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

FORM 10-Q

(Mark One)

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

For the quarterly period ended September 29, 2019

OR

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

For the transition period from to

Commission File No. 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 No.)**
600 Riverpark Drive, North Reading, Massachusetts **(Address of Principal Executive Offices)**	**01864** **(Zip Code)**

978-370-2700
(Registrant's Telephone Number, Including Area Code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $0.125 per share	**TER**	**Nasdaq Stock Market LLC**

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 the filing requirements for the past 90 days. Yes ☒ No ☐

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

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

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Emerging growth company	☐
Smaller reporting company	☐		

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

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

The number of shares outstanding of the registrant's only class of Common Stock as of November 4, 2019 was 167,577,669 shares.

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PART I

Item 1: Financial Statements

TERADYNE, INC.

CONDENSED CONSOLIDATED BALANCE SHEETS
(Unaudited)

	September 29, 2019	December 31, 2018
	(in thousands, except per share amount)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 593,939	$ 926,752
Marketable securities	342,538	190,096
Accounts receivable, less allowance for doubtful accounts of $1,770 and $1,673 at September 29, 2019 and December 31, 2018, respectively	357,886	291,267
Inventories, net	178,203	153,541
Prepayments and other current assets	182,013	170,826
Total current assets	1,654,579	1,732,482
Property, plant and equipment, net	307,567	279,821
Operating lease right-of-use assets, net	57,595	—
Marketable securities	103,558	87,731
Deferred tax assets	69,120	70,848
Other assets	22,724	11,509

Retirement plans assets	16,358	16,883
Acquired intangible assets, net	96,573	125,482
Goodwill	370,717	381,850
Total assets	$ 2,698,791	$ 2,706,606
LIABILITIES		
Current liabilities:		
Accounts payable	$ 117,936	$ 100,688
Accrued employees' compensation and withholdings	127,912	148,566
Deferred revenue and customer advances	95,936	77,711
Other accrued liabilities	93,736	78,272
Operating lease liabilities	18,386	—
Contingent consideration	6,297	34,865
Income taxes payable	33,508	36,185
Total current liabilities	493,711	476,287
Retirement plans liabilities	121,340	117,456
Long-term deferred revenue and customer advances	42,592	32,750
Deferred tax liabilities	15,390	20,662
Long-term other accrued liabilities	9,803	37,547
Long-term contingent consideration	11,783	35,678
Long-term operating lease liabilities	46,813	—
Long-term income taxes payable	83,782	83,891
Debt	390,942	379,981
Total liabilities	1,216,156	1,184,252
Commitments and contingencies (See Note S)		
SHAREHOLDERS' EQUITY		
Common stock, $0.125 par value, 1,000,000 shares authorized; 168,490 and 175,522 shares issued and outstanding at September 29, 2019 and December 31, 2018, respectively	21,061	21,940
Additional paid-in capital	1,712,185	1,671,645
Accumulated other comprehensive loss	(24,221)	(13,040)
Accumulated deficit	(226,390)	(158,191)
Total shareholders' equity	1,482,635	1,522,354
Total liabilities and shareholders' equity	$ 2,698,791	$ 2,706,606

The accompanying notes, together with the Notes to Consolidated Financial Statements included in Teradyne's Annual Report on Form 10-K for the year ended December 31, 2018, are an integral part of thecondensed consolidated financial statements.

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TERADYNE, INC.

CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS
(Unaudited)

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands, except per share amount)			
Revenues:				
Products	$ 488,170	$ 470,994	$ 1,339,123	$ 1,308,969
Services	93,868	95,854	301,192	272,275
Total revenues	582,038	566,848	1,640,315	1,581,244
Cost of revenues:				
Cost of products	197,196	195,339	555,863	557,074
Cost of services	39,804	37,816	127,861	113,311
Total cost of revenues (exclusive of acquired intangible assets amortization shown separately below)	237,000	233,155	683,724	670,385
Gross profit	345,038	333,693	956,591	910,859
Operating expenses:				
Selling and administrative	109,166	100,199	319,990	290,115
Engineering and development	77,804	77,049	236,030	226,799
Acquired intangible assets amortization	9,647	11,142	30,363	28,633
Restructuring and other	(6,500)	1,710	(11,792)	3,785
Total operating expenses	190,117	190,100	574,591	549,332
Income from operations	154,921	143,593	382,000	361,527
Non-operating (income) expense:				
Interest income	(5,159)	(6,213)	(18,641)	(17,620)
Interest expense	5,682	5,557	17,195	18,087
Other (income) expense, net	2,665	3,405	6,557	4,385
Income before income taxes	151,733	140,844	376,889	356,675

Income tax provision	15,873	20,863	34,494	48,684
Net income	$ 135,860	$ 119,981	$ 342,395	$ 307,991
Net income per common share:				
Basic	$ 0.80	$ 0.65	$ 2.00	$ 1.62
Diluted	$ 0.75	$ 0.63	$ 1.92	$ 1.57
Weighted average common shares—basic	169,641	185,744	171,471	190,576
Weighted average common shares—diluted	180,494	190,505	178,685	196,300

The accompanying notes, together with the Notes to Consolidated Financial Statements included in Teradyne's Annual Report on Form 10-K for the year ended December 31, 2018, are an integral part of the condensed consolidated financial statements.

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TERADYNE, INC.

CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(Unaudited)

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands)			
Net income	$ 135,860	$ 119,981	$ 342,395	$ 307,991
Other comprehensive income, net of tax:				
Foreign currency translation adjustment, net of tax of $0	(18,002)	7,213	(17,019)	(11,568)
Available-for-sale marketable securities:				
Unrealized gains (losses) on marketable securities arising during period, net of tax of $507, $(62), $1,762, $(806), respectively	1,754	(66)	6,391	(2,555)
Less: Reclassification adjustment for (gains) losses included in net income, net of tax of $(99), $(17), $(125), $(6), respectively	(345)	(57)	(442)	1,411
	1,409	(123)	5,949	(1,144)
Defined benefit pension and post-retirement plans:				
Amortization of prior service benefit included in net periodic pension and post-retirement benefit, net of tax of $(11), $(18), $(32), $(53), respectively	(37)	(61)	(111)	(184)
Other comprehensive (loss) income	(16,630)	7,029	(11,181)	(12,896)
Comprehensive income	$ 119,230	$ 127,010	$ 331,214	$ 295,095

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TERADYNE, INC.

CONDENSED CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY
(Unaudited)

	Common Stock Shares Issued	Common Stock Par Value	Additional Paid-in Capital	Accumulated Other Comprehensive (Loss) Income	Accumulated Deficit	Total Shareholders' Equity
			(in thousands)			
For the Three Months Ended September 29, 2019						
Balance, June 30, 2019	170,436	$ 21,305	$1,688,211	$ (7,591)	$ (222,513)	$ 1,479,412
Net issuance of common stock under stock-based plans	377	46	14,041	—	—	14,087
Stock-based compensation expense	—	—	9,933	—	—	9,933
Repurchase of common stock	(2,323)	(290)	—	—	(124,473)	(124,763)
Cash dividends ($0.09 per share)	—	—	—	—	(15,264)	(15,264)
Net income	—	—	—	—	135,860	135,860
Other comprehensive loss	—	—	—	(16,630)	—	(16,630)
Balance, September 29, 2019	168,490	$ 21,061	$1,712,185	$ (24,221)	$ (226,390)	$ 1,482,635
For the Three Months Ended September 30, 2018						
Balance, July 1, 2018	187,962	$ 23,495	$1,645,679	$ (3,504)	$ 74,270	$ 1,739,940
Net issuance of common stock under stock-based plans	332	42	10,056	—	—	10,098
Stock-based compensation expense	—	—	8,833	—	—	8,833

Repurchase of common stock	(5,005)	(626)	—	—	(200,846)	(201,472)
Cash dividends ($0.09 per share)	—	—	—	—	(16,648)	(16,648)
Net income	—	—	—	—	119,981	119,981
Other comprehensive income	—	—	—	7,028	—	7,028
Balance, September 30, 2018	183,289	$ 22,911	$1,664,568	$ 3,524	$ (23,243)	$ 1,667,760
For the Nine Months Ended September 29, 2019						
Balance, December 31, 2018	175,522	$ 21,940	$1,671,645	$ (13,040)	$ (158,191)	$ 1,522,354
Net issuance of common stock under stock-based plans	1,762	220	14,511	—	—	14,731
Stock-based compensation expense	—	—	26,029	—	—	26,029
Repurchase of common stock	(8,794)	(1,099)	—	—	(364,287)	(365,386)
Cash dividends ($0.09 per share)	—	—	—	—	(46,307)	(46,307)
Net income	—	—	—	—	342,395	342,395
Other comprehensive loss	—	—	—	(11,181)	—	(11,181)
Balance, September 29, 2019	168,490	$ 21,061	$1,712,185	$ (24,221)	$ (226,390)	$ 1,482,635
For the Nine Months Ended September 30, 2018						
Balance, December 31, 2017	195,548	$ 24,444	$1,638,413	$ 18,776	$ 272,013	$ 1,953,646
Net issuance of common stock under stock-based plans	1,584	197	1,813	—	—	2,010
Stock-based compensation expense	—	—	24,342	—	—	24,342
Repurchase of common stock	(13,843)	(1,730)	—	—	(566,930)	(568,660)
Cash dividends ($0.09 per share)	—	—	—	—	(51,352)	(51,352)
Net income	—	—	—	—	307,991	307,991
Other comprehensive loss	—	—	—	(12,896)	—	(12,896)
Reclassification of unrealized gains on equity securities	—	—	—	(3,125)	3,125	—
Reclassification of tax effects resulting from the Tax Reform Act	—	—	—	769	(769)	—
Cumulative effect of changes in accounting principle related to revenue recognition	—	—	—	—	12,679	12,679
Balance, September 30, 2018	183,289	$ 22,911	$1,664,568	$ 3,524	$ (23,243)	$ 1,667,760

The accompanying notes, together with the Notes to Consolidated Financial Statements included in Teradyne's Annual Report on Form 10-K for the year ended December 31, 2018, are an integral part of the condensed consolidated financial statements.

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TERADYNE, INC.

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited)

	For the Nine Months Ended	
	September 29, 2019	September 30, 2018
	(in thousands)	
Cash flows from operating activities:		
Net income	$ 342,395	$ 307,991
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation	51,508	49,930
Amortization	36,849	32,909
Stock-based compensation	28,822	25,327
Deferred taxes	(2,977)	24,442
Provision for excess and obsolete inventory	8,848	9,522
Contingent consideration fair value adjustment	(16,460)	(9,236)
Gains on marketable securities	(4,158)	(420)
Retirement plans actuarial losses	448	196
Other	610	936
Changes in operating assets and liabilities, net of businesses acquired:		
Accounts receivable	(66,789)	(77,807)
Inventories	(14,143)	(34,117)
Prepayments and other assets	(16,118)	(28,719)
Accounts payable and other liabilities	20,807	16,124
Deferred revenue and customer advances	27,779	9,823
Retirement plans contributions	(3,775)	(3,244)
Income taxes	(31,224)	(33,152)
Net cash provided by operating activities	362,422	290,505
Cash flows from investing activities:		
Purchases of property, plant and equipment	(96,048)	(88,269)
Proceeds from government subsidy for property, plant and equipment	—	7,920
Purchases of marketable securities	(605,539)	(809,521)
Proceeds from sales of marketable securities	60,274	843,164
Proceeds from maturities of marketable securities	393,472	934,100
Proceeds from life insurance	2,912	1,126

Purchase of investment and acquisition of businesses, net of cash acquired	(21,970)	(169,474)
Net cash (used for) provided by investing activities	(266,899)	719,046
Cash flows from financing activities:		
Issuance of common stock under stock purchase and stock option plans	29,280	20,959
Repurchase of common stock	(368,782)	(562,263)
Dividend payments	(46,269)	(51,320)
Payments related to net settlement of employee stock compensation awards	(14,550)	(19,841)
Payments of contingent consideration	(27,615)	(13,571)
Net cash used for financing activities	(427,936)	(626,036)
Effects of exchange rate changes on cash and cash equivalents	(400)	661
(Decrease) increase in cash and cash equivalents	(332,813)	384,176
Cash and cash equivalents at beginning of period	926,752	429,843
Cash and cash equivalents at end of period	$ 593,939	$ 814,019

The accompanying notes, together with the Notes to Consolidated Financial Statements included in Teradyne's Annual Report on Form 10-K for the year ended December 31, 2018, are an integral part of the condensed consolidated financial statements.

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TERADYNE, INC.

NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Unaudited)

A. THE COMPANY

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

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

B. ACCOUNTING POLICIES

Basis of Presentation

The consolidated interim financial statements include the accounts of Teradyne and its wholly-owned subsidiaries. All significant intercompany balances and transactions have been eliminated. These interim financial statements are unaudited and reflect all normal recurring adjustments that are, in the opinion of management, necessary for the fair statement of such interim financial statements. Certain prior year amounts were reclassified to conform to the current year presentation. The December 31, 2018 condensed consolidated balance sheet data was derived from audited financial statements, but does not include all disclosures required by accounting principles generally accepted in the United States of America.

The accompanying financial information should be read in conjunction with the consolidated financial statements and notes thereto contained in Teradyne's Annual Report on Form 10-K, filed with the U.S. Securities and Exchange Commission ("SEC") on March 1, 2019, for the year ended December 31, 2018.

Preparation of Financial Statements and Use of Estimates

The preparation of consolidated financial statements requires management to make estimates and judgments that affect the amounts reported in the financial statements. Actual results may differ significantly from these estimates.

Investment in Other Company

Teradyne holds an investment in a private company that develops and sells advanced wearable technology. Teradyne does not have the ability to exert significant influence over the company. The investment was recorded at cost and is evaluated for impairment or an indication of changes in fair value resulting from observable price changes in orderly transactions for the identical or a similar investment of the same issuer on a quarterly basis. See Note D: "Acquisitions and Investment in Other Company."

