UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, DC 20549

Form 10-Q

☑ **QUARTERLY REPORT UNDER SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the quarterly period ended July 1, 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 Number: 0-31285

TTM TECHNOLOGIES, INC.

(Exact name of registrant as specified in its charter)

DELAWARE	**91-1033443**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**

200 East Sandpointe, Suite 400, Santa Ana, California 92707
(Address of principal executive offices)

(714) 327-3000
(Registrant's telephone number, including area code)

1665 Scenic Avenue, Suite 250, Costa Mesa, California 92626
(Former address of principal executive offices)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.001 par value	TTMI	Nasdaq Global Select Market

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

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

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

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

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

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

Number of shares of common stock, $0.001 par value, of registrant outstanding at August 5, 2019: 105,492,642

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PART I. FINANCIAL INFORMATION

Item 1. ***Financial Statements (unaudited)***

TTM TECHNOLOGIES, INC.

Consolidated Condensed Balance Sheets

	As of July 1, 2019	As of December 31, 2018
	(Unaudited) (In thousands, except par value)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 284,466	$ 256,360
Accounts receivable, net	482,740	523,165
Contract assets	261,071	287,741
Inventories	122,149	109,377
Prepaid expenses and other current assets	39,260	30,271
Total current assets	1,189,686	1,206,914
Property, plant and equipment, net	1,037,087	1,052,024
Operating lease right-of-use assets	25,625	—
Goodwill	767,045	767,045
Definite-lived intangibles, net	345,471	375,923
Deposits and other non-current assets	75,199	55,597
	$ 3,440,113	$ 3,457,503
LIABILITIES AND EQUITY		
Current liabilities:		
Short-term debt, including current portion of long-term debt	$ —	$ 30,000
Accounts payable	432,936	431,288
Contract liabilities	2,386	3,220
Accrued salaries, wages and benefits	81,490	94,950
Other	107,143	113,756
Total current liabilities	623,955	673,214
Long-term debt, net of discount and issuance costs	1,469,270	1,462,425
Operating lease liabilities	18,365	—
Other long-term liabilities	99,446	94,777
Total long-term liabilities	1,587,081	1,557,202
Commitments and contingencies (Note 14)		
Equity:		
Common stock, \$0.001 par value; 300,000 shares authorized, 105,491 and 103,687 shares issued and outstanding at July 1, 2019 and December 31, 2018, respectively	105	104
Additional paid-in capital	805,421	797,895
Retained earnings	433,180	433,008
Accumulated other comprehensive loss	(9,629)	(3,920)
Total stockholders’ equity	1,229,077	1,227,087
	$ 3,440,113	$ 3,457,503

See accompanying notes to consolidated condensed financial statements.

TTM TECHNOLOGIES, INC.

Consolidated Condensed Statements of Operations
For the Quarter and Two Quarters Ended July 1, 2019 and July 2, 2018

	Quarter Ended		Two Quarters Ended	
	July 1, 2019	July 2, 2018	July 1, 2019	July 2, 2018
	(Unaudited) (In thousands, except per share data)			
Net sales	$ 633,038	$ 716,887	$ 1,253,238	$ 1,380,469
Cost of goods sold	548,423	600,747	1,079,938	1,175,651
Gross profit	84,615	116,140	173,300	204,818
Operating expenses:				
Selling and marketing	17,867	18,619	36,768	36,247
General and administrative	38,637	46,298	74,105	81,486
Amortization of definite-lived intangibles	11,267	19,489	28,093	25,350
Total operating expenses	67,771	84,406	138,966	143,083
Operating income	16,844	31,734	34,334	61,735
Other income (expense):				
Interest expense	(20,871)	(20,453)	(42,559)	(34,200)
Other, net	4,621	6,178	4,091	5,071
Total other expense, net	(16,250)	(14,275)	(38,468)	(29,129)
Income (loss) before income taxes	594	17,459	(4,134)	32,606
Income tax benefit	2,830	66,545	4,306	61,495
Net income	$ 3,424	$ 84,004	$ 172	$ 94,101
Earnings per share:				
Basic earnings per share	$ 0.03	$ 0.81	$ 0.00	$ 0.91
Diluted earnings per share	$ 0.03	$ 0.65	$ 0.00	$ 0.75

See accompanying notes to consolidated condensed financial statements.

TTM TECHNOLOGIES, INC.

Consolidated Condensed Statements of Comprehensive (Loss) Income
For the Quarter and Two Quarters Ended July 1, 2019 and July 2, 2018

	Quarter Ended		Two Quarters Ended	
	July 1, 2019	July 2, 2018	July 1, 2019	July 2, 2018
	(Unaudited) (In thousands)			
Net income	$ 3,424	$ 84,004	$ 172	$ 94,101
Other comprehensive loss, net of tax:				
Foreign currency translation adjustments, net	(601)	(1,701)	29	(1,079)
Pension obligation adjustments, net	—	—	19	—
Net unrealized losses on cash flow hedges:				
Unrealized loss on effective cash flow hedges during the period, net	(4,503)	(1,739)	(6,331)	(1,745)
Loss realized in the statement of operations	296	342	574	383
Net	(4,207)	(1,397)	(5,757)	(1,362)
Other comprehensive loss, net of tax	(4,808)	(3,098)	(5,709)	(2,441)
Comprehensive (loss) income, net of tax	$ (1,384)	$ 80,906	$ (5,537)	$ 91,660

See accompanying notes to consolidated condensed financial statements.

TTM TECHNOLOGIES, INC.

Consolidated Condensed Statements of Stockholders' Equity
For the Two Quarters Ended July 1, 2019 and July 2, 2018

	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	(Unaudited) (In thousands)					
Balance, December 31, 2018	103,687	$ 104	$ 797,895	$ 433,008	$ (3,920)	$ 1,227,087
Net loss	—	—	—	(3,252)	—	(3,252)
Other comprehensive loss	—	—	—	—	(901)	(901)
Redemption of convertible notes, net	—	—	(1)	—	—	(1)
Issuance of common stock for performance-based restricted stock units	694	—	—	—	—	—
Issuance of common stock for restricted stock units	1,040	1	(1)	—	—	—
Stock-based compensation	—	—	3,926	—	—	3,926
Balance, April 1, 2019	105,421	$ 105	$ 801,819	$ 429,756	$ (4,821)	$ 1,226,859
Net income	—	—	—	3,424	—	3,424
Other comprehensive loss	—	—	—	—	(4,808)	(4,808)
Issuance of common stock for restricted stock units	70	—	—	—	—	—
Stock-based compensation	—	—	3,602	—	—	3,602
Balance, July 1, 2019	105,491	$ 105	$ 805,421	$ 433,180	$ (9,629)	$ 1,229,077

	Common Stock Shares	Common Stock Amount	Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Income	Total Stockholders' Equity
	(Unaudited) (In thousands)					
Balance, January 1, 2018	101,820	$ 102	$ 777,025	$ 230,850	$ 3,403	$ 1,011,380
New revenue standard adjustment	—	—	—	28,574	—	28,574
Net income	—	—	—	10,097	—	10,097
Other comprehensive income	—	—	—	—	657	657
Issuance of common stock for performance-based restricted stock units	521	—	—	—	—	—
Issuance of common stock for restricted stock units	1,104	1	(1)	—	—	—
Stock-based compensation	—	—	3,622	—	—	3,622
Balance, April 2, 2018	103,445	$ 103	$ 780,646	$ 269,521	$ 4,060	$ 1,054,330
Net income	—	—	—	84,004	—	84,004
Other comprehensive loss	—	—	—	—	(3,098)	(3,098)
Exercise of stock options	20	—	190	—	—	190
Issuance of common stock for restricted stock units	209	1	(1)	—	—	—
Stock-based compensation	—	—	5,867	—	—	5,867
Balance, July 2, 2018	103,674	$ 104	$ 786,702	$ 353,525	$ 962	$ 1,141,293

See accompanying notes to consolidated condensed financial statements.

TTM TECHNOLOGIES, INC.
Consolidated Condensed Statements of Cash Flows
For the Two Quarters Ended July 1, 2019 and July 2, 2018

	Two Quarters Ended	
	July 1, 2019	July 2, 2018
	(Unaudited) (In thousands)	
Cash flows from operating activities:		
Net income	$ 172	$ 94,101
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation of property, plant and equipment	82,837	80,073
Amortization of definite-lived intangible assets	30,452	25,350
Amortization of debt discount and issuance costs	7,313	6,358
Deferred income taxes	(2,228)	(64,769)
Stock-based compensation	7,528	9,489
Other	(8,785)	56
Changes in operating assets and liabilities, net of acquisition:		
Accounts receivable, net	40,425	(17,056)
Contract assets	26,670	(16,478)
Inventories	(12,772)	5,685
Prepaid expenses and other current assets	(8,934)	356
Accounts payable	(10,659)	(33,778)
Contract liabilities	(834)	(98)
Accrued salaries, wages and benefits and other current liabilities	(28,138)	(47,911)
Net cash provided by operating activities	123,047	41,378
Cash flows from investing activities:		
Acquisition, net of cash acquired	—	(596,396)
Purchase of property, plant and equipment and other assets	(69,099)	(81,338)
Proceeds from sale of property, plant and equipment and other assets	5,912	251
Net cash used in investing activities	(63,187)	(677,483)
Cash flows from financing activities:		
Proceeds from incremental long-term borrowings	—	600,000
Repayment of long-term debt borrowing	(30,000)	(3,718)
Repayment of assumed long-term debt in acquisition	—	(178,604)
Proceeds from borrowings of revolving loan	—	23,000
Payment of debt issuance costs	(1,532)	(7,653)
Payment of original issue discount	—	(1,500)
Proceeds from exercise of stock options	—	192
Redemption of convertible notes	(10)	—
Net cash (used in) provided by financing activities	(31,542)	431,717
Effect of foreign currency exchange rates on cash and cash equivalents	(212)	(838)
Net increase (decrease) in cash and cash equivalents	28,106	(205,226)
Cash and cash equivalents at beginning of period	256,360	409,326
Cash and cash equivalents at end of period	$ 284,466	$ 204,100
Supplemental cash flow information:		
Cash paid, net for interest	$ 39,739	$ 28,896
Cash paid, net for income taxes	13,119	18,557
Noncash transactions:		
Property, plant and equipment recorded in accounts payable	$ 61,475	$ 54,369

See accompanying notes to consolidated condensed financial statements.

(1) Nature of Operations and Basis of Presentation

TTM Technologies, Inc. (the Company or TTM) is a leading global printed circuit board (PCB) manufacturer, focusing on quick-turn and volume production of technologically complex PCBs, backplane assemblies and electro-mechanical solutions (E-M Solutions) as well as a global designer and manufacturer of radio-frequency (RF) and microwave components and assemblies. The Company provides time-to-market and volume production of advanced technology products and offers a one-stop design, engineering and manufacturing solution to customers from engineering support to prototype development through final mass production. This one-stop design and manufacturing solution enables the Company to align technology developments with the diverse needs of the Company's customers and to enable them to reduce the time required to develop new products and bring them to market.

The Company serves a diversified customer base in various markets throughout the world, including aerospace and defense, automotive components, smartphones and touchscreen tablets, high-end computing, medical, industrial and instrumentation related products, as well as networking/communications infrastructure products. The Company's customers include both original equipment manufacturers (OEMs) and electronic manufacturing services (EMS) providers.

The accompanying consolidated condensed financial statements have been prepared by the Company, without audit, pursuant to the rules and regulations of the Securities and Exchange Commission (SEC). Certain information and disclosures normally included in financial statements prepared in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP) have been condensed or omitted pursuant to such rules and regulations. These consolidated condensed financial statements reflect all adjustments (consisting only of normal recurring adjustments) which, in the opinion of management, are necessary to present fairly the financial position, the results of operations and cash flows of the Company for the periods presented. It is suggested that these consolidated condensed financial statements be read in conjunction with the consolidated financial statements and the notes thereto included in the Company's most recent Annual Report on Form 10-K. The results of operations for the interim periods are not necessarily indicative of the results to be expected for the full year. The preparation of financial statements in accordance with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported in the Company's consolidated condensed financial statements and accompanying notes. Actual results could differ materially from those estimates. The Company uses a 13-week fiscal quarter accounting period with the fourth quarter ending on the Monday nearest December 31.

Reclassifications

Certain amounts in the prior period consolidated condensed financial statement have been reclassified to conform to the presentation of the current period consolidated condensed financial statement. These reclassifications had no effect on the previously reported net income. An adjustment has been made to combine the statutory surplus reserve with retained earnings on the consolidated condensed balance sheet and the consolidated condensed statement of stockholders' equity.

Recently Adopted and Issued Accounting Standards

Recently Adopted Accounting Standards

In February 2016, the Financial Accounting Standards Board (FASB) issued ASU 2016-02, *Leases (Topic 842)* which supersedes the existing lease recognition requirements in the current accounting standard for leases. The core principal of the new standard is that an entity should recognize right-of-use (ROU) assets and lease liabilities arising from a lease for both financing and operating leases, along with additional qualitative and quantitative disclosures.

In July 2018, the FASB issued ASU 2018-11, *Leases (Topic 842): Targeted Improvements*. ASU 2018-11 provides additional guidance to Topic 842 including providing preparers an additional optional retrospective adoption method which allows entities to initially apply the new leases standard at the adoption date and recognize a cumulative effect adjustment to the opening balance of retained earnings. ASU 2018-11 also provides lessors a practical expedient to not separate lease from non-lease components, in certain situations.

The Company adopted the new lease standard as of January 1, 2019 and utilized the retrospective cumulative effect adjustment transition method with a cumulative effect adjustment being recorded as of the adoption date. Therefore, comparative information has not been adjusted and continues to be reported under previous U.S. GAAP guidance for the consolidated condensed balance sheet as of December 31, 2018 and the consolidated condensed statement of operations for the quarter and two quarters ended July 2, 2018. The Company implemented internal controls and key system functionality to enable the preparation of financial information on adoption. The Company elected certain available practical expedients including the package of practical expedients permitted under the transition guidance within the new standard, which among other things, allowed the Company to carry forward the historical lease classification. Additionally, the Company elected an accounting policy to not record ROU assets and lease liabilities for leases with an initial term of twelve months or less on its consolidated condensed balance sheet.

The cumulative effect of the changes made to the Company's January 1, 2019 consolidated condensed balance sheet for the adoption of the new lease standard was as follows:

	Balance as of December 31, 2018	New Lease Standard Adjustment	Balance as of January 1, 2019
		(In thousands)	
Assets			
Operating lease right-of-use assets	$ —	$ 16,894	$ 16,894
Deposits and other non-current assets	55,597	(548)	55,049
Liabilities			
Other current liabilities	113,756	2,545	116,301
Operating lease liabilities	—	14,356	14,356
Other long-term liabilities	94,777	(555)	94,222

The adoption of the new accounting guidance did not have a material impact to the consolidated condensed statement of operations for the quarter and two quarters ended July 1, 2019, or the consolidated condensed statement of cash flows for the two quarters ended July 1, 2019. See Note 3 for further details.

In June 2018, the FASB issued ASU 2018-07, *Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-based Payments*. This ASU expands the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from nonemployees. The effective date for the standard is for interim periods in fiscal years beginning after December 15, 2018, with early adoption permitted, but no earlier than the Company's adoption date of Topic 606. The new guidance is required to be applied retrospectively with the cumulative effect recognized at the date of initial application. The Company adopted ASU 2018-07 on January 1, 2019. The adoption did not have a material impact on the consolidated condensed financial statements or related disclosures.

In August 2017, the FASB issued ASU 2017-12, *Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities*. This ASU amends and simplifies existing guidance in order to allow companies to more accurately present the economic effects of risk management activities in the financial statements. ASU 2017-12 also amends the guidance surrounding the recognition of the value of hedged instruments to include the entire change in value, rather than just the effective portion, in other comprehensive income and recognized in earnings at the same time that the hedged item affects earnings for cash flow and net investment hedges. This ASU is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early adoption is permitted. The Company adopted ASU 2017-12 on January 1, 2019. The adoption did not have a material impact on the consolidated condensed financial statements or related disclosures.

Recently Issued Accounting Standards Not Yet Adopted

In August 2018, the FASB issued ASU 2018-14, *Compensation—Retirement Benefits—Defined Benefit Plans—General (Subtopic 715-20)—Disclosure Framework—Changes to the Disclosure Requirements for Defined Benefit Plans*. The amendments in this update change the disclosure requirements for employers that sponsor defined benefit pension and/or other postretirement benefit plans. It eliminates requirements for certain disclosures that are no longer considered cost beneficial and requires new disclosures that the FASB considers pertinent. The guidance is effective for fiscal years ending after December 15, 2020. Early adoption is permitted. The Company does not anticipate the adoption will have a material impact on the consolidated condensed financial statements and related disclosures.

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*. ASU 2016-13 seeks to provide financial statement users with more decision-useful information about the expected credit losses on financial instruments, including trade receivables, and other commitments to extend credit held by a reporting entity at each reporting date. The amendments require an entity to replace the incurred loss impairment methodology in current U.S. GAAP with a methodology that reflects current expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. This ASU is effective for fiscal years beginning after December 15, 2019, including interim periods within those fiscal years. Early adoption is permitted. The Company is currently evaluating the new guidance to determine the impact it may have on its consolidated condensed financial statements and related disclosures.

(2) Summary of Significant Accounting Policies

Leases

The Company determines if an arrangement is a lease at inception. Operating leases are included in operating lease ROU assets, other current liabilities, and operating lease liabilities on the consolidated condensed balance sheets.

ROU assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. As most of the Company's leases do not provide an implicit rate, the Company uses incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments. The operating lease ROU asset also includes any lease payments made and excludes lease incentives. Lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease expense for lease payments is recognized on a straight-line basis over the lease term.

The Company has lease agreements with lease and non-lease components and accounts for the lease and non-lease components as a single lease component.

(3) Leases

The Company leases some of its manufacturing and assembly plants, sales offices and equipment under non-cancellable operating leases that expire at various dates through 2049. The majority of the Company's lease arrangements are comprised of fixed payments and a limited number of leases consist of variable payments based on equipment usage. Certain leases contain renewal provisions at the Company's option. Most of the leases require the Company to pay for certain other costs such as property taxes and maintenance. Certain leases also contain rent escalation clauses (step rents) that require additional rental amounts in the later years of the term. Rent expense for leases with step rents is recognized on a straight-line basis over the minimum lease term. The lease agreements do not contain any material residual value guarantees or material restrictive covenants.

The components of lease expense were as follows:

	Quarter Ended July 1, 2019	Two Quarters Ended July 1, 2019
	(In thousands)	
Operating lease cost	$ 2,293	$ 4,524
Variable lease cost	1,811	2,002
Short-term lease cost	230	381

Supplemental cash flow information related to leases was as follows:

	Two Quarters Ended July 1, 2019
	(In thousands)
Cash paid for amounts included in the measurement of lease liabilities:	
Operating cash flows from operating leases	$ 4,410
Right-of-use assets obtained in exchange for new lease obligations:	
Operating leases	12,860

Supplemental balance sheet information related to leases was as follows:

	As of July 1, 2019
	(In thousands)
Operating lease right-of-use assets	$ 25,625
Other current liabilities	7,376
Operating lease liabilities	18,365
Total operating lease liabilities	$ 25,741
Weighted average remaining lease term	4.6 years
Weighted average discount rate	3.97%

Maturities of operating lease liabilities were as follows (1):

		(In thousands)
Less than one year	$	8,182
1 - 2 years		6,964
2 - 3 years		4,864
3 - 4 years		2,449
4 - 5 years		1,925
Thereafter		3,886
Total lease payments		28,270
Less imputed interest		(2,529)
Total	$	25,741

(1) Excludes $851 of legally binding minimum lease payments for leases signed but not yet commenced.

Operating Leases Pre-Topic 842 Adoption

The following is a schedule of future minimum lease payments as of December 31, 2018:

		Operating Leases (In thousands)
2019	$	7,282
2020		4,701
2021		3,406
2022		2,408
2023		2,172
Thereafter		4,172
Total minimum lease payments	$	24,141

(4) Revenues

As of July 1, 2019, the aggregate amount of the transaction price allocated to remaining performance obligations for long-term contracts was $20,097. The Company expects to recognize revenue on approximately 94% of the remaining performance obligations for the Company's long-term contracts over the next twelve months with the remaining amount recognized thereafter. The remaining performance obligations for the Company's short-term contracts are expected to be recognized within one year or less.

Revenue from products and services transferred to customers over time and at a point in time accounted for 97% and 3%, respectively, of the Company's revenue for the quarter and two quarters ended July 1, 2019.

