

## CONTENTS

### **3 Market Highlights**

### **4 Public Company Summary**

5 Integrated Device Manufacturers (IDMs) & Foundries

6 Fabless Semiconductor Manufacturers

7 Semiconductor Equipment

8 Electronic Design Automation & IP

### **9 Selected M&A Transactions**

### **10 Corporate Finance Services**

### **11 Contact**

# 2016 Top 25 Firm

*as ranked by Accounting Today*

# 2015 Best of the Best Firm

*as ranked by Accounting Today*

# 2014 Fastest Growing Firm

*as ranked by Inside Public Accounting*

**Strategic Thinking.**  
**Sound Insights.**  
**Positive Action.**

Armanino<sup>LLP</sup> is the largest independent accounting and consulting firm based in California and one of the largest firms in the United States. Armanino provides an integrated set of audit, tax, consulting, business management and technology solutions to companies in the U.S. and globally. Armanino extends its global services to more than 100 countries through its membership in Moore Stephens International Limited—one of the world's major accounting and consulting membership organizations.



## MARKET HIGHLIGHTS

**The semiconductor industry is closing out a banner year in 2017:** The S&P Semiconductor & Semiconductor Equipment Index increased by +9.7% for the quarter, and outperformed the S&P 500 by a wide margin over 3, 6, 12, and 24 months. The index increased a whopping 68% over the last 24 months, making the semiconductor sector an investor darling. The S&P Semiconductor Equipment index even increased by +110.5% over 24 months, but declined a tad (-1.0%) in the last quarter; valuations seem to finally slow down a bit.

**All segments were up over the last three months,** with a median gain of +6.7% for the IDM/Foundries segment, +5.9% for the Fabless segment, +2.4% for the Equipment segment, and +6.0% for the EDA/IP segment. Median price increases for these segments ranged from +33.5% to +56.6% year over year.

Within the IDM/Foundries segment, stock price changes over 3 months ranged from +21.4% (Sony) to -6.8% (Skyworks). Within the Fabless segment, Mellanox performed best (up 37.2%), and AMD the worst (-19.4%). The Semiconductor Equipment segment had another strong quarter; changes ranged from +18.2% (SCREEN) to a modest -3.2% (ASM

PacTech). The EDA/IP segment saw increases between +20.3% (Ansys) and +1.4% (PDF Solutions).

**Valuation momentum is still increasing in most sectors, along with profitability:** All segments but equipment showed increasing revenue multiples. However, only Fabless and EDA/IP saw expanding EBITDA multiples.

And just when we thought the M&A market had cooled down a bit, **Broadcom makes a play for Qualcomm** at 4x revenue and almost 14x EBITDA! This of course after Qualcomm made a play for NXP in 2016 – a deal now stuck in shareholder and regulatory approval limbo. NXP itself had previously bought Freescale in 2015. Also in November, **Marvell announced its acquisition of Cavium**, with 7.0x revenue and 37.1x EBITDA also at a healthy valuation.

Global semiconductor revenues came in at a new record of \$37.7 billion in revenues for the month of November, an increase of 21.5% from the previous year, and in line to reach a record \$400 billion for the year (SIA)

*Gunther Hofmann, CFA, CVA, CEPA  
Managing Director*

MARKET SECTOR	Median % Change		LTM
	Price		Median
	3 mo	12 mo	EBITDA/Rev
Integrated Device Manufacturers (IDMs) & Foundries	6.7%	39.8%	33.8%
Fabless Semiconductor Manufacturers	5.9%	33.5%	24.4%
Semiconductor Equipment	2.4%	56.6%	27.4%
Electronic Design Automation & IP	6.0%	51.4%	22.8%

## EV/REVENUE MULTIPLES

MARKET SECTOR	Median 12/29/17	LTM		NTM 12/29/17	Revenue
		Median % Change			Median
		3 mo	12 mo		YoY Growth
Integrated Device Manufacturers (IDMs) & Foundries	3.1x	3.7%	18.2%	2.7x	8.6%
Fabless Semiconductor Manufacturers	3.7x	2.2%	18.4%	3.5x	6.9%
Semiconductor Equipment	3.6x	(7.1%)	12.8%	3.2x	12.0%
Electronic Design Automation & IP	4.3x	3.5%	32.1%	4.1x	6.4%

## EV/EBITDA MULTIPLES

MARKET SECTOR	Median 12/29/17	LTM		NTM 12/29/17	EBITDA
		Median % Change			Median
		3 mo	12 mo		YoY Growth
Integrated Device Manufacturers (IDMs) & Foundries	9.9x	(0.6%)	12.6%	8.8x	17.7%
Fabless Semiconductor Manufacturers	17.8x	7.4%	13.2%	11.9x	30.4%
Semiconductor Equipment	12.2x	(5.2%)	(1.4%)	10.9x	17.5%
Electronic Design Automation & IP	24.8x	9.4%	49.2%	15.8x	36.9%

