establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of the Company's stockholders, including proposed nominations of persons for election to the board of directors. Stockholders at an annual meeting may only consider proposals or nominations specified in the written notice of meeting or brought before the meeting by or at the direction of the board of directors, the Chief Executive Officer or the President or by a stockholder who was a stockholder of record on the record date for the meeting, who is entitled to vote at the meeting and who has given our Secretary timely written notice, in proper form, of the stockholder's intention to bring that business before the meeting, or pursuant to the proxy access nomination procedures in the Bylaws.

Proxy Access Nominations. Under the Bylaws, the Company will include in its proxy statement for an annual meeting the name, together with certain other required information, of any person nominated for the election of to the board of directors in compliance with specified provisions in the Bylaws by a single stockholder that satisfies (or by a group of no more than 20 stockholders that satisfy) various notice and other requirements specified in the Bylaws. Among other requirements in the Bylaws, such stockholder or group of stockholders would need to provide evidence verifying that the stockholder or group owns, and has owned continuously for the preceding three years, at

least 3% of the issued and outstanding voting shares of the Company. The Bylaws contain limitations on the maximum number of nominees submitted by stockholders that the Company would be required to include in its proxy statement for an annual meeting.

Removal of Directors and Vacancies. The Bylaws provide that any director may be removed from office only (a) for cause as defined in the Massachusetts General Laws and by the affirmative vote of a majority of our outstanding shares and entitled to vote in the election of directors or (b) for cause by vote of a majority of the directors then in office. Vacancies and newly created directorships, whether resulting from an increase in the size of the board of directors, from the death, resignation, disqualification or removal of a director or otherwise, shall be filled solely by the affirmative vote of a majority of the remaining directors then in office, even though less than a quorum of the board of directors.

Indemnification of Directors, Officers and Employees. Pursuant to the Articles of Organization and Bylaws, Teradyne shall indemnify, to the full extent authorized by law, any person made or threatened to be made a party to an action, suit or proceeding, whether criminal, civil, administrative or investigative, by reason of the fact that he or she is or was a director, officer, employee or agent of Teradyne or is or was serving, at the request of the Teradyne, as a director, officer, employee or agent of another organization. The board of directors may, without stockholder approval, authorize Teradyne to enter into agreements, including any amendments or modifications thereto, with any of its directors, officers, employees or other agents providing for indemnification of such persons to the maximum extent permitted under applicable law and Teradyne's Articles of Organization and Bylaws.

Business Combinations with Interested Stockholders. The Massachusetts General Laws contain anti-takeover provisions regarding, among other things, business combinations with an affiliated stockholder. In general, the Massachusetts General Laws prevent a publicly held Massachusetts corporation from engaging in a business combination, as defined in the Massachusetts General Laws, with an interested stockholder for a period of three years after the date of the transaction in which the person became an interested stockholder, unless:

- before the date on which the person became an interested stockholder, the board of directors of the corporation approved either the business combination or the transaction in which the person became an interested stockholder;
- the interested stockholder acquires at least 90% of the outstanding voting stock of the corporation at the time it becomes an interested stockholder; or
- the business combination is approved by the board of directors and the holders of at least two-thirds of the outstanding voting stock of the corporation voting at a meeting, excluding the voting stock owned by the interested stockholder.

An interested stockholder is generally a person owning 5% or more of the outstanding voting stock of the corporation. A business combination includes mergers, consolidations, stock and asset sales and other transactions with the interested stockholder that result in a financial benefit to the interested stockholder.

Control Share Acquisitions. Teradyne has elected to opt out of the control share acquisitions provisions of the Massachusetts General Laws. Teradyne could, however, opt into these control share acquisitions provisions at any time by amending our Bylaws.

In general, the control share acquisitions provisions of the Massachusetts General Laws provide that any person, including his, her or its affiliates, who acquires shares of a corporation that are subject to the control share acquisitions statute and whose shares represent one-fifth or more, one-third or more, or a majority or more of the voting power of the corporation in the election of directors cannot exercise any voting power with respect to those shares, or any shares acquired by the person within 90 days before or after an acquisition of this nature, unless these voting rights are authorized by the stockholders of the corporation.

The authorization of voting rights requires the affirmative vote of the holders of a majority of the outstanding voting shares, excluding shares owned by:

- the person making an acquisition of this nature;

- any officer of the corporate; and
- any employee who is also a director of the corporation.

There are several other types of share acquisitions that are not subject to these provisions of the Massachusetts General Laws, including acquisitions of shares under a tender offer, merger or consolidation which is made in connection with an agreement to which the corporation is a party and acquisitions of shares directly from the corporation or a wholly owned subsidiary of the corporation.