Leases

In February 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU")2016-02, *"Leases (Topic 842)"* ("Topic 842"), which requires a lessee to record a right-of-use ("ROU") asset and a lease liability on the balance sheet for operating leases with terms longer than twelve months. Teradyne adopted this standard and the related amendments (collectively "ASC 842") on January 1, 2019 and utilized the modified retrospective approach provided by ASU 2018-11, *"Leases (Topic 842): Targeted Improvements,"* that allowed for a cumulative effect adjustment in the period of adoption. Under this method of adoption, the comparative information in the consolidated financial statements has not been revised and continues to be reported under the previously applicable lease accounting guidance (ASC 840). Teradyne also utilized the package of practical expedients permitted under the transition guidance which included the carry-forward of historical lease classification. Adoption of ASC 842 resulted in recording ROU assets and lease liabilities of approximately $50.1 million and $54.3 million, respectively. Operating lease liabilities were calculated using the discount rate on January 1, 2019. The adoption of ASC 842 did not have a material impact on beginning retained earnings, the consolidated statement of operations, cash flows, or earnings per share.

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 September 29, 2019, Teradyne does not have material leases that have not yet commenced.

Teradyne determines if the lease is operating or finance 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.

For leases commencing after January 1, 2019, 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 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 H: "Leases."

C. RECENTLY ISSUED ACCOUNTING PRONOUNCEMENTS

On January 26, 2017, the FASB issued ASU2017-04, *"Intangibles—Goodwill and Other (Topic 350): Simplifying the Accounting for Goodwill Impairment."* The new guidance removes Step 2 of the goodwill impairment test, which requires a hypothetical purchase price allocation. 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. All other goodwill impairment guidance will remain largely unchanged. Entities will continue to have the option to perform a qualitative assessment to determine if a quantitative impairment test is necessary. The same one-step impairment test will be applied to goodwill at all reporting units, even those with zero or negative carrying amounts. Entities will be required to disclose the amount of goodwill at reporting units with zero or negative carrying amounts. The revised guidance will be applied prospectively, and is effective in 2020. Early adoption is permitted for any impairment tests performed after January 1, 2017. Teradyne is currently evaluating the impact of this ASU on its financial position, results of operations and statements of cash flows.

D. ACQUISITIONS AND INVESTMENT IN OTHER COMPANY

Acquisitions

Lemsys SA

On January 30, 2019, Teradyne acquired all of the issued and outstanding shares of Lemsys SA ("Lemsys") for a total purchase price of approximately $9.1 million. Lemsys strengthens Teradyne's position in the electrification trends of vehicles, solar, wind, and industrial applications. The Lemsys acquisition was accounted for as a business combination and, accordingly, the results have been included in Teradyne's Semiconductor Test segment from the date of acquisition. Teradyne's final allocation of the purchase price was goodwill of $1.4 million, which is not deductible for tax purposes, acquired intangible assets of $4.6 million with an average estimated useful life of5.2 years, and $3.1 million of net tangible assets. The acquisition was not material to Teradyne's condensed consolidated financial statements.

Mobile Industrial Robots

On April 25, 2018, Teradyne acquired all of the issued and outstanding shares of Mobile Industrial Robots Aps ("MiR"), a Danish limited liability company located in Odense, Denmark. MiR is the leading maker of collaborative autonomous mobile robots for industrial applications. MiR is part of Teradyne's Industrial Automation segment.

The total purchase price of $197.8 million included $145.2 million of cash paid and $52.6 million of contingent consideration measured at fair value. The contingent consideration is payable in Euros upon the achievement of certain thresholds and targets for revenue and earnings before interest and taxes for periods from January 1, 2018 to December 31, 2018; January 1, 2018 to December 31, 2019; and January 1, 2018 to December 31, 2020. The contingent consideration related to revenue for the period from January 1, 2018 to December 31, 2018 in the amount of $30.8 million was paid in March 2019. The remaining maximum contingent consideration that could be paid is $81.0 million.

The valuation of the contingent consideration is dependent on the following assumptions: forecasted revenues, revenue volatility, earnings before interest and taxes, and discount rate. These assumptions were estimated based on a review of the historical and projected results.

The MiR acquisition was accounted for as a business combination and, accordingly, the results have been included in Teradyne's consolidated results of operations from the date of acquisition. MiR's products will help expand the Industrial Automation segment, which is a key component of Teradyne's growth strategy. The allocation of the total purchase price to MiR's net tangible liabilities and identifiable intangible assets was based on their estimated fair values as of the acquisition date. The excess of the purchase price over the identifiable intangible assets and net tangible liabilities in the amount of $136.0 million was allocated to goodwill, which is not deductible for tax purposes. MiR's results have been included in Teradyne's Industrial Automation segment from the date of acquisition.

The following table represents the final allocation of the purchase price:

	Purchase Price Allocation (in thousands)
Goodwill	$ 135,976
Intangible assets	80,670
Tangible assets acquired and liabilities assumed:	
Current assets	6,039
Non-current assets	1,336
Accounts payable and current liabilities	(7,336)
Long-term deferred tax liabilities	(18,007)
Other long-term liabilities	(900)
Total purchase price	$ 197,778

Teradyne estimated the fair value of intangible assets using the income and cost approaches. Acquired intangible assets are amortized on a straight-line basis over their estimated useful lives. Components of these intangible assets and their estimated useful lives at the acquisition date are as follows:

	Fair Value (in thousands)	Estimated Useful Life (in years)
Developed technology	$ 58,900	7.0
Trademarks and tradenames	13,240	11.0
Customer relationships	8,500	2.5
Backlog	30	0.2
Total intangible assets	$ 80,670	7.2

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The following unaudited pro forma information gives effect to the acquisition of MiR as if the acquisition occurred on January 1, 2018. The unaudited pro forma results are not necessarily indicative of what actually would have occurred had the acquisition been in effect for the periods presented:

	For the Nine Months Ended September 30, 2018 (in thousands)
Revenue	$ 1,588,042
Net income	306,768
Net income per common share:	
Basic	$ 1.61
Diluted	$ 1.56

Pro forma results for the nine months ended September 30, 2018 were adjusted to exclude $2.9 million of acquisition related costs, and $0.4 million of non-recurring expense related to fair value adjustment to acquisition-date inventory.

Energid Technologies Corporation

On February 26, 2018, Teradyne acquired all of the issued and outstanding shares of Energid Technologies Corporation ("Energid") for a total purchase price of approximately $27.6 million. Energid's technology enables and simplifies the programming of complex robotic motions used in a wide variety of end markets, ranging from heavy industry to healthcare, utilizing both traditional robots and collaborative robots. The Energid acquisition was accounted for as a business combination and, accordingly, Energid's results have been included in Teradyne's Industrial Automation segment from the date of acquisition. As of the acquisition date, Teradyne's purchase price allocation was goodwill of $14.4 million which is deductible for tax purposes, acquired intangible assets of $12.3 million with an average estimated useful life of 7.7 years, and $1.0 million of net tangible assets. The acquisition was not material to Teradyne's condensed consolidated financial statements.

Investment in Other Company

On June 3, 2019, Teradyne invested $15.0 million in RealWear, Inc. ("RealWear"). RealWear, a private company, develops and sells advanced wearable technology including industrial, hands-free, head-mounted augmented reality devices that make the workplace safer and more productive. Teradyne's investment in RealWear aligns with its strategy of bringing the power of advanced automation to companies of all sizes to improve the productivity of their employees and the quality of their products and services. The investment was recorded at cost and is evaluated for impairment or an indication of changes in fair value resulting from observable price changes in orderly transactions for the identical or a similar investment of the same issuer on a quarterly basis. At September 29, 2019, the value of the investment was $15.0 million, which was unchanged in the three months ended September 30, 2019.

E. REVENUE

For the three and nine months ended September 29, 2019, revenues recognized in accordance with ASC 606: "*Revenue from Contracts with Customers*" were $580.6 million and $1,635.5 million, respectively. For the three and nine months ended September 29, 2019, Teradyne also recognized $1.5 million and $4.9 million, respectively, of revenues from leases of Teradyne systems, which are accounted for outside of ASC 606.

For the three and nine months ended September 30, 2018, revenues recognized in accordance with ASC 606: "*Revenue from Contracts with Customers*" were $564.5 million and $1,571.0 million, respectively. For the three and nine months ended September 30, 2018, Teradyne also recognized $2.3 million and $10.2 million, respectively, of revenues from leases of Teradyne systems, which are accounted for outside of ASC 606.

Disaggregation of Revenue

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

For the Three Months Ended September 29, 2019

	Semiconductor Test		System Test			Industrial Automation			Wireless Test	Corporate and Other	Consolidated
	System on a chip ("SOC")	Memory	Defense/ Aerospace	Storage Test	Production Board Test	Universal Robots	MiR	Energid			
						(in thousands)					
Americas											
Point in time	$ 6,307	$ 3,464	$ 22,861	$ 2,232	$ 2,165	$ 16,294	$ 2,820	$ —	$ 5,621	$ (160)	$ 61,604
Over time	8,497	621	5,814	—	796	293	—	188	723	—	16,932
Europe, Middle East and Africa											
Point in time	6,894	274	742	—	4,354	25,557	5,011	—	1,220	—	44,052
Over time	5,189	255	469	—	1,613	459	—	615	48	—	8,648
Asia Pacific											
Point in time	259,909	63,483	99	22,696	6,751	15,575	1,800	—	33,032	—	403,345
Over time	37,680	3,874	299	1,496	830	280	—	—	1,545	—	46,004
Lease Revenue	1,290	—	—	—	88	—	—	—	75	—	1,453
Total	$325,766	$ 71,971	$ 30,284	$26,424	$ 16,597	$ 58,458	$ 9,631	$ 803	$ 42,264	$ (160)	$ 582,038

For the Three Months Ended September 30, 2018

	Semiconductor Test		System Test			Industrial Automation			Wireless Test	Corporate and Other	Consolidated
	SOC	Memory	Defense/ Aerospace	Storage Test	Production Board Test	Universal Robots	MiR	Energid			
						(in thousands)					
Americas											
Point in time	$ 8,866	$ 4,600	$ 15,423	$ —	$ 2,625	$ 17,834	$ 1,810	$ 104	$ 3,820	$ (272)	$ 54,810
Over time	8,810	686	6,037	—	789	190	—	167	146	—	16,825
Europe, Middle East and Africa											
Point in time	9,728	2,080	161	—	3,223	26,445	2,647	—	1,504	—	45,788
Over time	5,336	301	505	—	1,510	282	—	457	318	—	8,709
Asia Pacific											
Point in time	258,898	76,429	931	9,916	5,201	13,656	2,087	10	26,851	—	393,979
Over time	36,722	2,794	212	2,116	885	145	—	79	1,494	—	44,447
Lease Revenue	2,047	—	—	—	72	—	—	—	171	—	2,290
Total	$330,407	$ 86,890	$ 23,269	$12,032	$ 14,305	$ 58,552	$ 6,544	$ 817	$ 34,304	$ (272)	$ 566,848

For the Nine Months Ended September 29, 2019

	Semiconductor Test		System Test			Industrial Automation			Wireless Test	Corporate and Other	Consolidated
	SOC	Memory	Defense/ Aerospace	Storage Test	Production Board Test	Universal Robots	MiR	Energid			
						(in thousands)					
Americas											
Point in time	$ 21,830	$ 19,574	$ 54,870	$ 7,528	$ 6,760	$ 48,529	$ 9,152	$ —	$ 12,961	$ (402)	$ 180,802
Over time	24,862	2,056	19,116	—	2,317	793	—	1,235	1,550	—	51,929
Europe, Middle East and Africa											
Point in time	27,934	2,443	992	—	12,391	78,007	13,883	—	2,575	—	138,225
Over time	15,681	819	1,442	—	4,782	1,274	—	1,381	140	—	25,519
Asia Pacific											
Point in time	727,035	143,163	525	66,974	17,235	48,284	6,208	—	91,029	—	1,100,453
Over time	113,158	10,447	1,391	5,860	2,526	786	—	221	4,146	—	138,535
Lease Revenue	4,487	—	—	—	225	—	—	—	140	—	4,852

Total	$934,987	$178,502	$ 78,336	$80,362	$ 46,236	$177,673	$29,243	$ 2,837	$112,541	$ (402)	$ 1,640,315

For the Nine Months Ended September 30, 2018

	Semiconductor Test		System Test			Industrial Automation			Wireless Test	Corporate and Other	Consolidated
	SOC	Memory	Defense/ Aerospace	Storage Test	Production Board Test	Universal Robots	MiR	Energid			
					(in thousands)						
Americas											
Point in time	$ 30,577	$ 10,291	$ 42,276	$ 284	$ 5,814	$ 48,025	$ 3,009	$ 104	$13,515	$ (602)	$ 153,293
Over time	26,536	2,092	18,462	—	2,342	431	—	578	379	—	50,820
Europe, Middle East and Africa											
Point in time	32,079	3,066	2,104	—	12,109	75,631	4,647	—	2,570	—	132,206
Over time	16,240	824	1,596	—	4,781	675	—	732	802	—	25,650
Asia Pacific											
Point in time	702,097	202,336	1,417	51,863	10,804	39,135	3,397	10	68,180	—	1,079,239
Over time	108,011	7,401	678	5,077	2,364	350	—	79	5,893	—	129,853
Lease Revenue	9,162	—	—	—	337	—	—	—	684	—	10,183
Total	$924,702	$226,010	$ 66,533	$57,224	$ 38,551	$164,247	$11,053	$ 1,503	$92,023	$ (602)	$ 1,581,244

Contract Balances

During the three and nine months ended September 29, 2019, Teradyne recognized $14.2 million and $47.6 million, respectively, that was previously included within the deferred revenue and customer advances balances. During the three and nine months ended September 30, 2018, Teradyne recognized $24.5 million and $70.9 million, respectively, that was previously included within the deferred revenue and customer advances balances. This revenue primarily relates to undelivered hardware, extended warranties, training, application support, and post contract support. Each of these represents a distinct performance obligation. Teradyne expects to recognize 69% of the remaining performance obligation in the next 12 months, 26% in 1-3 years, and the remainder thereafter.

Accounts Receivable

Teradyne sells certain trade accounts receivables on anon-recourse basis to third-party financial institutions pursuant to factoring agreements. Teradyne accounts for these transactions as sales of receivables and presents cash proceeds in operating activities in the consolidated statements of cash flows. Total trade accounts receivable sold under the factoring agreements were $113.4 million and $10.6 million for the nine months ended September 29, 2019 and September 30, 2018, respectively. Factoring fees for the sales of receivables are recorded in interest expense and are not material.