INDICIES	Price	% Change			
	12/29/17	3 mo	6 mo	12 mo	24 mo
S&P 500	2,673.61	6.1%	10.5%	18.9%	28.6%
Dow Jones Industrial Average	24,719.22	10.3%	16.1%	24.7%	39.5%
NASDAQ Composite Index	6,903.39	6.3%	12.4%	27.1%	35.2%
Russell 2000 Index	1,535.51	3.0%	8.4%	12.6%	32.3%
S&P Composite 1500 Information Technology (Sector)	1,134.95	8.3%	16.8%	34.2%	49.7%
S&P Composite 1500 Semiconductor & Semiconductor Equipment (Industry)	939.58	9.7%	23.4%	33.0%	68.0%
S&P Composite 1500 Semiconductors (Sub Ind)	899.08	11.6%	23.6%	30.7%	62.6%
S&P Composite 1500 Semiconductor Equipment (Sub Ind)	754.96	(1.0%)	22.4%	49.8%	110.5%

Source: Capital IQ. (\$ in '000, except per share)

COMPANY	TICKER	Price 12/29/17	% Change		52-Week		Market Cap	Ent Val (TEV)	LTM		NTM		YoY Growth		LTM EBITDA/ Rev
			3 mo	12 mo	High	Low			Rev	EBITDA	Rev	EBITDA	Rev	EBITDA	
<b>Integrated Device Manufacturers (IDMs) &amp; Foundries</b>															
Samsung Electronics Co., Ltd.	A005930	\$2,382.09	6.4%	59.9%	\$2,692.23	\$ 1,663.45	\$319,026	\$272,067	\$ 212,428	\$ 63,813	\$249,793	\$86,541	17.6%	35.6%	30.0%
Intel Corporation	INTC	46.16	21.2%	25.9%	47.64	33.23	216,029	230,165	62,082	25,143	63,469	27,002	2.2%	7.4%	40.5%
TSMC Limited	2330	7.74	8.4%	38.8%	8.26	6.03	200,601	190,464	32,431	21,422	35,949	24,192	10.8%	12.9%	66.1%
Texas Instruments Incorporated	TXN	104.44	16.5%	40.8%	105.33	72.47	102,932	103,071	14,625	6,629	15,407	7,169	5.3%	8.1%	45.3%
Sony Corporation	6758	45.13	21.4%	59.1%	48.70	28.96	57,049	69,075	72,994	8,762	76,884	9,507	5.3%	8.5%	12.0%
NXP Semiconductors N.V.	NXPI	117.09	3.5%	19.4%	118.20	96.00	39,697	43,362	9,240	2,695	9,481	3,444	2.6%	27.8%	29.2%
SK Hynix Inc.	A000660	0.00	(1.2%)	93.5%	84.53	41.75	50,558	48,901	24,750	14,638	33,499	21,688	35.4%	48.2%	59.1%
Micron Technology, Inc.	MU	41.12	4.6%	84.6%	49.89	21.49	47,548	51,304	23,155	12,912	27,985	17,207	20.9%	33.3%	55.8%
Infineon Technologies AG	IFX	27.42	9.1%	57.5%	30.55	19.29	30,990	30,248	8,481	2,148	9,251	2,525	9.1%	17.5%	25.3%
Skyworks Solutions, Inc.	SWKS	94.95	(6.8%)	24.0%	117.65	73.94	17,446	15,829	3,651	1,508	4,045	1,777	10.8%	17.8%	41.3%
Renesas Electronics Corporation	6723	11.66	7.1%	46.9%	13.70	7.83	19,435	20,406	5,576	1,184	7,218	1,793	29.4%	51.4%	21.2%
Microchip Technology Incorporated	MCHP	87.88	(2.1%)	35.7%	95.92	62.21	20,556	22,259	3,721	1,398	4,087	1,760	9.8%	25.9%	37.6%
STMicroelectronics N.V.	STM	21.86	13.0%	94.8%	25.76	12.02	19,298	18,913	7,864	1,411	9,141	1,874	16.2%	32.8%	17.9%
Maxim Integrated Products, Inc.	MXIM	52.28	9.6%	34.0%	55.43	38.18	14,716	13,431	2,310	874	2,461	999	6.5%	14.3%	37.8%
Toshiba Corporation	6502	2.81	0.6%	26.5%	3.08	1.58	18,340	24,299	41,883	5,760	41,956	3,970	0.2%	(31.1%)	13.8%
ON Semiconductor Corporation	ON	20.94	13.4%	61.4%	22.15	12.37	8,882	10,947	5,427	1,170	5,514	1,274	1.6%	8.9%	21.6%
United Microelectronics Corporation	2303	0.48	(4.1%)	36.8%	0.57	0.38	5,844	6,901	5,089	1,926	5,066	2,033	(0.4%)	5.5%	37.9%
Cypress Semiconductor Corporation	CY	15.24	1.5%	32.2%	17.42	10.99	5,085	6,086	2,260	274	2,444	563	8.1%	105.4%	12.1%
<b>Median</b>			<b>6.7%</b>	<b>39.8%</b>									<b>8.6%</b>	<b>17.7%</b>	<b>33.8%</b>

