

November 17, 2017

Cirrus Logic, Inc.: CRUS

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Sector: Technology

Industry: Semiconductor – Specialized

Current Price: \$55.66

Target Price: \$65.46

Company Description: Cirrus Logic, Inc. is an industry leader in high performance, low-power integrated circuits for audio and voice signal processing applications. Cirrus' products are used span from audio capture to playback, and are used in top smartphones, tablets, digital headsets, and emerging smart home applications.

BUY

| | |
|----------------|---------|
| Current Price: | \$55.66 |
| Target Price: | \$65.46 |
| Market Cap: | \$3.49B |
| ROIC: | 26.53% |
| WACC: | 12.4% |
| Net Margin: | 17.6% |
| EBITDA Margin: | 28.11% |

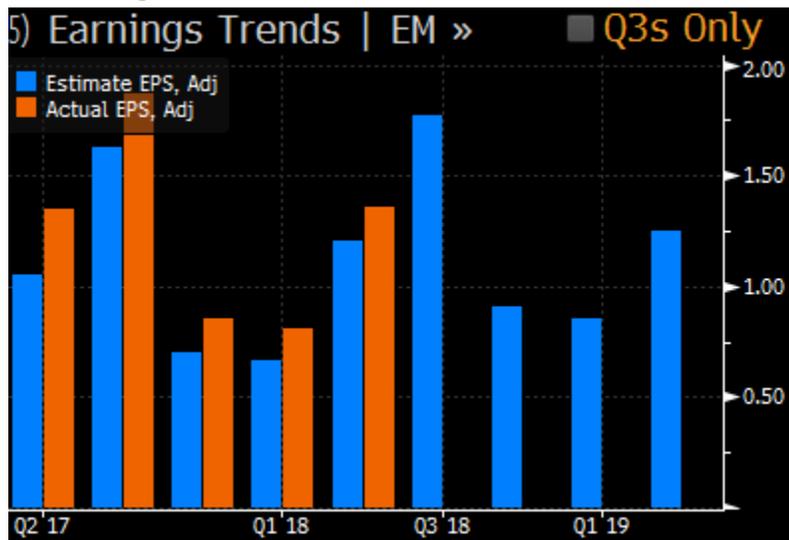


Thesis: Cirrus Logic, Inc. is a leader in fabless semiconductors for audio and voice semiconductors. Based on their impressive earnings over the past several quarters and several promising projects, Cirrus can expect long term, double digit growth over the next several years.

Catalysts:

- Short Term (within the year): Continued growth of iPhone 8 and X sales, which uses chips made by Cirrus.
- Mid Term (1-2 years): Acquisition of Wolfson Microelectronics in 2014 will lead to new markets and customers.
- Long Term (3+): Development of voice biometrics chip and MEMS microphone products and market.

Earnings Performance:



Cirrus Logic, Inc. has beaten eight out of their last eight quarters in earnings per share, and have beaten their revenue estimates seven times within the same time period. This is promising for Cirrus, as it shows they can consistently outperform their estimates and continue to grow within their semiconductor industry.

Cirrus released their Q2 2018 earnings on November 2nd, which showed promising growth. They beat their estimated revenue by \$15.173M, for a total reported revenue of \$425.537M. This is primarily due to increased chip sales to smartphone and tablet companies, which have increased their production in anticipation of the holiday season. Additionally, Cirrus began to distribute several of their new and work-in-progress products for testing to target customers for feedback.

Looking ahead to Q3 2018, Cirrus is expected to bring in \$510M-\$550M in revenue for the quarter, and \$1.65B for FYE 2018. As shown in the graph, their earnings are not expected to be as high as Q2 2018; however, this is an anticipated seasonality issue for the company. In fact, when Q3 and Q4 2018 earnings are compared with Q3 and Q4 2017 earnings, the 2018 earnings are higher than 2017. Regardless of the drop in earnings from Q2 2018 to Q3 2018, the quarterly company is still anticipated to continue growing year over year.