F. INVENTORIES

Inventories, net consisted of the following at September 29, 2019 and December 31, 2018:

	September 29, 2019	December 31, 2018
	(in thousands)	
Raw material	$ 114,162	$ 89,365
Work-in-process	28,460	31,014
Finished goods	35,581	33,162
	$ 178,203	$ 153,541

Inventory reserves at September 29, 2019 and December 31, 2018 were $101.2 million and $100.8 million, respectively.

G. 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 available-for-sale debt securities are classified as Level 2 and equity securities are classified as Level 1. 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 three and nine months ended September 29, 2019 and September 30, 2018, there were no transfers in or out of Level 1, Level 2, or Level 3 financial instruments.

Realized gains recorded in the three and nine months ended September 29, 2019 were $0.5 million and $0.7 million, respectively. Realized losses recorded in the nine months ended September 29, 2019 were $0.2 million. Realized gains recorded in the three and nine months ended September 30, 2018 were $0.2 million and $0.6 million, respectively. Realized losses recorded in the nine months ended September 30, 2018 were $1.6 million. Realized gains are included in interest income and realized losses are included in interest expense.

Unrealized gains on equity securities recorded in the three and nine months ended September 29, 2019 were $0.1 million and $3.8 million, respectively. Unrealized losses on equity securities recorded in the three and nine months ended September 29, 2019 were $0.2 million. Unrealized gains on equity securities recorded in the three and nine months ended September 30, 2018 were $1.0 million and $1.4 million, respectively. Unrealized gains on equity securities are included in interest income and unrealized losses are included in interest expense. 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 the specific identification method.

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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 September 29, 2019 and December 31, 2018.

	September 29, 2019			
	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	$ 257,235	$ —	$ —	$ 257,235
Cash equivalents	198,519	138,185	—	336,704
Available-for-sale securities:				
U.S. Treasury securities	—	185,025	—	185,025
Commercial paper	—	117,714	—	117,714
Corporate debt securities	—	90,898	—	90,898
Certificates of deposit and time deposits	—	14,086	—	14,086
U.S. government agency securities	—	8,024	—	8,024
Debt mutual funds	3,968	—	—	3,968
Non-U.S. government securities	—	380	—	380
Equity securities:				
Mutual funds	26,001	—	—	26,001
	$ 485,723	$ 554,312	$ —	$1,040,035
Derivative assets	—	119	—	119
Total	$ 485,723	$ 554,431	$ —	$1,040,154
Liabilities				
Contingent consideration	$ —	$ —	$ 18,080	$ 18,080
Derivative liabilities	—	489	—	489
Total	$ —	$ 489	$ 18,080	$ 18,569

Reported as follows:

	(Level 1)	(Level 2)	(Level 3)	Total
	(in thousands)			
Assets				
Cash and cash equivalents	$ 455,754	$ 138,185	$ —	$ 593,939
Marketable securities	—	342,538	—	342,538
Long-term marketable securities	29,969	73,589	—	103,558
Prepayments	—	119	—	119
Total	$ 485,723	$ 554,431	$ —	$1,040,154
Liabilities				
Other current liabilities	$ —	$ 489	$ —	$ 489
Contingent consideration	—	—	6,297	6,297
Long-term contingent consideration	—	—	11,783	11,783
Total	$ —	$ 489	$ 18,080	$ 18,569

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December 31, 2018

	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	$ 312,512	$ —	$ —	$ 312,512
Cash equivalents	253,525	360,715	—	614,240
Available-for-sale securities:				
U.S. Treasury securities	—	109,721	—	109,721
Commercial paper	—	86,117	—	86,117
Corporate debt securities	—	40,020	—	40,020
U.S. government agency securities	—	9,611	—	9,611
Certificates of deposit and time deposits	—	7,604	—	7,604
Debt mutual funds	3,187	—	—	3,187
Non-U.S. government securities	—	376	—	376
Equity securities:				—
Mutual funds	21,191	—	—	21,191
	$ 590,415	$ 614,164	$ —	$1,204,579
Derivative assets	—	79	—	79
Total	$ 590,415	$ 614,243	$ —	$1,204,658
Liabilities				
Contingent consideration	$ —	$ —	$ 70,543	$ 70,543
Derivative liabilities	—	514	—	514
Total	$ —	$ 514	$ 70,543	$ 71,057

Reported as follows:

	(Level 1)	(Level 2)	(Level 3)	Total
	(in thousands)			
Assets				
Cash and cash equivalents	$ 566,037	$ 360,715	$ —	$ 926,752
Marketable securities	—	190,096	—	190,096
Long-term marketable securities	24,378	63,353	—	87,731
Prepayments	—	79	—	79
Total	$ 590,415	$ 614,243	$ —	$1,204,658
Liabilities				
Other accrued liabilities	$ —	$ 514	$ —	$ 514
Contingent consideration	—	—	34,865	34,865
Long-term contingent consideration	—	—	35,678	35,678
Total	$ —	$ 514	$ 70,543	$ 71,057

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Changes in the fair value of Level 3 contingent consideration for the three and nine months ended September 29, 2019 and September 30, 2018 were as follows:

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands)			
Balance at beginning of period	$ 26,847	$ 60,914	$ 70,543	$ 45,102
Fair value adjustment (a)	(7,759)	(768)	(16,460)	(9,236)
Foreign currency impact	(1,008)	796	(1,413)	(1,770)
Payments (b)	—	—	(34,590)	(24,553)
Acquisition of MiR	—	—	—	51,399
Balance at end of period	$ 18,080	$ 60,942	$ 18,080	$ 60,942

(a) In the three and nine months ended September 29, 2019, the fair value of contingent consideration for the earn-out in connection with the acquisition of MiR was decreased by $7.8 million and $16.5 million, respectively, primarily due to a decrease in the forecasted revenue, partially offset by impact from the modification, in the three months ended September 29, 2019, of the earn-out structure. In the three and nine months ended September 30, 2018, the fair value of contingent consideration for the earn-out in connection with the acquisition of Universal Robots A/S (“Universal Robots”) was decreased by $0.8 million and $9.2 million, respectively, primarily due to a decrease in forecasted revenue.

(b) In the nine months ended September 29, 2019, Teradyne paid $30.8 million and $3.8 million of contingent consideration for the earn-outs in connection with the acquisition of MiR and Universal Robots, respectively. In the nine months ended September 30, 2018, Teradyne paid $24.6 million of contingent consideration for the earn-out in connection with the acquisition of Universal Robots.

The following table provides quantitative information associated with the fair value measurement of Teradyne’s Level 3 financial instruments:

Liability	September 29, 2019 Fair Value (in thousands)	Valuation Technique	Unobservable Inputs	Weighted Average
Contingent consideration (MiR)	$ 18,080	Monte Carlo simulation	Revenue volatility	15.0%
			Discount rate	0.1%

As of September 29, 2019, the significant unobservable inputs used in the Monte Carlo simulation to fair value the MiR contingent consideration include forecasted revenues, revenue volatility, earnings before interest and taxes, and discount rate. Increases or decreases in the inputs would result in a higher or lower fair value measurement. As of September 29, 2019, the maximum amount of contingent consideration that could be paid in connection with the acquisition of MiR is $81.0 million. The remaining earn-out periods end on December 31, 2019 and December 31, 2020.

The carrying amounts and fair values of Teradyne's financial instruments at September 29, 2019 and December 31, 2018 were as follows:

	September 29, 2019		December 31, 2018	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(in thousands)			
Assets				
Cash and cash equivalents	$ 593,939	$593,939	$ 926,752	$926,752
Marketable securities	446,096	446,096	277,827	277,827
Derivative assets	119	119	79	79
Liabilities				
Contingent consideration	18,080	18,080	70,543	70,543
Derivative liabilities	489	489	514	514
Convertible debt (1)	390,942	867,388	379,981	547,113

(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.

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

The following table summarizes the composition of available-for-sale marketable securities at September 29, 2019:

	September 29, 2019				
	Available-for-Sale				
	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
	(in thousands)				
U.S. Treasury securities	$184,229	$ 847	$ (51)	$ 185,025	$ 25,814
Commercial paper	117,618	99	(3)	117,714	30,704
Corporate debt securities	86,718	4,229	(49)	90,898	3,079
Certificates of deposit and time deposits	14,083	3	—	14,086	—
U.S. government agency securities	8,009	17	(2)	8,024	1,150
Debt mutual funds	3,820	148	—	3,968	—
Non-U.S. government securities	380	—	—	380	—
	$414,857	$ 5,343	$ (105)	$ 420,095	$ 60,747

Reported as follows:

	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
	(in thousands)				
Marketable securities	$342,234	$ 313	$ (9)	$ 342,538	$ 46,115
Long-term marketable securities	72,623	5,030	(96)	77,557	14,632
	$414,857	$ 5,343	$ (105)	$ 420,095	$ 60,747

The following table summarizes the composition of available-for-sale marketable securities at December 31, 2018:

	December 31, 2018				
	Available-for-Sale				
	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses

	(in thousands)				
U.S. Treasury securities	$110,969	$ 112	$ (1,360)	$ 109,721	$ 75,040
Commercial paper	86,130	13	(26)	86,117	85,094
Corporate debt securities	41,133	432	(1,545)	40,020	24,767
U.S. government agency securities	9,646	1	(36)	9,611	7,077
Certificates of deposit and time deposits	7,604	—	—	7,604	—
Debt mutual funds	3,153	34	—	3,187	—
Non-U.S. government securities	376	—	—	376	—
	$259,011	$ 592	$ (2,967)	$ 256,636	$ 191,978

Reported as follows:

	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
	(in thousands)				
Marketable securities	$190,100	$ 88	$ (92)	$ 190,096	$ 140,262
Long-term marketable securities	68,911	504	(2,875)	66,540	51,716
	$259,011	$ 592	$ (2,967)	$ 256,636	$ 191,978

As of September 29, 2019, the fair market value of investments in available-for-sale securities with unrealized losses totaled $60.7 million. Of this value, $4.9 million had unrealized losses of $0.1 million for greater than one year and $55.8 million had unrealized losses of $0.1 million for less than one year.

As of December 31, 2018, the fair market value of investments with unrealized losses totaled $192.0 million. Of this value, $28.5 million had unrealized losses of $1.6 million greater than one year and $163.5 million had unrealized losses of $1.4 million for less than one year.

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 September 29, 2019 and December 31, 2018 were temporary.

The contractual maturities of investments in available-for-sale securities held at September 29, 2019 were as follows:

	September 29, 2019	
	Cost	Fair Market Value
	(in thousands)	
Due within one year	$342,234	$ 342,538
Due after 1 year through 5 years	16,609	16,718
Due after 5 years through 10 years	15,002	15,297
Due after 10 years	37,192	41,574
Total	$411,037	$ 416,127

Contractual maturities of investments in available-for-sale securities held at September 29, 2019 exclude $4.0 million of debt mutual funds as they do not have a contractual maturity date.

Derivatives

Teradyne conducts business in a number of foreign countries, with certain transactions denominated in local currencies. The purpose of Teradyne's foreign currency management is to minimize the effect of exchange rate fluctuations on certain foreign currency denominated monetary assets and liabilities. Teradyne does not use derivative financial instruments for trading or speculative purposes.

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.

The notional amount of foreign currency forward contracts at September 29, 2019 and December 31, 2018 was $114.9 million and $163.1 million, respectively.

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.

The following table summarizes the fair value of derivative instruments as of September 29, 2019 and December 31, 2018:

	Balance Sheet Location	September 29, 2019	December 31, 2018
		(in thousands)	
Derivatives not designated as hedging instruments:			
Foreign exchange contracts - derivative assets	Prepayments	$ 119	$ 79
Foreign exchange contracts - derivative liabilities	Other current liabilities	(489)	(514)
Total derivatives		$ (370)	$ (435)

The following table summarizes the effect of derivative instruments recognized in the statement of operations for the three and nine months ended September 29, 2019 and September 30, 2018.

	Location of Losses (Gains) Recognized in Statement of Operations	For the Three Months Ended		For the Nine Months Ended	
		September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
		(in thousands)			
Derivatives not designated as hedging instruments:					
Foreign exchange contracts	Other (income) expense, net	$ 3,699	$ (899)	$ 7,872	$ 2,502

(1) The table does not reflect the corresponding gains and losses from the remeasurement of monetary assets and liabilities denominated in foreign currencies.
(2) For the three months ended September 29, 2019, net gains from the remeasurement of monetary assets and liabilities denominated in foreign currencies were $1.5 million. For the nine months ended September 29, 2019, net gains from the remeasurement of monetary assets and liabilities denominated in foreign currencies were $3.4 million.
(3) For the three and nine months ended September 30, 2018, net losses from the remeasurement of monetary assets and liabilities denominated in foreign currencies were $3.7 million and $1.2 million, respectively.

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

H. LEASES

On January 1, 2019, Teradyne adopted ASC 842 using the modified retrospective approach. Under this method of adoption, the comparative information in the consolidated financial statements has not been revised and continues to be reported under the previously applicable lease accounting guidance (ASC 840). Adoption of ASC 842 resulted in recording ROU assets and lease liabilities of approximately $50.1 million and $54.3 million, respectively. The adoption of ASC 842 did not have a material impact on beginning retained earnings, the consolidated statement of operations, cash flows, or earnings per share.

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 ten years.

Total lease expense for the three months ended September 29, 2019 was $9.1 million and included $3.0 million of variable lease costs and $0.7 million of costs related to short-term leases which are not recorded on the consolidated balance sheets. Total lease expense for the nine months ended September 29, 2019 was $26.6 million and included $8.3 million of variable lease costs and $2.2 million of costs related to short-term leases which are not recorded on the consolidated balance sheets.

At September 29, 2019, the weighted average remaining lease term and weighted average discount rate for operating leases was 4.7 years and 5.0%, respectively.