## EV/REVENUE MULTIPLES

COMPANY	TICKER	TTM					NTM
		Trailing		% Change			
		12/29/17	3 mo	12 mo	3 mo	12 mo	
<b>Integrated Device Manufacturers (IDMs) &amp; Foundries</b>							
Samsung Electronics Co., Ltd.	A005930	1.3x	1.4x	0.9x	(8.5%)	39.0%	1.1x
Intel Corporation	INTC	3.7x	3.0x	3.1x	23.7%	18.0%	3.6x
TSMC Limited	2330	5.9x	5.3x	5.0x	9.9%	18.4%	5.3x
Texas Instruments Incorporated	TXN	7.0x	6.3x	5.6x	11.9%	26.2%	6.7x
Sony Corporation	6758	0.9x	0.7x	0.6x	42.8%	65.6%	0.9x
NXP Semiconductors N.V.	NXPI	4.7x	4.5x	4.7x	3.2%	(0.5%)	4.6x
SK Hynix Inc.	A000660	2.0x	2.6x	2.0x	(23.2%)	(0.0%)	1.5x
Micron Technology, Inc.	MU	2.2x	2.5x	2.3x	(10.3%)	(5.2%)	1.8x
Infineon Technologies AG	IFX	3.6x	3.4x	2.8x	4.2%	27.3%	3.3x
Skyworks Solutions, Inc.	SWKS	4.3x	4.9x	3.9x	(12.1%)	11.5%	3.9x
Renesas Electronics Corporation	6723	3.7x	3.5x	2.2x	6.0%	68.9%	2.8x
Microchip Technology Incorporated	MCHP	6.0x	6.3x	5.9x	(5.5%)	0.5%	5.4x
STMicroelectronics N.V.	STM	2.4x	2.1x	1.5x	12.6%	62.4%	2.1x
Maxim Integrated Products, Inc.	MXIM	5.8x	5.3x	4.5x	9.4%	29.2%	5.5x
Toshiba Corporation	6502	0.6x	0.5x	0.5x	26.7%	26.1%	0.6x
ON Semiconductor Corporation	ON	2.0x	2.0x	2.3x	(0.2%)	(13.2%)	2.0x
United Microelectronics Corporation	2303	1.4x	1.4x	1.2x	(5.1%)	13.4%	1.4x
Cypress Semiconductor Corporation	CY	2.7x	2.8x	2.6x	(3.6%)	2.8%	2.5x
<b>Median</b>		<b>3.1x</b>	<b>2.9x</b>	<b>2.5x</b>	<b>3.7%</b>	<b>18.2%</b>	<b>2.7x</b>

## EV/EBITDA MULTIPLES

COMPANY	TICKER	TTM					NTM
		Trailing		% Change			
		12/29/17	3 mo	12 mo	3 mo	12 mo	
<b>Integrated Device Manufacturers (IDMs) &amp; Foundries</b>							
Samsung Electronics Co., Ltd.	A005930	4.3x	5.1x	3.9x	(16.7%)	9.2%	3.1x
Intel Corporation	INTC	9.2x	7.5x	8.0x	22.3%	14.7%	8.5x
TSMC Limited	2330	8.9x	8.2x	7.7x	7.8%	15.2%	7.9x
Texas Instruments Incorporated	TXN	15.5x	14.2x	13.3x	9.3%	17.1%	14.4x
Sony Corporation	6758	7.9x	6.5x	7.1x	21.5%	10.9%	7.3x
NXP Semiconductors N.V.	NXPI	16.1x	15.4x	17.4x	4.5%	(7.5%)	12.6x
SK Hynix Inc.	A000660	3.3x	4.7x	4.6x	(28.6%)	(27.9%)	2.3x
Micron Technology, Inc.	MU	4.0x	5.2x	9.2x	(22.9%)	(56.6%)	3.0x
Infineon Technologies AG	IFX	14.1x	13.6x	11.4x	3.4%	23.0%	12.0x
Skyworks Solutions, Inc.	SWKS	10.5x	11.9x	9.3x	(11.9%)	12.6%	8.9x
Renesas Electronics Corporation	6723	17.2x	16.3x	11.3x	6.0%	52.3%	11.4x
Microchip Technology Incorporated	MCHP	15.9x	17.8x	20.0x	(10.8%)	(20.4%)	12.6x
STMicroelectronics N.V.	STM	13.4x	12.9x	11.1x	3.8%	20.2%	10.1x
Maxim Integrated Products, Inc.	MXIM	15.4x	14.3x	13.7x	7.3%	12.5%	13.4x
Toshiba Corporation	6502	4.2x	4.4x	NM	(4.6%)	NM	6.1x
ON Semiconductor Corporation	ON	9.4x	9.9x	12.9x	(5.6%)	(27.5%)	8.6x
United Microelectronics Corporation	2303	3.6x	3.8x	3.0x	(5.7%)	18.3%	3.4x
Cypress Semiconductor Corporation	CY	22.2x	29.0x	16.5x	(23.6%)	34.2%	10.8x
<b>Median</b>		<b>9.9x</b>	<b>10.9x</b>	<b>11.1x</b>	<b>(0.6%)</b>	<b>12.6%</b>	<b>8.8x</b>