The following tables represent a disaggregation of revenue by principal end markets with the reportable segments:

	Quarter Ended July 1, 2019			Quarter Ended July 2, 2018		
	PCB	E-M Solutions	Total	PCB	E-M Solutions	Total
End Markets	(In thousands)					
Aerospace and Defense	$ 175,301	$ 362	$ 175,663	$ 162,951	$ 455	$ 163,406
Automotive	79,048	23,993	103,041	110,607	25,854	136,461
Cellular Phone	40,094	—	40,094	55,393	—	55,393
Computing/Storage/Peripherals	95,127	—	95,127	109,633	568	110,201
Medical/Industrial/Instrumentation	87,471	9,641	97,112	96,704	9,856	106,560
Networking/Communications	79,937	25,926	105,863	99,353	24,602	123,955
Other	16,143	(5)	16,138	20,404	507	20,911
Total	$ 573,121	$ 59,917	$ 633,038	$ 655,045	$ 61,842	$ 716,887

	Two Quarters Ended July 1, 2019			Two Quarters Ended July 2, 2018		
	PCB	E-M Solutions	Total	PCB	E-M Solutions	Total
End Markets	(In thousands)					
Aerospace and Defense	$ 340,369	$ 366	$ 340,735	$ 285,627	$ 544	$ 286,171
Automotive	164,861	43,758	208,619	226,899	45,164	272,063
Cellular Phone	83,178	—	83,178	160,253	—	160,253
Computing/Storage/Peripherals	176,019	189	176,208	198,175	873	199,048
Medical/Industrial/Instrumentation	175,141	17,808	192,949	190,338	17,379	207,717
Networking/Communications	168,000	49,265	217,265	181,290	44,075	225,365
Other	34,375	(91)	34,284	28,894	958	29,852
Total	$ 1,141,943	$ 111,295	$ 1,253,238	$ 1,271,476	$ 108,993	$ 1,380,469

(5) Composition of Certain Consolidated Condensed Financial Statement Captions

	As of July 1, 2019	As of December 31, 2018
	(In thousands)	
Inventories:		
Raw materials	$ 102,974	$ 97,600
Work-in-process	13,083	10,299
Finished goods	6,092	1,478
	$ 122,149	$ 109,377
Property, plant and equipment, net:		
Land and land use rights	$ 74,850	$ 75,431
Buildings and improvements	538,003	534,122
Machinery and equipment	1,398,905	1,357,035
Construction-in-progress, furniture and fixtures and other	57,946	42,713
	2,069,704	2,009,301
Less: Accumulated depreciation	(1,032,617)	(957,277)
	$ 1,037,087	$ 1,052,024

(6) Goodwill

As of July 1, 2019 and December 31, 2018, goodwill was as follows:

	Total
	(In thousands)
Balance as of July 1, 2019 and December 31, 2018	
Goodwill	$ 938,445
Accumulated impairment losses	(171,400)
	$ 767,045

All goodwill relates to the Company's PCB reportable segment.

The Company evaluates its goodwill on an annual basis during its fourth fiscal quarter and whenever events or changes in circumstances — such as significant adverse changes in business climate or operating results, changes in management strategy, coupled with a decline in the market price of its stock and market capitalization — indicate that there may be a potential impairment. During the quarter, the Company evaluated for triggering events and management did not believe that goodwill was impaired as of July 1, 2019.

(7) Definite-lived Intangibles

As of July 1, 2019 and December 31, 2018, the components of definite-lived intangibles were as follows:

	Gross Amount	Accumulated Amortization	Net Carrying Amount	Weighted Average Amortization Period
		(In thousands)		(In years)
July 1, 2019				
Customer relationships	$ 415,000	$ (103,324)	$ 311,676	10.7
Technology	39,500	(5,705)	33,795	9.4
	$ 454,500	$ (109,029)	$ 345,471	
December 31, 2018				
Customer relationships	$ 203,634	$ (123,522)	$ 80,112	8.1
Technology	3,000	(3,000)	—	3.0
Acquired intangibles from acquisition				
Customer relationships	267,500	(15,561)	251,939	12.2
Developed technology	39,500	(3,345)	36,155	9.4
Backlog	29,000	(21,283)	7,717	0.9
	$ 542,634	$ (166,711)	$ 375,923	

Definite-lived intangibles are generally amortized using the straight-line method of amortization over the estimated useful life, with the exception of certain customer relationship intangibles, which are amortized using an accelerated method of amortization based on estimated cash flows. Amortization expense was $12,447 and $19,489 for the quarters ended July 1, 2019 and July 2, 2018, respectively, and $30,452 and $25,350 for the two quarters ended July 1, 2019 and July 2, 2018, respectively. For the quarter and two quarters ended July 1, 2019, $1,180 and $2,359, respectively, of amortization expense is included in cost of goods sold.

Estimated aggregate amortization for definite-lived intangible assets for the next five years and thereafter is as follows:

	(In thousands)
Remaining 2019	$ 22,709
2020	45,419
2021	42,108
2022	39,002
2023	36,290
Thereafter	159,943
	$ 345,471

(8) Long-term Debt and Letters of Credit

The following table summarizes the long-term debt of the Company as of July 1, 2019 and December 31, 2018:

	Interest Rate as of July 1, 2019	Principal Outstanding as of July 1, 2019	Interest Rate as of December 31, 2018	Principal Outstanding as of December 31, 2018
	(In thousands, except interest rates)			
Term Loan due September 2024	4.89 %	$ 805,879	5.00 %	$ 835,879
Senior Notes due October 2025	5.63	375,000	5.63	375,000
Convertible Senior Notes due December 2020	1.75	249,975	1.75	249,985
U.S. ABL Revolving Loan due June 2024	3.76	40,000	4.00	40,000
Asia ABL Revolving Loan due June 2024	3.79	30,000	3.90	30,000
		1,500,854		1,530,864
Less: Long-term debt unamortized discount		(17,090)		(22,167)
Long-term debt unamortized debt issuance costs		(14,494)		(16,272)
		1,469,270		1,492,425
Less: current maturities		—		(30,000)
Long-term debt, less current maturities		$ 1,469,270		$ 1,462,425

Term Loan Facility

On April 18, 2018, the Company closed its $600,000 commitment of incremental loans concurrent with the completion of its acquisition of Anaren. At issuance, these incremental loans increased the Company's existing balance of its Term Loan Facility due 2024 from $ 348,250 to $948,250. The Term Loan Facility had an outstanding balance of $805,879 as of July 1, 2019 and is included in long-term debt. The Term Loan Facility was issued at a weighted average discount of 99.7% and bears interest, at the Company's option, at a floating rate of LIBOR plus an applicable interest margin of 2.5%, or an alternate base rate (as defined in the Term Loan Credit Agreement) plus an applicable margin of 1.5%. As of July 1, 2019, the interest rate on the outstanding borrowings under the Term Loan Facility was 4.89%. There is no provision, other than an event of default, for the interest margin to increase. The Term Loan Facility will mature on September 28, 2024. The Term Loan Facility is secured by a significant amount of the domestic assets of the Company and a pledge of 65% of voting stock of the Company's first tier foreign subsidiaries and is structurally senior to the Company's Senior Notes and Convertible Senior Notes. See Senior Notes and Convertible Senior Notes below.

Based on certain parameters defined in the Term Loan Facility, including a First Lien Leverage Ratio, the Company may be required to make an additional principal payment on an annual basis beginning after fiscal year 2018, if the Company's First Lien Leverage Ratio is greater than 2.0. For 2019, the Company is not required to make an additional principal payment as its First Lien Leverage Ratio was less than 2.0. Any remaining outstanding balance under the Term Loan Facility is due at the maturity date of September 28, 2024.

Borrowings under the Term Loan Facility are subject to certain affirmative and negative covenants, including limitations on indebtedness, corporate transactions, investments and dispositions, and share payments.

Senior Notes

The $375,000 of Senior Notes, which is included in long-term debt, bear interest at a rate of 5.63% per annum. Interest is payable semiannually in arrears on April 1 and October 1 of each year beginning April 1, 2018. The Senior Notes will mature on October 1, 2025.

Borrowings under the Senior Notes are subject to certain affirmative and negative covenants, including limitations on indebtedness, corporate transactions, investments, dispositions, and share payments.

Convertible Senior Notes due 2020

The Company maintains 1.75% Convertible Senior Notes in the amount of $249,975 due December 15, 2020. The Convertible Senior Notes bear interest at a rate of 1.75% per annum. Interest is payable semiannually in arrears on June 15 and December 15 of each year. The Convertible Senior Notes are senior unsecured obligations and would rank equally to the Company's future unsecured senior indebtedness and are senior in right of payment to any of the Company's future subordinated indebtedness.

As of July 1, 2019 and December 31, 2018, the following summarizes the equity components of the Convertible Senior Notes included in additional paid-in capital:

	As of July 1, 2019			As of December 31, 2018		
	Embedded conversion option — Convertible Senior Notes	Embedded conversion option — Convertible Senior Notes Issuance Costs	Total	Embedded conversion option — Convertible Senior Notes	Embedded conversion option — Convertible Senior Notes Issuance Costs	Total
	(In thousands)					
Convertible Senior Notes due 2020	$ 60,213	$ (1,916)	$ 58,297	$ 60,216	$ (1,916)	$ 58,300

The components of interest expense resulting from the Convertible Senior Notes for the quarter and two quarters ended July 1, 2019 and July 2, 2018 were as follows:

	Quarter Ended		Two Quarters Ended	
	July 1, 2019	July 2, 2018	July 1, 2019	July 2, 2018
	(In thousands)			
Contractual coupon interest	$ 1,093	$ 1,093	$ 2,187	$ 2,187
Amortization of debt discount	$ 2,418	$ 2,267	$ 4,797	$ 4,497
Amortization of debt issuance costs	$ 243	$ 227	$ 481	$ 451

Asset-Based Lending Agreements

During June 2019, the Company amended its U.S. Asset-Based Lending Credit Agreement (U.S. ABL) and its Asia Asset-Based Lending Credit Agreement (Asia ABL) (collectively the ABL Revolving Loans). The U.S. ABL credit facility was amended to extend its maturity to June 2024, decrease the size of the facility to $150,000 and add a $100,000 incremental facility. The Asia ABL credit facility was amended to extend the maturity to June 2024 and add a $50,000 incremental facility.

The U.S. ABL consists of two tranches comprised of a revolving credit facility for up to $150,000 and a letter of credit facility for up to $50,000, provided that at no time may amounts outstanding under the tranches exceed in aggregate $150,000 or the applicable borrowing base, which is a percentage of the principal amount of Eligible Accounts, as defined in the U.S. ABL agreement. Borrowings under the U.S. ABL bear interest at either a floating rate of LIBOR plus a margin of 138 basis points or an alternate base rate (defined as the greater of the prime rate, the New York Fed bank rate plus 0.5% or LIBOR plus 1.0%) subject to a 1.0% floor, plus an applicable margin of 38 basis points, at the Company's option. As of July 1, 2019, the interest rate on the outstanding borrowings under the U.S. ABL was 3.76%. The applicable margin can vary based on the remaining availability of the facility, from 125 to 150 basis points for LIBOR-based loans and from 25 to 50 basis points for JP Morgan Chase Bank's prime rate-based loans. Other than availability and an event of default, there are no other provisions for the interest margin to increase. The U.S. ABL will mature on June 3, 2024. Loans made under the U.S. ABL are secured first by all of the Company's domestic cash, receivables and certain inventories as well as by a second position against a significant amount of the domestic assets of the Company and a pledge of 65% of the voting stock of the Company's first tier foreign subsidiaries and are structurally senior to the Company's Senior Notes and Convertible Senior Notes. See Senior Notes and Convertible Senior Notes above. As of July 1, 2019, $ 40,000 of the U.S. ABL was outstanding and classified as long-term debt, which is consistent with its maturity date.

The Asia ABL consists of two tranches comprised of a revolving credit facility for up to $150,000 and a letter of credit facility for up to $100,000, provided that at no time may amounts outstanding under both tranches exceed in aggregate $150,000 or the applicable borrowing base, which is a percentage of the principal amount of Eligible Accounts, as defined in the Asia ABL agreement. Borrowings under the Asia ABL bear interest at a floating rate of LIBOR plus 140 basis points. As of July 1, 2019, the interest rate on the outstanding borrowings under the Asia ABL was 3.79%. There is no provision, other than an event of default, for the interest margin to increase. The Asia ABL will mature on June 4, 2024. Loans made under the Asia ABL are secured by a portion of the Company's Asia Pacific cash and receivables and are structurally senior to the Company's domestic obligations, including the Senior Notes and Convertible Senior Notes. See Senior Notes and Convertible Senior Notes above. As of July 1, 2019, $30,000 of the Asia ABL was outstanding and classified as long-term debt, which is consistent with its maturity date.

The Company has up to $50,000 and $100,000 Letters of Credit Facilities under the U.S. ABL and the Asia ABL, respectively. As of July 1, 2019, letters of credit in the amount of $15,287 were outstanding under the U.S. ABL and $22,718 were outstanding under the Asia ABL with various expiration dates through May 2020. Available borrowing capacity under the U.S. ABL and the Asia ABL was $94,713 and $97,282, respectively, which considers letters of credit outstanding as of July 1, 2019.

The Company is required to pay a commitment fee of 0.25% per annum on any unused portion of the U.S. ABL and 0.28% per annum on any unused portion of the Asia ABL. The Company incurred total commitment fees related to unused borrowing availability of $210 and $247 for the quarters ended July 1, 2019 and July 2, 2018, respectively, and $450 and $488 for the two quarters ended July 1, 2019 and July 2, 2018, respectively. Under the occurrence of certain events, the ABL Revolving Loans are subject to various financial and operational covenants, including maintaining minimum fixed charge coverage ratios.

Other Credit Facility

Additionally, the Company is party to a revolving loan credit facility (Chinese Revolver) with a lender in China. Under this arrangement, the lender has made available to the Company approximately $29,070 in unsecured borrowing with all terms of the borrowing to be negotiated at the time the Chinese Revolver is drawn upon. There are no commitment fees on the unused portion of the Chinese Revolver. In July 2019, the expiration of the Chinese Revolver was extended to July 2020. As of July 1, 2019, the Chinese Revolver had not been drawn upon.

Debt Issuance and Debt Discount

As of July 1, 2019 and December 31, 2018, remaining unamortized debt discount and debt issuance costs for the Term Loan Facility, Senior Notes and Convertible Senior Notes were as follows:

	As of July 1, 2019			As of December 31, 2018		
	Debt Issuance Costs	Debt Discount	Effective Interest Rate	Debt Issuance Costs	Debt Discount	Effective Interest Rate
	(In thousands, except interest rates)					
Term Loan due September 2024	$ 7,303	$ 2,210	4.66 %	$ 8,229	$ 2,489	4.66 %
Senior Notes due October 2025	5,700	—	5.92	6,071	—	5.92
Convertible Senior Notes	1,491	14,880	6.48	1,972	19,678	6.48
	$ 14,494	$ 17,090		$ 16,272	$ 22,167	

The above debt discount and debt issuance costs are recorded as a reduction of the debt and are amortized into interest expense using an effective interest rate over the duration of the debt.

Remaining unamortized debt issuance costs for the ABL Revolving Loans of $2,741 and $1,420 as of July 1, 2019 and December 31, 2018, respectively, are included in other non-current assets and are amortized to interest expense over the duration of the ABL Revolving Loans using the straight-line method of amortization.

As of July 1, 2019, the remaining weighted average amortization period for all unamortized debt discount and debt issuance costs was 3.6 years.

(9) Income Taxes

The Company's effective tax rate is impacted by tax rates in China and Hong Kong, the U.S. federal income tax rate, apportioned state income tax rates, generation of other credits and deductions available to the Company as well as changes in valuation allowances and certain non-deductible items.

During the quarter and two quarters ended July 1, 2019, the Company's effective tax rate was impacted by a net discrete benefit of $2,946 and $3,288, respectively. This is related mainly to release of uncertain tax positions due to the expiration of the statute of limitations in foreign jurisdictions netted against accrued interest expense on existing uncertain tax positions. Additionally, no tax benefit was recorded on the losses incurred in certain foreign jurisdictions as a result of corresponding increases in the valuation allowances in these jurisdictions.

The Company has various foreign subsidiaries formed or acquired to conduct or support its business outside the United States. The Company expects its earnings attributable to most foreign subsidiaries may be repatriated back to the U.S. and so a deferred tax liability has been recorded for foreign withholding and the estimated federal/state tax impact. For those other companies with earnings currently being reinvested outside of the U.S., no deferred tax liabilities on undistributed earnings are recorded.

(10) Financial Instruments

Derivatives

Interest Rate Swaps

The Company's business is exposed to interest rate risk resulting from fluctuations in interest rates on certain LIBOR-based variable rate debt. Increases in interest rates would increase interest expenses relating to the outstanding variable rate borrowings and increase the cost of debt. Fluctuations in interest rates can also lead to significant fluctuations in the fair value of the debt obligations.

On May 15, 2018, the Company entered into a four-year pay-fixed, receive floating (1-month LIBOR), interest rate swap arrangement with a notional amount of $400,000 for the period beginning June 1, 2018 and ending on June 1, 2022. Under the terms of the interest rate swap, the Company pays a fixed rate of 2.84% against the first interest payments of a portion of its LIBOR-based debt and receives floating 1-month LIBOR during the swap period.

At inception, the Company designated the interest rate swap as a cash flow hedge and the fair value of the interest rate swap was zero. As of July 1, 2019, the fair value of the interest rate swap was recorded as a liability in the amount of $12,693 and included as a component of other long-term liabilities. The change in the fair value of the interest rate swap is recorded as a component of accumulated other comprehensive loss, net of tax. No ineffectiveness was recognized for the quarter and two quarters ended July 1, 2019 and July 2, 2018. The interest rate swap increased interest expense by $367 and $303 for the quarters ended July 1, 2019 and July 2, 2018, respectively, and $706 and $303 for the two quarters ended July 1, 2019 and July 2, 2018, respectively.

Foreign Exchange Contracts

The Company enters into foreign currency forward contracts to mitigate the impact of changes in foreign currency exchange rates and to reduce the volatility of purchases and other obligations generated in currencies other than its functional currencies. The Company's foreign subsidiaries may at times purchase forward exchange contracts to manage their foreign currency risks in relation to certain purchases of machinery denominated in foreign currencies other than the Company's functional currencies. The notional amount of the foreign exchange contracts as of July 1, 2019 and December 31, 2018 was approximately $1,608 and $4,313, respectively. The Company has designated certain of these foreign exchange contracts as cash flow hedges.

The fair values of derivative instruments in the consolidated condensed balance sheets are as follows:

		Asset / (Liability) Fair Value	
	Balance Sheet Location	**July 1, 2019**	**December 31, 2018**
		(In thousands)	
Cash flow derivative instruments designated as hedges:			
Foreign exchange contracts	Prepaid expenses and other current assets	$ 40	$ —
Interest rate swap	Other long-term liabilities	(12,693)	(4,735)
Cash flow derivative instruments not designated as hedges:			
Foreign exchange contracts	Other current liabilities	—	(139)

The following table provides information about the amounts recorded in accumulated other comprehensive loss related to derivatives designated as cash flow hedges, as well as the amounts recorded in each caption in the consolidated condensed statements of operations when derivative amounts are reclassified out of accumulated other comprehensive loss for the quarter and two quarters ended July 1, 2019 and July 2, 2018:

		Quarter Ended July 1, 2019		Quarter Ended July 2, 2018	
	Financial Statement Caption	**Loss Recognized in Other Comprehensive Income**	**Loss Reclassified into Income**	**Loss Recognized in Other Comprehensive Income**	**Loss Reclassified into Income**
		(In thousands)			
Cash flow hedge:					
Interest rate swap	Interest expense	$ (6,077)	$ (367)	$ (1,719)	$ (303)
Foreign currency forward	Depreciation expense	(5)	(39)	(20)	(39)

		Two Quarters Ended July 1, 2019		Two Quarters Ended July 2, 2018	
	Financial Statement Caption	**Loss Recognized in Other Comprehensive Income**	**Loss Reclassified into Income**	**Loss Recognized in Other Comprehensive Income**	**Loss Reclassified into Income**
		(In thousands)			
Cash flow hedge:					
Interest rate swap	Interest expense	$ (8,663)	$ (706)	$ (1,719)	$ (303)
Foreign currency forward	Depreciation expense	(5)	(78)	(26)	(80)

The following table provides a summary of the activity associated with the designated cash flow hedges reflected in accumulated other comprehensive loss for the two quarters ended July 1, 2019 and July 2, 2018:

	Two Quarters Ended	
	July 1, 2019	July 2, 2018
	(In thousands)	
Beginning balance, net of tax	$ (4,214)	$ (742)
Changes in fair value loss, net of tax	(6,331)	(1,745)
Reclassification to earnings	574	383
Ending balance, net of tax	$ (9,971)	$ (2,104)

Based on the current yield curve, the Company expects that losses of approximately $2,956 of the accumulated other comprehensive loss will be reclassified into the statement of operations, net of tax, in the next twelve months.