Business Description:

Cirrus Logic, Inc. is a leading producer of high performance, low-power integrated circuits for audio and voice signal applications. These semiconductors are end-user solutions for the fabrication of top smartphones, tablets, digital headsets, wearables, and emerging smart home applications. In general, Cirrus offers portable audio products and non-portable audio products. Portable audio products are high-precision and mixed-signal components designed for mobile devices, such as smartphones and tablets, and digital headsets and speakers. Non-portable audio products are high-precision and mixed signal components for consumer electronic products and applications, such as automotive and smart home applications.

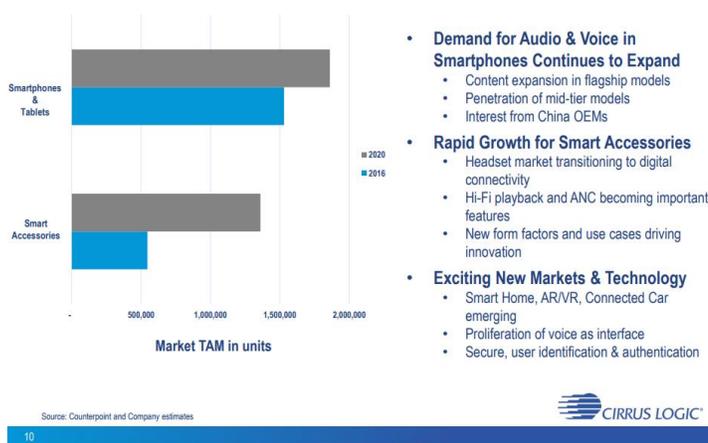
Currently, Cirrus has over 3,000 customers worldwide. These customers include Sony, Samsung, LG, Ford, and Apple. Apple is Cirrus' number one customer, and uses Cirrus' chips on a variety of their products, most notably the iPhone 8 and iPhone X. In fact, the improved sound quality on both phones is attributed to the inclusion of a Cirrus semiconductor chip. Most of the revenue generated by Cirrus is from direct sales channels in Asia, the United States, and Europe.

Industry Outlook:

Cirrus Logic, Inc. operates in the highly cyclical semiconductor industry. This industry is driven by the consumers of semiconductors, or consumer electronic companies, such as Samsung and Apple. These companies control the market through the timing of their chip purchases and technology requirements, which in turn leads to chip production capacities initially exceeding and then lagging behind the global demand for semiconductor chips. Often times, this cycle is hard to predict, and the chip manufacturers are left with excess chip inventories and softened chip prices.

Over the last year, the semiconductor chip market has been experiencing a boom in demand for chips, and chip manufacturers, such as Cirrus, have been seeing record revenues. This has been expected, as the market has been a bust since late 2015. Within the overall semiconductor chip market, Cirrus' niche market of audio and voice chips has been booming as well. In particular, the last several months have seen a great increase in chip purchases as consumer electronic companies ramp up their production for the holiday season. This seasonality effect is expected and reflected in chip manufacturers' earnings across the industry.

Opportunities in Key Markets Are Growing



The semiconductor chip market, and the chips that are used in smartphones and tablets in particular, are expected to experience this growth well into 2018. Looking further into the future, the smart phone and tablet market is expected to continue grow with the development of new products. The most significant development in the smartphone and tablet industry has been the removal of the standard headphone jack. This has caused many chip manufacturers to search for low-power, high performance solutions to connect headphones and smart devices. By 2020, the total addressable market for Cirrus is expected to be around 2 million units, a 33%

increase in market from 2016. This market expansion will be driven by the increased demand for audio and voice chips in smartphones and the development of more affordable mid-tier smartphones.

Another new and emerging market Cirrus is a player in is the smart home and car accessories market. Recently, leading car companies, such Cirrus' customer Ford, have been developing audio and voice applications for their products. This includes features such as hands free calling and other Bluetooth capabilities. Furthermore, the development of Amazon's Echo line of products is accelerating the development in this market, pushing companies to become the first to have a high performing reliable chip to sell to Amazon and other smart home companies.