Source: Capital IQ. (\$ in '000, except per share)

COMPANY	TICKER	Price 12/29/17	% Change		52-Week		Market Cap	Ent Val (TEV)	LTM		NTM		YoY Growth		LTM
			3 mo	12 mo	High	Low			Rev	EBITDA	Rev	EBITDA	Rev	EBITDA	EBITDA/ Rev
<b>Fabless Semiconductor Manufacturers</b>															
Broadcom Limited	AVGO	\$256.90	5.9%	42.8%	\$285.68	\$173.31	\$ 105,165	\$114,410	\$17,636	\$ 7,524	\$ 20,959	\$ 13,303	18.8%	76.8%	42.7%
QUALCOMM Incorporated	QCOM	64.02	23.5%	(3.1%)	69.28	48.92	94,793	79,378	22,291	6,472	22,753	7,917	2.1%	22.3%	29.0%
NVIDIA Corporation	NVDA	193.50	8.2%	73.7%	218.67	95.17	117,261	112,955	8,976	3,072	10,580	3,484	17.9%	13.4%	34.2%
Xilinx, Inc.	XLNX	67.42	(4.8%)	11.0%	75.14	54.99	16,919	15,100	2,430	764	2,581	842	6.2%	10.2%	31.4%
Advanced Micro Devices, Inc.	AMD	10.28	(19.4%)	(11.3%)	15.65	9.42	9,918	10,465	4,955	(82)	5,769	565	16.4%	NM	(1.7%)
MediaTek Inc.	2454	9.91	5.7%	47.8%	11.81	6.84	15,596	12,772	8,309	646	8,726	1,014	5.0%	56.9%	7.8%
Marvell Technology Group Ltd.	MRVL	21.47	19.9%	52.2%	24.22	13.83	10,546	8,814	2,377	554	2,474	741	4.1%	33.7%	23.3%
Microsemi Corporation	MSCC	51.65	0.3%	(6.6%)	57.97	46.09	6,069	7,721	1,812	534	1,905	679	5.2%	27.2%	29.5%
Cirrus Logic, Inc.	CRUS	51.86	(2.7%)	(10.6%)	71.97	48.61	3,302	3,106	1,597	401	1,707	458	6.9%	14.0%	25.1%
Silicon Laboratories Inc.	SLAB	88.30	10.5%	33.5%	96.93	63.15	3,759	3,378	750	118	811	183	8.1%	55.7%	15.7%
Mellanox Technologies, Ltd.	MLNX	64.70	37.2%	58.6%	65.90	40.40	3,295	3,147	848	97	942	275	11.1%	185.3%	11.4%
Silicon Motion Technology Corporation	SIMO	52.96	10.3%	21.6%	56.25	37.37	1,893	1,560	531	130	558	144	4.9%	11.2%	24.4%
Himax Technologies, Inc.	HIMX	10.42	(4.7%)	70.5%	13.95	4.88	1,793	1,791	708	24	822	83	16.2%	237.5%	3.5%
<b>Median</b>			<b>5.9%</b>	<b>33.5%</b>									<b>6.9%</b>	<b>30.4%</b>	<b>24.4%</b>