The net gain (loss) recognized in other, net in the consolidated condensed statements of operations on derivative instruments not designated as hedges is as follows:

	Quarter Ended		Two Quarters Ended	
	July 1, 2019	July 2, 2018	July 1, 2019	July 2, 2018
	(In thousands)			
Derivative instruments not designated as hedges:				
Foreign exchange contracts	$ 45	$ (324)	$ 49	$ 103

(11) Accumulated Other Comprehensive Loss

The following provides a summary of the components of accumulated other comprehensive loss, net of tax, as of July 1, 2019 and December 31, 2018:

	Foreign Currency Translation	Pension Obligation	Gains (Losses) on Cash Flow Hedges	Total
	(In thousands)			
Ending balance as of December 31, 2018	$ 1,578	$ (1,284)	$ (4,214)	$ (3,920)
Other comprehensive loss before reclassifications	29	19	(6,331)	(6,283)
Amounts reclassified from accumulated other comprehensive income	—	—	574	574
Other comprehensive loss	29	19	(5,757)	(5,709)
Ending balance as of July 1, 2019	$ 1,607	$ (1,265)	$ (9,971)	$ (9,629)

(12) Significant Customers and Concentration of Credit Risk

In the normal course of business, the Company extends credit to its customers. The Company performs ongoing credit evaluations of customers, does not require collateral, and considers the credit risk profile of the entity from which the receivable is due in further evaluating collection risk.

The Company's customers include both OEMs and EMS companies. The Company's OEM customers often direct a significant portion of their purchases through EMS companies. While the Company's customers include both OEM and EMS providers, the Company measures customer concentration based on OEM companies, as they are the ultimate end customers.

For the quarter ended July 1, 2019, one customer accounted for approximately 10% of the Company's net sales. There were no customers that accounted for 10% or more of net sales for the two quarters ended July 1, 2019. There were no customers that accounted for 10% or more of net sales for the quarter ended July 2, 2018. For the two quarters ended July 2, 2018, one customer accounted for approximately 12% of the Company's net sales. There were no other customers that accounted for 10% or more of net sales for the quarter and two quarters ended July 1, 2019 and July 2, 2018.

(13) Fair Value Measures

The Company measures at fair value its financial and non-financial assets by using a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date, essentially an exit price, based on the highest and best use of the asset or liability.

The carrying amount and estimated fair value of the Company's financial instruments as of July 1, 2019 and December 31, 2018 were as follows:

	As of July 1, 2019		As of December 31, 2018	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
	(In thousands)			
Derivative liabilities, current	$ —	$ —	$ 139	$ 139
Derivative liabilities, non-current	12,693	12,693	4,735	4,735
Term Loan due September 2024	796,366	798,828	825,161	782,592
Senior Notes due October 2025	369,300	369,274	368,929	350,880
Convertible Senior Notes	233,604	293,571	228,335	290,858
ABL Revolving Loans	70,000	70,000	70,000	70,000

The fair value of the derivative instruments was determined using pricing models developed based on the LIBOR swap rate, foreign currency exchange rates, and other observable market data, including quoted market prices, as appropriate using Level 2 inputs. The values were adjusted to reflect non-performance risk of both the counterparty and the Company, as necessary.

The fair value of the long-term debt was estimated based on quoted market prices or discounting the debt over its life using current market rates for similar debt as of July 1, 2019 and December 31, 2018, which are considered Level 2 inputs.

The fair value of the Convertible Senior Notes was estimated based on quoted market prices of the securities on an active exchange, which are considered Level 2 inputs.

As of July 1, 2019 and December 31, 2018, the Company's other financial instruments also included cash and cash equivalents, accounts receivable, and accounts payable. Due to short-term maturities, the carrying amount of these instruments approximates fair value. The Company's cash and cash equivalents as of July 1, 2019 consisted of $79,661 held in the U.S., with the remaining $204,805 held by foreign subsidiaries.

The majority of the Company's non-financial assets and liabilities, which include goodwill, intangible assets, inventories, and property, plant and equipment, are not required to be carried at fair value on a recurring basis. However, if certain triggering events occur (or are tested at least annually in the case of goodwill) such that a non-financial instrument is required to be evaluated for impairment, based upon a comparison of the non-financial instrument's fair value to its carrying value, an impairment is recorded to reduce the carrying value to the fair value, if the carrying value exceeds the fair value.

(14) Commitments and Contingencies

Legal Matters

The Company is subject to various legal matters, which it considers normal for its business activities. While the Company currently believes that the amount of any reasonably possible loss for known matters would not be material to the Company's financial condition, the outcome of these actions is inherently difficult to predict. In the event of an adverse outcome, the ultimate potential loss could have a material adverse effect on the Company's financial condition or results of operations in a particular period. The Company has accrued amounts for its loss contingencies which are probable and estimable as of July 1, 2019 and December 31, 2018. However, these amounts are not material to the consolidated condensed financial statements of the Company.

(15) Earnings Per Share

The following is a reconciliation of the numerator and denominator used to calculate basic earnings per share and diluted earnings per share for the quarter and two quarters ended July 1, 2019 and July 2, 2018:

	Quarter Ended		Two Quarters Ended	
	July 1, 2019	July 2, 2018	July 1, 2019	July 2, 2018
	(In thousands, except per share amounts)			
Basic earnings:				
Basic earnings	$ 3,424	$ 84,004	$ 172	$ 94,101
Diluted earnings:				
Net income	$ 3,424	$ 84,004	$ 172	$ 94,101
Interest expense from Convertible Senior Notes, net of tax	—	3,587	—	7,135
Diluted earnings	$ 3,424	$ 87,591	$ 172	$ 101,236
Basic weighted average shares	105,470	103,553	104,893	103,030
Dilutive effect of performance-based restricted stock units, restricted stock units and stock options	637	1,376	967	1,603
Dilutive effect of outstanding warrants	—	3,854	—	3,517
Dilutive effect of assumed conversion of Convertible Senior Notes outstanding	—	25,938	—	25,938
Diluted shares	106,107	134,721	105,860	134,088
Earnings per share:				
Basic	$ 0.03	$ 0.81	$ 0.00	$ 0.91
Diluted	$ 0.03	$ 0.65	$ 0.00	$ 0.75

Performance-based restricted stock units (PRUs), restricted stock units (RSUs), and stock options to purchase 1,089 and 45 shares of common stock for the quarters ended July 1, 2019 and July 2, 2018, respectively, and 1,089 and 488 shares of common stock for the two quarters ended July 1, 2019 and July 2, 2018, respectively, were not included in the computation of diluted earnings per share because the options' exercise prices or the total expected proceeds under the treasury stock method for PRUs, RSUs, or stock options was greater than the average market price of common shares during the applicable quarter and two quarters and, as a result, the impact would be anti-dilutive.

Outstanding warrants for the quarter and two quarters ended July 1, 2019, to purchase common stock were not included in the computation of dilutive earnings per share because the strike price of the warrants to purchase the Company's common stock were greater than the average market price of common shares during the applicable quarter, and therefore, the effect would be anti-dilutive.

For the quarter and two quarters ended July 1, 2019, the effect of shares of common stock related to the Company's Convertible Senior Notes, based on the if-converted method, were not included in the computation of dilutive earnings per share as the impact would be anti-dilutive.

(16) Stock-Based Compensation

Stock-based compensation expense is recognized in the accompanying consolidated condensed statements of operations as follows:

	Quarter Ended		Two Quarters Ended	
	July 1, 2019	July 2, 2018	July 1, 2019	July 2, 2018
	(In thousands)			
Cost of goods sold	$ 570	$ 829	$ 1,275	$ 1,358
Selling and marketing	396	545	862	919
General and administrative	2,636	4,493	5,391	7,212
Stock-based compensation expense recognized	$ 3,602	$ 5,867	$ 7,528	$ 9,489

Performance-based Restricted Stock Units

The Company maintains a long-term incentive program for executives that provides for the issuance of PRUs, representing hypothetical shares of the Company's common stock that may be issued. Under the PRU program, a target number of PRUs is typically awarded at the beginning of each three-year performance period. The number of shares of common stock released at the end of the performance period will range from zero to 2.4 times the target number depending on performance during the period. The performance metrics of the PRU program are based on (a) annual financial targets, which are based on revenue and EBITDA (earnings before interest, tax, depreciation, and amortization expense), each equally weighted, and (b) an overall modifier based on the Company's total stockholder return (TSR) relative to a group of peer companies selected by the Company's compensation committee, over the three-year performance period.

The Company records stock-based compensation expense for PRU awards granted based on management's periodic assessment of the annual financial performance goals to be achieved. As of July 1, 2019, management determined that vesting of the PRU awards was probable. PRUs activity for the two quarters ended July 1, 2019 was as follows:

	Shares	Weighted Average Fair Value
	(In thousands)	
Outstanding shares as of December 31, 2018	255	$ 18.75
Granted	293	10.17
Change in units due to annual performance achievement	(51)	10.15
Forfeited / cancelled	(6)	15.18
Outstanding shares as of July 1, 2019	491	$ 14.57

The fair value of PRUs granted is calculated using a Monte Carlo simulation model, as the TSR modifier contains a market condition. For the two quarters ended July 1, 2019 and July 2, 2018, the following assumptions were used in determining the fair value:

	Two Quarters Ended	
	July 1, 2019 (1)	July 2, 2018 (2)
Weighted-average fair value	$ 10.17	$ 19.59
Risk-free interest rate	2.18%	2.14%
Dividend yield	—	—
Expected volatility	38%	40%
Expected term in years	1.8	1.5

(1) Reflects the weighted-averages for the third year of the three-year performance period applicable to PRUs granted in 2017 and second year of the three-year performance period applicable to PRUs granted in 2018 and first year of the three-year performance period applicable to PRUs granted in 2019.

(2) Reflects the weighted-averages for the third year of the three-year performance period applicable to PRUs granted in 2016, second year of the three-year performance period applicable to PRUs granted in 2017 and first year of the three-year performance period applicable to PRUs granted in 2018.

The risk-free interest rate for the expected term of PRUs is based on the U.S. Treasury yield curve in effect at the time of grant. Expected volatility is calculated using the Company's historical stock price. The expected term of the PRUs reflects the performance period for the PRUs granted.

Restricted Stock Units

The Company granted 1,599 and 195 RSUs during the quarters ended July 1, 2019 and July 2, 2018, respectively, and 1,601 and 1,023 RSUs during the two quarters ended July 1, 2019 and July 2, 2018, respectively. The RSUs granted have a weighted-average fair value per unit of $10.04 and $16.06 for the quarters ended July 1, 2019 and July 2, 2018, respectively, and $10.04 and $15.44 for the two quarters ended July 1, 2019 and July 2, 2018, respectively. The fair value for RSUs granted is based on the closing share price of the Company's common stock on the date of grant.

Stock Options

The Company did not grant stock option awards during the quarter and two quarters ended July 1, 2019. During the quarter and two quarters ended July 2, 2018, the Company granted 20 stock option awards to a newly appointed member of the board which were estimated to have a fair value per share of $8.92. The fair value calculation is based on stock options granted during the period using the Black-Scholes option-pricing model on the date of grant. For the quarter and two quarters ended July 2, 2018, the fair value was determined using 3.0% as the risk-free interest rate, 43.0% as the expected volatility, 8.5 years as the expected term and no dividend yield.

Summary of Unrecognized Compensation Costs

The following is a summary of total unrecognized compensation costs as of July 1, 2019:

	Unrecognized Stock-Based Compensation Cost (In thousands)	Remaining Weighted Average Recognition Period (In years)
RSU awards	$ 27,002	1.6
PRU awards	3,326	1.3
Stock options	300	1.9
	$ 30,628	

(17) Segment Information

The reportable segments shown below are the Company's segments for which separate financial information is available and upon which operating results are evaluated by the chief operating decision maker to assess performance and to allocate resources. The Company has two reportable segments: PCB and E-M Solutions. The PCB reportable segment is comprised of multiple operating segments. Factors considered to determine whether operating segments can be aggregated into reportable segments included similarity regarding economic characteristics, products, production processes, type or classes of customers, distribution methods, and regulatory environments.

The Company, including the chief operating decision maker, evaluates segment performance based on reportable segment income, which is operating income before amortization of intangibles. Interest expense and interest income are not presented by segment since they are not included in the measure of segment profitability reviewed by the chief operating decision maker. All inter-segment transactions have been eliminated.

	Quarter Ended		Two Quarters Ended	
	July 1, 2019	July 2, 2018	July 1, 2019	July 2, 2018
	(In thousands)			
Net Sales:				
PCB	$ 573,121	$ 655,045	$ 1,141,943	$ 1,271,476
E-M Solutions	59,917	61,842	111,295	108,993
Total net sales	$ 633,038	$ 716,887	$ 1,253,238	$ 1,380,469
Operating Segment Income (Loss):				
PCB	$ 50,989	$ 80,964	$ 109,531	$ 144,428
E-M Solutions	863	2,496	2,042	2,536
Corporate	(22,561)	(32,237)	(46,787)	(59,879)
Total operating segment income	29,291	51,223	64,786	87,085
Amortization of definite-lived intangibles (1)	(12,447)	(19,489)	(30,452)	(25,350)
Total operating income	16,844	31,734	34,334	61,735
Total other expense, net	(16,250)	(14,275)	(38,468)	(29,129)
Income (loss) before income taxes	$ 594	$ 17,459	$ (4,134)	$ 32,606

(1) Amortization of definite-lived intangibles primarily relates to the PCB reportable segment. For the quarter and two quarters ended July 1, 2019, $1,180 and $2,359, respectively, of amortization expense is included in cost of goods sold.

The Corporate category primarily includes operating expenses that are not included in the segment operating performance measures. Corporate consists primarily of corporate governance functions such as finance, accounting, information technology, facilities and human resources personnel, as well as global sales and marketing personnel, research and development costs, acquisition and integration costs associated with acquisitions.

(18) Related Party Transactions

In the normal course of business, the Company's foreign subsidiaries purchase laminate and prepreg from related parties in which a member of the Board of Directors of the Company holds an equity interest. The Company's foreign subsidiaries purchased laminate and prepreg from these related parties in the amount of $8,917 and $12,550 for the quarters ended July 1, 2019 and July 2, 2018, respectively, and $17,229 and $25,258 for the two quarters ended July 1, 2019 and July 2, 2018, respectively.

As of July 1, 2019 and December 31, 2018, the Company's consolidated condensed balance sheets included $10,537 and $10,630, respectively, in accounts payable due to related parties for purchases of laminate and prepreg and such balances are included as a component of accounts payable on the consolidated condensed balance sheets.

(19) Restructuring Charges

The Company periodically incurs restructuring charges as part of the integration process of recent acquisitions and to realign its operations with anticipated market demand. The Company recognized employee separation, contract termination and other costs during the quarter and two quarters ended July 1, 2019. Contract termination and other costs primarily represented plant closure costs.

The below table summarizes such restructuring costs by reportable segment for the quarter and two quarters ended July 1, 2019:

	Quarter Ended July 1, 2019			Two Quarters Ended July 1, 2019		
	Employee separation/ severance	Contract termination and other costs	Total	Employee separation/ severance	Contract termination and other costs	Total
	(In thousands)					
Reportable Segment:						
PCB	$ 3,776	$ —	$ 3,776	$ 4,213	$ —	$ 4,213
E-M Solutions	—	—	—	—	—	—
Corporate	160	8	168	160	16	176
	$ 3,936	$ 8	$ 3,944	$ 4,373	$ 16	$ 4,389

Accrued restructuring costs are included as a component of other current liabilities in the consolidated condensed balance sheet. The below table shows the utilization of the accrued restructuring costs during the two quarters ended July 1, 2019:

	Employee separation/ severance	Contract termination and other costs	Total
	(In thousands)		
Accrued at December 31, 2018	$ 3,158	$ 393	$ 3,551
Charged to expense	4,373	16	4,389
Amount paid	(3,851)	(61)	(3,912)
Accrued at July 1, 2019	$ 3,680	$ 348	$ 4,028

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

The following discussion of our financial condition and results of operations should be read in conjunction with our consolidated condensed financial statements and the related notes and the other financial information included in this Quarterly Report on Form 10-Q. This discussion and analysis contains forward-looking statements that involve risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of specified factors, including those set forth in Item 1A "Risk Factors" of Part II below and elsewhere in this Quarterly Report on Form 10-Q. This discussion and analysis should also be read in conjunction with "Management's Discussion and Analysis of Financial Condition and Results of Operations" set forth in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018, filed with the SEC.

COMPANY OVERVIEW

We are a leading global printed circuit board (PCB) manufacturer, focusing on quick-turn and volume production of technologically complex PCBs, backplane assemblies and electro-mechanical solutions (E-M Solutions), as well as a global designer and manufacturer of radio-frequency (RF) and microwave components and assemblies. We focus on providing time-to-market and volume production of advanced technology products and offer a one-stop design, engineering and manufacturing solution to our customers from engineering support to prototype development through final mass production. This one-stop design, engineering and manufacturing solution allows us to align technology development with the diverse needs of our customers and to enable them to reduce the time required to develop new products and bring them to market. We serve a diversified customer base consisting of approximately 1,600 customers in various markets throughout the world, including aerospace and defense, automotive components, smartphones and touchscreen tablets, high-end computing, medical, industrial and instrumentation related products, as well as networking/communications infrastructure products. Our customers include both original equipment manufacturers (OEMs) and electronic manufacturing services (EMS) providers.

RECENT DEVELOPMENTS

During June 2019, we amended our U.S. Asset-Based Lending Credit Agreement (U.S. ABL) and our Asia Asset-Based Lending Credit Agreement (Asia ABL) (collectively the ABL Revolving Loans). The U.S. ABL credit facility was amended to extend its maturity to June 2024, decrease the size of the facility to $150,000 and add a $100,000 incremental facility. The Asia ABL credit facility was amended to extend the maturity to June 2024 and add a $50,000 incremental facility.

During July 2019, we extended the maturity of our revolving loan credit facility (Chinese Revolver) with a lender in China to July 2020.

FINANCIAL OVERVIEW

While our customers include both OEMs and EMS providers, we measure customers based on OEM companies, as they are the ultimate end customers. Sales to our ten largest customers accounted for 46% of our net sales for both the quarter and two quarters ended July 1, 2019. Sales to our ten largest customers accounted for 43% of our net sales for both the quarter and two quarters ended July 2, 2018. We sell to OEMs both directly and indirectly through EMS providers.

The following table shows the percentage of our net sales attributable to each of the principal end markets we served for the periods indicated:

	Quarter Ended		Two Quarters Ended	
End Markets (1)	**July 1, 2019**	**July 2, 2018** (3)	**July 1, 2019**	**July 2, 2018** (3)
Aerospace and Defense	28 %	23 %	27 %	21 %
Automotive	16	19	17	20
Cellular Phone (2)	6	8	7	12
Computing/Storage/Peripherals (2)	15	15	14	14
Medical/Industrial/Instrumentation	15	15	15	15
Networking/Communications	17	17	17	16
Other (2)	3	3	3	2
Total	100 %	100 %	100 %	100 %

(1) Sales to EMS companies are classified by the end markets of their OEM customers.

(2) Smartphones are included in the Cellular Phone end market, tablets are included in the Computing/Storage/Peripherals end market and other consumer devices that include wearables, portable video devices and personal headphones are included in the Other end market.

(3) The quarter and two quarters ended July 2, 2018 were amended for the Anaren integration, as the acquisition occurred on April 18, 2018.

We derive revenues primarily from the sale of PCBs, custom electronic assemblies using customer-supplied engineering and design plans as well as the design and manufacture of RF and microwave components and assemblies. Most orders for products generally correspond to the production schedules of our customers and are supported with firm purchase orders. Most of our customers have continuous control of the work in progress and finished goods throughout the PCB manufacturing process, as PCBs are built to customer specifications with no alternative use, and there is an enforceable right of payment for work performed to date. As a result, we recognize revenue progressively over time based on the extent of progress towards completion of the performance obligation. We recognize revenue under these contracts based on the cost-to-cost method as it best depicts the transfer of control to the customer which takes place as we incur costs. Under the cost-to-cost measure of progress, the extent of progress toward completion is measured based on the ratio of costs incurred to date to the total estimated costs at completion of the performance obligation. Revenues are recorded proportionally as costs are incurred.

Additionally, we have certain long-term contracts related to the manufacture of components, assemblies, and subsystems which service the aerospace and defense electronics market. These long-term contracts, many of which provide for periodic payments, are recognized over time under the percentage-of completion method. Estimated manufacturing cost-at-completion for these contracts are reviewed on a periodic basis, and adjustments are made as needed to the estimated cost-at-completion, based on actual costs incurred, progress made, and estimates of costs required to complete the contractual requirements. When the estimated manufacturing cost-at-completion exceeds the contract value, the contract is written down to its net realizable value and the loss resulting from the cost overruns are immediately recognized.

We also manufacture certain components, assemblies, and subsystems which service our wireless communications customers. We recognize revenue at a point in time upon transfer of control of the products to our customer. Point in time recognition was determined as our customers do not simultaneously receive or consume the benefits provided by our performance and the asset being manufactured has alternative uses to us.