Supplemental cash flow information related to leases was as follows:

	For the Three Months Ended September 29, 2019	For the Nine Months Ended September 29, 2019
	(in thousands)	
Cash paid for amounts included in the measurement of lease liabilities included in operating cash flows:	$ 4,946	$ 14,998
Right-of-use assets obtained in exchange for new lease obligations	8,315	23,727

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Maturities of lease liabilities as of September 29, 2019 were as follows:

	Operating Lease
	(in thousands)
2019	$ 5,520
2020	20,368
2021	16,045
2022	11,603
2023	6,135
Thereafter	13,285
Total lease payments	72,956
Less imputed interest	(7,757)
Total lease liabilities	$ 65,199

As of December 31, 2018, future non-cancelable rent obligations as determined under ASC 840 were as follows:

	Operating Lease (in thousands)
2019	$ 19,570
2020	18,293
2021	13,578
2022	9,693
2023	5,449
Thereafter	9,472
Total lease payments	$ 76,055

I. 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") due December 15, 2023 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 will mature on December 15, 2023, unless earlier repurchased or converted. The Notes bear interest from December 12, 2016 at a rate of 1.25% per year payable semiannually in arrears on June 15 and December 15 of each year, beginning on June 15, 2017. The Notes will be convertible at the option of the noteholders at any time prior to the close of business on the business day immediately preceding September 15, 2023, only under the following circumstances: (1) during any calendar quarter beginning after March 31, 2017 (and only during such calendar quarter), if the closing sale price of Teradyne's common stock, for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is greater than 130% of the conversion price on each applicable trading day; (2) during the five business day period after any five consecutive trading day period (the "measurement period") in which the trading price (as defined in the Indenture) per $1,000 principal amount of Notes for each trading day of the measurement period was less than 98% of the product of the closing sale price of the Teradyne's common stock and the conversion rate on each such trading day; and (3) upon the occurrence of specified corporate events. On or after September 15, 2023 until the close of business on the second scheduled trading day immediately preceding the maturity date, holders may convert their Notes at any time, regardless of the foregoing circumstances. Teradyne may satisfy its conversion obligation by paying or delivering cash, shares of its common stock or a combination of cash and shares of its common stock, at Teradyne's election. As of September 29, 2019, the conversion price was approximately $31.70 per share of Teradyne's common stock. The conversion rate is subject to adjustment under certain circumstances.

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, with a strike price equal to the conversion price of the Notes of $31.70. The Note Hedge Transactions cover, subject to customary anti-dilution adjustments, approximately 14.5 million shares of Teradyne's common stock.

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. The Warrant Transactions cover, subject to customary anti-dilution adjustments, approximately 14.5 million shares of common stock. As of September 29, 2019, the strike price of the warrants was approximately $39.78 per share. The strike price is subject to adjustment under certain circumstances. The Warrant Transactions could have a dilutive effect to Teradyne's common stock 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 Note Hedge Transactions are expected to reduce the potential dilution to Teradyne's common stock upon any conversion of the Notes. However, the Warrant Transactions could separately have a dilutive effect to the extent that the market value per share of Teradyne's common stock exceeds the applicable strike price of the warrant. 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.

Teradyne considered the guidance of ASC 815-40, *"Derivatives and Hedging—Contracts in Entity's Own Equity,"* and concluded that the convertible note hedge is both indexed to Teradyne's common stock and should be classified in stockholders' equity in its statements of financial position. The convertible note hedge is considered indexed to Teradyne's common stock as the terms of the Note Hedge Transactions do not contain an exercise contingency and the settlement amount equals the difference between the fair value of a fixed number of Teradyne's shares and a fixed strike price. Because the only variable that can affect the settlement amount is Teradyne's stock price, which is an input to the fair value of a fixed-for-fixed option contract, the convertible note hedge is considered indexed to Teradyne's common stock.

Teradyne assessed whether the convertible note hedge should be classified as equity under ASC815-40. In the Note Hedge Transactions contract the settlement terms permit net cash settlement or net share settlement, at the option of Teradyne. Therefore, the criteria as set forth in ASC 815-40 were evaluated by Teradyne. In reviewing the criteria, Teradyne noted the following: (1) the convertible note hedge does not require Teradyne to issue shares; (2) there is no requirement to net cash settle the convertible note hedge for failure to make timely filings with the SEC; (3) in the case of termination, the convertible note hedge is settled in the same consideration as the holders of the underlying stock; (4) the counterparty does not have rights that rank higher than those of a shareholder of the stock underlying the convertible note hedge; and (5) there is no requirement to post collateral. Based on its analysis of those criteria, Teradyne concluded that the convertible note hedge should be recorded in equity and no further adjustment should be made in future periods to adjust the value of the convertible note hedge.

Teradyne analyzed the Warrant Transactions under ASC 815-40, *"Derivatives and Hedging—Contracts in Entity's Own Equity,"* and other relevant literature, and determined that it met the criteria for classification as an equity transaction and is considered indexed to Teradyne's common stock. As a result, Teradyne recorded the proceeds from the warrants as an increase to additional paid-in capital. Teradyne does not recognize subsequent changes in fair value of the warrants in its financial statements.

The provisions of ASC 470-20, "*Debt with Conversion and Other Options,*" are applicable to the Notes. ASC 470-20 requires Teradyne to separately account for the liability (debt) and equity (conversion feature) components of the Notes in a manner that reflects Teradyne's nonconvertible debt borrowing rate at the date of issuance when interest cost is recognized in subsequent periods. Teradyne allocated $100.8 million of the $460.0 million principal amount of the Notes to the equity component, which represents a discount to the debt and will be amortized to interest expense using the effective interest method through December 2023. Accordingly, Teradyne's effective annual interest rate on the Notes will be approximately 5.0%. The Notes are classified as long-term debt in the balance sheet based on their December 15, 2023 maturity date. Debt issuance costs of approximately $7.2 million are being amortized to interest expense using the effective interest method over the seven-year term of the Notes. As of September 29, 2019, debt issuance costs were approximately $4.6 million.

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

	September 29, 2019	December 31, 2018
	(in thousands)	
Debt Principal	$ 460,000	$ 460,000
Unamortized discount	69,058	80,019
Net Carrying amount of convertible debt	$ 390,942	$ 379,981

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands)			
Contractual interest expense on the coupon	$ 1,438	$ 1,438	$ 4,313	$ 4,313
Amortization of the discount component recognized as interest expense	3,699	3,520	10,961	10,431
Total interest expense on the convertible debt	$ 5,137	$ 4,958	$ 15,274	$ 14,744

As of September 29, 2019, the remaining unamortized discount was $69.1 million, which will be amortized over 4.3 years using the effective interest rate method. The carrying amount of the equity component was $100.8 million. As of September 29, 2019, the if-converted value of the Notes was $832.9 million.

Revolving Credit Facility

On June 27, 2019, Teradyne terminated its credit agreement, which Teradyne entered into with Barclays Bank PLC, on April 27, 2015. The terminated credit agreement provided for a five-year, senior secured revolving credit facility of up to $350 million.

J. PREPAYMENTS

Prepayments consist of the following and are included in prepayments and other assets on the balance sheet:

	September 29, 2019	December 31, 2018
	(in thousands)	
Contract manufacturer and supplier prepayments	$ 136,470	$ 131,642
Prepaid taxes	9,754	9,646
Prepaid maintenance and other services	8,310	8,487
Other prepayments	17,180	12,744
Total prepayments	$ 171,714	$ 162,519

K. DEFERRED REVENUE AND CUSTOMER ADVANCES

Deferred revenue and customer advances consist of the following and are included in short and long-term deferred revenue and customer advances on the balance sheet:

	September 29, 2019	December 31, 2018
	(in thousands)	
Maintenance and training	$ 61,048	$ 58,362
Extended warranty	29,937	27,422
Customer advances, undelivered performance obligations and other	47,543	24,677
Total deferred revenue and customer advances	$ 138,528	$ 110,461

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L. PRODUCT WARRANTY

Teradyne generally provides a one-year warranty on its products, commencing upon installation, acceptance, delivery 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 warranty balance below is included in other accrued liabilities on the balance sheet.

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands)			
Balance at beginning of period	$ 8,133	$ 7,136	$ 7,909	$ 8,200
Acquisition	—	—	14	41
Accruals for warranties issued during the period	3,508	2,760	10,008	9,171
Accruals related to pre-existing warranties	1,132	282	3,156	109
Settlements made during the period	(4,265)	(2,675)	(12,579)	(10,018)
Balance at end of period	$ 8,508	$ 7,503	$ 8,508	$ 7,503

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 on the balance sheet.

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands)			
Balance at beginning of period	$ 28,716	$ 25,971	$ 27,422	$ 24,438
Deferral of new extended warranty revenue	5,666	7,232	16,962	19,072
Recognition of extended warranty deferred revenue	(4,445)	(5,586)	(14,447)	(15,893)
Balance at end of period	$ 29,937	$ 27,617	$ 29,937	$ 27,617

M. STOCK-BASED COMPENSATION

On July 17, 2019 (the “Retirement Date”), former Chief Financial Officer Gregory Beecher retired as Vice President and Senior Advisor of Teradyne, and Teradyne entered into an agreement (the “Retirement Agreement”) with Mr. Beecher. Under the Retirement Agreement, Mr. Beecher’s unvested time-based restricted stock units and stock options granted prior to 2019 were modified to allow continued vesting; unvested time-based restricted stock units and stock options granted in 2019 were modified to allow continued vesting through January 31, 2023 (the “Non-Competition Period”) in a pro-rated amount based on the number of days that Mr. Beecher was employed during 2019; unvested, performance-based restricted stock units awarded in 2019 will vest on the date the amount of shares underlying the performance-based restricted stock units are determined in a pro-rated amount of shares based on the number of days that Mr. Beecher was employed during 2019; vested options or options that vest during the Non-Competition Period may be exercised for the remainder of the applicable option term.

During the three and nine months ended September 29, 2019, Teradyne recorded a stock based compensation expense of $2.1 million related to the Retirement Agreement.

Under Teradyne’s stock compensation plans, Teradyne grants 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”).

Time-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 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 200% to 0% of the target shares capped at four times the grant date value. 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.

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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 employees meeting the retirement provisions prior to the grant date will be recognized in full on the date of 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.

During the nine months ended September 29, 2019 and September 30, 2018, Teradyne granted PRSUs to its executive officers with 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 othernon-recurring gains and charges. The final number of PBIT PRSUs that vest will vary based upon the level of performance achieved from 200% to 0% 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 employees meeting the retirement provisions prior to the grant date will be recognized in full on the date of 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.

During the nine months ended September 29, 2019 and September 30, 2018, Teradyne granted0.1 million and 0.1 million TSR PRSUs, respectively, with a grant date fair value of $51.51 and $54.85, respectively. The fair value was estimated using the Monte Carlo simulation model with the following assumptions:

	For the Nine Months Ended	
	September 29, 2019	September 30, 2018
Risk-free interest rate	2.6%	2.2%
Teradyne volatility-historical	31.9%	26.8%
NYSE Composite Index volatility-historical	11.9%	12.4%
Dividend yield	1.0%	0.8%

Expected volatility was based on the historical volatility of Teradyne's stock and the NYSE Composite Index for each of the 2019 and 2018 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 $0.36 per share, divided by Teradyne's stock price on the grant date of $37.95 for the 2019 grants and $47.70 for the 2018 grants.

During the nine months ended September 29, 2019 and September 30, 2018, Teradyne granted0.1 million and 0.1 million, respectively, of PBIT PRSUs with a grant date fair value of $36.88 and $46.62, respectively.

During the nine months ended September 29, 2019, Teradyne granted0.7 million of service-based restricted stock unit awards to employees at a weighted average grant date fair value of $36.85, 0.1 million of service-based restricted stock unit awards tonon-employee directors at a weighted average grant date fair value of $48.03, and 0.1 million of service-based stock options to executive officers at a weighted average grant date fair value of $10.61.

During the nine months ended September 30, 2018, Teradyne granted0.6 million of service-based restricted stock unit awards to employees at a weighted average grant date fair value of $46.25, 0.1 million of service-based restricted stock unit awards tonon-employee directors at a weighted average grant date fair value of $35.81, and 0.1 million of service-based stock options to executive officers at a weighted average grant date fair value of $12.17.

Restricted stock unit awards granted to employees vest in equal annual installments over four years. Stock options to purchase Teradyne's common stock at 100% of the fair market value on the grant date vest in equal annual installments overfour years from the grant date and have a maximum term of seven years.

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

	For the Nine Months Ended	
	September 29, 2019	September 30, 2018
Expected life (years)	5.0	5.0
Risk-free interest rate	2.5%	2.4%
Volatility-historical	30.1%	26.4%
Dividend yield	1.0%	0.8%

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 $0.36 per share divided by Teradyne's stock price on the grant date of $37.95 for the 2019 grants and $47.70 for the 2018 grants.

N. ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

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

	Foreign Currency Translation Adjustment	Unrealized Gains (Losses) on Marketable Securities	Retirement Plans Prior Service Credit	Total
	(in thousands)			
Nine Months Ended September 29, 2019				
Balance at December 31, 2018, net of tax of $0, $(521), $(1,081), respectively	$ (12,523)	$ (1,845)	$ 1,328	$(13,040)
Other comprehensive loss before reclassifications, net of tax of $0, $1,762, $0, respectively	(17,019)	6,391	—	(10,628)
Amounts reclassified from accumulated other comprehensive income, net of tax of $0, $(125), $(32), respectively	—	(442)	(111)	(553)
Net current period other comprehensive income (loss), net of tax of $0, $1,637, $(32), respectively	(17,019)	5,949	(111)	(11,181)
Balance at September 29, 2019, net of tax of $0, $1,116, $(1,113), respectively	$ (29,542)	$ 4,104	$ 1,217	$(24,221)

	Foreign Currency Translation Adjustments	Unrealized Gains (Losses) on Marketable Securities	Retirement Plans Prior Service Credit	Total
	(in thousands)			
Nine Months Ended September 30, 2018				
Balance at December 31, 2017, net of tax of $0, $1,815, $(932), respectively	$ 15,919	$ 1,362	$ 1,495	$ 18,776
Other comprehensive income (loss) before reclassifications, net of tax of $0, $(806), $0, respectively	(11,568)	(2,555)	—	(14,123)
Amounts reclassified from accumulated other comprehensive income, net of tax of $0, $(6), $(53), respectively	—	1,411	(184)	1,227
Net current period other comprehensive income (loss), net of tax of $0, $(812), $(53), respectively	(11,568)	(1,144)	(184)	(12,896)
Reclassification of income tax effects from the Tax Reform Act, net of tax of $0, $(691), $(78), respectively	—	691	78	769
Reclassification of unrealized gains on equity securities, net of tax of $0, $(902), $0, respectively	—	(3,125)	—	(3,125)
Balance at September 30, 2018, net of tax of $0, $(590), $(1,063), respectively	$ 4,351	$ (2,216)	$ 1,389	$ 3,524

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Reclassifications out of accumulated other comprehensive income (loss) to the statement of operations for the three and nine months ended September 29, 2019 and September 30, 2018 were as follows:

Details about Accumulated Other Comprehensive Income Components	For the Three Months Ended September 29, 2019	For the Three Months Ended September 30, 2018	For the Nine Months Ended September 29, 2019	For the Nine Months Ended September 30, 2018	Affected Line Item in the Statements of Operations
	(in thousands)				
Available-for-sale marketable securities:					
Unrealized gains (losses), net of tax of $99, $17, $125, $6, respectively	$ 345	$ 57	$ 442	$ (1,411)	Interest income (expense)
Defined benefit pension and postretirement plans:					
Amortization of prior service benefit, net of tax of $11, $18, $32, $53 respectively	37	61	111	184	(a)
Total reclassifications, net of tax of $110, $35, $157, $59, respectively	$ 382	$ 118	$ 553	$ (1,227)	Net income

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

O. GOODWILL AND ACQUIRED INTANGIBLE ASSETS

Goodwill

Teradyne performs its annual goodwill impairment test as required under the provisions of ASC350-10, *"Intangibles—Goodwill and Other"* on December 31 of each fiscal year unless interim indicators of impairment exist. Goodwill is considered impaired when the net book value of a reporting unit exceeds its estimated fair value.