Segment Analysis:

Cirrus operates in two basic product segments, portable audio products and non-portable audio and other products. Portable audio products are semiconductor chips and microphones that are used in portable electronic devices, such as smartphones, tablets, headphones, and speakers. Non-portable auto products are semiconductor chips used in smart home applications, automobiles, and any other end-user product that is not portable. Unfortunately, no individual segment margins are available due to Cirrus' revenue reporting policies. Of the two segments, portable audio is the larger and more profitable, bringing in \$1.37B for FYE 2017. Cirrus' largest segment is also is fastest growing, expanding 38.9% during FY 2017 and 33.6% in FY 2016. This growth is attributable to two factors, the implementation of Cirrus' chips in the iPhone 8 and X, and the acquisition of Wolfson Microelectronics in 2014. The acquisition of Cirrus' competitor occurred in 2014 for \$488M in cash and credit from Wells Fargo, which was paid off in 2015. Short term, the main growth driver in this segment is continued sales of the iPhone 8 and X, which are projected to continue at their 2% sales growth from last quarter. Looking long term, the development of voice biometrics, identifying an individual by their voice for security purposes, is promising, as shown by Cirrus' distribution of prototype chips to select customers this past quarter.

Cirrus' non-portable audio and other products segment has struggled over the past two years. While the segment saw 2.2% growth in FY 2015, but declined 8.4% in FY 2016. While this may seem troubling, Cirrus' overall revenue growth has compensated for this loss. Ford and Vizio are major customers for Cirrus in this segment, using Cirrus' chips in their new products. Looking into the future, the development of voice biometrics and MEMS microphones are significant growth drivers.

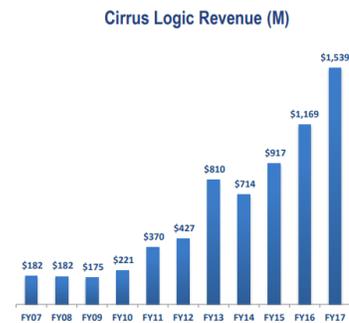
Geographically, Cirrus operates in three main segments, the United States, Europe and Asia. Of the three, Asia has seen the most significant growth over the past two years. Since FY 2015, Cirrus has expanded its revenues in Asia by 72%. This is mostly due to the boom in the semiconductor chip market and the acquisition of Wolfson in 2014. Looking ahead, Cirrus plans to continue this growth through the development of their MEMS (microelectronic-mechanical systems) Microphone product. MEMS microphones deliver low power consumption and good sound sensitivity in a small package. Cirrus is poised to become a major player in this market, as many suppliers have run into product reliability issues. To prevent this issue from happening to themselves, the company is currently investing heavily to build a supply chain in Taiwan in order to accommodate large order customers of billions of units. Since Cirrus already sells tens of millions of microphone units per year, this is an excellent market to break into due to their familiarity with the microphone market.

Revenue and EBITDA Margin Growth:

Cirrus' overall revenue and margin growth over the past three years has been impressive. Cirrus' revenue has grown 28.3%, 27.6%, and 31.6% year over year in fiscal years 2015, 2016, and 2017 respectively. Revenue growth in 2015 and 2016 is attributable to the Wolfson acquisition in 2014. In 2017, iPhone sales made up a significant amount of revenue. Most recently, iPhone sales made up 82% of Q2 2018 growth, which was an increase from 76% in Q1 2018. While this may be concerning that one customer makes up such a large portion of Cirrus' revenue, Apple products are in high demand and capture a large share of the smartphone market. Therefore, Cirrus' hedged revenue is not as risky as it seems. Furthermore, iPhone sales are projected to continue their 2% sales revenue growth, so Cirrus' revenue will grow at that rate at a minimum.