COMPANY	TICKER	EV/REVENUE MULTIPLES					NTM	EV/EBITDA MULTIPLES					NTM
		TTM		% Change		Trailing 12/29/17		TTM		% Change		Trailing 12/29/17	
		3 mo	12 mo	3 mo	12 mo			3 mo	12 mo	3 mo	12 mo		
<b>Fabless Semiconductor Manufacturers</b>													
Broadcom Limited	AVGO	6.5x	6.5x	6.3x	(0.1%)	2.2%	5.5x	15.2x	15.8x	16.8x	(3.8%)	(9.4%)	8.6x
QUALCOMM Incorporated	QCOM	3.6x	3.4x	3.8x	3.7%	(6.2%)	3.5x	12.3x	10.8x	10.8x	13.1%	13.1%	10.0x
NVIDIA Corporation	NVDA	12.6x	12.4x	8.8x	1.5%	43.4%	10.7x	36.8x	36.7x	30.7x	0.1%	19.8%	32.4x
Xilinx, Inc.	XLNX	6.2x	6.6x	5.8x	(5.4%)	6.7%	5.9x	19.8x	20.8x	17.4x	(4.8%)	13.4%	17.9x
Advanced Micro Devices, Inc.	AMD	2.1x	2.7x	2.6x	(22.8%)	(20.0%)	1.8x	NM	NM	NM	NM	NM	18.5x
MediaTek Inc.	2454	1.5x	1.4x	0.9x	11.5%	63.8%	1.5x	19.8x	16.1x	8.3x	22.6%	137.2%	12.6x
Marvell Technology Group Ltd.	MRVL	3.7x	3.1x	2.2x	21.1%	67.6%	3.6x	15.9x	14.5x	23.9x	9.5%	(33.5%)	11.9x
Microsemi Corporation	MSCC	4.3x	4.3x	5.0x	(1.7%)	(14.2%)	4.1x	14.5x	14.1x	19.4x	2.7%	(25.6%)	11.4x
Cirrus Logic, Inc.	CRUS	1.9x	2.0x	2.8x	(3.6%)	(29.8%)	1.8x	7.7x	7.8x	12.9x	(0.7%)	(40.0%)	6.8x
Silicon Laboratories Inc.	SLAB	4.5x	4.2x	3.7x	6.9%	21.2%	4.2x	28.7x	27.2x	27.1x	5.3%	5.7%	18.4x
Mellanox Technologies, Ltd.	MLNX	3.7x	2.7x	2.4x	38.1%	54.7%	3.3x	32.6x	21.7x	13.7x	50.6%	137.8%	11.4x
Silicon Motion Technology Corporation	SIMO	2.9x	2.6x	2.5x	15.1%	18.4%	2.8x	12.0x	9.8x	9.7x	22.2%	23.9%	10.8x
Himax Technologies, Inc.	HIMX	2.5x	2.5x	1.3x	2.2%	91.4%	2.2x	73.1x	51.9x	13.8x	41.0%	429.0%	21.7x
<b>Median</b>		<b>3.7x</b>	<b>3.1x</b>	<b>2.8x</b>	<b>2.2%</b>	<b>18.4%</b>	<b>3.5x</b>	<b>17.8x</b>	<b>16.0x</b>	<b>15.3x</b>	<b>7.4%</b>	<b>13.2%</b>	<b>11.9x</b>

Source: Capital IQ. (\$ in '000, except per share)

COMPANY	TICKER	Price 12/29/17	% Change		52-Week		Market Cap	Ent Val (TEV)	LTM		NTM		YoY Growth		LTM EBITDA/ Rev
			3 mo	12 mo	High	Low			Rev	EBITDA	Rev	EBITDA	Rev	EBITDA	
<b>Semiconductor Equipment</b>															
ASML Holding N.V.	ASML	\$174.29	2.4%	56.6%	\$192.06	#####	\$ 74,924	\$ 75,432	\$ 10,086	\$ 3,465	\$ 11,562	\$ 3,600	14.6%	3.9%	34.4%
Applied Materials, Inc.	AMAT	51.12	(1.9%)	56.5%	60.89	31.66	54,000	52,028	14,537	4,275	16,831	5,329	15.8%	24.7%	29.4%
Lam Research Corporation	LRCX	184.07	(0.5%)	71.8%	219.70	105.30	29,809	26,073	8,859	2,601	10,492	3,362	18.4%	29.3%	29.4%
Tokyo Electron Limited	8035	181.12	18.0%	92.1%	211.97	96.11	29,718	26,791	8,558	2,119	10,830	2,962	26.5%	39.8%	24.8%
KLA-Tencor Corporation	KLAC	105.07	(0.9%)	32.5%	114.43	77.86	16,465	16,184	3,699	1,447	3,957	1,577	7.0%	8.9%	39.1%
Teradyne, Inc.	TER	41.87	12.3%	63.7%	44.63	25.24	8,213	6,939	2,037	604	2,159	635	6.0%	5.1%	29.6%
ASM Pacific Technology Limited	522	13.94	(3.2%)	33.3%	16.77	10.24	5,676	5,588	2,152	451	2,273	379	5.6%	(15.8%)	20.9%
Disco Corporation	6146	222.58	9.5%	84.8%	252.05	122.52	7,995	7,272	1,381	456	1,560	534	13.0%	17.1%	33.0%
ASM International NV	ASM	67.69	7.1%	50.4%	74.99	49.91	3,797	3,167	846	261	932	216	10.2%	(17.1%)	30.8%
MKS Instruments, Inc.	MKSI	94.50	0.1%	58.3%	110.60	58.80	5,131	5,036	1,809	456	2,048	580	13.2%	27.3%	25.2%
Entegris, Inc.	ENTG	30.45	5.5%	68.7%	33.05	17.65	4,306	4,382	1,300	330	1,420	396	9.2%	20.2%	25.4%
SCREEN Holdings Co., Ltd.	7735	81.86	18.2%	33.9%	103.34	58.60	3,819	3,461	2,823	391	3,131	461	10.9%	17.9%	13.8%
ULVAC, Inc.	6728	63.04	0.4%	110.7%	79.28	31.03	3,106	2,979	2,155	343	2,240	395	4.0%	15.3%	15.9%
Advantest Corporation	6857	18.56	(0.7%)	11.9%	23.95	15.87	3,294	2,744	1,493	158	1,746	290	17.0%	83.1%	10.6%
<b>Median</b>			<b>2.4%</b>	<b>56.6%</b>									<b>12.0%</b>	<b>17.5%</b>	<b>27.4%</b>