The changes in the carrying amount of goodwill by reportable segments for the nine months ended September 29, 2019 were as follows:

	Industrial Automation	System Test	Wireless Test	Semiconductor Test	Total
	(in thousands)				
Balance at December 31, 2018					
Goodwill	$ 363,358	$ 158,699	$ 361,819	$ 260,540	$1,144,416

Accumulated impairment losses	—	(148,183)	(353,843)	(260,540)	(762,566)
	363,358	10,516	7,976	—	381,850
Lemsys acquisition	—	—	—	1,428	1,428
Foreign currency translation adjustment	(12,572)	—	—	11	(12,561)
Balance at September 29, 2019					
Goodwill	350,786	158,699	361,819	261,979	1,133,283
Accumulated impairment losses	—	(148,183)	(353,843)	(260,540)	(762,566)
	$ 350,786	$ 10,516	$ 7,976	$ 1,439	$ 370,717

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.

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

	September 29, 2019			
	Gross Carrying Amount (1) (2)	Accumulated Amortization (2)	Foreign Currency Translation Adjustment	Net Carrying Amount
	(in thousands)			
Developed technology	$ 337,198	$ (272,317)	$ (6,461)	$ 58,420
Customer relationships	100,313	(89,540)	(562)	10,211
Tradenames and trademarks	64,670	(35,368)	(1,360)	27,942
Total intangible assets	$ 502,181	$ (397,225)	$ (8,383)	$ 96,573

	December 31, 2018			
	Gross Carrying Amount	Accumulated Amortization	Foreign Currency Translation Adjustment	Net Carrying Amount
	(in thousands)			
Developed technology	$ 336,308	$ (252,080)	$ (4,079)	$ 80,149
Customer relationships	97,153	(83,448)	(340)	13,365
Tradenames and trademarks	64,420	(31,653)	(799)	31,968
Non-compete agreement	320	(320)	—	—
Backlog	30	(30)	—	—
Total intangible assets	$ 498,231	$ (367,531)	$ (5,218)	$125,482

(1) $4.6 million of intangible assets from Lemsys acquisition have been added in January 2019.
(2) $0.7 million of amortizable intangible assets became fully amortized and have been removed from the gross carrying amount and accumulated amortization.

Aggregate intangible asset amortization expense was $9.6 million and $30.4 million, respectively, for the three and nine months ended September 29, 2019 and $11.1 million and $28.6 million, respectively, for the three and nine months ended September 30, 2018.

Estimated intangible asset amortization expense for each of the five succeeding fiscal years is as follows:

Year	Amortization Expense (in thousands)
2019 (remainder)	8,694
2020	24,232
2021	14,340
2022	13,447
2023	12,976
Thereafter	22,884

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P. NET INCOME PER COMMON SHARE

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

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands, except per share amounts)			

Net income for basic and diluted net income per share	$ 135,860	$ 119,981	$ 342,395	$ 307,991
Weighted average common shares-basic	169,641	185,744	171,471	190,576
Effect of dilutive potential common shares:				
Incremental shares from assumed conversion of convertible notes (1)	5,800	3,025	4,117	3,356
Convertible note hedge warrant shares (2)	3,580	108	1,786	646
Restricted stock units	1,313	1,331	1,112	1,406
Stock options	155	275	186	290
Employee stock purchase plan	5	22	13	26
Dilutive potential common shares	10,853	4,761	7,214	5,724
Weighted average common shares-diluted	180,494	190,505	178,685	196,300
Net income per common share-basic	$ 0.80	$ 0.65	$ 2.00	$ 1.62
Net income per common share-diluted	$ 0.75	$ 0.63	$ 1.92	$ 1.57

(1) Incremental shares from assumed conversion of the convertible notes were calculated using the difference between the average Teradyne stock price for the period and the conversion price of $31.70, multiplied by 14.5 million 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.

(2) Convertible note hedge warrant shares were calculated using the difference between the average Teradyne stock price for the period and the warrant price of $39.78, multiplied by 14.5 million 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.

The computation of diluted net income per common share for the three and nine months ended September 29, 2019 excludes the effect of the potential vesting of 0.1 million of stock options, because the effect would have been anti-dilutive.

The computation of diluted net income per share for the nine months ended September 29, 2019 excludes the effect of the potential vesting of 0.2 million of restricted stock units because the effect would have been anti-dilutive.

The computation of diluted net income per common share for the three and nine months ended September 30, 2018 excludes the effect of the potential vesting of 0.5 million shares of restricted stock units because the effect would have been anti-dilutive.

Q. RESTRUCTURING AND OTHER

During the three months ended September 29, 2019, Teradyne recorded a $7.8 million gain for the decrease in the fair value of the MiR contingent consideration liability, partially offset by $0.5 million recorded for employee severance charges primarily in Industrial Automation, $0.5 million for acquisition related compensation and expenses, and $0.3 million of fixed assets impairment in Wireless Test

During the three months ended September 30, 2018, Teradyne recorded $1.7 million for employee severance charges, primarily in Semiconductor Test and $0.8 million for acquisition related compensation, partially offset by a $0.8 million gain for the decrease in the fair value of the Universal Robots contingent consideration liability.

During the nine months ended September 29, 2019, Teradyne recorded a $16.5 million gain for the decrease in the fair value of the MiR contingent consideration liability, partially offset by $2.1 million recorded for employee severance charges primarily in Semiconductor Test and Industrial Automation, $2.3 million for acquisition related expenses and compensation, and $0.3 million of fixed assets impairment in Wireless Test.

During the nine months ended September 30, 2018, Teradyne recorded $7.9 million for employee severance charges, primarily in Semiconductor Test, and $4.1 million for acquisition related compensation and expenses, partially offset by a $9.2 million gain for the decrease in the fair value of the Universal Robots contingent consideration liability.

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R. RETIREMENT PLANS

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

Defined Benefit Pension Plans

Teradyne has defined benefit pension plans covering a portion of domestic employees and employees of certainnon-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 these plans in accordance with local laws and to the extent that such contributions are tax deductible. The assets of the U.S. qualified pension plan consist primarily of fixed income and equity securities. In addition, Teradyne has unfunded qualified foreign plans as well as 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 ("IRC").

In the nine months ended September 29, 2019, Teradyne contributed $2.1 million to the U.S. supplemental executive defined benefit pension plan and $0.6 million to certain qualified pension plans fornon-U.S. subsidiaries.

For the three and nine months ended September 29, 2019 and September 30, 2018, Teradyne's net periodic pension cost was comprised of the following:

For the Three Months Ended

	September 29, 2019		September 30, 2018	
	United States	Foreign	United States	Foreign
	(in thousands)			
Service cost	$ 402	$ 183	$ 538	$ 203
Interest cost	1,797	168	1,750	177
Expected return on plan assets	(1,510)	(7)	(1,551)	(5)
Amortization of prior service cost	—	—	14	—
Settlement loss	—	—	267	—
Total net periodic pension cost	$ 689	$ 344	$ 1,018	$ 375

	For the Nine Months Ended			
	September 29, 2019		September 30, 2018	
	United States	Foreign	United States	Foreign
	(in thousands)			
Service cost	$ 1,206	$ 550	$ 1,657	$ 609
Interest cost	5,392	505	7,188	532
Expected return on plan assets	(4,531)	(21)	(7,484)	(15)
Amortization of prior service cost	—	—	43	—
Net actuarial loss (gain)	252	—	(189)	—
Settlement loss	—	—	345	—
Total net periodic pension cost	$ 2,319	$ 1,034	$ 1,560	$ 1,126

Postretirement Benefit Plan

In addition to receiving pension benefits, Teradyne employees in the United States 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.

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For the three and nine months ended September 29, 2019 and September 30, 2018, Teradyne's net periodic postretirement benefit cost was comprised of the following:

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands)			
Service cost	$ 10	$ 10	$ 31	$ 29
Interest cost	87	49	260	147
Amortization of prior service credit	(48)	(93)	(143)	(280)
Net actuarial loss	—	—	196	40
Special termination benefits	—	601	—	3,419
Total net periodic postretirement benefit cost	$ 49	$ 567	$ 344	$ 3,355

S. COMMITMENTS AND CONTINGENCIES

Purchase Commitments

As of September 29, 2019, Teradyne had entered into purchase commitments for certain components and materials. The purchase commitments covered by the agreements aggregate to approximately $360.3 million, of which $354.2 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. In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on Teradyne's results of operations, financial condition or cash flows.

T. INCOME TAXES

A reconciliation of the United States federal statutory corporate tax rate to Teradyne's effective tax rate was as follows:

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
US statutory federal tax rate	21.0%	21.0%	21.0%	21.0%
Discrete expense related to U.S. transition tax	—	—	3.9	0.0
Foreign taxes	(5.1)	(4.4)	(4.9)	(3.7)
International provisions of the U.S. Tax Cuts and Jobs Act of 2017	(2.8)	(1.4)	(0.6)	(1.4)
Tax credits	(1.8)	(1.9)	(2.2)	(2.1)
Discrete benefit related to equity compensation	(0.7)	(0.1)	(1.5)	(2.2)

Discrete benefit related to release of reserves for uncertain tax positions	—	(0.1)	(6.9)	—
Other, net	(0.1)	1.7	0.4	2.0
Effective tax rate	10.5%	14.8%	9.2%	13.6%

On a quarterly basis, Teradyne evaluates the realizability of the deferred tax assets by jurisdiction and assesses the need for a valuation allowance. As of September 29, 2019, Teradyne believes that it will ultimately realize the deferred tax assets recorded on the condensed consolidated balance sheet. However, should Teradyne believe that it is more-likely-than-not that the deferred tax assets would not be realized, the tax provision would increase in the period in which Teradyne determined that the realizability was not likely. Teradyne considers the probability of future taxable income and historical profitability, among other factors, in assessing the realizability of the deferred tax assets.

As of September 29, 2019 and December 31, 2018, Teradyne had $13.6 million and $43.4 million, respectively, of reserves for uncertain tax positions. The $29.8 million net decrease in reserves for uncertain tax positions is primarily composed of reductions in uncertain tax positions amounting to $22.4 million related to transfer pricing and $7.2 million associated with U.S. research and development tax credits. These reductions primarily resulted from the conclusion of the U.S. Federal income tax audit for the year ended December 31, 2015.

As of September 29, 2019, Teradyne does not anticipate a material change in the balance of unrecognized tax benefits during the next twelve months.

On July 27, 2015, in Altera Corp. v. Commissioner ("Altera"), 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 Ninth Circuit Federal Court issued a decision that was subsequently withdrawn and a reconstituted panel has conferred on the appeal. On June 7, 2019, the Ninth Circuit Federal Court upheld the cost-sharing regulations. Due to the uncertainty surrounding the status of the current regulations, questions related to the scope of potential benefits or obligations, the outcome of the appeals process, and questions regarding jurisdiction, Teradyne has not established any income tax reserves as of September 29, 2019 related to Altera. Teradyne estimates that including stock-based compensation in Teradyne's intercompany cost-sharing arrangement could result in a potential tax reserve of $5 million to $11 million. Teradyne will continue to monitor ongoing developments and potential impacts to our consolidated financial statements.

Teradyne recognizes interest and penalties related to income tax matters in income tax expense. As of September 29, 2019 and December 31, 2018, $0.5 million and $0.3 million, respectively, of interest and penalties were accrued for uncertain tax positions. For the nine months ended September 29, 2019 and September 30, 2018, expense of $0.2 million and $0.1 million, respectively, was recorded for interest and penalties related to income tax items.

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 due to the tax holiday for the nine months ended September 29, 2019 was $12.0 million, or $0.07 per diluted share. The tax savings due to the tax holiday for the nine months ended September 30, 2018 was $8.9 million, or $0.05 per diluted share. The tax holiday is scheduled to expire on December 31, 2020.

U. SEGMENT INFORMATION

Teradyne has four reportable segments (Semiconductor Test, System Test, Industrial Automation and Wireless Test). Each of the Semiconductor Test, System Test, and Wireless Test segments is also an individual operating segment. The Industrial Automation reportable segment consists of operating segments with discrete financial information, which have been combined into one reportable segment as they share similar economic characteristics, types of products, production processes, distribution channels, and currency risks. 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 defense/aerospace instrumentation test, storage test and circuit-board test. The Industrial Automation segment includes operations related to the design, manufacturing and marketing of collaborative robotic arms, autonomous mobile robots and advanced robotic control software. The Wireless Test segment includes operations related to the design, manufacturing and marketing of wireless test products and services.

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 in effect are described in Note B: "Accounting Policies" in Teradyne's Annual Report on Form 10-K for the year ended December 31, 2018, and Note B: "Accounting Policies" in this filing for any changes in the three and nine months ended September 29, 2019.