Long-Term Track Record of Growth

- 10-year CAGR of 24% fueled by strong demand for portable audio products
- FY17 revenue up 32% Y/Y to \$1.5B



Not only has Cirrus increased their revenues, but also Cirrus has increased their EBITDA margin over the past three years. In fiscal years 2015, 2016, and 2017, Cirrus increased its EBITDA margin by 46.54%, 61.88%, and 3.64% respectively. This is particularly impressive considering the fact that in late 2015 and most of 2016, the semiconductor market was in a downturn and it was hard to generate revenues. This increasing margin proves that Cirrus knows how to keep their costs low and improve their supply chain. However, the fact that 2017 EBITDA margin only increased by 3.64% suggests that there is little room for improvement in the years ahead.

| Name (BI Peers) | Mkt Cap↑ (USD) | Rev - 1 Yr Gr:Y | T12M EBITDA Mrgn:Q |
|--------------------------------|----------------|-----------------|--------------------|
| Median | 1.58B | 11.02% | 20.10% |
| (100) CIRRUS LOGIC INC | 3.55B | 31.62% | 25.36% |
| (101) ANALOG INTEGRATIONS C... | 3.35M | -4.63% | -8.59% |
| (102) SILICON TOUCH TECHNOL... | 5.03M | -21.36% | -17.50% |
| (103) SOLITRON DEVICES INC | 7.84M | -13.96% | -6.14% |

When compared to its competitors, Cirrus is the clear leader in revenue growth and trailing 12 month EBITDA margin. It seems as though Cirrus' competitors have not been able to recover from the downturn the semiconductor industry experienced.

Looking into future growth drivers, Cirrus is breaking into the emerging mid-tier smartphone market through acquiring customer that use the Android operating system, such as LG and Samsung. The mid-tier smartphone market is a potential high growth market since there is currently a transition from micro-USB connectivity to USB-C connectivity. The USB-C connectivity allows power to be supplied to headsets and accessories, which in turn increases the demand for premium audio. Additionally, voice biometrics is a segment that Cirrus believes could be as big as fingerprint identification. If so, Cirrus' demos with existing customers this past quarter is a head start in the industry, which will allow them to capture a majority of the market.

Conclusion:

As a long term buy, Cirrus Logic, Inc. will deliver double digit growth. Their continued chip sales to Apple, and improved EBITA margin will sustain their revenue growth in the short term. Furthermore, their revenue growth and T12M EBITDA margin both lead among competitors. However, the real value in this buy is long term, as the development of voice biometrics and MEMS microphones improve and continue to be tested

Cirrus Logic, Inc. (CRUS)

CENTER FOR GLOBAL FINANCIAL STUDIES

NEUTRAL

Analysis by Nick Matzelevich
11/17/2017

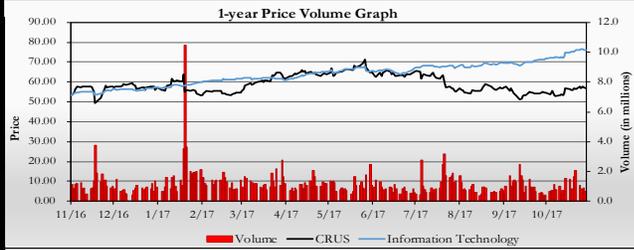
Current Price:
Divident Yield:

\$55.91
1.4%

Intrinsic Value
Target Price:

\$51.67
\$65.46

Target 1 year Return: 18.52%
Probability of Price Increase: 99%

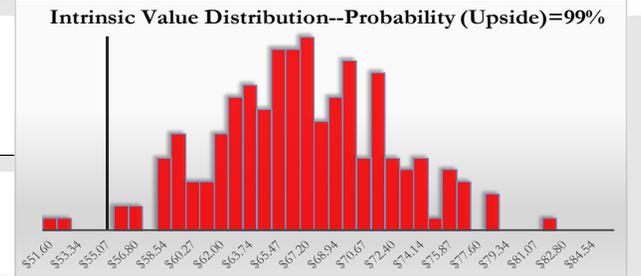


| Description | |
|--|--|
| Cirrus Logic, Inc., a fabless semiconductor company, develops, manufactures, and markets analog and mixed-signal integrated circuits (ICs) for a range of consumer and industrial markets. | |
| General Information | |
| Sector | Information Technology |
| Industry | Semiconductors and Semiconductor Equipment |
| Last Guidance | November 3, 2015 |
| Next earnings date | January 31, 2018 |
| Estimated Country Risk Premium | 10.13% |
| Effective Tax rate | 24% |
| Effective Operating Tax rate | 24% |