Exhibit 21.1

Present Subsidiaries

Entity Name:	State or Jurisdiction Of Incorporation	Percentage of Voting Securities Owned
Teradyne (Asia) Pte., Ltd.	Singapore	100%*
Teradyne Canada Limited	Canada	100%
Teradyne de Costa Rica S.R.L.	Costa Rica	100%
Teradyne GmbH	Germany	100%*
Teradyne Holdings Denmark ApS	Denmark	100%*
Teradyne International Holdings B.V.	The Netherlands	100%
Teradyne International UK Holdings Ltd.	United Kingdom	100%*
Teradyne Israel Limited	Israel	100%
Teradyne Italia SrL	Italy	100%*
Teradyne K.K.	Japan	100%
Teradyne Korea Ltd.	Korea	100%*
Teradyne Limited	United Kingdom	100%*
Teradyne Malaysia Sdn. Bhd.	Malaysia	100%*
Teradyne Philippines Limited	Delaware	100%
Teradyne Robotics Holdings Denmark ApS	Denmark	100%*
Teradyne SAS	France	100%
Teradyne (Shanghai) Co., Ltd	Peoples Republic of China	100%*
Teradyne Taiwan LLC	Delaware	100%*
Teradyne Thailand Limited	Delaware	100%
Device Interface Solutions Technology (Shanghai) Co., Ltd	Peoples Republic of China	100%*
DIS Tech America, LLC	Delaware	100%
DIS Tech Italia S.r.l.	Italy	100%
DIS Tech Japan, G.K.	Japan	100%*
DIS Tech Philippines, LLC	Delaware	100%
DIS Tech Singapore Pte. Ltd.	Singapore	100%*
DIS Tech Taiwan LLC	Delaware	100%
GenRad, LLC	Delaware	100%
Herco Technology Corp.	California	100%
P.L.S.T., Inc. (f/k/a Perception Laminates, Inc.)	California	100%
Eagle Test Systems, Inc.	Delaware	100%
Nextest Systems Corporation	Delaware	100%
Lemsys SA	Switzerland	100%*
LitePoint Corporation	Delaware	100%
LitePoint Europe A/S	Denmark	100%*
LitePoint Technology Limited	Hong Kong	100%*
LitePoint Technology (Shanghai) Company Ltd.	Peoples Republic of China	100%*
LitePoint Vietnam Limited	Socialist Republic of Vietnam	100%*
Mobile Industrial Robots A/S	Denmark	100%*
Mobile Industrial Robots, Inc.	Delaware	100%*
MiR Global, Inc.	Delaware	100%
MiR Robots (Shanghai) Co. Ltd.	Peoples Republic of China	100%*
Universal Robots A/S	Denmark	100%*
Universal Robots (India) Pte. Ltd.	India	100%*
Universal Robots (Shanghai) Co. Ltd.	Peoples Republic of China	100%*
Universal Robots (USA), Inc.	Delaware	100%*
Teradyne Robots (Germany) GmbH	Germany	100%*
Teradyne Robots (Spain) S.L.	Spain	100%*
Universal Robots Mexico S.A. de C.V.	Mexico	100%*
Universal Robots (UK) Ltd.	United Kingdom	100%*
UR Technology (Shanghai) Co. Ltd.	People Republic of China	100%*

* Indirect subsidiaries whose voting securities are 100% controlled by Teradyne, Inc.

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 333-256136; 333-188824; 333-159723; 333-143231; 333-134519; 333-116632; 333-101983; 333-68074; 333-56373; and 333-07177) of Teradyne, Inc. of our report dated February 22, 2024 relating to the financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 22, 2024

EXHIBIT 31.1

CERTIFICATIONS

I, Gregory Smith, certify that:

1. I have reviewed this annual report on Form 10-K of Teradyne, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 22, 2024

By: /s/ GREGORY SMITH

Gregory Smith
Chief Executive Officer

EXHIBIT 31.2

CERTIFICATIONS

I, Sanjay Mehta, certify that:

1. I have reviewed this annual report on Form 10-K of Teradyne, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 22, 2024

By: /s/ SANJAY MEHTA

Sanjay Mehta
Chief Financial Officer

EXHIBIT 32.1

CERTIFICATION PURSUANT TO
18 U.S.C SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Teradyne, Inc. (the "Company") on Form 10-K for the period ending December 31, 2023 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Gregory Smith, Chief Executive Officer of the Company, certify pursuant to 18 U.S.C Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of my knowledge:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/S/ GREGORY SMITH

Gregory Smith
Chief Executive Officer

February 22, 2024

EXHIBIT 32.2

CERTIFICATION PURSUANT TO
18 U.S.C SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Teradyne, Inc. (the "Company") on Form 10-K for the period ending December 31, 2023 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Sanjay Mehta, Chief Financial Officer of the Company, certify pursuant to 18 U.S.C Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of my knowledge:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/S/ SANJAY MEHTA

Sanjay Mehta
Chief Financial Officer

February 22, 2024