Segment information for the three and nine months ended September 29, 2019 and September 30, 2018 is as follows:

	Semiconductor Test	Industrial Automation	System Test	Wireless Test	Corporate and Other	Consolidated
			(in thousands)			
Three Months Ended September 29, 2019						
Revenues	$ 397,737	$ 68,892	$ 73,305	$ 42,264	$ (160)	$ 582,038
Income (loss) before income taxes (1)(2)	116,633	(1,645)	24,381	11,182	1,182	151,733
Total assets (3)	757,422	580,635	126,452	94,789	1,139,493	2,698,791
Three Months Ended September 30, 2018						
Revenues	$ 417,297	$ 65,913	$ 49,606	$ 34,304	$ (272)	$ 566,848
Income (loss) before income taxes (1)(2)	126,638	940	9,056	7,843	(3,633)	140,844

Total assets (3)	709,616	617,741	83,160	79,986	1,391,984	2,882,487
Nine Months Ended September 29, 2019						
Revenues	$ 1,113,489	$ 209,753	$204,934	$112,541	$ (402)	$ 1,640,315
Income (loss) before income taxes (1)(2)	291,037	(10,670)	63,254	25,740	7,528	376,889
Total assets (3)	757,422	580,635	126,452	94,789	1,139,493	2,698,791
Nine Months Ended September 30, 2018						
Revenues	$ 1,150,712	$ 176,803	$162,308	$ 92,023	$ (602)	$ 1,581,244
Income (loss) before income taxes (1)(2)	305,876	(1,198)	35,296	18,615	(1,914)	356,675
Total assets (3)	709,616	617,741	83,160	79,986	1,391,984	2,882,487

(1) Included in Corporate and Other are: contingent consideration adjustments, severance charges, interest income and expense, net foreign exchange gains (losses), intercompany eliminations, acquisition related expenses and compensation, pension and postretirement plans actuarial losses and an expense for the modification of Teradyne's former chief financial officer's outstanding equity awards.

(2) Included in the income (loss) before income taxes for each of the segments are charges and credits related to restructuring and other and inventory charges.

(3) Total business assets are directly attributable to each business. 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 Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
	(in thousands)			
Semiconductor Test:				
Cost of revenues—inventory charge	$ 1,867	$ 2,071	$ 5,319	$ 5,851
Restructuring and other—employee severance	—	1,716	1,009	7,657
Industrial Automation:				
Restructuring and other—acquisition related expenses	$ —	$ 811	$ 1,330	$ 811
Restructuring and other—employee severance	—	—	604	—
Cost of revenues—inventory charge	—	—	508	680
System Test:				
Cost of revenues—inventory charge	$ —	$ —	$ 1,129	$ 812
Wireless Test:				
Cost of revenues—inventory charge	$ 724	$ 716	$ 1,892	$ 2,179
Corporate and Other:				
Restructuring and other—MiR contingent consideration adjustment	$ (7,759)	$ —	$ (16,427)	$ —
Selling and administrative – equity modification charge	2,108	—	2,108	—
Restructuring and other—acquisition related expenses and compensation	816	—	928	3,318
Restructuring and other—Universal Robots contingent consideration adjustment	—	(768)	—	(9,236)

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V. SHAREHOLDERS' EQUITY

Stock Repurchase Program

In January 2018, Teradyne's Board of Directors cancelled the December 2016 stock repurchase program and authorized a new stock repurchase program for up to $1.5 billion of common stock. Teradyne intends to repurchase $500 million in 2019.

During the nine months ended September 29, 2019, Teradyne repurchased 8.8 million shares of common stock for $368.8 million at an average price of $41.93 per share. The cumulative repurchases under the $1.5 billion stock repurchase program as of September 29, 2019 totaled30.4 million shares of common stock for $1.2 billion at an average price per share of $39.18.

During the nine months ended September 30, 2018, Teradyne repurchased 13.8 million shares of common stock for $562.3 million at an average price of $40.62 per share.

The total price includes commissions and is recorded as a reduction to retained earnings.

Dividend

Holders of Teradyne's common stock are entitled to receive dividends when they are declared by Teradyne's Board of Directors.

In January 2019, May 2019 and August 2019, Teradyne's Board of Directors declared a quarterly cash dividend of $0.09 per share. Dividend payments for the three and nine months ended September 29, 2019 were $15.3 million and $46.3 million, respectively.

In January 2018, May 2018 and August 2018, Teradyne's Board of Directors declared a quarterly cash dividend of $0.09 per share. Dividend payments for the three and nine months ended September 30, 2018 were $16.6 million and $51.3 million, respectively.

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.

W. SUBSEQUENT EVENTS

On October 18, 2019, Teradyne entered into an agreement to acquire100% of the equity of AutoGuide, LLC ("AutoGuide"), a maker of high-payload autonomous mobile robots (AMRs), an emerging and fast growing segment of the global forklift market for $58 million of cash and up to $107 million in earn-outs potentially through 2022. AutoGuide is based in Chelmsford, MA. AutoGuide's AMRs are used for material transport of payloads up to 4,500 kg in manufacturing, warehouse and logistics applications. These products complement MiR's lower payload products. The acquisition of AutoGuide is expected to close in the fourth quarter of 2019, subject to customary closing conditions and regulatory approval. AutoGuide will be included in Teradyne's Industrial Automation segment.

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

Statements in this Quarterly Report on Form10-Q which are not historical facts, so called "forward-looking statements," are made pursuant to the safe harbor provisions of Section 21E of the Securities Exchange Act of 1934, as amended. Investors are cautioned that all forward-looking statements involve risks and uncertainties, including those detailed in our filings with the Securities and Exchange Commission. See also Part II, Item 1A of this Quarterly Report on Form 10-Q and Part I, Item 1A "Risk Factors" in our Annual Report on Form10-K for the year ended December 31, 2018. Readers are cautioned not to place undue reliance on these forward-looking statements which reflect management's analysis only as of the date hereof. We assume no obligation to update these forward-looking statements to reflect actual results or changes in factors or assumptions affecting forward-looking statements, except as may be required by law.

Overview

We are a leading global supplier of automation equipment for test and industrial applications. We design, develop, manufacture and sell automatic test systems used to test semiconductors, wireless products, data storage and complex electronics systems in the consumer electronics, wireless, automotive, industrial, computing, communications, and aerospace and defense industries. Our industrial automation products include collaborative robotic arms, autonomous mobile robots and advanced robotic control software used by global manufacturing and light industrial customers to improve quality, increase manufacturing and material handling efficiency and decrease manufacturing costs. Our automatic test equipment and industrial automation products and services include:

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

We have a customer base which includes integrated device manufacturers ("IDMs"), outsourced semiconductor assembly and test providers ("OSATs"), original equipment manufacturers ("OEMs"), wafer foundries, fabless companies that design, but contract with others for the manufacture of integrated circuits ("ICs"), developers of wireless devices and consumer electronics, manufacturers of circuit boards, automotive suppliers, wireless product manufacturers, storage device manufacturers, aerospace and military contractors, and distributors that sell collaborative robots, autonomous mobile robots and wireless test systems. The sales of our products and services are dependent, to a large degree, on these customers who are subject to cyclical trends in the demand for their products. These cyclical periods have had, and will continue to have, a significant effect on our business because our customers often delay or accelerate purchases in reaction to changes in their businesses and to demand fluctuations in the semiconductor, electronics and industrial automation industries. Historically, these demand fluctuations have resulted in significant variations in our results of operations.

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 test 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 the nine months ended September 29, 2019, revenue in our test businesses has exceeded forecasts as a result of semiconductor test demand in China, early 5G test investments and strength in our System Test businesses. It is difficult to predict whether these positive trends will continue in 2020.

In the nine months ended September 29, 2019, the revenue growth of our industrial automation business was below our forecast. We expect 2019 full year revenue growth of our industrial automation business to be under the low end of our long-term range of 30% to 40%. We will continue to invest in our industrial automation businesses to position us for returning to our long-term range of 30% to 40% growth when industrial activity and investment increase.

On February 26, 2018, we acquired Energid Technologies Corporation ("Energid") for a total purchase price of approximately $27.6 million. Energid's technology enables and simplifies the programming of complex robotic motions used in a wide variety of end markets, ranging from heavy industry to healthcare, utilizing both traditional robots and collaborative robots.

On April 25, 2018, we acquired Mobile Industrial Robots ApS ("MiR"), a Danish limited liability company. MiR is the leading maker of collaborative autonomous mobile robots for industrial applications. The total purchase price was approximately $197.8 million, which included cash paid of approximately $145.2 million and $52.6 million in fair value of contingent consideration payable upon achievement of certain thresholds and targets for revenue and earnings before interest and taxes through 2020. Contingent consideration for 2018 was $30.8 million and was paid in March 2019. The maximum payment for the remaining MiR contingent consideration that could be paid is $81.0 million.

MiR and Energid are included in our Industrial Automation segment.

On January 30, 2019, we acquired all of the issued and outstanding shares of Lemsys SA ("Lemsys") for a total purchase price of approximately $9.1 million. Lemsys strengthens our position in the electrification trends of vehicles, solar, wind, and industrial applications. Lemsys is included in our Semiconductor Test segment.

On June 3, 2019, we invested $15 million in RealWear, Inc. ("RealWear"). RealWear, a private company, develops and sells advanced wearable technology including industrial, hands-free, head-mounted augmented reality devices that make the workplace safer and more productive. Our investment in RealWear aligns with our strategy of bringing the power of advanced automation to companies of all sizes to improve the productivity of their employees and the quality of their products and services.

On October 18, 2019, we entered into an agreement to acquire 100% of the equity of AutoGuide, LLC ("AutoGuide"), a maker of high-payload autonomous mobile robots (AMRs), an emerging and fast growing segment of the global forklift market for $58 million of cash and up to $107 million in earn-outs potentially through 2022. AutoGuide is based in Chelmsford, MA. AutoGuide's AMRs are used for material transport of payloads up to 4,500 kg in manufacturing, warehouse and logistics applications. These products complement MiR's lower payload products. The acquisition of AutoGuide is expected to close in the fourth quarter of 2019, subject to customary closing conditions and regulatory approval. AutoGuide will be included in Teradyne's Industrial Automation segment.

We believe our recent acquisitions and investments have enhanced our opportunities for growth. We intend to continue to invest in our business, grow market share in our markets and expand further our addressable markets while tightly managing our costs.

Critical Accounting Policies and Estimates

We have identified the policies which are critical to understanding our business and our results of operations. There have been no significant changes during the three and nine months ended September 29, 2019 to the items disclosed as our critical accounting policies and estimates in Management's Discussion and Analysis of Financial Condition and Results of Operations in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018, except as noted below.

Investment in Other Company

We hold an investment in a private company that develops and sells advanced wearable technology. We do not have the ability to exert significant influence over the company. The investment was recorded at cost and is evaluated for impairment or an indication of changes in fair value resulting from observable price changes in orderly transactions for the identical or a similar investment of the same issuer on a quarterly basis. See Note D: "Acquisitions and Investment in Other Company."

Leases

In February 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU")2016-02, *"Leases (Topic 842)"* ("Topic 842"), which requires a lessee to record a right-of-use ("ROU") asset and a lease liability on the balance sheet for operating leases with terms longer than twelve months. We adopted this standard and the related amendments (collectively "ASC 842") on January 1, 2019 and utilized the modified retrospective approach provided by ASU 2018-11, *"Leases (Topic 842): Targeted Improvements,"* that allowed for a cumulative effect adjustment in the period of adoption. Under this method of adoption, the comparative information in the consolidated financial statements has not been revised and continues to be reported under the previously applicable lease accounting guidance (ASC 840). We also utilized the package of practical expedients permitted under the transition guidance which included the carry-forward of historical lease classification. Adoption of ASC 842 resulted in recording ROU assets and lease liabilities of approximately $50.1 million and $54.3 million, respectively. Operating lease liabilities were calculated using the discount rate on January 1, 2019. The adoption of ASC 842 did not have a material impact on beginning retained earnings, the consolidated statement of operations, cash flows, or earnings per share.

Under ASC 842, a contract is or contains a lease when we have the right to control the use of an identified asset. We determine 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. As of September 29, 2019, we do not have material leases that have not yet commenced.

We determine if the lease is operating or finance 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.

For leases commencing after January 1, 2019, 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 we are typically unable to determine the implicit rate, we use an incremental borrowing rate based on the lease term and economic environment at commencement date. We initially measure 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 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.

Our contracts often include non-lease components such as common area maintenance. We 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 we 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. We include lease costs within cost of revenues and operating expenses.

Preparation of Financial Statements and Use of Estimates

The preparation of consolidated financial statements requires management to make estimates and judgments that affect the amounts reported in the financial statements. Actual results may differ significantly from these estimates.

SELECTED RELATIONSHIPS WITHIN THE CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS

	For the Three Months Ended		For the Nine Months Ended	
	September 29, 2019	September 30, 2018	September 29, 2019	September 30, 2018
Percentage of revenues:				
Revenues:				
Products	84%	83%	82%	83%
Services	16	17	18	17
Total revenues	100	100	100	100
Cost of revenues:				
Cost of products	34	34	34	35
Cost of services	7	7	8	7
Total cost of revenues (exclusive of acquired intangible assets amortization shown separately below)	41	41	42	42
Gross profit	59	59	58	58
Operating expenses:				
Selling and administrative	19	18	20	18
Engineering and development	13	14	14	14
Acquired intangible assets amortization	2	2	2	2
Restructuring and other	(1)	—	(1)	—
Total operating expenses	33	34	35	35
Income from operations	27	25	23	23
Non-operating (income) expense:				
Interest income	(1)	(1)	(1)	(1)
Interest expense	1	1	1	1
Other (income) expense, net	—	1	—	—
Income before income taxes	26	25	23	23
Income tax provision	3	4	2	3
Net income	23%	21%	21%	19%

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Results of Operations

Third Quarter 2019 Compared to Third Quarter 2018

Revenues

Revenues by our four reportable segments were as follows:

	For the Three Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Semiconductor Test	$ 397.7	$ 417.3	$ (19.6)
System Test	73.3	49.6	23.7
Industrial Automation	68.9	65.9	3.0
Wireless Test	42.3	34.3	8.0
Corporate and Other	(0.2)	(0.3)	0.1
	$ 582.0	$ 566.8	$ 15.2

The decrease in Semiconductor Test revenues of $19.6 million, or 4.7%, was driven primarily by a decrease in sales in the automotive and memory test segments, partially offset by an increase in semiconductor tester sales for 5G infrastructure. The increase in System Test revenues of $23.7 million, or 47.8%, was primarily due to higher sales in Storage Test of 3.5” hard disk drive and system level testers, higher sales in Defense/Aerospace test instrumentation and systems, and higher sales in Production Board Test from higher 5G demand. The increase in Industrial Automation revenues of $3.0 million, or 4.6%, was due to higher demand for collaborative autonomous mobile robots. The increase in Wireless Test revenues of $8.0 million, or 23.3%, was primarily due to higher demand for millimeter wave test products driven by new wireless standards and 5G.