Net sales consist of gross sales less an allowance for returns, which typically have been approximately 2% of gross sales. We provide our customers a limited right of return for defective PCBs including components, subsystems and assemblies. We record an estimate for sales returns and allowances at the time of sale based on historical results and anticipated returns.

Cost of goods sold consists of materials, labor, outside services, and overhead expenses incurred in the manufacture and testing of our products. Shipping and handling fees and related freight costs and supplies associated with shipping products are also included as a component of cost of goods sold. Many factors affect our gross margin, including capacity utilization, product mix, production volume, and yield. While we have entered into supply assurance agreements with some of our key suppliers to maintain the continuity of supply of some of the key materials we use, we generally do not participate in any significant long-term contracts with suppliers, and we believe there are a number of potential suppliers for the raw materials we use.

Selling and marketing expenses consist primarily of salaries, labor related benefits, and commissions paid to our internal sales force, independent sales representatives, and our sales support staff, as well as costs associated with marketing materials and trade shows.

General and administrative costs primarily include the salaries for executive, finance, accounting, information technology, facilities, research and development, and human resources personnel, as well as expenses for accounting and legal assistance, incentive compensation expense, and gains or losses on the sale or disposal of property, plant and equipment.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Our consolidated condensed financial statements included in this report have been prepared in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP). The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, net sales and expenses, and related disclosure of contingent assets and liabilities.

See Item 7, *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 for further discussion of critical accounting policies and estimates. There were no material changes to our critical accounting policies and estimates since December 31, 2018.

RESULTS OF OPERATIONS

The following table sets forth the relationship of various items to net sales in our consolidated condensed statements of operations:

	Quarter Ended		Two Quarters Ended	
	July 1, 2019	July 2, 2018	July 1, 2019	July 2, 2018
Net sales	100.0 %	100.0 %	100.0 %	100.0 %
Cost of goods sold	86.6	83.8	86.2	85.2
Gross profit	13.4	16.2	13.8	14.8
Operating expenses:				
Selling and marketing	2.8	2.6	2.9	2.6
General and administrative	6.1	6.5	5.9	5.9
Amortization of definite-lived intangibles	1.8	2.7	2.3	1.8
Total operating expenses	10.7	11.8	11.1	10.3
Operating income	2.7	4.4	2.7	4.5
Other income (expense):				
Interest expense	(3.3)	(2.9)	(3.4)	(2.5)
Other, net	0.7	0.9	0.3	0.4
Total other expense, net	(2.6)	(2.0)	(3.1)	(2.1)
Income (loss) before income taxes	0.1	2.4	(0.4)	2.4
Income tax benefit	0.4	9.3	0.4	4.4
Net income	0.5 %	11.7 %	0.0 %	6.8 %

We have two reportable segments: PCB and E-M Solutions. The PCB reportable segment is comprised of multiple operating segments. Factors considered in determining whether operating segments can be aggregated into reportable segments included similarity regarding economic characteristics, products, production process, type or class of customers, distribution methods and regulatory environments.

Net Sales

Total net sales decreased $83.9 million, or 11.7%, to $633.0 million for the second quarter of 2019 from $716.9 million for the second quarter of 2018. This decrease primarily resulted from a reduction in net sales for the PCB reportable segment of $81.9 million, or 12.5%, to $573.1 million for the second quarter of 2019 from $655.0 million for the second quarter of 2018. The reduction in PCB net sales was primarily due to lower demand in our commercial (non-Aerospace and Defense related) end markets, partially offset by an increase in demand in our Aerospace and Defense end market. These changes resulted in an average PCB selling price increase of 14.0%, driven mainly by product mix shift and a 22.7% decrease in the volume of PCB shipments as compared to the second quarter of 2018. Net sales for the E-M Solutions reportable segment decreased $1.9 million, or 3.1%, to $59.9 million for the second quarter of 2019 from $61.8 million for the second quarter of 2018. The decrease was primarily due to lower demand in our Automotive end market.

Total net sales decreased $127.3 million, or 9.2%, to $1,253.2 million for the first two quarters of 2019 from $1,380.5 million for the first two quarters of 2018. This decrease resulted from a reduction in net sales for the PCB reportable segment of $129.6 million, or 10.2% to $1,141.9 million for the first two quarters of 2019 from $1,271.5 million for the first two quarters of 2018. The reduction in PCB net sales was primarily due to lower demand in our commercial end markets, partially offset by an increase in demand in our Aerospace and Defense end market, which increase was primarily the result of the impact in the first two quarters of 2019 of our acquisition of Anaren (which occurred on April 18, 2018). These changes resulted in an average PCB selling price increase of 12.8%, driven mainly by product mix shift and a 21.9% decrease in the volume of PCB shipments as compared to the first two quarters of 2018. Net sales for the E-M Solutions reportable segment increased $2.3 million, or 2.1%, to $111.3 million for the first two quarters of 2019 from $109.0 million for the first two quarters of 2018. The increase was primarily due to higher demand in our Networking/Communications end market, partially offset by a decrease in our Automotive end market.

Gross Margin

Overall gross margin decreased to 13.4% for the second quarter of 2019 from 16.2% for the second quarter of 2018. Gross margin for the PCB reportable segment decreased to 14.5% for the second quarter of 2019 from 15.4% for the second quarter of 2018, primarily due to lower volumes in our commercial end markets and ramp related inefficiencies associated with a major product launch in our Cellular end market. Gross margin for the E-M Solutions reportable segment decreased to 7.3% for the second quarter of 2019 from 8.0% for the second quarter of 2018, primarily due to lower volume in our Automotive end market.

Overall gross margin decreased to 13.8% for the first two quarters of 2019 from 14.8% for the first two quarters of 2018. Gross margin for the PCB reportable segment increased to 15.0% for the first two quarters of 2019 from 14.8% for the first two quarters of 2018, primarily due to the impact in the first two quarters of 2019 of our acquisition of Anaren and higher production levels at our Aerospace and Defense focused facilities partially offset by lower volumes in our commercially focused facilities. Gross margin for the E-M Solutions reportable segment decreased to 6.8% for the first two quarters of 2019 from 6.9% for the first two quarters of 2018.

Capacity utilization is a key driver for us, particularly in our high volume facilities in Asia, as a significant portion of our operating costs are fixed in nature. Capacity utilization for the second quarter of 2019 in our Asia and North America PCB facilities was 56% and 60%, respectively, compared to 71% and 61%, respectively, in the second quarter of 2018. Capacity utilization for the first two quarters of 2019 in our Asia and North America PCB facilities was 56% and 60%, respectively, compared to 74% and 61%, respectively, in the first two quarters of 2018. The significant decline in the utilization of our facilities in Asia was due to the softness we experienced in our commercial end markets.

Selling and Marketing Expenses

Selling and marketing expenses decreased $0.7 million, to $17.9 million for the second quarter of 2019 from $18.6 million for the second quarter of 2018. As a percentage of net sales, selling and marketing expenses was 2.8% for the second quarter of 2019, as compared to 2.6% for the second quarter of 2018. The decrease in selling and marketing expense for the quarter ended July 1, 2019 primarily relates to reduced commission expense.

Selling and marketing expenses increased $0.6 million, to $36.8 million for the first two quarters of 2019 from $36.2 million for the first two quarters of 2018. As a percentage of net sales, selling and marketing expenses was 2.9% for the first two quarters of 2019, as compared to 2.6% for the first two quarters of 2018. The increase in selling and marketing expense for the two quarters ended July 1, 2019 primarily relates to expenses incurred by Anaren post acquisition partially offset by reduced commission expense.

General and Administrative Expenses

General and administrative expenses decreased $7.7 million to $38.6 million, or 6.1% of net sales, for the second quarter of 2019 from $46.3 million, or 6.5% of net sales, for the second quarter of 2018. The decrease in general and administrative expenses for the quarter ended July 1, 2019 was primarily due to the decrease in acquisition-related costs of $6.1 million associated with the acquisition of Anaren on April 18, 2018 and a decrease in incentive compensation expense of $3.7 million partially offset by higher restructuring charges.

General and administrative expenses decreased $7.4 million to $74.1 million, or 5.9% of net sales, for the first two quarters of 2019 from $81.5 million, or 5.9% of net sales, for the first two quarters of 2018. The decrease in general and administrative expenses for the two quarters ended July 1, 2019 was primarily due to the decrease in acquisition-related costs of $8.6 million associated with the acquisition of Anaren on April 18, 2018 and a decrease in incentive compensation expense of $3.9 million partially offset by $6.4 million additional three and a half months of general and administrative expense incurred by Anaren (which occurred on April 18, 2018).

Other Income (Expense)

Other expense, net increased $2.0 million to $16.3 million for the second quarter of 2019 from $14.3 million for the second quarter of 2018. The increase in other expense, net for the quarter ended July 1, 2019 was primarily the result of lower foreign currency gains due to the depreciation of the Chinese Renminbi (RMB) in the second quarter of 2019 compared to the second quarter of 2018. We utilize the RMB at our China facilities for employee-related expenses, foreign currency denominated purchases, and other costs of running our operations in China.

Other expense, net increased $9.4 million to $38.5 million for the first two quarters of 2019 from $29.1 million for the first two quarters of 2018. The increase in other expense, net for the two quarters ended July 1, 2019 was primarily due to the increase in interest expense of $8.4 million mainly related to the $600.0 million incremental debt incurred in conjunction with the Anaren acquisition.

Income Taxes

The income tax benefit decreased by $63.7 million to $2.8 million of tax benefit for the second quarter of 2019 from $66.5 million of tax benefit for the second quarter of 2018. The income tax benefit decreased by $57.2 million to $4.3 million of tax benefit for the first two quarters of 2019 from $61.5 million of tax benefit for the first two quarters of 2018. The decrease in income tax benefit for the first two quarters of 2019 was primarily due to the absence of a $74.6 million release of a portion of the Company’s valuation allowance against its U.S. federal and state net deferred tax assets which occurred in the second quarter of 2018, partially offset by tax benefits resulting from the decreased income before income taxes for the two quarters ended July 1, 2019 and a reduction of discrete tax expense recorded for the first two quarters of 2019 compared to the amount recorded in the first two quarters of 2018.

Our effective tax rate is primarily impacted by tax rates in China and Hong Kong, the U.S. federal income tax rate, apportioned state income tax rates, generation of other credits and deductions available to us, as well as changes in valuation allowances and certain non-deductible items. We had a net deferred income tax asset of approximately $15.9 million and $13.7 million as of July 1, 2019 and December 31, 2018, respectively.

Liquidity and Capital Resources

Our principal sources of liquidity have been cash provided by operations, the issuance of Convertible Senior Notes, Term Loan, Senior Notes, and Revolving Credit Facility. Our principal uses of cash have been to finance capital expenditures, finance acquisitions, meet debt service requirements, fund working capital requirements, and pay down existing debt. We anticipate that servicing debt, financing capital expenditures, financing acquisitions, and funding working capital requirements will continue to be the principal demands on our cash in the future.

Cash flow provided by operating activities during the first two quarters of 2019 was $123.0 million as compared to $41.4 million in the same period in 2018. The increase in cash flow was primarily due to lower investment in working capital during the first two quarters of 2019. As of July 1, 2019, we had net working capital of approximately $565.7 million compared to $533.7 million as of December 31, 2018.

Net cash used in investing activities was approximately $63.2 million for the first two quarters of 2019, reflecting $69.1 million used for purchases of property, plant and equipment, less proceeds from the sale of property, plant and equipment and other assets of $5.9 million. Net cash used in investing activities was approximately $677.5 million for the first two quarters of 2018, reflecting $596.4 million used for acquisition of Anaren, net of debt assumed, and $81.1 million used for net purchases of property, plant and equipment.

Net cash used in financing activities was approximately $31.5 million for the first two quarters of 2019, reflecting repayment of long-term debt of $30.0 million and payment of debt issuance costs of $1.5 million. Net cash provided by financing activities was approximately $431.7 million for the first two quarters of 2018, primarily reflecting proceeds of $623.0 million from incremental term and revolving loan borrowings, less the repayment of assumed long-term debt in acquisition of $178.6 million, repayment of long-term debt of $3.7 million, and payment of debt issuance costs and original issue discount of $9.2 million associated with the incremental term loans.

As of July 1, 2019, we had cash and cash equivalents of approximately $284.5 million, of which approximately $204.8 million was held by our foreign subsidiaries, primarily in China.

Our 2019 net capital expenditures and asset acquisitions are expected to be in the range of $150.0 million to $170.0 million.

Long-term Debt and Letters of Credit

Term Loan Facility

On April 18, 2018, we closed our $600.0 million commitment of incremental loans concurrent with the completion of our acquisition of Anaren. At issuance, these incremental loans increased the existing balance of our Term Loan Facility due 2024 from $348.3 million to $948.3 million. The Term Loan Facility had an outstanding balance of $805.9 million as of July 1, 2019 and is included in long-term debt. The Term Loan Facility was issued at a weighted average discount of 99.7% and bears interest, at our option, at a floating rate of LIBOR plus an applicable interest margin of 2.5%, or an alternate base rate (as defined in the Term Loan Credit Agreement) plus an applicable margin of 1.5%. As of July 1, 2019, the interest rate on the outstanding borrowings under the Term Loan Facility was 4.89%. There is no provision, other than an event of default, for the interest margin to increase. The Term Loan Facility will mature on September 28, 2024. The Term Loan Facility is secured by a significant amount of our domestic assets and a pledge of 65% of voting stock of our first tier foreign subsidiaries and is structurally senior to our Senior Notes and Convertible Senior Notes. See Senior Notes and Convertible Senior Notes below.

Based on certain parameters defined in the Term Loan Facility, including a First Lien Leverage Ratio, we may be required to make an additional principal payment on an annual basis beginning after fiscal year 2018, if our First Lien Leverage Ratio is greater than 2.0. For 2019, we are not required to make an additional principal payment as our First Lien Leverage Ratio was less than 2.0. Any remaining outstanding balance under the Term Loan Facility is due at the maturity date of September 28, 2024.

Borrowings under the Term Loan Facility are subject to certain affirmative and negative covenants, including limitations on indebtedness, corporate transactions, investments and dispositions, and share payments. As of July 1, 2019, we were in compliance with the covenants under the Term Loan Facility.

Senior Notes

The $375.0 million of Senior Notes, which is included in long-term debt, bears interest at a rate of 5.63% per annum. Interest is payable semiannually in arrears on April 1 and October 1 of each year beginning April 1, 2018. The Senior Notes will mature on October 1, 2025.

Borrowings under the Senior Notes are subject to certain affirmative and negative covenants, including limitations on indebtedness, corporate transactions, investments, dispositions, and share payments. As of July 1, 2019, we were in compliance with the covenants under the Senior Notes.

Convertible Senior Notes due 2020

We maintain 1.75% Convertible Senior Notes in the amount of $250.0 million due December 15, 2020. The Convertible Senior Notes bear interest at a rate of 1.75% per annum. Interest is payable semiannually in arrears on June 15 and December 15 of each year. The Convertible Senior Notes are senior unsecured obligations and rank equally to our future unsecured senior indebtedness and senior in right of payment to any of our future subordinated indebtedness. Offering expenses are being amortized to interest expense over the term of the Convertible Senior Notes.

Asset-Based Lending Agreements

During June 2019, we amended our ABL Revolving Loans. The U.S. ABL credit facility was amended to extend its maturity to June 2024, decrease the size of the facility to $150,000 and add a $100,000 incremental facility. The Asia ABL credit facility was amended to extend the maturity to June 2024 and add a $50,000 incremental facility.

The U.S. ABL consists of two tranches comprised of a revolving credit facility of up to $150.0 million and a letter of credit facility for up to $50.0 million, provided that at no time may amounts outstanding under the tranches exceed in aggregate $150.0 million or the applicable borrowing base, which is a percentage of the principal amount of Eligible Accounts, as defined in the U.S. ABL agreement. Borrowings under the U.S. ABL bear interest at either a floating rate of LIBOR plus a margin of 138 basis points or an alternate base rate (defined as the greater of the prime rate, the New York Fed bank rate plus 0.5% or LIBOR plus 1.0%) subject to a 1.0% floor, plus an applicable margin of 38 basis points, at our option. As of July 1, 2019, the interest rate on the outstanding borrowings under the U.S. ABL was 3.76%. The applicable margin can vary based on the remaining availability of the facility, from 125 to 150 basis points for LIBOR-based loans and from 25 to 50 basis points for JP Morgan Chase Bank's prime rate-based loans. Other than availability and an event of default, there are no other provisions for the interest margin to increase. The U.S. ABL will mature on June 3, 2024. Loans made under the U.S. ABL are secured first by all of our domestic cash, receivables and certain inventories as well as by a second position against a significant amount of our domestic assets and a pledge of 65% of the voting stock of our first tier foreign subsidiaries and are structurally senior to our Senior Notes and Convertible Senior Notes. See Senior Notes and Convertible Senior Notes above. As of July 1, 2019, $40.0 million of the U.S. ABL was outstanding and classified as long-term debt, which is consistent with its maturity date.

The Asia ABL consists of two tranches comprised of a revolving credit facility for up to $150.0 million and a letter of credit facility for up to $100.0 million, provided that at no time may amounts outstanding under both tranches exceed in aggregate $150.0 million or the applicable borrowing base, which is a percentage of the principal amount of Eligible Accounts, as defined in the Asia ABL agreement. Borrowings under the Asia ABL bear interest at a floating rate of LIBOR plus 140 basis points. As of July 1, 2019, the interest rate on the outstanding borrowings under the Asia ABL was 3.79%. There is no provision, other than an event of default, for the interest margin to increase. The Asia ABL will mature on June 4, 2024. Loans made under the Asia ABL are secured by a portion of our Asia Pacific cash and receivables and are structurally senior to our domestic obligations, including the Senior Notes and Convertible Senior Notes. See Senior Notes and Convertible Senior Notes above. As of July 1, 2019, $30.0 million of the Asia ABL was outstanding and classified as long-term debt, which is consistent with its maturity date.

We have up to $50.0 million and $100.0 million Letters of Credit Facilities under the U.S. ABL and the Asia ABL, respectively. As of July 1, 2019, letters of credit in the amount of $15.3 million were outstanding under the U.S. ABL and $22.7 million were outstanding under the Asia ABL with various expiration dates through May 2020. Available borrowing capacity under the U.S. ABL and the Asia ABL was $94.7 million and $97.3 million, respectively, which considers letters of credit outstanding as of July 1, 2019.

We are required to pay a commitment fee of 0.25% per annum on any unused portion of the U.S. ABL and 0.28% per annum on any unused portion of the Asia ABL. We paid commitment fees of $0.2 million for the quarters ended July 1, 2019 and July 2, 2018. Additionally, we paid commitment fees of $0.5 million for the two quarters ended July 1, 2019 and July 2, 2018. Under the occurrence of certain events, the ABL Revolving Loans are subject to various financial and operational covenants, including maintaining minimum fixed charge coverage ratios. As of July 1, 2019, we were in compliance with the covenants under the ABL Revolving Loans.

Other Credit Facility

Additionally, we are party to a revolving loan credit facility (Chinese Revolver) with a lender in China. Under this arrangement, the lender has made available to us approximately $29.1 million in unsecured borrowing with all terms of the borrowing to be negotiated at the time the Chinese Revolver is drawn upon. There are no commitment fees on the unused portion of the Chinese Revolver. In July 2019, the expiration of the Chinese Revolver was extended to July 2020. As of July 1, 2019, the Chinese Revolver had not been drawn upon.

Based on our current level of operations, we believe that cash generated from operations, cash on hand and cash from the issuance of term and revolving debt will be adequate to meet our currently anticipated capital expenditure, debt service, and working capital needs for the next twelve months.

Contractual Obligations and Commitments

As of the date of this report, other than changes related to adoption of the new lease accounting standard as discussed in Note 1 to the consolidated condensed financial statements, there were no material changes to our contractual obligations and commitments outside the ordinary course of business since December 31, 2018 as reported in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018.

Off Balance Sheet Arrangements

We do not have any relationships with unconsolidated entities or financial partnerships, such as entities often referred to as structured finance or special purpose entities, which would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. In addition, we do not engage in trading activities involving non-exchange traded contracts. As a result, we are not materially exposed to any financing, liquidity, market, or credit risk that could arise if we had engaged in these relationships.

Seasonality

Orders for our products generally correspond to the production schedules of our customers. We historically experience higher net sales in the third and fourth quarters due to end customer demand in the fourth quarter for consumer electronics products. Seasonal fluctuations also include the Chinese New Year holidays in the first quarter, which typically results in lower net sales for that quarter. We attribute this decline to shutdowns of our customers' and our own China based manufacturing facilities surrounding the Chinese New Year public holidays, which normally occur in January or February of each year.

Item 3. ***Quantitative and Qualitative Disclosures About Market Risk***

In the normal course of business operations, we are exposed to risks associated with fluctuations in interest rates and foreign currency exchange rates. We address these risks through controlled risk management that includes the use of derivative financial instruments to economically hedge or reduce these exposures. We do not enter into derivative financial instruments for trading or speculative purposes.