## EV/REVENUE MULTIPLES

COMPANY	TICKER	TTM		% Change		NTM
		Trailing 12/29/17	12 mo	3 mo	12 mo	
<b>Semiconductor Equipment</b>						
ASML Holding N.V.	ASML	7.5x	8.0x	7.0x	(7.1%)	6.6%
Applied Materials, Inc.	AMAT	3.6x	3.9x	3.2x	(7.5%)	12.8%
Lam Research Corporation	LRCX	2.9x	3.3x	2.4x	(11.8%)	21.5%
Tokyo Electron Limited	8035	3.1x	2.9x	2.3x	9.4%	35.9%
KLA-Tencor Corporation	KLAC	4.4x	4.8x	4.1x	(8.0%)	5.5%
Teradyne, Inc.	TER	3.4x	3.3x	2.5x	4.6%	36.7%
ASM Pacific Technology Limited	522	2.6x	2.8x	2.4x	(8.7%)	6.8%
Disco Corporation	6146	5.3x	5.1x	3.5x	2.5%	50.6%
ASM International NV	ASM	3.7x	3.8x	3.9x	(2.7%)	(2.8%)
MKS Instruments, Inc.	MKSI	2.8x	3.0x	3.2x	(7.3%)	(13.4%)
Entegris, Inc.	ENTG	3.4x	3.4x	2.4x	(0.1%)	40.1%
SCREEN Holdings Co., Ltd.	7735	1.2x	1.1x	1.2x	13.8%	(0.8%)
ULVAC, Inc.	6728	1.4x	1.5x	1.0x	(6.2%)	39.1%
Advantest Corporation	6857	1.8x	2.1x	1.9x	(10.5%)	(5.1%)
<b>Median</b>		<b>3.6x</b>	<b>3.8x</b>	<b>3.2x</b>	<b>(7.1%)</b>	<b>12.8%</b>

	TTM		% Change		NTM
	Trailing 12/29/17	12 mo	3 mo	12 mo	
	7.5x	8.0x	7.0x	(7.1%)	6.6%
	3.6x	3.9x	3.2x	(7.5%)	12.8%
	2.9x	3.3x	2.4x	(11.8%)	21.5%
	3.1x	2.9x	2.3x	9.4%	35.9%
	4.4x	4.8x	4.1x	(8.0%)	5.5%
	3.4x	3.3x	2.5x	4.6%	36.7%
	2.6x	2.8x	2.4x	(8.7%)	6.8%
	5.3x	5.1x	3.5x	2.5%	50.6%
	3.7x	3.8x	3.9x	(2.7%)	(2.8%)
	2.8x	3.0x	3.2x	(7.3%)	(13.4%)
	3.4x	3.4x	2.4x	(0.1%)	40.1%
	1.2x	1.1x	1.2x	13.8%	(0.8%)
	1.4x	1.5x	1.0x	(6.2%)	39.1%
	1.8x	2.1x	1.9x	(10.5%)	(5.1%)
<b>Median</b>	<b>3.6x</b>	<b>3.8x</b>	<b>3.2x</b>	<b>(7.1%)</b>	<b>12.8%</b>

## EV/EBITDA MULTIPLES

	TTM		% Change		NTM
	Trailing 12/29/17	12 mo	3 mo	12 mo	
	21.8x	23.0x	21.6x	(5.2%)	0.8%
	12.2x	13.6x	13.5x	(10.4%)	(10.0%)
	10.0x	12.0x	10.2x	(16.8%)	(1.3%)
	12.6x	12.2x	11.6x	3.2%	9.1%
	11.2x	12.4x	11.3x	(9.8%)	(1.4%)
	11.5x	11.6x	11.7x	(0.7%)	(1.4%)
	12.4x	14.1x	14.7x	(11.9%)	(15.9%)
	15.9x	16.6x	13.1x	(4.3%)	21.7%
	12.1x	7.6x	14.5x	60.7%	(16.2%)
	11.1x	12.6x	16.5x	(12.4%)	(33.0%)
	13.3x	14.1x	11.3x	(5.5%)	17.7%
	8.9x	8.1x	10.9x	9.6%	(19.0%)
	8.7x	9.5x	7.3x	(8.2%)	18.4%
	17.3x	20.9x	15.8x	(17.0%)	9.7%
<b>Median</b>	<b>12.2x</b>	<b>12.4x</b>	<b>13.1x</b>	<b>(5.2%)</b>	<b>(1.4%)</b>

Source: Capital IQ. (\$ in '000, except per share)