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

	For the Three Months Ended	
	September 29, 2019	September 30, 2018
China	31%	21%
Taiwan	21	25
United States	14	12
Korea	10	6
Europe	9	9
Japan	4	7
Thailand	4	2

Singapore	3	7
Malaysia	2	7
Philippines	2	3
Rest of World	—	1
	100%	100%

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

Gross Profit

Our gross profit was as follows:

	For the Three Months Ended		
	September 29, 2019	September 30, 2018	Dollar/Point Change
	(in millions)		
Gross profit	$ 345.0	$ 333.7	$ 11.3
Percent of total revenues	59.3%	58.9%	0.4

Gross profit as a percent of revenue increased by 0.4 points, primarily due to favorable product mix in Semiconductor Test and Storage Test.

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 revenue information is obtained from sales and marketing groups and incorporates factors such as backlog and future revenue demand. 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 during the next twelve quarters for our Semiconductor Test, System Test and Industrial Automation segments and the next four quarters for our Wireless Test segment, is written-down to estimated net realizable value.

During the three months ended September 29, 2019, we recorded an inventory provision of $3.0 million included in cost of revenues primarily due to downward revisions to previously forecasted demand levels, of which $1.9 million was related to Semiconductor Test, $0.7 million was related to Wireless Test and $0.4 million was related to System Test.

During the three months ended September 30, 2018, we recorded an inventory provision of $3.3 million included in cost of revenues primarily due to downward revisions to previously forecasted demand levels, of which $2.1 million was related to Semiconductor Test, $0.7 million was related to Wireless Test, and $0.4 million was related to Industrial Automation.

During the three months ended September 29, 2019 and September 30, 2018, we scrapped $3.4 million and $1.7 million of inventory, respectively. During the three months ended September 29, 2019 and September 30, 2018, we sold $0.8 million and $1.0 million of previously written-down or written-off inventory, respectively. As of September 29, 2019, we had inventory related reserves, which had been written-down or written-off totaling $101.2 million. We have no pre-determined timeline to scrap the remaining inventory.

Selling and Administrative

Selling and administrative expenses were as follows:

	For the Three Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Selling and administrative	$ 109.2	$ 100.2	$ 9.0
Percent of total revenues	18.8%	17.7%	

The increase of $9.0 million in selling and administrative expenses was due primarily to higher spending in Industrial Automation from higher sales and marketing spending in Universal Robots and MiR, and higher stock compensation expense from the modification of Teradyne's former chief financial officer's outstanding equity awards.

Engineering and Development

Engineering and development expenses were as follows:

	For the Three Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Engineering and development	$ 77.8	$ 77.0	$ 0.8
Percent of total revenues	13.4%	13.6%	

The increase of $0.8 million in engineering and development expenses was primarily due to higher spending in Industrial Automation, partially offset by lower spending in Semiconductor Test.

Restructuring and Other

During the three months ended September 29, 2019, we recorded a $7.8 million gain for the decrease in the fair value of the MiR contingent consideration liability, partially offset by $0.5 million recorded for employee severance charges primarily in Industrial Automation, $0.5 million for acquisition related compensation and expenses, and $0.3 million of fixed assets impairment in Wireless Test.

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During the three months ended September 30, 2018, we recorded $1.7 million for employee severance charges, primarily in Semiconductor Test and $0.8 million for acquisition related compensation, partially offset by a $0.8 million gain for the decrease in the fair value of the Universal Robots contingent consideration liability.

Interest and Other

	For the Three Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Interest income	$ (5.2)	$ (6.2)	$ 1.0
Interest expense	5.7	5.6	0.1
Other (income) expense, net	2.7	3.4	(0.7)

Interest income decreased by $1.0 million due primarily to lower unrealized gains on equity marketable securities in 2019. Other (income) expense, net decreased by $0.7 million due primarily to lower foreign exchange losses.

Income (Loss) Before Income Taxes

	For the Three Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Semiconductor Test	$ 116.6	$ 126.6	$ (10.0)
System Test	24.4	9.1	15.3
Wireless Test	11.2	7.8	3.3
Industrial Automation	(1.6)	0.9	(2.6)
Corporate and Other (1)	1.2	(3.6)	4.8
	$ 151.7	$ 140.8	$ 10.9

(1) Included in Corporate and Other are: contingent consideration adjustments, employee severance, equity modification charge, interest income, interest expense, net foreign exchange gains and losses, intercompany eliminations, and acquisition related expenses and compensation.

The decrease in income before income taxes in Semiconductor Test was driven primarily by a decrease in sales in the automotive and memory test segments, partially offset by an increase in semiconductor tester sales for 5G infrastructure. The increase in income before income taxes in System Test was primarily due to higher sales in Storage Test of 3.5" hard disk drive testers and system level testers, higher sales in Defense/Aerospace test instrumentation and systems, and higher sales in Production Board Test from higher 5G demand. The increase in income before income taxes in Wireless Test was primarily due to higher demand for millimeter wave test products. The decrease in income before income taxes in Industrial Automation was primarily due to higher sales and marketing, and engineering spending.

Income Taxes

The effective tax rate for the three months ended September 29, 2019 and September 30, 2018 was 10.5% and 14.8%, respectively. The decrease in the effective tax rate from the three months ended September 29, 2019 to the three months ended September 30, 2018 primarily resulted from the tax rate effect of a projected shift in the geographic distribution of income, which reduces the income subject to taxation in higher tax rate jurisdictions relative to lower tax rate jurisdictions, an increase in the net favorable impact of the U.S. Tax Cuts and Jobs Act of 2017, and an increase in net discrete tax benefit.

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Nine Months 2019 Compared to Nine Months 2018

Revenues

Revenues by our four reportable segments were as follows:

	For the Nine Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change

	(in millions)		
Semiconductor Test	$ 1,113.5	$ 1,150.7	$ (37.2)
Industrial Automation	209.8	176.8	33.0
System Test	204.9	162.3	42.6
Wireless Test	112.5	92.0	20.5
Corporate and Other	(0.4)	(0.6)	0.2
	$ 1,640.3	$ 1,581.2	$ 59.1

The decrease in Semiconductor Test revenues of $37.2 million, or 3.2%, was driven primarily by a decrease in sales in the automotive and memory test segments, partially offset by an increase in semiconductor tester sales for 5G infrastructure and image sensors. The increase in Industrial Automation revenues of $33.0 million, or 18.7%, was primarily due to higher demand for collaborative robots. The increase in System Test revenues of $42.6 million, or 26.2%, was primarily due to higher sales in Storage Test of 3.5" hard disk drive testers, higher sales in Defense/Aerospace test instrumentation and systems, and higher sales in Production Board Test from higher 5G demand. The increase in Wireless Test revenues of $20.5 million, or 22.3%, was primarily due to higher demand for millimeter wave and cellular test products driven by new wireless standards and 5G, partially offset by lower sales in connectivity test products.

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

	For the Nine Months Ended	
	September 29, 2019	September 30, 2018
China	23%	18%
Taiwan	22	26
United States	14	13
Europe	10	10
Korea	10	8
Japan	7	6
Singapore	4	5
Thailand	4	3
Malaysia	3	6
Philippines	3	4
Rest of World	—	1
	100%	100%

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

Gross Profit

Our gross profit was as follows:

	For the Nine Months Ended		
	September 29, 2019	September 30, 2018	Dollar/Point Change
	(in millions)		
Gross profit	$ 956.6	$ 910.9	$ 45.7
Percent of total revenues	58.3%	57.6%	0.7

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Gross profit as a percent of revenue increased by 0.7 points, primarily due to favorable product mix in Semiconductor Test and Storage Test.

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 revenue information is obtained from sales and marketing groups and incorporates factors such as backlog and future revenue demand. 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 during the next twelve quarters for our Semiconductor Test, System Test and Industrial Automation segments and the next four quarters for our Wireless Test segment, is written-down to estimated net realizable value.

During the nine months ended September 29, 2019, we recorded an inventory provision of $8.8 million included in cost of revenues primarily due to downward revisions to previously forecasted demand levels, of which $5.3 million was related to Semiconductor Test, $1.9 million was related to Wireless Test, $1.1 million was related to System Test, and $0.5 million was related to Industrial Automation.

During the nine months ended September 30, 2018, we recorded an inventory provision of $9.5 million included in cost of revenues primarily due to downward revisions to previously forecasted demand levels, of which $5.9 million was related to Semiconductor Test and $2.2 million was related to Wireless Test.

During the nine months ended September 29, 2019 and September 30, 2018, we scrapped $6.4 million and $3.2 million of inventory, respectively. During the nine months ended September 29, 2019 and September 30, 2018, we sold $2.0 million and $5.2 million of previously written-down or written-off inventory, respectively. As of September 29, 2019, we had inventory related reserves for inventory, which had been written-down or written-off totaling

$101.2 million. We have no pre-determined timeline to scrap the remaining inventory.

Selling and Administrative

Selling and administrative expenses were as follows:

	For the Nine Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Selling and administrative	$ 320.0	$ 290.1	$ 29.9
Percent of total revenues	19.5%	18.3%	

The increase of $29.9 million in selling and administrative expenses was due primarily to higher spending in Industrial Automation from higher sales and marketing spending in Universal Robots and MiR, which was acquired on April 25, 2018.

Engineering and Development

Engineering and development expenses were as follows:

	For the Nine Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Engineering and development	$ 236.0	$ 226.8	$ 9.2
Percent of total revenues	14.4%	14.3%	

The increase of $9.2 million in engineering and development expenses was primarily due to higher spending in Industrial Automation partially offset by lower spending in Semiconductor Test.

Restructuring and Other

During the nine months ended September 29, 2019, we recorded a $16.5 million gain for the decrease in the fair value of the MiR contingent consideration liability, partially offset by $2.1 million recorded for employee severance charges primarily in Semiconductor Test and Industrial Automation, $2.3 million for acquisition related expenses and compensation and $0.3 million of fixed assets impairment in Wireless Test.

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During the nine months ended September 30, 2018, we recorded $7.9 million for employee severance charges, primarily in Semiconductor Test, and $4.1 million for acquisition related compensation and expenses, partially offset by a $9.2 million gain for the decrease in the fair value of the Universal Robots contingent consideration liability.

Interest and Other

	For the Nine Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Interest income	$ (18.6)	$ (17.6)	$ (1.0)
Interest expense	17.2	18.1	(0.9)
Other (income) expense, net	6.6	4.4	2.2

Interest income increased by $1.0 million due primarily to higher unrealized gains on equity marketable securities in 2019. Interest expense decreased by $0.9 million due primarily to lower realized losses on sales of marketable securities in 2019. Other (income) expense, net increased by $2.2 million due primarily to higher pension costs and higher foreign exchange losses.

Income (Loss) Before Income Taxes

	For the Nine Months Ended		
	September 29, 2019	September 30, 2018	Dollar Change
	(in millions)		
Semiconductor Test	$ 291.0	$ 305.9	$ (14.8)
System Test	63.3	35.3	28.0
Wireless Test	25.7	18.6	7.1
Industrial Automation	(10.7)	(1.2)	(9.5)
Corporate and Other (1)	7.5	(1.9)	9.4
	$ 376.9	$ 356.7	$ 20.2

(1) Included in Corporate and Other are: contingent consideration adjustments, employee severance, equity modification charge, interest income, interest expense, net foreign exchange gains and losses, intercompany eliminations, and acquisition related expenses and compensation.

The decrease in income before income taxes in Semiconductor Test revenues was driven primarily by a decrease in sales in the automotive and memory test segments, partially offset by an increase in semiconductor tester sales for 5G infrastructure and image sensors. The increase in income before income taxes in System Test was primarily due to higher sales in Storage Test of 3.5" hard disk drive testers, higher sales in Defense/Aerospace test instrumentation and systems and higher sales in Production Board Test for 5G. The increase in income before income taxes in Wireless Test was primarily due to higher demand for millimeter wave and cellular test products driven by new wireless standards and 5G, partially offset by lower connectivity test products sales. The decrease in income before income taxes in Industrial Automation was primarily due to higher sales and marketing, and engineering spending.

Income Taxes

The effective tax rate for the nine months ended September 29, 2019 and September 30, 2018 was 9.2% and 13.6%, respectively. The decrease in the effective tax rate from the nine months ended September 29, 2019 to the nine months ended September 30, 2018 primarily resulted from the tax rate effect of a projected shift in the geographic distribution of income, which reduces the income subject to taxation in higher tax rate jurisdictions relative to lower tax rate jurisdictions, and an increase in net discrete tax benefit. These reductions were partially offset by a decrease in the net favorable impact of the U.S. Tax Cuts and Jobs Act of 2017.

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Contractual Obligations

The following table reflects our contractual obligations as of September 29, 2019:

	Payments Due by Period					
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years	Other
	(in thousands)					
Convertible debt	$ 460,000	$ —	$ —	$460,000	$ —	$ —
Purchase obligations	360,342	354,195	6,147	—	—	—
Retirement plans contributions	126,147	9,494	20,594	26,485	69,574	—
Transition tax payable (1)	91,139	7,358	15,958	22,940	44,883	—
Operating lease obligations	73,253	21,342	29,923	12,508	9,480	—
Interest on long-term debt	25,875	5,750	11,500	8,625	—	—
Fair value of contingent consideration	18,080	6,297	11,783	—	—	—
Other long-term liabilities reflected on the balance sheet under GAAP (2)	67,785	—	36,044	6,097	451	25,193
Total	$ 1,222,621	$ 404,436	$131,949	$536,655	$124,388	$25,193

(1) Represents the transition tax liability associated with our accumulated foreign earnings as a result of the enactment of the Tax Reform Act on December 22, 2017.