We have not experienced any losses to date on any derivative financial instruments due to counterparty credit risk.

To ensure the adequacy and effectiveness of our interest rate and foreign exchange hedge positions, we continually monitor our interest rate swap positions and foreign exchange forward positions, both on a stand-alone basis and in conjunction with their underlying interest rate and foreign currency exposures, from an accounting and economic perspective. However, given the inherent limitations of forecasting and the anticipatory nature of the exposures intended to be hedged, we cannot assure that such programs will offset more than a portion of the adverse financial impact resulting from unfavorable movements in either interest or foreign exchange rates. In addition, the timing of the accounting for recognition of gains and losses related to mark-to-market instruments for any given period may not coincide with the timing of gains and losses related to the underlying economic exposures and, therefore, may adversely affect our consolidated operating results and financial position.

Interest rate risk

Our business is exposed to interest rate risk resulting from fluctuations in interest rates. Our interest expense is more sensitive to fluctuations in the general level of LIBOR interest rates than to changes in rates in other markets. Increases in interest rates would increase interest expense relating to our outstanding variable rate borrowings and increase the cost of debt. Fluctuations in interest rates can also lead to significant fluctuations in the fair value of our debt obligations.

On May 15, 2018, we entered into a four-year pay-fixed, receive floating (1-month LIBOR), interest rate swap arrangement with a notional amount of $400.0 million for the period beginning June 1, 2018 and ending on June 1, 2022. Under the terms of the interest rate swap, we pay a fixed rate of 2.84% against the first interest payments of a portion of our LIBOR-based debt and receive floating 1-month LIBOR during the swap period. At inception, we designated the interest rate swap as a cash flow hedge and the fair value of the interest rate swap was zero. As of July 1, 2019, the fair value of the interest rate swap was recorded as a liability and as a component of other long-term liabilities in the amount of $12.7 million. No ineffectiveness was recognized for the quarter and two quarters ended July 1, 2019. During the quarter and two quarters ended July 1, 2019, the interest rate swap increased interest expense by $0.4 million and $0.7 million, respectively.

See Liquidity and Capital Resources and Long-term Debt and Letters of Credit appearing in Item 2 of this Quarterly Report on Form 10-Q for further discussion of our financing facilities and capital structure. As of July 1, 2019, approximately 68.3% of our total debt was based on fixed rates. Based on our borrowings as of July 1, 2019, an assumed 100 basis point change in variable rates would cause our annual interest cost to change by $4.8 million.

Foreign currency risks

In the normal course of business, we are exposed to risks associated with fluctuations in foreign currency exchange rates associated with transactions that are denominated in currencies other than our functional currencies, as well as the effects of translating amounts denominated in a foreign currency to the U.S. Dollar as a normal part of our financial reporting process. Most of our foreign operations have the U.S. Dollar as their functional currency, however, two of our China facilities utilize the Renminbi (RMB), which results in recognition of translation adjustments included as a component of other comprehensive loss. Our foreign exchange exposure results primarily from employee-related and other costs of running our operations in foreign countries, foreign currency denominated purchases and translation of balance sheet accounts denominated in foreign currencies. Our primary foreign exchange exposure is to the RMB. Except for certain equipment purchases, we do not engage in hedging to manage foreign currency risk. However, we may consider the use of derivatives in the future. In general, our Chinese customers pay us in RMB, which partially mitigates this foreign currency exchange risk.

We enter into foreign currency forward contracts to mitigate the impact of changes in foreign currency exchange rates and to reduce the volatility of purchases and other obligations generated in currencies other than our functional currencies. Our foreign subsidiaries may at times enter into forward exchange contracts to manage foreign currency risks in relation to certain purchases of machinery denominated in foreign currencies other than our functional currencies. The notional amount of the foreign exchange contracts as of July 1, 2019 and December 31, 2018 was approximately $1.6 million and $4.3 million, respectively. We had designated certain of these foreign exchange contracts as cash flow hedges.

The table below presents information about certain of the foreign currency forward contracts as of July 1, 2019 and December 31, 2018:

	As of July 1, 2019		As of December 31, 2018	
	Notional Amount	Average Contract Rate or Strike Amount	Notional Amount	Average Contract Rate or Strike Amount
	(In thousands)			
Receive foreign currency/pay USD				
Japanese Yen	$ 1,608	0.01	$ 4,313	0.01
Estimated fair value, net asset / (liability)	$ 40		$ (139)	

Debt Instruments

The table below presents information about certain of our debt instruments as of July 1, 2019 and December 31, 2018:

	As of July 1, 2019								
	Remaining 2019	2020	2021	2022	2023	Thereafter (1)	Total	Fair Market Value	Weighted Average Interest Rate
	(In thousands)								
US$ Variable Rate	$ —	$ —	$ —	$ —	$ —	$ 875,879	$ 875,879	$ 868,828	4.80%
US$ Fixed Rate	—	249,975	—	—	—	375,000	624,975	662,845	4.08%
Total	$ —	$ 249,975	$ —	$ —	$ —	$1,250,879	$1,500,854	$1,531,673	

	As of December 31, 2018								
	2019	2020	2021	2022	2023	Thereafter (1)	Total	Fair Market Value	Weighted Average Interest Rate
	(In thousands)								
US$ Variable Rate	$ 30,000	$ 70,000	$ —	$ —	$ —	$ 805,879	$ 905,879	$ 852,592	4.92%
US$ Fixed Rate	—	249,985	—	—	—	375,000	624,985	641,738	4.08%
Total	$ 30,000	$ 319,985	$ —	$ —	$ —	$1,180,879	$1,530,864	$1,494,330	

(1) Interest rate swap effectively fixed $400,000 of variable rate debt.

Interest Rate Swap Contracts

The table below presents information regarding our interest rate swaps as of July 1, 2019:

	2019	Fair Market Value
	(In thousands, except interest rates)	
Average interest payout rate	2.84%	
Interest payout amount	$ (5,741)	
Average interest received rate	2.49%	
Interest received amount	5,035	
Fair value loss as of July 1, 2019		$ (12,693)

Item 4. ***Controls and Procedures***

Evaluation of Disclosure Controls and Procedures

Our management, under the supervision and with the participation of our Chief Executive Officer (CEO) and Chief Financial Officer (CFO), has evaluated the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act of 1934, as amended (the Exchange Act)) as of the end of the period covered by this report. Based on this evaluation, our CEO and CFO have concluded that, as of July 1, 2019, such disclosure controls and procedures were effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is (i) recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and (ii) accumulated and communicated to our management, including our CEO and CFO, as appropriate to allow timely decisions regarding required disclosures.

In designing and evaluating our disclosure controls and procedures, our management recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their desired control objectives, and our management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Changes in Internal Control Over Financial Reporting

We continue to expand our implementation of an enterprise resource planning (ERP) system on a worldwide basis, which is expected to improve the efficiency of the financial reporting and related transaction processes. We have completed the implementation with respect to the next phase and as a result, we made changes to our processes and procedures which, in turn, resulted in changes to our internal control over financial reporting, including the implementation of additional controls. We continue to roll out the ERP system to our remaining locations.

There have been no other changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the quarter ended July 1, 2019 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1. ***Legal Proceedings***

From time to time, we may become a party to various legal proceedings arising in the ordinary course of our business. There can be no assurance that we will prevail in any such litigation. We believe that the amount of any reasonably possible or probable loss for known matters would not be material to our financial statements; however, the outcome of these actions is inherently difficult to predict. In the event of an adverse outcome, the ultimate potential loss could have a material adverse effect on our financial condition, results of operations, or cash flows in a particular period.

Item 1A. ***Risk Factors***

An investment in our common stock involves a high degree of risk. You should carefully consider the factors described below, in addition to those discussed elsewhere in this report, in analyzing an investment in our common stock. If any of the events described below occurs, our business, financial condition, and results of operations would likely suffer, the trading price of our common stock could fall, and you could lose all or part of the money you paid for our common stock. The risk factors described below are not the only ones we face. Risks and uncertainties not known to us currently, or that may appear immaterial, also may have a material adverse effect on our business, financial condition, and results of operations.

In addition, the following risk factors and uncertainties could cause our actual results to differ materially from those projected in our forward-looking statements, whether made in this report or in other documents we file with the SEC, or our annual or quarterly reports to stockholders, future press releases, or orally, whether in presentations, responses to questions, or otherwise.

Risks Related to our Business

We serve customers and have manufacturing facilities outside the United States and are subject to the risks characteristic of international operations, including recently imposed tariffs.

We have significant manufacturing operations in Asia and Canada and sales offices located in Asia and Europe, and we continue to consider additional opportunities to make foreign investments and construct new foreign facilities.

For the quarter ended July 1, 2019, we generated approximately 59.2% of our net sales from non-U.S. operations, and a significant portion of our manufacturing material was provided by international suppliers during this period. The United States' trade policies and those of foreign countries are subject to change which could adversely affect our ability to purchase and sell goods and materials without significant tariffs, taxes or duties that may be imposed on the materials we purchase or the goods we sell, thereby increasing the cost of such materials and potentially decreasing our margins. Further, our revenues could be impacted if our customers' ability to sell their goods is reduced by such tariffs, taxes or duties. Both the U.S. and Chinese governments have included PCBs among items subjected to tariffs imposed on imports from such countries, which may negatively impact our revenue and profitability. In addition, we are subject to risks relating to significant international operations, including but not limited to:

- managing international operations;
- imposition of governmental controls;
- unstable regulatory environments;
- compliance with employment laws;
- implementation of disclosure controls, internal controls, financial reporting systems, and governance standards to comply with U.S. accounting and securities laws and regulations;
- limitations on imports or exports of our product offerings;
- fluctuations in the value of local currencies;
- inflation or changes in political and economic conditions;
- labor unrest, rising wages, difficulties in staffing, and geographical labor shortages;
- government or political unrest;
- longer payment cycles;
- language and communication barriers, as well as time zone differences;
- cultural differences;
- increases in duties and taxation levied on our products;
- other potentially adverse tax consequences;
- imposition of restrictions on currency conversion or the transfer of funds;
- travel restrictions;
- expropriation of private enterprises;
- the potential reversal of current favorable policies encouraging foreign investment and trade;
- the potential for strained trade relationships between the United States and its trading partners, including trade tariffs which could create competitive pricing risk; and
- government imposed sanction laws and regulations.

Our operations in China subject us to risks and uncertainties relating to the laws and regulations of China.

Under its current leadership, the government of China has been pursuing economic reform policies, including the encouragement of foreign trade and investment and greater economic decentralization. No assurance can be given, however, that the government of China will continue to pursue such policies, that such policies will be successful if pursued, or that such policies will not be significantly altered from time to time, particularly in light of the increasingly tense trade climate with the United States. Despite progress in developing its legal system, China does not have a comprehensive and highly developed system of laws, particularly with respect to foreign investment activities and foreign trade. Enforcement of existing and future laws and contracts is uncertain, and implementation and interpretation thereof may be inconsistent. As the Chinese legal system develops, the promulgation of new laws, changes to existing laws, and the preemption of local regulations by national laws may adversely affect foreign investors. Further, any litigation in China may be protracted and may result in substantial costs and diversion of resources and management's attention. In addition, though changes in government policies and rules are timely published or communicated, there is usually no indication of the duration of any grace period before which full implementation and compliance will be required. As a result, we may operate our business in violation of new rules and policies before full compliance can be achieved. These uncertainties could limit the legal protections available to us and adversely impact our results of operations.

Uncertainty and adverse changes in the economy and financial markets could have an adverse impact on our business and operating results.

Uncertainty or adverse changes in the economy could lead to a significant decline in demand for the end products manufactured by our customers, which, in turn, could result in a decline in the demand for our products and pressure to reduce our prices. Any decrease in demand for our products could have an adverse impact on our financial condition, operating results and cash flows. Uncertainty and adverse changes in the economy could also increase the cost and decrease the availability of potential sources of financing and increase our exposure to losses from bad debts, either of which could have a material adverse effect on our financial condition, operating results and cash flows.

We participate in the competitive, cyclical automotive industry, which is subject to strict quality control standards. Failure to meet quality standards may adversely affect our business, financial condition and results of operations.

A significant portion of our sales are to customers within the telecommunications and automotive industry. The telecommunications industry is characterized by intense competition, relatively short product life cycles, and significant fluctuations in product demand, which is heavily dependent on the end markets it serves and therefore can be affected by the demand patterns of those markets. If the volatility in the telecommunications industry continues, it may have a material adverse effect on our business, financial condition and result of operations. The automotive industry has historically experienced multi-year cycles of growth and decline. If sales of automobiles should decline or go into a cyclical down turn, our sales could decline and this could have a materially adverse impact on our business, financial condition and result of operations.

In addition, for safety reasons, automotive customers have strict quality standards that generally exceed the quality requirements of other customers. If such products do not meet these quality standards, our business, financial condition, and results of operations may be materially adversely affected. These automotive customers may require long periods of time to evaluate whether our manufacturing processes and facilities meet their quality standards. If we were to lose automotive customers due to quality control issues, we might not be able to regain those customers or gain new automotive customers for long periods of time, which could have a material adverse effect on our business, financial condition, and results of operations. Moreover, we may be required under our contracts with automotive industry customers to indemnify them for the cost of warranties and recalls relating to our products.

We rely on the cellular phone and mobile technology industry for a significant portion of sales. The economic volatility in this industry has had, and may continue to have, a material adverse effect on our ability to forecast demand and production and to meet desired sales levels.

A large percentage of our business is conducted with customers who are in the cellular phone and mobile technology industry. This industry is characterized by intense competition, short product life cycles, seasonality, particularly around the year-end holiday season, and significant fluctuations in consumer demand. This industry is heavily dependent on consumers and therefore can be affected by their demand patterns. If the volatility in this industry continues, it may have a material adverse effect on our business, financial condition, and results of operations.

If we are unable to maintain satisfactory capacity utilization rates, our business, financial condition, and results of operations would be materially adversely affected.

Given the high fixed costs of our operations, decreases in capacity utilization rates can have a significant effect on our business. Accordingly, our ability to maintain or enhance gross margins will continue to depend, in part, on maintaining satisfactory capacity utilization rates. In turn, our ability to maintain satisfactory capacity utilization will depend on the demand for our products, the volume of orders we receive, and our ability to offer products that meet our customers' requirements at competitive prices. If current or future production capacity fails to match current or future customer demands, our facilities would be underutilized, our sales may not fully cover our fixed overhead expenses, and we would be less likely to achieve expected gross margins. If forecasts and assumptions used to support the realizability of our long-lived assets change in the future, significant impairment charges could result that would materially adversely affect our business, financial condition, and results of operations.

In addition, we generally schedule our quick turnaround production facilities at less than full capacity to retain our ability to respond to unexpected additional quick-turn orders. However, if these orders are not received, we may forego some production and could experience continued excess capacity. If we conclude we have significant, long-term excess capacity, we may decide to permanently close one or more of our facilities and lay off some of our employees. Closures or lay-offs could result in our recording restructuring charges such as severance, other exit costs, and asset impairments, as well as potentially causing disruptions in our ability to supply customers.

We have substantial outstanding indebtedness, and our outstanding indebtedness could adversely impact our liquidity and flexibility in obtaining additional financing, our ability to fulfill our debt obligations and our financial condition and results of operations.

We have substantial debt and, as a result, we have significant debt service obligations. We maintain $250.0 million of Convertible Senior Notes due 2020 at an interest rate of 1.75%, a $805.9 million Term Loan Facility due 2024 (Term Loan Facility) at a floating rate of LIBOR plus 2.5%, $375.0 million of Senior Notes due 2025 (Senior Notes) at an interest rate of 5.63%, $40.0 million outstanding under a $150.0 million U.S. Asset-Based Lending Credit Agreement (U.S ABL), and $30.0 million outstanding under a $150.0 million Asia Asset-Based Lending Credit Agreement (Asia ABL). We and a number of our direct and indirect subsidiaries also have various credit facilities and letters of credit. Such agreements also contain certain financial covenants which require us to maintain, under the occurrence of certain events, a consolidated fixed charge coverage ratio.

Subject to the limits contained in the credit agreements governing the Term Loan Facility, the U.S. ABL, the Asia ABL, the indenture governing the Senior Notes, and our other debt instruments, we may be able to incur substantial additional debt from time to time to finance working capital, capital expenditures, investments or acquisitions, or for other purposes. If we do so, the risks related to our high level of debt could intensify. Specifically, our high level of debt could have important consequences to us and our shareholders. For example, it could:

- make it more difficult for us to satisfy our obligations with respect to our indebtedness, which could in turn result in an event of default on such indebtedness;
- require us to use a substantial portion of our cash flow from operations for debt service payments, thereby reducing the availability of cash for working capital, capital expenditures, acquisitions and other general corporate purposes;
- impair our ability to obtain additional financing in the future for working capital, capital expenditures, acquisitions and other investments or general corporate purposes, which may limit our ability to execute our business strategy;
- diminish our ability to withstand a downturn in our business, the industry in which we operate or the economy generally and restrict us from exploiting business opportunities or making acquisitions;
- limit our flexibility in planning for, or reacting to, changes in our business and the industry in which we operate or the general economy;
- increase our vulnerability to general adverse economic and industry conditions, including movements in interest rates, which could result in increased borrowing costs;
- limit management's discretion in operating our business; and
- place us at a competitive disadvantage as compared to our competitors that have less debt as it could limit our ability to capitalize on future business opportunities and to react to competitive pressures or adverse changes.

In addition, the indenture governing the Senior Notes and the credit agreements governing the Term Loan Facility, the U.S. ABL and the Asia ABL contain restrictive covenants that will limit our ability to engage in activities that may be in our long-term best interest. Our failure to comply with those covenants could result in an event of default which, if not cured or waived, could result in the acceleration of all our debt.

We have a significant amount of goodwill and other intangible assets on our consolidated condensed balance sheet. If our goodwill or other intangible assets become impaired in the future, we would be required to record a non-cash charge to earnings, which may be material and would also reduce our stockholders' equity.

As of July 1, 2019, our consolidated condensed balance sheet included $1,112.5 million of goodwill and definite-lived intangible assets. We periodically evaluate whether events and circumstances have occurred, such that the potential for reduced expectations for future cash flows coupled with further decline in the market price of our stock and market capitalization may indicate that the remaining balance of goodwill and definite-lived intangible assets may not be recoverable. If factors indicate that assets are impaired, we would be required to reduce the carrying value of our goodwill and definite-lived intangible assets, which could harm our results during the periods in which such a reduction is recognized.

We rely on suppliers and equipment manufacturers for the timely delivery of raw materials, components, equipment and spare parts used in manufacturing our PCBs and E-M Solutions. If a raw material supplier or equipment manufacturer goes bankrupt, liquidates, consolidates out of existence or fails to satisfy our product quality standards, it could harm our ability to purchase new manufacturing equipment, service the equipment we have, or timely produce our products, thereby affecting our customer relationships.

Consolidations and restructuring in our supplier base and equipment fabricators related to our raw materials purchases or the manufacturing equipment we use to fabricate our products may result in adverse changes in pricing of materials due to reduction in competition among our raw material suppliers or an elimination or shortage of equipment and spare parts from our manufacturing equipment supply base. Suppliers and equipment manufacturers may be impacted by other events outside our control including macro-economic, financial instability, environmental occurrences, or supplier interruptions due to fire, natural catastrophes or otherwise. Suppliers and equipment manufacturers may extend lead times, limit supplies, or increase prices due to capacity constraints or other factors, which could harm our ability to deliver our products on a timely basis and negatively impact our financial results. In addition, in extreme circumstances, the suppliers we purchase from could cease production due to a fire, natural disaster, consolidation or liquidation of their businesses. As such, this may impact our ability to deliver our products on a timely basis and harm our customer relationships and negatively impact our financial results.

Despite our current level of indebtedness, we and our subsidiaries may decide to incur substantially more debt. This could further exacerbate the risks to our financial condition described above.

We and our subsidiaries may decide to incur significant additional indebtedness in the future. Although the indenture governing the Senior Notes and the credit agreements governing the Term Loan Facility, the U.S. ABL and the Asia ABL will contain restrictions on the incurrence of additional indebtedness, these restrictions are subject to a number of qualifications and exceptions, and the additional indebtedness incurred in compliance with these restrictions could be substantial. These restrictions also will not prevent us from incurring obligations that do not constitute indebtedness.

A lowering or withdrawal of the ratings assigned to our debt securities by rating agencies may increase our future borrowing costs and reduce our access to capital.

Our debt has a non-investment grade rating, and any rating assigned could be lowered or withdrawn entirely by a rating agency if, in that rating agency's judgment, future circumstances relating to the basis of rating, such as adverse changes, so warrant. Any future lowering of our ratings likely would make it more difficult or more expensive for us to obtain additional debt financing.

Possible replacement of the LIBOR benchmark interest rate may have an impact on our financial condition or results of operations.