| Market Data | |
|---------------------------------------|------------|
| Market Capitalization | \$3,559.52 |
| Daily volume (mil) | 0.78 |
| Shares outstanding (mil) | 63.67 |
| Diluted shares outstanding (mil) | 66.89 |
| % shares held by institutions | 116% |
| % shares held by investments Managers | 82% |
| % shares held by hedge funds | 4% |
| % shares held by insiders | 0.63% |
| Short interest | 8.10% |
| Days to cover short interest | 5.50 |
| 52 week high | \$71.97 |
| 52-week low | \$49.05 |
| Volatility | 41.30% |

| Past Earning Surprises | | |
|------------------------|---------|---------|
| Quarter ending | Revenue | EBITDA |
| 9/24/2016 | 8.51% | 6.31% |
| 12/24/2016 | 5.66% | -0.69% |
| 3/25/2017 | 2.46% | -10.28% |
| 6/24/2017 | 0.23% | -3.18% |
| 9/25/2017 | 3.79% | -11.93% |
| Mean | 4.13% | -3.95% |
| Standard error | 1.4% | 3.3% |

| Peers | |
|-----------------------------------|--|
| Xilinx, Inc. | |
| Maxim Integrated Products, Inc. | |
| Cypress Semiconductor Corporation | |
| Microsemi Corporation | |
| Synaptics Incorporated | |
| Skyworks Solutions, Inc. | |
| Microchip Technology Incorporated | |
| Qorvo, Inc. | |



| Management | | |
|-----------------|------------------------------|----------------------------|
| Management | Position | Total compensations growth |
| Rhode, Jason | Chief Executive Officer, Pre | 15.36% per annum over 6y |
| Case, Thurman | CFO, Principal Accounting Of | 8.24% per annum over 6y |
| Thomas, Gregory | VP, Corporate Secretary & Ge | 5.16% per annum over 6y |
| Benson, Jo-Dee | Chief Culture Officer & VP | -100% per annum over 1y |
| Anderson, Scott | Senior VP & GM of Mixed-Sign | 4.48% per annum over 6y |
| Kaller, Roy | Vice President of Quality an | N/M |

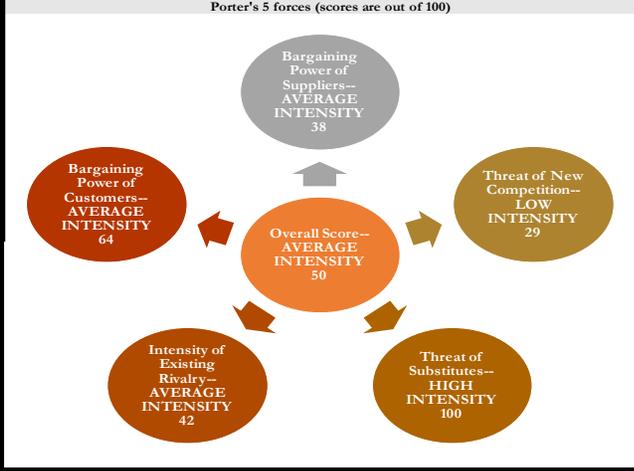
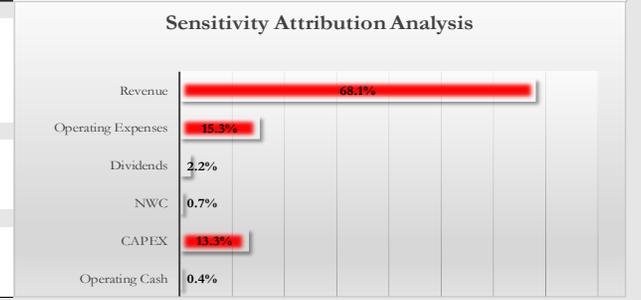
| Profitability | | |
|---------------------------|------------|-----------------------------------|
| | CRUS (LTM) | CRUS (5 years historical average) |
| Return on Capital (GAAP) | 31.1% | 17.82% |
| Operating Margin | 24% | 18.57% |
| Revenue/Capital (GAAP) | 1.32 | 0.96 |
| ROE (GAAP) | 23.4% | 11.7% |
| Net margin | 20.5% | 13.7% |
| Revenue/Book Value (GAAP) | 1.14 | 0.86 |