(2) Included in other long-term liabilities are liabilities for customer advances, extended warranty, uncertain tax positions, deferred tax liabilities and other obligations. For certain long-term obligations, we are unable to provide a reasonably reliable estimate of the timing of future payments relating to these obligations and therefore we included these amounts in the column marked "Other."

Liquidity and Capital Resources

Our cash, cash equivalents, and marketable securities balances decreased by $164.5 million in the nine months ended September 29, 2019 to $1.0 billion.

Operating activities during the nine months ended September 29, 2019 provided cash of $362.4 million. Changes in operating assets and liabilities used cash of $83.5 million due to a $97.1 million increase in operating assets and a $13.6 million increase in operating liabilities.

The increase in operating assets was primarily due to a $66.8 million increase in accounts receivable due to increased sales, a $16.1 million increase in prepayments and other assets, and a $14.1 million increase in inventories.

The increase in operating liabilities was due to a $27.8 million increase in deferred revenue and customer advance payments, a $23.7 million increase in other accrued liabilities, and a $17.5 million increase in accounts payable, partially offset by a $31.2 million decrease in income taxes, a $20.4 million decrease in accrued employee compensation due primarily to first quarter payments related to variable compensation, and $3.8 million of retirement plan contributions.

Investing activities during the nine months ended September 29, 2019 used cash of $266.9 million due to $605.5 million used for purchases of marketable securities, $96.0 million used for purchases of property, plant and equipment, $15.0 million used for an investment in RealWear, and $7.0 million, net of cash acquired, used for the acquisition of Lemsys, partially offset by $393.5 million and $60.3 million in proceeds from maturities and sales of marketable securities, respectively, and proceeds from life insurance of $2.9 million related to the cash surrender value from the cancellation of Teradyne owned life insurance policies.

Financing activities during the nine months ended September 29, 2019 used cash of $427.9 million due to $368.8 million used for the repurchase of 8.8 million shares of common stock at an average price of $41.93 per share, $46.3 million used for dividend payments, $27.6 million used for payments related to MiR and Universal Robots acquisition contingent consideration, and $14.5 million used for payments related to net settlements of employee stock compensation awards, partially offset by $29.3 million from the issuance of common stock under employee stock purchase and stock option plans.

Operating activities during the nine months ended September 30, 2018 provided cash of $290.5 million. Changes in operating assets and liabilities used cash of $151.1 million due to a $140.6 million increase in operating assets and a $10.4 million decrease in operating liabilities.

The increase in operating assets was primarily due to a $77.8 million increase in accounts receivable due to increased sales and the impact of the new revenue recognition standard, a $34.1 million increase in inventories, and a $28.7 million increase in prepayments and other assets.

The decrease in operating liabilities was due to a $26.1 million decrease in accrued employee compensation due primarily to first quarter payments related to variable compensation, a $33.2 million decrease in income taxes, and $3.2 million of retirement plan contributions, partially offset by a $22.9 million increase in other accrued liabilities, a $19.4 million increase in accounts payable and a $9.8 million increase in deferred revenue and customer advance payments.

Investing activities during the nine months ended September 30, 2018 provided cash of $719.0 million due to $843.2 million and $934.1 million in proceeds from sales and maturities of marketable securities, respectively, proceeds from a government subsidy of $7.9 million for property, plant and equipment and proceeds from life insurance of $1.1 million related to the cash surrender value from the cancellation of Teradyne owned life insurance policies, partially offset by $809.5 million used for purchases of marketable securities, $169.5 million used for the acquisitions of MiR and Energid, and $88.3 million used for purchases of property, plant and equipment.

Financing activities during the nine months ended September 30, 2018 used cash of $626.0 million due to $562.3 million used for the repurchase of 13.8 million shares of common stock at an average price of $40.62 per share, $51.3 million used for dividend payments, $19.8 million used for payment related to net settlement of employee stock compensation awards, and $13.6 million used for a payment related to Universal Robots acquisition contingent consideration, partially offset by $21.0 million from the issuance of common stock under employee stock purchase and stock option plans.

In January 2019, May 2019, and August 2019, our Board of Directors declared a quarterly cash dividend of $0.09 per share. Dividend payments for the nine months ended September 29, 2019 were $46.3 million.

In January 2018, May 2018, and August 2018, our Board of Directors declared a quarterly cash dividend of $0.09 per share. Dividend payments for the nine months ended September 30, 2018 were $51.3 million.

In January 2018, our Board of Directors cancelled the December 2016 stock repurchase program and authorized a new stock repurchase program for up to $1.5 billion of common stock. We intend to repurchase $500 million in 2019. During the nine months ended September 29, 2019, we repurchased 8.8 million shares of common stock for $368.8 million at an average price of $41.93 per share. During the nine months ended September 30, 2018, we repurchased 13.8 million shares of common stock for $562.3 million at an average price of $40.62 per share. The cumulative repurchases under the $1.5 billion stock repurchase program as of September 29, 2019 totaled 30.4 million shares of common stock for $1,192.3 million at an average price per share of $39.18.

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.

We believe our cash, cash equivalents and marketable securities balance will be sufficient to pay our quarterly dividend, execute our authorized share repurchase program 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.

Equity Compensation Plans

As discussed in Note O: “Stock Based Compensation” in our 2018 Annual Report on Form10-K, we have a 1996 Employee Stock Purchase Plan and a 2006 Equity and Cash Compensation Incentive Plan (the “2006 Equity Plan”).

The purpose of the 1996 Employee Stock Purchase Plan is to encourage stock ownership by all eligible employees of Teradyne. The purpose of the 2006 Equity Plan is to provide equity ownership and compensation opportunities in Teradyne to our employees, officers, directors, consultants and/or advisors. Both plans were approved by our shareholders.

Recently Issued Accounting Pronouncements

On January 26, 2017, the FASB issued ASU2017-04, *“Intangibles—Goodwill and Other (Topic 350): Simplifying the Accounting for Goodwill Impairment.”* The new guidance removes Step 2 of the goodwill impairment test, which requires a hypothetical purchase price allocation. 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. All other goodwill impairment guidance will remain largely unchanged. Entities will continue to have the option to perform a qualitative assessment to determine if a quantitative impairment test is necessary. The same one-step impairment test will be applied to goodwill at all reporting units, even those with zero or negative carrying

amounts. Entities will be required to disclose the amount of goodwill at reporting units with zero or negative carrying amounts. The revised guidance will be applied prospectively, and is effective in 2020. Early adoption is permitted for any impairment tests performed after January 1, 2017. We are currently evaluating the impact of this ASU on our financial position, results of operations and statements of cash flows.

Item 3: Quantitative and Qualitative Disclosures about Market Risks

For "Quantitative and Qualitative Disclosures about Market Risk" affecting Teradyne, see Part 2 Item 7a, "Quantitative and Qualitative Disclosures about Market Risks," in our Annual Report on Form 10-K filed with the SEC on March 1, 2019. There were no material changes in our exposure to market risk from those set forth in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018.

In addition to market risks described in our Annual Report on Form10-K, we have an equity price risk related to the fair value of our convertible senior unsecured notes issued in December 2016. In December 2016, Teradyne issued $460 million aggregate principal amount of 1.25% convertible senior unsecured notes (the "Notes") due December 15, 2023. As of September 29, 2019, the Notes had a fair value of $867.4 million. The table below provides a sensitivity analysis of hypothetical 10% changes of Teradyne's stock price as of the end of the third quarter of 2019 and the estimated impact on the fair value of the Notes. The selected scenarios are not predictions of future events, but rather are intended to illustrate the effect such event may have on the fair value of the Notes. The fair value of the Notes is subject to equity price risk due to the convertible feature. The fair value of the Notes will generally increase as Teradyne's common stock price increases and will generally decrease as the common stock price declines in value. The change in stock price affects the fair value of the convertible senior notes, but does not impact Teradyne's financial position, cash flows or results of operations due to the fixed nature of the debt obligation. Additionally, we carry the Notes at face value less unamortized discount on our balance sheet, and we present the fair value for required disclosure purposes only. In connection with the offering of the Notes we also sold warrants to the option counterparties. These transactions have been accounted for as an adjustment to our shareholders' equity. The convertible note hedge transactions are expected to reduce the potential equity dilution upon conversion of the Notes. The warrants along with any shares issuable upon conversion of the Notes will have a dilutive effect on our earnings per share to the extent that the average market price of our common stock for a given reporting period exceeds the applicable strike price or conversion price of the warrants or Notes, respectively.

Hypothetical Change in Teradyne Stock Price	Fair Value	Estimated change in fair value	Hypothetical percentage increase (decrease) in fair value
10% Increase	$936,589	$ 69,201	8.0%
No Change	867,388	—	—
10% Decrease	793,228	(74,160)	(8.5)

See Note I: "Debt" for further information.

Item 4: Controls and Procedures

As of the end of the period covered by this report, our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures pursuant to Rule 13a-15(b) or Rule 15d-15(f) promulgated under the Exchange Act. Based upon that evaluation, our Chief Executive Officer and Chief Financial Officer 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 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 Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

PART II. OTHER INFORMATION

Item 1: Legal Proceedings

We are subject to various legal proceedings and claims, which have arisen, in the ordinary course of business. In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on our results of operations, financial condition or cash flows.

Item 1A: Risk Factors

In addition to other information set forth in this Form10-Q, you should carefully consider the factors discussed in Part I, "Item 1A: Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2018, which could materially affect our business, financial condition or future results. The risk factors described in our Annual Report on Form 10-K remain applicable to our business.

The risks described in our Annual Report on Form10-K 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.

Trade regulations and restrictions could impact our ability 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 may prohibit the export of certain products, services and technologies, and in other circumstances we may be 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 companies by adding those companies to the Entity List under U.S.

Export Administration Regulations ("EAR"). 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 imposes 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. While most of our products are not subject to the EAR and therefore not affected by the Entity List restrictions, certain of our products are currently manufactured in the U.S. and thus subject to the Entity List restrictions. Compliance with the Entity List restrictions has not significantly impacted our sales, but could limit sales in the future. In addition, the prohibition on transfers of U.S. origin technology to Huawei could significantly limit our ability to service certain of our products sold to Huawei and our ability to engage in product development activities with Huawei and, therefore, could have a material adverse effect on our business, financial condition or results of operations. Furthermore, Huawei's inability to obtain products from other companies in its supply chain may adversely impact Huawei's demand for our products. Huawei or other foreign customers affected by future U.S. government sanctions or threats of sanctions may respond by developing their own solutions to replace our products or by adopting our foreign competitors' solutions. Also, our controls related to Entity List compliance could be circumvented, exposing us to legal liabilities. Even if such restrictions are lifted, any financial or other penalties or continuing export restrictions imposed on Huawei could have a material adverse effect on our business, financial condition or results of operations.

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

In January 2018, our Board of Directors cancelled the December 2016 stock repurchase program and authorized a new stock repurchase program for up to $1.5 billion of common stock. We intend to repurchase $500 million in 2019. During the nine months ended September 29, 2019, we repurchased 8.8 million shares of common stock for $368.8 million at an average price of $41.93 per share. During the nine months ended September 30, 2018, we repurchased 13.8 million shares of common stock for $562.3 million at an average price of $40.62 per share. The cumulative repurchases under the $1.5 billion stock repurchase program as of September 29, 2019 totaled 30.4 million shares of common stock for $1,192.3 million at an average price per share of $39.18.

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The following table includes information with respect to repurchases we made of our common stock during the three months ended September 29, 2019 (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
July 1, 2019 – July 28, 2019	806	$ 47.02	806	$ 391,430
July 29, 2019 – August 25, 2019	386	$ 53.36	385	$ 370,875
August 26, 2019 – September 29, 2019	1,133	$ 55.75	1,132	$ 307,737
	2,325 (1)	$ 52.33 (1)	2,323	

(1) Includes approximately two thousand shares at an average price of $50.83 withheld from employees for the payment of taxes.

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 4: Mine Safety Disclosures

Not Applicable

Item 6: Exhibits

Exhibit Number	Description
31.1	Certification of Principal Executive Officer, pursuant to Rule 13a-14(a) of Securities and Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 (filed herewith)
31.2	Certification of Principal Financial Officer, pursuant to Rule 13a-14(a) of Securities and Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 (filed herewith)
32.1	Certification of Principal Executive Officer pursuant to 18 U.S.C. 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (furnished herewith)
32.2	Certification of Principal Financial Officer pursuant to 18 U.S.C. 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (furnished herewith)
101.INS	XBRL Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

104	Cover Page Interactive Data File (formatted as Inline XBRL, and contained in Exhibit 101)

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SIGNATURES

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

TERADYNE, INC.
Registrant

/s/ Sanjay Mehta

Sanjay Mehta
Vice President,
Chief Financial Officer and Treasurer
(Duly Authorized Officer
and Principal Financial Officer)

Exhibit 31.1

CERTIFICATIONS

I, Mark E. Jagiela, certify that:

1. I have reviewed this quarterly report on Form 10-Q 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 officer 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 Rules13a-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 officer 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 function):

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: November 8, 2019

By: /S/ MARK E. JAGIELA

Mark E. Jagiela
Chief Executive Officer
November 8, 2019

Exhibit 31.2

CERTIFICATIONS

I, Sanjay Mehta, certify that:

1. I have reviewed this quarterly report on Form 10-Q 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 officer 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 Rules13a-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 officer 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 function):

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: November 8, 2019

By: /S/ SANJAY MEHTA

Sanjay Mehta
Chief Financial Officer
November 8, 2019

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 Quarterly Report of Teradyne, Inc. (the "Company") on Form10-Q for the period ended September 29, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Mark E. Jagiela, Chief Executive Officer of the Company, certify pursuant to 18 U.S.C (S) 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 as of the dates and for the periods expressed in the Report.

/S/ MARK E. JAGIELA

Mark E. Jagiela
Chief Executive Officer
November 8, 2019

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 Quarterly Report of Teradyne, Inc. (the "Company") on Form10-Q for the period ended September 29, 2019 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 (S) 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 as of the dates and for the periods expressed in the Report.

/S/ SANJAY MEHTA

Sanjay Mehta
Chief Financial Officer
November 8, 2019