On July 27, 2017, the Financial Conduct Authority (FCA), a regulator of financial services firms in the United Kingdom, announced that it intends to stop persuading or compelling banks to submit LIBOR rates after 2021. The FCA and the submitting LIBOR banks have indicated they will support the LIBOR indices through 2021 to allow for an orderly transition to an alternative reference rate. In the United States, efforts to identify a set of alternative U.S. dollar reference interest rates include proposals by the Alternative Reference Rates Committee of the Federal Reserve Board. Other financial services regulators and industry groups are evaluating the possible phase-out of LIBOR and the development of alternate reference rate indices or reference rates. Many of our assets and liabilities are indexed to LIBOR. We are evaluating the potential impact of the possible replacement of the LIBOR benchmark interest rate, but are not able to predict whether LIBOR will cease to be available after 2021, whether the alternative rates the Federal Reserve Board proposes to publish will become market benchmarks in place of LIBOR, or what the impact of such a transition will have on our financial condition or results of operations.

We are exposed to the credit risk of some of our customers and to credit exposures in weakened markets.

Most of our sales are on an "open credit" basis, with standard industry payment terms. We monitor individual customer payment capability in granting such open credit arrangements, seek to limit such open credit to amounts we believe the customers can pay, and maintain reserves we believe are adequate to cover exposure for doubtful accounts. During periods of economic downturn in the electronics industry and the global economy, our exposure to credit risks from our customers increases. Although we have programs in place to monitor and mitigate the associated risks, such programs may not be effective in reducing our credit risks.

Additionally, our OEM customers often direct a significant portion of their purchases through a relatively limited number of EMS companies. Sales to EMS companies represented approximately 36% and 38% of our net sales for the quarters ended July 1, 2019 and July 2, 2018, respectively. Our contractual relationship is often with the EMS companies, who are obligated to pay us for our products. Because we expect our OEM customers to continue to direct our sales to EMS companies, we expect to continue to be subject to this credit risk with a limited number of EMS customers. If one or more of our significant customers were to become insolvent or were otherwise unable to pay us, our business, financial condition, and results of operations would be materially adversely affected.

We depend upon a relatively small number of OEM customers for a large portion of our sales, and a decline in sales to major customers would materially adversely affect our business, financial condition, and results of operations.

A small number of customers are responsible for a significant portion of our sales. Our five largest OEM customers accounted for approximately 30% and 27% of our net sales for the quarters ended July 1, 2019 and July 2, 2018, respectively, and one customer represented approximately 10% of our net sales for the quarter ended July 1, 2019. Sales attributed to OEMs include both direct sales as well as sales that the OEMs place through EMS providers. Our customer concentration could fluctuate, depending on future customer requirements, which will depend in large part on market conditions in the electronics industry segments in which our customers participate. The loss of one or more significant customers or a decline in sales to our significant customers would materially adversely affect our business, financial condition, and results of operations. In addition, we generate significant accounts receivable in connection with providing manufacturing services to our customers. If one or more of our significant customers were to become insolvent or were otherwise unable to pay for the manufacturing services provided by us, our business, financial condition, and results of operations would be materially adversely affected.

In addition, during industry downturns, we may need to reduce prices to limit the level of order losses, and we may be unable to collect payments from our customers. There can be no assurance that key customers would not cancel orders, that they would continue to place orders with us in the future at the same levels as experienced by us in prior periods, that they would be able to meet their payment obligations, or that the end-products that use our products would be successful. This concentration of customer base may materially adversely affect our business, financial condition, and results of operations due to the loss or cancellation of business from any of these key customers, significant changes in scheduled deliveries to any of these customers, or decreases in the prices of the products sold to any of these customers.

We are heavily dependent upon the worldwide electronics industry, which is characterized by economic cycles and fluctuations in product demand. A downturn in the electronics industry or prolonged global economic crisis could result in decreased demand for our manufacturing services and materially adversely affect our business, financial condition, and results of operations.

A majority of our revenue is generated from the electronics industry, which is characterized by intense competition, relatively short product life cycles, and significant fluctuations in product demand. The industry is subject to economic cycles and recessionary periods. Due to the uncertainty in the end markets served by most of our customers, we have a low level of visibility with respect to future financial results. Consequently, our past operating results, earnings, and cash flows may not be indicative of our future operating results, earnings, and cash flows.

Changes in prices or availability of raw materials could have a material adverse effect on our business, financial condition, and results of operations and reduce our gross margins.

To manufacture PCBs, we use raw materials such as laminated layers of fiberglass, copper foil, chemical solutions, gold, copper and other commodity products, which we order from our suppliers. For RF components, we use various high performance materials such as ceramics and printed circuit board materials. In the case of backplane assemblies, components include connectors, sheet metal, capacitors, resistors and diodes, many of which are custom made and controlled by our customers' approved vendors.

If raw material and component prices increase or if there is inflationary pressure on the cost of the metals that we use to produce our product, especially copper, it may reduce our gross margins. Should the supply of materials used in our above manufacturing processes become limited, our ability to obtain the quantities necessary to meet our customers' demand may be impacted which could cause us to encounter reduced revenue levels or price increases which would impact our profit margins. If either of these situations occurs, our financial condition and results of operations could be negatively impacted.

We depend on the U.S. government for a significant portion of our business, which involves unique risks. Changes in government defense spending or regulations could have a material adverse effect on our business, financial condition, and results of operations.

A significant portion of our revenues is derived from products and services that are ultimately sold to the U.S. government by our OEM and EMS customers and is therefore affected by, among other things, the federal government budget process. We are a supplier, primarily as a subcontractor, to the U.S. government and its agencies, as well as foreign governments and agencies. The contracts between our direct customers and the government end user are subject to political and budgetary constraints and processes, changes in short-range and long-range strategic plans, the timing of contract awards, the congressional budget authorization and appropriation processes, the government's ability to terminate contracts for convenience or for default, as well as other risks, such as contractor suspension or debarment in the event of certain violations of legal and regulatory requirements.

For the quarter ended July 1, 2019, aerospace and defense sales accounted for approximately 28% of our total net sales. The substantial majority of aerospace and defense sales are related to both U.S. and foreign military and defense programs. While we do not sell any significant volume of products directly to the U.S. government, we are a supplier to the U.S. government and its agencies, as well as foreign governments and agencies. Consequently, our sales are affected by changes in the defense budgets of the U.S. and foreign governments and may be affected by federal budget sequestration measures.

The domestic and international threat of terrorist activity, emerging nuclear states, and conventional military threats have led to an increase in demand for defense products and services and homeland security solutions in the recent past. Although a two-year budget agreement has recently been approved by the U.S. government and the budget agreement includes sustained spending on defense programs, the termination or failure to fund one or more significant contracts by the U.S. government could have a material adverse effect on our business, financial condition, and results of operations.

Future changes to the U.S. Munitions List could reduce or eliminate restrictions that currently apply to some of the products we produce. If these regulations or others are changed in a manner that reduces restrictions on products being manufactured overseas, we would likely face an increase in the number of competitors and increased price competition from overseas manufacturers, who are restricted by the current export laws from manufacturing products for U.S. defense systems.

We may be unable to hire and retain sufficient qualified personnel, and the loss of any of our key executive officers could materially adversely affect our business, financial condition, and results of operations.

We believe that our future success will depend in large part on our ability to attract and retain highly skilled, knowledgeable, sophisticated, and qualified managerial and professional personnel. We may not be able to retain our executive officers and key personnel or attract additional qualified management in the future. We can make no assurances that future changes in executive management will not have a material adverse effect on our business, financial condition, or results of operations. Our business also depends on our continuing ability to recruit, train, and retain highly qualified employees, particularly engineering and sales and marketing personnel. The competition for these employees is intense, and the loss of these employees could harm our business. Further, our ability to successfully integrate acquired companies depends in part on our ability to retain key management and existing employees at the time of the acquisition.

Increasingly, our customers are requesting that we enter into supply agreements with them that have restrictive terms and conditions. These agreements typically include provisions that increase our financial exposure, which could result in significant costs to us.

Increasingly, our customers are requesting that we enter into supply agreements with them. These agreements typically do not include volume commitments, but do include provisions that generally serve to increase our exposure for product liability and limited sales returns, which could result in higher costs to us as a result of such claims. In addition, these agreements typically contain provisions that seek to limit our operational and pricing flexibility and extend payment terms, which could materially adversely affect our cash flow, business, financial condition, and results of operations.

We may need additional capital in the future to fund investments in our operations, refinance our indebtedness, and to maintain and grow our business, and such capital may not be available on a timely basis, on acceptable terms, or at all.

Our business is capital-intensive, and our ability to increase revenue, profit, and cash flow depends upon continued capital spending. To the extent that the funds generated by our ongoing operations are insufficient to cover our liquidity requirements, we may need to raise additional funds through financings. If we are unable to fund our operations and make capital expenditures as currently planned or if we do not have sufficient liquidity to service the interest and principal payments on our debt, it would have a material adverse effect on our business, financial condition, and results of operations. If we do not achieve our expected operating results, we would need to reallocate our sources and uses of operating cash flows. This may include borrowing additional funds to service debt payments, which may impair our ability to make investments in our business. Looking ahead at long-term needs, we may need to raise additional funds for a number of purposes, including the following:

- to fund capital equipment purchases to increase production capacity, upgrade and expand our technological capabilities and replace aging equipment or introduce new products;
- to refinance our existing indebtedness;
- to fund our operations beyond 2019;
- to fund working capital requirements for future growth that we may experience;
- to enhance or expand the range of services we offer;
- to increase our sales and marketing activities; or
- to respond to competitive pressures or perceived opportunities, such as investment, acquisition, and international expansion activities.

Should we need to raise funds through incurring additional debt, we may become subject to covenants even more restrictive than those contained in our current debt instruments. There can be no assurance that additional capital, including any future equity or debt financing, would be available on a timely basis, on favorable terms, or at all. If such funds are not available to us when required or on acceptable terms, our business, financial condition, and results of operations could be materially adversely affected.

The Company may experience cash flow volatility.

We experience fluctuations in our revenues and cost structure and the resulting cash flows and expect that this will continue to occur in the future. We experience fluctuations in our cash flows for reasons that include (i) the types and complexity, number, size, timing and duration of client engagements; (ii) the timing of revenue recognition under U.S. GAAP; (iii) the seasonality of our business; (iv) fluctuations in costs of labor; (v) fluctuations in the cost and availability of raw materials; (vi) fluctuations in demand for our products; (vii) the length of billing and collection cycles and changes in amounts that may become uncollectible; (viii) changes in the frequency and complexity of government regulatory and enforcement activities; (ix) timing of customer payments; (x) fluctuations in the exchange rates of various currencies against the U.S. dollar; and (xi) economic factors beyond our control. Such fluctuations could affect our ability to meet our obligations including debt repayments. Any failure to meet our financial obligations could have a material adverse effect on our financial position and results of operations.

The complete integration of Anaren presented significant challenges to TTM, and although TTM has realized some of the expected cost savings and synergies, TTM may not realize all of such benefits as quickly as expected.

TTM and Anaren operated independently until consummation of the acquisition on April 18, 2018. Specifically, the following issues and potential risks, among others, must be addressed in continuing the integration of the operations of TTM and Anaren in order to fully realize the anticipated benefits of the acquisition so the combined company performs as expected:

- combining the businesses of TTM and Anaren and meeting the capital requirements of the combined company in a manner that permits the combined company to achieve the cost savings or revenue synergies anticipated to result from the acquisition, the failure of which would result in the anticipated benefits of the acquisition not being realized in the time frame currently anticipated or at all;
- harmonizing the companies' operating practices, employee development and compensation programs, internal controls, and other policies, procedures, and processes;
- potential deterioration in the financial performance of TTM and acquired Anaren business, including any potential deviation in results of operations from historical levels;
- demands on management related to the increase in the size of our company after the acquisition;
- difficulties and risks in the integration of departments and systems (including accounting, health information and management information systems), technologies (including software), books and records and procedures, as well as in maintaining uniform standards and controls (including internal control over financial reporting and related procedures and policies); and
- other unanticipated issues, expenses, or liabilities that could materially adversely affect our ability to realize any expected synergies on a timely basis, or at all.

If we cannot successfully finish the integration of the acquisition of Anaren, we may experience material negative consequences to our business, financial condition, or results of operations. Successful integration of TTM and Anaren depends on our ability to manage these operations, to realize opportunities for revenue growth and to eliminate redundant and excess costs. Because of difficulties in combining the two companies, we may not be able to achieve all of the benefits that we expected to achieve as a result of the acquisition.

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

Borrowings under the Term Loan Facility, the U.S. ABL and the Asia ABL are at variable rates of interest and expose us to interest rate risk. If interest rates were to increase, our debt service obligations on the variable rate indebtedness would increase even though the amount borrowed remained the same, and our net income and cash flows, including cash available for servicing our indebtedness, will correspondingly decrease. On May 15, 2018, we entered into an interest rate swap arrangement with a notional amount of $400.0 million, which expires on June 1, 2022, in order to reduce interest rate volatility exposure. This arrangement effectively converts $400.0 million of our variable rate debt to fixed rate. Under the terms of the interest rate swap, we would pay a fixed rate of 2.84% and would receive floating 1-month LIBOR during the swap period.

For illustrative purposes and assuming all loans under the Term Loan Facility, the U.S. ABL and the Asia ABL were fully drawn, each quarter point change in interest rates would result in a $1.8 million change in annual interest expense on our indebtedness under the Term Loan Facility, the U.S. ABL and the Asia ABL, after giving effect to our interest rate swap.

We are subject to risks of currency fluctuations.

A portion of our cash, other current assets and current liabilities is held in currencies other than the U.S. dollar. Changes in exchange rates among other currencies and the U.S. dollar will affect the value of these assets or liabilities as re-measured to U.S. dollars on our balance sheet. To the extent that we ultimately decide to repatriate some portion of these funds to the United States, the actual value transferred could be impacted by movements in exchange rates. Any such type of movement could negatively impact the amount of cash available to fund operations or to repay debt. Additionally, we have revenues and costs denominated in currencies other than the U.S. dollar (primarily the RMB). Fluctuations in the exchange rates between the U.S. dollar and the RMB could result in increases or decreases in our costs or revenues which could negatively impact our business, financial condition, and results of operations. Significant inflation or disproportionate changes in foreign exchange rates could occur as a result of general economic conditions, acts of war or terrorism, changes in governmental monetary or tax policy, or changes in local interest rates Further, China's government imposes controls over the convertibility of RMB into foreign currencies, which subjects us to further currency exchange risk.

Our results of operations are often subject to demand fluctuations and seasonality. With a high level of fixed operating costs, even small revenue shortfalls would decrease our gross margins.

Our results of operations fluctuate for a variety of reasons, including:

- timing of orders from and shipments to major customers;
- the levels at which we utilize our manufacturing capacity;
- price competition;
- changes in our mix of revenues generated from quick-turn versus standard delivery time services;
- expenditures, charges or write-offs, including those related to acquisitions, facility restructurings, or asset impairments; and
- expenses relating to expanding existing manufacturing facilities.

A significant portion of our operating expenses is relatively fixed in nature, and planned expenditures are based in part on anticipated orders. Accordingly, unexpected revenue shortfalls may decrease our gross margins. In addition, we have experienced sales fluctuations due to seasonal patterns in the capital budgeting and purchasing cycles, as well as inventory management practices of our customers and the end markets we serve. In particular, the seasonality of the cellular phone and tablet industries and quick-turn ordering patterns affect the overall PCB industry. These seasonal trends have caused fluctuations in our operating results in the past and may continue to do so in the future. Results of operations in any period should not be considered indicative of the results that may be expected for any future period. In addition, our future quarterly operating results may fluctuate and may not meet the expectations of securities analysts or investors.

If we are unable to respond to rapid technological change and process development, we may not be able to compete effectively.

The market for our manufacturing services is characterized by rapidly changing technology and continual implementation of new production processes. The future success of our business will depend in large part upon our ability to maintain and enhance our technological capabilities, to manufacture products that meet changing customer needs, and to successfully anticipate or respond to technological changes on a cost-effective and timely basis. We expect that the investment necessary to maintain our technological position will increase as customers make demands for products and services requiring more advanced technology on a quicker turnaround basis. For example, in 2019 we expect to continue to make significant capital expenditures to expand our HDI, mSAP, and other advanced manufacturing capabilities. We may not be able to obtain access to additional sources of funds in order to respond to technological changes as quickly as our competitors. In addition, failure to adopt and implement technological improvements quickly may cause inefficiencies as our product yields or quality may decrease, resulting in increased costs.

In addition, the PCB industry could encounter competition from new or revised manufacturing and production technologies that render existing manufacturing and production technology less competitive or obsolete. We may not respond effectively to the technological requirements of the changing market. If we need new technologies and equipment to remain competitive, the development, acquisition, and implementation of those technologies and equipment will require us to make significant capital investments.

Servicing our debt requires a significant amount of cash and we may not be able to generate sufficient cash to service all of our debt and may be forced to take other actions to satisfy our obligations under our debt, which may not be successful.

Based on certain parameters defined in the Term Loan Facility, including a First Lien Leverage Ratio, we may be required to make an additional principal payment on an annual basis beginning after fiscal year 2018, if our First Lien Leverage Ratio is greater than 2.0.

Our ability to make scheduled payments on or to refinance our debt obligations and to fund planned capital expenditures and expansion efforts depends on our ability to generate cash in the future and our financial condition and operating performance, which are subject to prevailing economic and competitive conditions and to certain regulatory, competitive, financial, business and other factors beyond our control. We cannot assure you that we will maintain a level of cash flows from operating activities sufficient to permit us to pay the principal, premium, if any, and interest on our debt.

If our cash flows and capital resources are insufficient to fund our debt service obligations, we could face substantial liquidity problems and could be forced to reduce or delay investments and capital expenditures or to dispose of material assets or operations, seek additional capital (which could include obtaining additional equity capital on terms that may be onerous or highly dilutive) or restructure or refinance our indebtedness. We may not be able to effect any such alternative measures, if necessary, on commercially reasonable terms or at all and, even if successful, those alternative actions may not allow us to meet our scheduled debt service obligations. The credit agreements governing the Term Loan Facility, the U.S. ABL and the Asia ABL, the indenture governing the

Senior Notes will restrict our ability to dispose of assets and use the proceeds from those dispositions and may also restrict our ability to raise debt or equity capital to be used to repay other indebtedness when it becomes due. We may not be able to consummate those dispositions or to obtain proceeds in an amount sufficient to meet any debt service obligations then due.

In addition, we conduct certain of our operations through our subsidiaries. Accordingly, repayment of our indebtedness may be dependent on the generation of cash flow by our subsidiaries and their ability to make such cash available to us, by dividend, debt repayment or otherwise. Unless they are guarantors of the Senior Notes or our other indebtedness, our subsidiaries do not have any obligation to pay amounts due on our indebtedness or to make funds available for that purpose. Our subsidiaries may not be able to, or may not be permitted to, make distributions to enable us to make payments in respect of our indebtedness. Each subsidiary is a distinct legal entity, and under certain circumstances, legal and contractual restrictions may limit our ability to obtain cash from our subsidiaries. While the indenture governing the Senior Notes and the credit agreements governing the Term Loan Facility, the U.S. ABL and the Asia ABL will limit the ability of our subsidiaries to incur consensual restrictions on their ability to pay dividends or make other intercompany payments to us, these limitations are subject to qualifications and exceptions. In the event that we do not receive distributions from our subsidiaries, we may be unable to make required principal and interest payments on our indebtedness.

Our inability to generate sufficient cash flows to satisfy our debt obligations, or to refinance our indebtedness on commercially reasonable terms or at all, would materially and adversely affect our financial position and results of operations and our ability to satisfy our obligations under our indebtedness.

If we cannot make scheduled payments on our debt, we will be in default and holders of the Senior Notes could declare all outstanding principal and interest to be due and payable, the lenders under the Term Loan Facility, the U.S. ABL and the Asia ABL could terminate their commitments to loan money, the lenders could foreclose against the assets securing their borrowings and we could be forced into bankruptcy or liquidation.

Products we manufacture may contain design or manufacturing defects, which could result in reduced demand for our services and liability claims against us.

We manufacture products to our customers' specifications, which are highly complex and may contain design or manufacturing errors or failures, despite our quality control and quality assurance efforts. Defects in the products we manufacture, whether caused by a design, manufacturing, or materials failure or error, may result in delayed shipments, customer dissatisfaction, a reduction or cancellation of purchase orders, or liability claims against us. If these defects occur either in large quantities or too frequently, our business reputation may be impaired. Since our products are used in products that are integral to our customers' businesses, errors, defects, or other performance problems could result in financial or other damages to our customers beyond the cost of the PCB, for which we may be liable. Although our invoices and sales arrangements generally contain provisions designed to limit our exposure to product liability and related claims, existing or future laws or unfavorable judicial decisions could negate these limitation of liability provisions. In addition, we manufacture products for a range of automotive customers. If any of our products are or are alleged to be defective, we may be required to participate in a recall of such products. As suppliers become more integral to the vehicle design process and assume more of the vehicle assembly functions, vehicle manufacturers are increasingly looking to their suppliers for contributions when faced with product liability claims or recalls. In addition, vehicle manufacturers, which have traditionally borne the costs associated with warranty programs offered on their vehicles, are increasingly requiring suppliers to guarantee or warrant their products and may seek to hold us responsible for some or all of the costs related to the repair and replacement of parts supplied by us to the vehicle manufacturer.