COMPANY	TICKER	Price 12/29/17	% Change		52-Week		Market Cap	Ent Val (TEV)	LTM		NTM		YoY Growth		LTM EBITDA/ Rev
			3 mo	12 mo	High	Low			Rev	EBITDA	Rev	EBITDA	Rev	EBITDA	
<b>Electronic Design Automation &amp; IP</b>															
Synopsys, Inc.	SNPS	\$ 85.24	5.8%	43.5%	\$ 94.80	\$ 58.74	\$ 12,676	\$ 11,776	\$ 2,725	\$ 512	\$ 2,898	\$ 768	6.4%	50.0%	18.8%
Ansys, Inc.	ANSS	147.59	20.3%	59.3%	155.14	91.89	12,525	11,598	1,064	467	1,147	550	7.8%	17.7%	43.9%
Cadence Design Systems, Inc.	CDNS	41.82	6.0%	63.9%	45.64	25.18	11,808	11,770	1,910	436	2,008	638	5.1%	46.3%	22.8%
Rambus Inc.	RMBS	14.22	6.5%	NA	15.50	11.30	1,561	1,546	389	112	408	142	5.0%	27.5%	28.7%
PDF Solutions, Inc.	PDFS	15.70	1.4%	(30.8%)	23.93	14.11	502	401	104	7	112	25	8.4%	NM	6.8%
<b>Median</b>			<b>6.0%</b>	<b>51.4%</b>									<b>6.4%</b>	<b>36.9%</b>	<b>22.8%</b>

COMPANY	TICKER	EV/REVENUE MULTIPLES						EV/EBITDA MULTIPLES					
		TTM			NTM			TTM			NTM		
		Trailing		% Change	Trailing		% Change	Trailing		% Change	Trailing		% Change
12/29/17		3 mo	12 mo	3 mo	12 mo	3 mo	12 mo	12/29/17	3 mo	12 mo	3 mo	12 mo	
<b>Electronic Design Automation &amp; IP</b>													
Synopsys, Inc.	SNPS	4.3x	4.2x	3.3x	2.4%	32.1%	4.1x	23.0x	21.0x	17.8x	9.4%	29.1%	15.3x
Ansys, Inc.	ANSS	10.9x	9.2x	7.4x	18.2%	47.6%	10.1x	24.8x	20.7x	16.0x	20.1%	55.1%	21.1x
Cadence Design Systems, Inc.	CDNS	6.2x	5.9x	4.1x	4.4%	49.1%	5.9x	27.0x	26.2x	18.1x	3.0%	49.2%	18.5x
Rambus Inc.	RMBS	4.0x	3.8x	4.9x	3.5%	(18.0%)	3.8x	13.8x	14.0x	14.7x	(1.0%)	(5.5%)	10.9x
PDF Solutions, Inc.	PDFS	3.9x	3.8x	5.7x	3.0%	(32.5%)	3.6x	57.0x	41.5x	31.7x	37.3%	80.0%	15.8x
<b>Median</b>		<b>4.3x</b>	<b>4.2x</b>	<b>4.9x</b>	<b>3.5%</b>	<b>32.1%</b>	<b>4.1x</b>	<b>24.8x</b>	<b>21.0x</b>	<b>17.8x</b>	<b>9.4%</b>	<b>49.2%</b>	<b>15.8x</b>

Source: Capital IQ. (\$ in '000, except per share)



ACQUIRER	TARGET	Date Announced	Headquarters		EV Announcement	LTM		EV / LTM		
			Buyer	Target		Revenue	EBITDA	Revenue	EBITDA	
<b>Selected Semiconductor Transactions (Announced in Q4)</b>										
Broadcom Limited	QUALCOMM Incorporated	11/6/2017	Singapore	United States	89,865,094	22,291,000	6,472,000	4.0x	13.9x	
Marvell Technology Group Ltd.	Cavium, Inc.	11/20/2017	Bermuda	United States	6,690,618	949,808	180,335	7.0x	37.1x	
Individuals	Canadian Solar Inc.	12/11/2017	NA	Canada	3,109,356	2,950,058	181,871	1.1x	17.1x	
Aurora Optoelectronics Co.,Ltd	Hefei Ruicheng Industry Investment Co., Ltd.	11/22/2017	China	China	1,086,693	262,322	NA	4.1x	NA	
Neo Solar Power Corporation	Gintech Energy Corporation	10/16/2017	Taiwan	Taiwan	315,678	444,494	8,826	0.7x	35.8x	
East Group Co., Ltd.	Ningbo Jiangbei Yize New Energy Technology Co., Ltd.	11/10/2017	China	China	436,629	NM	NA	NM	NA	
Neo Solar Power Corporation	Solartech Energy Corp.	10/16/2017	Taiwan	Taiwan	323,404	217,866	(5,526)	1.5x	NM	
Dialog Semiconductor Plc	Silego Technology, Inc.	10/5/2017	United Kingdom	United States	306,400	NA	NA	NA	NA	
Zhuhai Elec-Tech Electric Co., Ltd.	Elec-Tech International (H.K.) Company Limited	12/2/2017	China	Hong Kong	302,415	139,396	NA	2.2x	NA	
Silicon Laboratories Inc.	Sigma Designs, Inc.	12/7/2017	United States	United States	216,813	155,658	(22,539)	1.4x	NM	
Bomin Electronics Co., Ltd.	Shenzhen Juntian Hengxun Technology Co., Ltd.	11/29/2017	China	China	189,122	17,651	NA	10.7x	NA	
Microsemi Corporation	Knowles Corporation, High Performance Timing Business	10/26/2017	United States	United States	130,000	NA	NA	NA	NA	
Collinstar Capital Pty Ltd.	BiWang Group, Ltd.	12/3/2017	Australia	Australia	100,000	NA	NA	NA	NA	
Shanghai Pudong Science and Technology Investment Co., Ltd.	Semiconductor Technologies & Instruments Group	12/18/2017	China	Singapore	74,229	NA	NA	NA	NA	
LB Semicon Inc.	LUSEM Co., Ltd.	11/30/2017	South Korea	South Korea	72,356	116,045	NA	0.6x	NA	
Brooks Automation, Inc.	4titude Limited	10/5/2017	United States	United Kingdom	65,000	14,000	NA	4.6x	NA	
Risecomm Group Holdings Limited	Beijing Hongteng Weitong Technology Co., Ltd.	12/1/2017	China	China	63,167	NA	NA	NA	NA	
The Carlyle Group L.P.	Applied Micro Circuits Corporation (AMCC)	10/27/2017	United States	Japan	36,500	NA	NA	NA	NA	
<b>Median</b>								<b>2.2x</b>	<b>26.4x</b>	