Our results can be adversely affected by rising labor costs.

There is uncertainty with respect to rising labor costs, particularly within China, where we have most of our manufacturing facilities. In recent periods, there have been regular and significant increases in the minimum wage payable in various provinces of China. In addition, we have experienced very high employee turnover in our manufacturing facilities in China, generally after the Chinese New Year, and we are experiencing ongoing difficulty in recruiting employees for these facilities. Furthermore, labor disputes and strikes based partly on wages have in the past slowed or stopped production by certain manufacturers in China. In some cases, employers have responded by significantly increasing the wages of workers at such plants. Any increase in labor costs due to minimum wage laws or customer requirements about scheduling and overtime that we are unable to recover in our pricing to our customers could materially adversely affect our business, financial condition, and results of operations. In addition, the high turnover rate and our difficulty in recruiting and retaining qualified employees and the other labor trends we are noting in China could result in a potential for defects in our products, production disruptions or delays, or the inability to ramp production to meet increased customer orders, resulting in order cancellation or imposition of customer penalties if we are unable to deliver products in a timely manner.

To respond to competitive pressures and customer requirements, we may further expand internationally in lower-cost locations. If we pursue such expansions, we may be required to make additional capital expenditures. In addition, the cost structure in certain countries that are now considered to be favorable may increase as economies develop or as such countries join multinational economic communities or organizations, causing local wages to rise. As a result, we may need to continue to seek new locations with lower costs and the employee and infrastructure base to support PCB manufacturing. We cannot assure investors that we will realize the anticipated strategic benefits of our international operations or that our international operations will contribute positively to our operating results.

In North America, low unemployment rates are making it difficult to recruit and retain employees and we are experiencing wage inflation pressures, some of which are mandated by local and state governments. Further, we are experiencing rising health care costs. While we strive to manage these challenges, there can be no assurance that our efforts will succeed which would result in higher costs and lower profits.

Unanticipated changes in our tax rates or in our assessment of the realizability of our deferred income tax assets or exposure to additional income tax liabilities could affect our business, financial condition, and results of operations.

We are subject to income taxes in the United States and various foreign jurisdictions. Significant judgment is required in determining our provision for income taxes and, in the ordinary course of business, there are many transactions and calculations in which the ultimate tax determination is uncertain. Our effective tax rates could be materially adversely affected by changes in the mix of earnings in countries and states with differing statutory tax rates, changes in the valuation of deferred income tax assets and liabilities, changes in tax laws, as well as other factors. Our tax determinations are regularly subject to audit by tax authorities, and developments in those audits could adversely affect our income tax provision. Although we believe that our tax estimates are reasonable, the final determination of tax audits or tax disputes may be different from what is reflected in our historical income tax provisions, which could materially adversely affect our business, financial condition, and results of operations.

Issues arising during the upgrade of our enterprise resource planning system could affect our operating results and ability to manage our business effectively.

We are continuing the process of upgrading our enterprise resource planning, or ERP, management system to enhance operating efficiencies and provide more effective management of our business operations. We are investing significant financial and personnel resources into this project. However, there is no assurance that the system upgrade will meet our current or future business needs or that it will operate as designed. The transition to the new ERP system will affect numerous systems necessary for our operation. If we fail to correctly implement one or more components of the ERP system, we could experience significant disruption to our operations. Such disruptions could include, among other things, temporary loss of data, inability to process certain orders, failure of systems to communicate with each other and the inability to track or reconcile key data. We are heavily dependent on automated management systems, and any significant failure or delay in the system upgrade could cause a substantial interruption to our business and additional expense, which could result in an adverse impact on our operating results, cash flows or financial condition.

Adverse judgments or settlements resulting from legal proceedings in which we may be involved in the normal course of our business could reduce our profitability or limit our ability to operate our business.

In the normal course of our business, we have been, and may in the future be subject to employee claims based on, among other things, discrimination, minimum wage, overtime pay and other employment related matters. We cannot predict with certainty the cost of defense, the cost of prosecution or the ultimate outcome of these legal proceedings. Any significant adverse determinations, judgments or settlements could reduce our profitability and could materially adversely affect our business, financial condition and results of operations, limit our ability to operate our business or harm our reputation.

Our failure to comply with the requirements of environmental laws could result in litigation, fines, revocation of permits necessary to our manufacturing processes, or debarment from our participation in federal government contracts.

Our operations are regulated under a number of domestic and foreign environmental and safety laws and regulations that govern, among other things, the discharge of hazardous materials into the air and water, as well as the handling, storage, recycling, and disposal of such materials. These laws and regulations include the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, the Superfund Amendment and Reauthorization Act, the Comprehensive Environmental Response, Compensation and Liability Act, the Toxic Substances Control Act, and the Federal Motor Carrier Safety Improvement Act, as well as analogous state, local, and foreign laws. Compliance with these environmental laws is a major consideration for us because our manufacturing processes use and generate materials classified as hazardous. Because we use hazardous materials and generate hazardous wastes in our manufacturing processes, we may be subject to potential financial liability for costs associated with the investigation and remediation of our own sites, or sites at which we have arranged for the disposal of hazardous wastes, if such sites become contaminated. Even if we fully comply with applicable environmental laws and are not directly at fault for the contamination, we may still be liable. The wastes we generate include spent ammoniacal and cupric etching solutions, metal stripping solutions, waste acid solutions, waste alkaline cleaners, waste oil, and waste waters that contain heavy metals such as copper, tin, lead, nickel, gold, silver, cyanide, and fluoride, and both filter cake and spent ion exchange resins from equipment used for on-site waste treatment.

Environmental law violations, including the failure to maintain required environmental permits, could subject us to fines, penalties, and other sanctions, including the revocation of our effluent discharge permits. This could require us to cease or limit production at one or more of our facilities and could have a material adverse effect on our business, financial condition, and results of operations. Even if we ultimately prevail, environmental lawsuits against us would be time consuming and costly to defend.

Environmental laws have generally become more stringent and we expect this trend to continue over time, especially in developing countries, imposing greater compliance costs and increasing risks and penalties associated with violation. We operate in environmentally sensitive locations, and we are subject to potentially conflicting and changing regulatory agendas of political, business, and environmental groups. Changes or restrictions on discharge limits, emissions levels, material storage, handling, or disposal might require a high level of unplanned capital investment or relocation to another global location where prohibitive regulations do not exist. It is possible that environmental compliance costs and penalties from new or existing regulations may materially adversely affect our business, financial condition, and results of operations.

We are increasingly required to certify compliance with various material content restrictions in our products based on laws of various jurisdictions or territories such as the Restriction of Hazardous Substances (RoHS) and Registration, Evaluation, Authorization and Restriction of Chemicals, or REACH directives in the European Union and China's RoHS legislation. Similar laws have been adopted in other jurisdictions and may become increasingly prevalent. In addition, we must also certify as to the non-applicability of the EU's Waste Electrical and Electronic Equipment directive for certain products that we manufacture. The REACH directive requires the identification of Substances of Very High Concern, or SVHCs periodically. We must survey our supply chain and certify to the non-presence or presence of SVHCs to our customers. As with other types of product certifications that we routinely provide, we may incur liability and pay damages if our products do not conform to our certifications.

We are also subject to an increasing variety of environmental laws and regulations in China, which impose limitations on the discharge of pollutants into the air and water and establish standards for the treatment, storage, and disposal of solid and hazardous wastes for us and our vendors that assist us in managing the waste generated by our manufacturing processes. The manufacturing of our products generates gaseous chemical wastes, liquid wastes, waste water, and other industrial wastes from various stages of the manufacturing process. Production sites, waste collectors, and vendors in China are subject to increasing regulation and periodic monitoring by the relevant environmental protection authorities. Environmental claims or the failure to comply with current or future regulations could result in the assessment of damages or imposition of fines against us, suspension of production, or cessation of operations.

The process to manufacture PCBs requires adherence to domestic and foreign environmental regulations regarding the storage, use, handling, recycling, and disposal of chemicals, solid wastes, and other hazardous materials, as well as compliance with air quality standards and chemical use reporting. We rely on our vendors for the transportation and disposal of our solid and hazardous wastes generated by our manufacturing processes. If we are not able to find such services, our ability to conduct our business and our results of operations may be adversely impacted. In China, governmental authorities have adopted new rules and regulations governing environmental issues. An update to Chinese environmental waste water law was issued in late 2012, allowing for an interim period in which plants subject to such law may install equipment that meet the new regulatory regime. Our plants in China are not yet in full compliance with the newly adopted environmental regulations. We have developed plans for these new regulations and we are in the process of implementing these plans. However, there can be no assurance that violations will not occur in the future.

Employee strikes and other labor-related disruptions may materially adversely affect our business, financial condition, and results of operations.

Our business is labor intensive, utilizing large numbers of engineering and manufacturing personnel. Strikes or labor disputes with our unionized employees, primarily in China, may adversely affect our ability to conduct our business. If we are unable to reach agreement with any of our unionized work groups on future negotiations regarding the terms of their collective bargaining agreements, we may be subject to work interruptions or stoppages. Any of these events could be disruptive to our operations and could result in negative publicity, loss of contracts, and a decrease in revenues. We may also become subject to additional collective bargaining agreements in the future if more employees or segments of our workforce become unionized, including any of our employees in the United States.

We have pursued and intend to continue to pursue acquisitions of other businesses and may encounter risks associated with these activities, which could harm our business and operating results.

As part of our business strategy, we expect that we will continue to grow by pursuing acquisitions of businesses, technologies, assets, or product lines that complement or expand our business. Risks related to an acquisition may include:

- the potential inability to successfully integrate acquired operations and businesses or to realize anticipated synergies, economies of scale, or other expected value;
- diversion of management's attention from normal daily operations of our existing business to focus on integration of the newly acquired business;
- unforeseen expenses associated with the integration of the newly acquired business;
- difficulties in managing production and coordinating operations at new sites;
- the potential loss of key employees of acquired operations;
- the potential inability to retain existing customers of acquired companies when we desire to do so;
- insufficient revenues to offset increased expenses associated with acquisitions;
- the potential decrease in overall gross margins associated with acquiring a business with a different product mix;
- the inability to identify certain unrecorded liabilities;
- the potential need to restructure, modify, or terminate customer relationships of the acquired company;
- an increased concentration of business from existing or new customers; and
- the potential inability to identify assets best suited to our business plan.

Acquisitions may cause us to:

- enter lines of business and/or markets in which we have limited or no prior experience;
- issue debt and be required to abide by stringent loan covenants;
- assume liabilities; record goodwill and intangible assets that will be subject to impairment testing and potential periodic impairment charges;
- become subject to litigation and environmental issues, which include product material content certifications related to conflict minerals;
- incur unanticipated costs;
- incur large and immediate write-offs; and
- incur substantial transaction-related costs, whether or not a proposed acquisition is consummated.

Acquisitions of high technology companies are inherently risky, and no assurance can be given that our recent or future acquisitions will be successful. Failure to manage and successfully integrate acquisitions we make could have a material adverse effect on our business, financial condition, and results of operations. Even when an acquired company has already developed and marketed products, product enhancements may not be made in a timely fashion. In addition, unforeseen issues might arise with respect to such products after any such acquisition.

We are subject to the requirements of the National Industrial Security Program Operating Manual for our facility security clearance, which is a prerequisite to our ability to perform on classified contracts for the U.S. government.

A facility security clearance is required in order to be awarded and perform on classified contracts for the Department of Defense and certain other agencies of the U.S. government. As a cleared entity, we must comply with the requirements of the National Industrial Security Program Operating Manual (NISPOM), and any other applicable U.S. government industrial security regulations. Further, due to the fact that a portion of our voting equity is owned by a non-U.S. entity, we are required to be governed by and operate in accordance with the terms and requirements of the Special Security Agreement (SSA). The terms of the SSA have been previously disclosed in our SEC filings.

If we were to violate the terms and requirements of the SSA, the NISPOM, or any other applicable U.S. government industrial security regulations (which may apply to us under the terms of classified contracts), we could lose our security clearance. We cannot be certain that we will be able to maintain our security clearance. If for some reason our security clearance is invalidated or terminated, we may not be able to continue to perform on classified contracts and would not be able to enter into new classified contracts, which could materially adversely affect our business, financial condition, and results of operations.

Competition in the PCB market is intense, and we could lose market share if we are unable to maintain our current competitive position in end markets using our quick-turn, high technology, and high-mix manufacturing services.

The PCB industry is intensely competitive, highly fragmented, and rapidly changing. We expect competition to continue, which could result in price reductions, reduced gross margins, and loss of market share. Our principal PCB and substrate competitors include AT&S (Austria Technologie & Systemtechnik AG), Chin Poon Industrial Co., LTD., Compeq Manufacturing Co., Ltd., IBIDEN Co., Ltd., ISU Petasys Co., Ltd., Multek Corporation, Sanmina Corporation, Tripod Technology Corp., Unimicron Technology Corp., and Wus Printed Circuit Co., Ltd. Our principal E-M Solutions competitors include Amphenol Corp, Flex, Jabil, Inc. and Sanmina Corporation. Our competition for RF products include Cobham, Crane, TRM Microwave, Mercury Systems, AVX, Molex, and Smiths. In addition, we increasingly compete on an international basis, and new and emerging technologies may result in new competitors entering our markets.

Some of our competitors and potential competitors have advantages over us, including:

- greater financial and manufacturing resources that can be devoted to the development, production, and sale of their products;
- more established and broader sales and marketing channels;
- more manufacturing facilities worldwide, some of which are closer in proximity to OEMs;
- manufacturing facilities that are located in countries with lower production costs;
- lower capacity utilization, which in peak market conditions can result in shorter lead times to customers;
- ability to add additional capacity faster or more efficiently;
- preferred vendor status with existing and potential customers;
- greater name recognition; and
- larger customer bases.

In addition, these competitors may respond more quickly to new or emerging technologies or adapt more quickly to changes in customer requirements than we do. We must continually develop improved manufacturing processes to meet our customers' needs for complex products, and our manufacturing process technology is generally not subject to significant proprietary protection. During recessionary periods in the electronics industry, our strategy of providing quick-turn services, an integrated manufacturing solution, and responsive customer service may take on reduced importance to our customers. As a result, we may need to compete more on the basis of price, which would cause our gross margins to decline.

If we are unable to provide our customers with high-end technology, high-quality products, and responsive service, or if we are unable to deliver our products to our customers in a timely manner, our business, financial condition, and results of operations may be materially adversely affected.

In order to maintain our existing customer base and obtain business from new customers, we must demonstrate our ability to produce our products at the level of technology, quality, responsiveness of service, timeliness of delivery, and cost that our customers require. If our products are of substandard quality, if they are not delivered on time, if we are not responsive to our customers' demands, or if we cannot meet our customers' technological requirements, our reputation as a reliable supplier of our products would likely be damaged. If we are unable to meet anticipated product and service standards, we may be unable to obtain new contracts or keep our existing customers, and this would have a material adverse effect on our business, financial condition, and results of operations.

Outages, computer viruses, break-ins, and similar events could disrupt our operations, and breaches of our security systems may cause us to incur significant legal and financial exposure.

We rely on information technology networks and systems, some of which are owned and operated by third parties, to collect, process, transmit, and store electronic information. In particular, we depend on our information technology infrastructure for a variety of functions, including worldwide financial reporting, inventory management, procurement, invoicing, and email communications. Any of these systems may be susceptible to outages due to fire, floods, power loss, telecommunications failures, hacking, terrorist attacks, and similar events. In addition, in the ordinary course of our business, we collect and store sensitive data in our data centers and on our networks, including intellectual property, our proprietary and confidential business information and that of our customers, suppliers and business partners, and personally identifiable information of our employees. The secure collection, processing, storage, maintenance and transmission of this information is critical to our operations. Despite the implementation of network security measures, our systems and those of third parties on which we rely may also be vulnerable to computer viruses, break-ins, cyber-attacks, attacks by hackers or breaches due to employee or third party (including suppliers and business partners) error, malfeasance or other disruptions. If we or our vendors are unable to prevent such outages and breaches, our operations could be disrupted. If unauthorized parties gain access to our information systems or such information is used in an unauthorized manner, misdirected, altered, lost, or stolen during transmission, any theft or misuse of such information could result in, among other things, unfavorable publicity, governmental inquiry and oversight, difficulty in marketing our services, allegations by our customers that we have not performed our contractual obligations, loss of customers, litigation by affected parties, and possible financial obligations for damages related to the theft or misuse of such information, any of which could have a material adverse effect on our business, financial condition, and results of operations.

Damage to our manufacturing facilities due to fire, natural disaster, or other events could materially adversely affect our business, financial condition, and results of operations.

The destruction or closure of any of our facilities for a significant period of time as a result of fire, explosion, blizzard, act of war or terrorism, flood, tornado, earthquake, lightning, other natural disasters, an outbreak of epidemics such as Ebola or severe acute respiratory syndrome, required maintenance, or other events could harm us financially, increasing our costs of doing business and limiting our ability to deliver our manufacturing services on a timely basis.

Our insurance coverage with respect to damages to our facilities or our customers' products caused by natural disasters is limited and is subject to deductibles and coverage limits. Such coverage may not be adequate or continue to be available at commercially reasonable rates and terms.

In the event one or more of our facilities is closed on a temporary or permanent basis as a result of a natural disaster, required maintenance or other event, or in the event that an outbreak of a serious epidemic results in quarantines, temporary closures of offices or manufacturing facilities, travel restrictions or the temporary or permanent loss of key personnel, our operations could be significantly disrupted. Such events could delay or prevent product manufacturing and shipment for the time required to transfer production or repair, rebuild or replace the affected manufacturing facilities. This time frame could be lengthy and result in significant expenses for repair and related costs. While we have disaster recovery plans in place, there can be no assurance that such plans will be sufficient to allow our operations to continue in the event of every natural or man-made disaster, pandemic, required repair or other extraordinary event. Any extended inability to continue our operations at unaffected facilities following such an event would reduce our revenue and potentially damage our reputation as a reliable supplier.

We face constant pricing pressure from our customers and competitors, which may decrease our profit margins.

Competition in the PCB market is intense, and we expect that competition will continue to increase, thereby creating a highly aggressive pricing environment. We and some of our competitors have reduced average selling prices in the past. In addition, competitors may reduce their average selling prices faster than our ability to reduce costs, which can also accelerate the rate of decline of our selling prices. When prices decline, we may also be required to write down the value of our inventory.

The effects of such pricing pressures on our business may be exacerbated by inflationary pressures that affect our costs of supply. When we are unable to extract comparable concessions from our suppliers on prices they charge us, this in turn reduces gross profit if we are unable to raise prices. Further, uncertainty or adverse changes in the economy could also lead to a significant decline in demand for our products and pressure to reduce our prices. Recently, many businesses have taken a more conservative stance in ordering inventory. Any decrease in demand for our products, coupled with pressure from the market and our customers to decrease our prices, would materially adversely affect our business, financial condition, and results of operations.

The pricing pressure we face on our products requires us to introduce new and more advanced technology products to maintain average selling prices or reduce any declines in average selling prices. As we shift production to more advanced, higher-density PCBs, we tend to make significant investments in plants and other capital equipment and incur higher costs of production, which may not be recovered.

The prominence of EMS companies as our customers could reduce our gross margins, potential sales, and customers.

Sales to EMS companies represented approximately 36% and 38% of our net sales for the quarters ended July 1, 2019 and July 2, 2018, respectively. Sales to EMS providers include sales directed by OEMs as well as orders placed with us at the EMS providers' discretion. EMS providers source on a global basis to a greater extent than OEMs. The growth of EMS providers increases the purchasing power of such providers and has in the past, and could in the future, result in increased price competition or the loss of existing OEM customers. In addition, some EMS providers, including some of our customers, have the ability to directly manufacture PCBs and create backplane assemblies. If a significant number of our other EMS customers were to acquire these abilities, our customer base might shrink, and our sales might decline substantially. Moreover, if any of our OEM customers outsource the production of PCBs and creation of backplane assemblies to these EMS providers, our business, financial condition, and results of operations may be materially adversely affected.

If we are unable to manage our growth effectively, our business, financial condition, and results of operations could be materially adversely affected.

We have experienced, and expect to continue to experience, growth in the scope and complexity of our operations. This growth may strain our managerial, financial, manufacturing, and other resources. In order to manage our growth, we may be required to continue to implement additional operating and financial controls and hire and train additional personnel. There can be no assurance that we will be able to do so in the future, and failure to do so could jeopardize our expansion plans and seriously harm our operations. In addition, growth in our capacity could result in reduced capacity utilization and a corresponding decrease in gross margins.