Source: Capital IQ. (\$ in '000, except per share)

## CORPORATE FINANCE SERVICES

The sale of a company can represent the culmination of years of effort by its investors and management. With this in mind, Armanino guides our clients through the sale process, bringing to bear extensive structuring, preparation, negotiation, valuation and corporate finance experience and judgment to optimize value.

Our team has developed its expertise through many M&A, divestiture and strategic partnering transactions for closely-held businesses across most major technology sectors.

### **Corporate Finance Services include:**

- Sell-Side Representation
- Exit Planning
- Buy-Side Representation
- Special Situation M&A
- Purchaser Representative (SEC Reg 501)

The professionals in our practice have many years of business valuation and corporate finance experience with companies in every major industrial sector and size to deliver superior results for private technology companies in Silicon Valley.

### **SELL SIDE M&A ADVISORY**

We help companies pursuing a sale or merger involving all or part of their business, as well as organizations interested in partial divestitures of a division or assets. We provide end-to-end strategic advisory, introducing the company to potential acquirers and managing a rigorous process to optimize competition, achieve strategic valuations and successfully close transactions.

### **BUY SIDE M&A ADVISORY**

We represent clients pursuing strategic acquisitions, such as asset purchases, mergers, and intellectual property procurements. Our financial advisory includes market analyses, target identification, financial modeling, deal negotiations, preliminary due diligence and final negotiation of the definitive agreements.

### **SPECIAL SITUATION M&A**

Armanino is among Silicon Valley's most experienced restructuring specialists on behalf of investors, creditors, boards, and executive management of distressed technology companies, including monetizing assets such as intellectual property (IP) on an accelerated timeline.

### **PURCHASER REPRESENTATIVE SERVICES**

A Purchaser Representative may be necessary in merger and acquisition transactions where the consideration is not all cash, but includes securities that are not registered with the SEC.

## CONTACT

### CORPORATE FINANCE

*Sell-Side and Buy-Side Advisory, Special Situation M&A, Purchaser Representative*

**Gunther Hofmann, CFA, CVA**  
**Managing Director**

44 Montgomery Street, Suite 900  
San Francisco, CA 94104

[gunther.hofmann@armaninollp.com](mailto:gunther.hofmann@armaninollp.com)

+1 415 568 3298

### TRANSACTION ADVISORY

*Financial Due Diligence and other pre and post transaction support*

**John Dunican, CPA**  
**Partner**

12657 Alcosta Blvd., Suite 500  
San Ramon, CA 94583

[john.dunican@amllp.com](mailto:john.dunican@amllp.com)

+1 925 498 1902

### VALUATION

*Purchase Price Allocation, M&A Valuation, 409A Valuation, Gift & Estate Tax*

**Greg Ansel, ASA**  
**Partner**

12657 Alcosta Blvd., Suite 500  
San Ramon, CA 94583

[greg.ansel@armaninollp.com](mailto:greg.ansel@armaninollp.com)

+1 925 302 4107

### AUDIT

**Matthew Perreault, CPA**  
**Partner**

12657 Alcosta Blvd., Suite 500  
San Ramon, CA 94583

[mattt.perreault@armaninollp.com](mailto:mattt.perreault@armaninollp.com)

+1 925 790 2755

### TAX

**David Sordello, CPA**  
**Partner**

50 West Fernando Ave., Suite 500  
San Jose, CA 95113

[david.sordello@armaninollp.com](mailto:david.sordello@armaninollp.com)

+1 408 200 6403

### BUSINESS SYSTEMS, ERP

*Semiconductor Industry Solutions*

**Chris Moore**  
**Partner**

50 West Fernando Ave., Suite 500  
San Jose, CA 95113

[chris.moore@armaninollp.com](mailto:chris.moore@armaninollp.com)

+1 408 712 1893

**GENERAL:** [info@armaninollp.com](mailto:info@armaninollp.com), 925 790 2600