If our net earnings do not remain at or above recent levels, or we are not able to predict with a reasonable degree of probability that they will continue, we may have to record a valuation allowance against our net deferred income tax assets.

Our U.S. entities and certain of our foreign subsidiaries have deferred income tax assets. Based on our forecast for future taxable earnings, we believe we will utilize the deferred income tax assets in future periods except with respect to certain amounts where we have recorded valuation allowances. If our estimates of future earnings decline, we may have to increase our valuation allowance against our net deferred income tax assets, resulting in a higher income tax provision, which would reduce our results of operations.

Our international sales are subject to laws and regulations relating to corrupt practices, trade, and export controls and economic sanctions. Any non-compliance could have a material adverse effect on our business, financial condition, and results of operations.

We operate on a global basis and are subject to anti-corruption, anti-bribery, and anti-kickback laws and regulations, including restrictions imposed by the Foreign Corrupt Practices Act (FCPA). The FCPA and similar anti-corruption, anti-bribery, and anti-kickback laws in other jurisdictions generally prohibit companies and their intermediaries and agents from making improper payments to government officials or any other persons for the purpose of obtaining or retaining business. We operate and sell our products in many parts of the world that have experienced governmental corruption to some degree and, in certain circumstances, strict compliance with anti-corruption, anti-bribery, and anti-kickback laws may conflict with local customs and practices. We also, from time to time, undertake business ventures with state-owned companies or enterprises.

Our global business operations must also comply with all applicable domestic and foreign export control laws, including International Traffic In Arms Regulations (ITAR) and Export Administration Regulations (EAR). Some items we manufacture are controlled for export by the U.S. Department of Commerce's Bureau of Industry and Security under EAR.

We train our employees concerning anti-corruption, anti-bribery, and anti-kickback laws and compliance with international regulations regarding trades and exports, and we have policies in place that prohibit employees from making improper payments. We cannot provide assurances that our internal controls and procedures will guarantee compliance by our employees or third parties with whom we work. If we are found to be liable for violations of the FCPA or similar anti-corruption, anti-bribery, or anti-kickback laws in international jurisdictions or for violations of ITAR, EAR, or other similar regulations regarding trades and exports, either due to our own acts or out of inadvertence, or due to the inadvertence of others, we could suffer criminal or civil fines or penalties or other repercussions, including reputational harm, which could have a material adverse effect on our business, financial condition, and results of operations.

Our global business operations also must be conducted in compliance with applicable economic sanctions laws and regulations, such as laws administered by the U.S. Department of the Treasury's Office of Foreign Asset Control, the U.S. State Department, and the U.S. Department of Commerce. We must comply with all applicable economic sanctions laws and regulations of the United States and other countries. Imposition of economic sanction laws and regulations on a company or country could impact our revenue levels. Violations of these laws or regulations could result in significant additional sanctions including criminal or civil fines or penalties, more onerous compliance requirements, more extensive debarments from export privileges, or loss of authorizations needed to conduct aspects of our international business.

In certain countries, we may engage third-party agents or intermediaries, such as customs agents, to act on our behalf, and if these third-party agents or intermediaries violate applicable laws, their actions may result in criminal or civil fines or penalties or other sanctions being assessed against us. We take certain measures designed to ensure our compliance with U.S. export and economic sanctions laws, anti-corruption laws and regulations, and export control laws. However, it is possible that some of our products were sold or will be sold to distributors or other parties, without our knowledge or consent, in violation of applicable law. There can be no assurances that we will be in compliance in the future. Any such violation could result in significant criminal or civil fines, penalties, or other sanctions and repercussions, including reputational harm, which could have a material adverse effect on our business, financial condition, and results of operations.

Employee theft or fraud could result in loss.

Certain of our employees have access to, or signature authority with respect to, bank accounts or other company assets, which could expose us to fraud or theft. In addition, certain employees have access to certain precious metals used in connection with our manufacturing and key information technology infrastructure and to customer and other information that is commercially valuable. Should any employee, for any reason, steal any such precious metals (which has occurred from time to time), compromise our information technology systems, or misappropriate customer or other information, we could incur losses, including losses relating to claims by our customers against us, and the willingness of customers to do business with us may be damaged. Additionally, in the case of our defense business, we could be barred from future participation in government programs. Any such losses may not be fully covered by insurance.

Because we sell on a purchase order basis, we are subject to uncertainties and variability in demand by our customers that could decrease revenues and harm our operating results.

Although we have long-term contracts with many customers, those contracts generally do not contain volume commitments. We generally sell to customers on a purchase order basis. Our quick-turn orders are subject to particularly short lead times. Consequently, our sales are subject to short-term variability in demand by our customers. Customers submitting purchase orders may cancel, reduce, or delay their orders for a variety of reasons, subject to negotiations. The level and timing of orders placed by our customers may vary due to:

- customer attempts to manage inventory;
- changes in customers' manufacturing strategies, such as a decision by a customer to either diversify or consolidate the number of PCB manufacturers or backplane assembly service providers used or to manufacture or assemble its own products internally;
- variation in demand for our customers' products; and
- changes in new product introductions.

We have periodically experienced terminations, reductions, and delays in our customers' orders. Further terminations, reductions, or delays in our customers' orders could materially adversely affect our business, financial condition, and results of operations.

Our business has benefited from OEMs deciding to outsource their PCB manufacturing and backplane assembly needs to us. If OEMs choose to provide these services in-house or select other providers, our business could suffer.

Our future revenue growth partially depends on new outsourcing opportunities from OEMs. Current and prospective customers continuously evaluate our performance against other providers. They also evaluate the potential benefits of manufacturing their products themselves. To the extent that outsourcing opportunities are not available either due to OEM decisions to produce these products themselves or to use other providers, our financial results and future growth could be materially adversely affected.

Consolidation among our customers could materially adversely affect our business, financial condition, and results of operations.

Recently, some of our large customers have consolidated, and further consolidation of customers may occur. Depending on which organization becomes the controller of the supply chain function following the consolidation, we may not be retained as a preferred or approved supplier. In addition, product duplication could result in the termination of a product line that we currently support. While there is potential for increasing our position with the combined customer, there does exist the potential for decreased revenue if we are not retained as a continuing supplier. We also face the risk of increased pricing pressure from the combined customer because of its increased market share.

Our operations could be materially adversely affected by a shortage of utilities or a discontinuation of priority supply status offered for such utilities.

The manufacturing of PCBs requires significant quantities of electricity and water. Our operations in Asia have historically purchased substantially all of the electrical power for their manufacturing plants in China from local power plants. Because China's economy has recently been in a state of growth, the strain on the nation's power plants is increasing, which has led to continuing power outages in various parts of the country. There may be times when our operations in China may be unable to obtain adequate sources of electricity to meet production requirements. Various regions in China have in the past experienced shortages of both electricity and water and unexpected interruptions of power supply. From time to time, the Chinese government rations electrical power, which can lead to unscheduled production interruptions at our manufacturing facilities.

In addition, certain areas in which our North America operations have manufacturing facilities, particularly in California, have experienced power and resource shortages from time to time, including mandatory periods without electrical power, changes to water availability, and significant increases in utility and resource costs.

We do not generally maintain any back-up power generation facilities or reserves of water for our operations, so if we were to lose supplies of power or water at any of our facilities, we would be required to cease operations until such supply was restored. Any resulting cessation of operations could materially adversely affect our ability to meet our customers' orders in a timely manner, thus potentially resulting in a loss of business, along with increased costs of manufacturing, and under-utilization of capacity. In addition, the sudden cessation of our power or water supply could damage our equipment, resulting in the need for costly repairs or maintenance, as well as damage to products in production, resulting in an increase in scrapped products.

Our manufacturing processes depend on the collective industry experience of our employees. If a significant number of these employees were to leave us, it could limit our ability to compete effectively and could materially adversely affect our business, financial condition, and results of operations.

We have limited patent or trade secret protection for our manufacturing processes. We rely on the collective experience of our employees involved in our manufacturing processes to ensure that we continuously evaluate and adopt new technologies in our industry. Although we are not dependent on any one employee or a small number of employees, if a significant number of our employees involved in our manufacturing processes were to leave our employment, and we were not able to replace these people with new employees with comparable experience, our manufacturing processes might suffer as we might be unable to keep up with innovations in the industry. As a result, we may lose our ability to continue to compete effectively. For example, we have experienced a significant amount of employee attrition in our China operations each year, which has negatively impacted our yield, costs of production, and service times.

Infringement of our intellectual property rights could negatively affect us, and we may be exposed to intellectual property infringement claims from third parties that could be costly to defend, could divert management's attention and resources, and if successful, could result in liability.

We rely on a combination of copyright, patent, trademark, and trade secret laws, confidentiality procedures, contractual provisions, and other measures to establish and protect our proprietary and confidential information. All of these measures afford only limited protection. These measures may be invalidated, circumvented, breached, or challenged, and others may develop intellectual property, technologies or processes that are similar, or superior to, our intellectual property or technology. We may not have adequate controls and procedures in place to protect our proprietary and confidential information. Despite our efforts to protect our intellectual property and proprietary rights, unauthorized parties may attempt to copy, and succeed in, copying, our products or may obtain or use information that we regard as proprietary or confidential. If it becomes necessary for us to resort to litigation to protect our intellectual property rights, any proceedings could be burdensome, costly, and distracting to management, and we may not prevail. Further, adequate remedies may not be available in the event of an unauthorized use or disclosure of our proprietary or confidential information. Failure to successfully establish or enforce our intellectual property rights could materially and adversely affect our business, financial condition, and results of operations. Furthermore, there is a risk that we may infringe on the intellectual property rights of others. As is the case with many other companies in the PCB industry, we from time to time receive communications from third parties asserting patent rights over our products and enter into discussions with such third parties. Irrespective of the validity or the successful assertion of such claims, we could incur costs in either defending or settling any intellectual property disputes alleging infringement. If any claims, whether or not they have merit, are brought against our customers for such infringement, we could be required to expend significant resources in defending such claims. In the event we are subject to any infringement claims, we may be required to spend a significant amount of money to develop non-infringing alternatives or obtain licenses. We may not be successful in developing such alternatives or in obtaining such licenses on reasonable terms, or at all, and may be required to modify or cease marketing our products or services, which could disrupt the production processes, damage our reputation, and materially and adversely affect our business, financial condition, and results of operations.

Our business, financial condition, and results of operations could be materially adversely affected by climate change initiatives.

Our manufacturing processes require that we purchase significant quantities of energy from third parties, which results in the generation of greenhouse gases, either directly on-site or indirectly at electric utilities. Both domestic and international legislation to address climate change by reducing greenhouse gas emissions could create increases in energy costs and price volatility. Considerable international attention is now focused on development of an international policy framework to guide international action to address climate change. Proposed and existing legislative efforts to control or limit greenhouse gas emissions could affect our energy sources and supply choices, as well as increase the cost of energy and raw materials that are derived from sources that generate greenhouse gas emissions.

Our ability to use net operating loss carryforwards to offset future taxable income for U.S. federal income tax purposes is subject to limitations, and future transfers of shares of our common stock could cause us to experience an "ownership change" that could further limit our ability to utilize our net operating losses.

Under U.S. federal income tax law, a corporation's ability to utilize its net operating losses (NOL's) to offset future taxable income may be significantly limited if it experiences an "ownership change" as defined in Section 382 of the Internal Revenue Code of 1986, as amended (the Code). In general, an ownership change will occur if there is a cumulative change in a corporation's ownership by "5-percent shareholders" that exceeds 50 percentage points over a rolling three-year period.

A corporation that experiences an ownership change will generally be subject to an annual limitation on its pre-ownership change NOLs equal to the value of the corporation immediately before the ownership change, multiplied by the long-term tax-exempt rate (subject to certain adjustments). The annual limitation for a taxable year is generally increased by the amount of any "recognized built-in gains" for such year and the amount of any unused annual limitation in a prior year. As a result of our acquisition of Viasystems, the NOLs acquired were subject to this limitation. In February 2017 and November 2016, 4,000,000 and 13,800,000 shares of common stock, respectively, were sold by Su Sih, our largest shareholder and a "5-percent shareholder." Additional future transfers or sales of our common stock during the rolling period by "5-percent shareholders" could cause us to experience an ownership change under Section 382, which could further limit our use of NOLs.

We are subject to risks for the use of certain metals from "conflict minerals" originating in the Democratic Republic of the Congo.

During the third quarter of 2012, the SEC adopted rules implementing the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank). These rules impose diligence and disclosure requirements regarding the use of "conflict minerals" mined from the Democratic Republic of Congo and neighboring countries. While these new rules continue to be the subject of ongoing litigation and, as a result, uncertainty, we submitted a conflict minerals report on Form SD with the SEC for the past five years, most recently on May 24, 2019. Compliance with these rules results in additional costs and expenses, including costs and expenses incurred for due diligence to determine and verify the sources of any conflict minerals used in our products, in addition to the costs and expenses of remediation and other changes to products, processes, or sources of supply as a consequence of such verification efforts. These rules may also affect the sourcing and availability of minerals used in the manufacture of our PCBs, as there may be only a limited number of suppliers offering "conflict free" minerals that can be used in our products. There can be no assurance that we will be able to obtain such minerals in sufficient quantities or at competitive prices. Also, since our supply chain is complex, we may, at a minimum, face reputational challenges with our customers, stockholders, and other stakeholders if we are unable to sufficiently verify the origins of the minerals used in our products. We may also encounter customers who require that all of the components of our products be certified as conflict free. If we are not able to meet customer requirements, such customers may choose to disqualify us as a supplier, which could impact our sales and the value of portions of our inventory.

Item 6. ***Exhibits***

Exhibit Number	Exhibits
3.1	Registrant's Certificate of Incorporation, as amended May 12, 2016 (1)
3.2	Registrant's Fourth Amended and Restated Bylaws, as amended March 2, 2016 (2)
10.1	Amended and Restated Facility Agreement, dated as of June 4, 2019, by and among TTM Technologies Enterprises (HK) Limited, TTM Technologies China Limited and TTM Technologies Trading (Asia) Company Limited as borrowers, TTM Technologies (Asia Pacific) Limited and other parties as guarantors, The Hongkong and Shanghai Banking Corporation Limited and Barclays Bank PLC as original lenders, The Hongkong and Shanghai Banking Corporation Limited as arranger, facility agent, security trustee and issuing bank (3)
10.2	Second Amendment, dated as of June 3, 2019, to the ABL Credit Agreement, by and among TTM Technologies, Inc., as Borrower, the several Lenders from time to time parties thereto, JPMorgan Chase Bank, N.A., as Administrative Agent, and the other agents thereto (3)
10.3*	Chinese Revolver, dated as of July 18, 2019, by and among Shanghai Kaiser Electronics Co., Ltd. and Shanghai Meadville Electronics Co., Ltd., wholly-owned subsidiaries of TTM Technologies, Inc., as borrowers and the Agricultural Bank of China as lender
31.1	CEO Certification Pursuant to Section 302 of the Sarbanes — Oxley Act of 2002
31.2	CFO Certification Pursuant to Section 302 of the Sarbanes — Oxley Act of 2002
32.1	CEO Certification Pursuant to Section 906 of the Sarbanes — Oxley Act of 2002
32.2	CFO Certification Pursuant to Section 906 of the Sarbanes — Oxley Act of 2002
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 Documents
101.DEF	XBRL Taxonomy Extension Definition Linkbase Documents
101.LAB	XBRL Taxonomy Extension Label Linkbase Documents
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Documents

(1) Incorporated by reference to the Registrant's Current Report on Form 8-K as filed with the Commission on June 6, 2011 and to the Registrant's Form 8-K as filed with the Commission on May 18, 2016.
(2) Incorporated by reference to the Registrant's Current Report on Form 8-K as filed with the Commission on March 8, 2016.
(3) Incorporated by reference to the Registrant's Current Report on Form 8-K as filed with the Commission on June 6, 2019.
* Filed herewith

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.

TTM Technologies, Inc.

/s/ Thomas T. Edman

Dated: August 7, 2019

Thomas T. Edman
President and Chief Executive Officer

/s/ Todd B. Schull

Dated: August 7, 2019

Todd B. Schull
Executive Vice President and Chief Financial Officer

Exhibit 10.3

Chinese Revolver

Approved to extend RMB 200 million existing credit to Meadville Group, among which RMB 130 million is for Shanghai Meadville Electronics Co., Ltd. whose 12-class risk classification before the extension of the credit is normal Class 3 and RMB 70 million is for Shanghai Kaiser Electronics Co., Ltd., whose 12-class risk classification before the extension of the credit is normal Class 3. The details of the plan are as follows.

(One) Credit plan: 1. Line of credit RMB 200 million. 2. Credit period: 1 year. 3. Management model: centralized extension of credit and credit quota. 4. Purpose of the credit: for the purchase of raw materials and for day-to-day operation. 5. Credit type: short- and mid-term working capital loan in domestic and foreign currency; short-term credits such as trade financing, banker's acceptance, domestic or foreign letter of credit within 180 days (including 180 days), non-financial guarantee etc. 6. Type of guarantee: credit. Security deposit can be waived for businesses involving deposit. 7. Interest rate and fee: execute in accordance with our bank's current policy and subject to the approval from authorized departments. 8. Credit allocation: (1) RMB 130 million for Shanghai Meadville Electronics Co., Ltd. (2) RMB 70 million for Shanghai Kaiser Electronics Co., Ltd. The full amount of the line of credit under this credit extension plan can be used revolvingly. This line of credit is only for short-term credit.

(Two) Credit extension conditions: 1. Before the use of the credit, it is a must to obtain approval from authorized departments regarding the type of credit and reduction/waiver of deposit. 2. The use of the credit should strictly comply with regulations for the individual business type, i.e. working capital loan cannot be used for the construction of fixed assets or foreign investment etc. 3. Make sure that the credit user meets our bank's conditions for credit extension if the loan is given in the form of credit. 4. The total credit amount should match the company's revenue size. Use other credit types other than working capital loan first. 5. The actual amount from various non-low risk credit business contracts shall not exceed the line of credit.

(Three) Management requirement: 1. Watch the company's operation and financial standing closely, investigate and analyze account receivable age and the items. Urge the company to strengthen the collection of receivables to prevent unreasonable use. 2. Customer service departments shall stay informed of the profit allocation between the two companies. 3. The use of credit under the approved credit line shall strictly comply with our bank's individual business administrative measures, use of credit administrative measures and relevant foreign exchange control policies. More rigorously review the documentation in relation to the foreign exchange settlement between the related parties; verify the authenticity of the trade. The use of the loan must comply with regulations. 4. Watch closely the day-to-day capital dealings between the company and the related companies under the same group. Verify the background of the trade. Suggest using trade financing products first. Our bank's loan cannot be used for related parties, or fixed asset construction or foreign equity investment. 5. Customer service departments shall stay informed of the operations of the company and the Group. Pay attention to risk volidity in the electronic industry. Stay informed of the Group's overall strategy and industry risk of the downstream end product industries. In the event of operation deterioration or the occurrence of factors detrimental to the safety of the credit extended by our bank, we should be alert and take relevant measures. 6. Watch the development of the global PCB industry closely, especially the industry strategy implemented by the overseas controller and effectiveness of their strategy and conduct a comprehensive analysis with consideration of the operation performance of the credit receiver. 7. Watch Reminbi exchange rate risk, domestic labor cost upside risk and international export environment risk. 8. Request that the company's settlement cash flow be monitored by our bank and match it with the credit balance of our bank to ensure sufficient source of repayment funds.

Exhibit 31.1

CERTIFICATION

I, Thomas T. Edman, certify that:

1. I have reviewed this quarterly report on Form 10-Q of TTM Technologies, 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(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

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

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

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

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth 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(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

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

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

/s/ Thomas T. Edman

Thomas T. Edman
President and Chief Executive Officer
(Principal Executive Officer)

Date: August 7, 2019

Exhibit 31.2

CERTIFICATION

I, Todd B. Schull, certify that:

1. I have reviewed this quarterly report on Form 10-Q of TTM Technologies, 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(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

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

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

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

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth 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(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

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

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

/s/ Todd B. Schull

Todd B. Schull
Executive Vice President and Chief Financial Officer
(Principal Financial Officer and Principal Accounting Officer)

Date: August 7, 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 on Form 10-Q of TTM Technologies, Inc. (the "Company") for the quarter and two quarters ended July 1, 2019, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Thomas T. Edman, President and Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a) or 78o(d)); and

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

By: /s/ Thomas T. Edman

Thomas T. Edman
President and Chief Executive Officer
(Principal Executive Officer)

August 7, 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 on Form 10-Q of TTM Technologies, Inc. (the "Company") for the quarter and two quarters ended July 1, 2019, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Todd B. Schull, Executive Vice President and Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a) or 78o(d)); and

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

By: /s/ Todd B. Schull

Todd B. Schull
Executive Vice President and Chief Financial Officer
(Principal Financial Officer and Principal Accounting Officer)

August 7, 2019