| Invested Funds | | |
|--------------------------|------------|-----------------------------------|
| | CRUS (LTM) | CRUS (5 years historical average) |
| Cash/Capital | 19.4% | 12.7% |
| NWC/Capital | 11.4% | 5.9% |
| Operating Assets/Capital | 52.8% | 74.2% |
| Goodwill/Capital | 16.4% | 7.2% |

| Capital Structure | | |
|---|------------|-----------------------------------|
| | CRUS (LTM) | CRUS (5 years historical average) |
| Total Debt/Market Capitalization | 0.01 | 0.06 |
| Cost of Existing Debt | 4.1% | 3.7% |
| CGFS Rating (F-score, Z-score, and default Probability) | AA | BBB |
| WACC | 13.3% | 11.8% |

| Total return to shareholders | |
|------------------------------|--------------------------|
| | 1.91% per annum over 6y |
| | 1.91% per annum over 6y |
| | 1.91% per annum over 6y |
| | 55.03% per annum over 1y |
| | 1.91% per annum over 6y |
| | N/M |

| Peers' Median (LTM) | |
|---------------------|-------|
| | 8.23% |
| | 8.31% |
| | 0.99 |
| | 4.7% |
| | 5.9% |
| | 0.81 |



| Revenue Growth Forecast | |
|-------------------------|-----|
| Base Year | 26% |
| 9/23/2018 | 8% |
| 9/23/2019 | 6% |
| 9/23/2020 | 6% |
| 9/23/2021 | 5% |
| 9/23/2022 | 5% |
| 9/23/2023 | 5% |
| 9/23/2024 | 5% |
| 9/23/2025 | 5% |
| 9/23/2026 | 4% |
| 9/23/2027 | 4% |
| Continuing Period | 4% |

| Return on Capital Forecast | |
|----------------------------|-------|
| Base Year | 24.0% |
| 9/23/2018 | 23.2% |
| 9/23/2019 | 15.6% |
| 9/23/2020 | 13.8% |
| 9/23/2021 | 12.9% |
| 9/23/2022 | 12.7% |
| 9/23/2023 | 12.5% |
| 9/23/2024 | 12.2% |
| 9/23/2025 | 12.0% |
| 9/23/2026 | 11.8% |
| 9/23/2027 | 11.6% |
| Continuing Period | 11.7% |

| NOPAT Margin Forecast | |
|-----------------------|-------|
| Base Year | 26.4% |
| 9/23/2018 | 28.4% |
| 9/23/2019 | 24.5% |
| 9/23/2020 | 24.5% |
| 9/23/2021 | 24.9% |
| 9/23/2022 | 26.3% |
| 9/23/2023 | 27.8% |
| 9/23/2024 | 29.3% |
| 9/23/2025 | 30.7% |
| 9/23/2026 | 32.2% |
| 9/23/2027 | 33.6% |
| Continuing Period | 36.2% |

| Revenue to Capital Forecast | |
|-----------------------------|------|
| Base Year | 0.91 |
| 9/23/2018 | 0.82 |
| 9/23/2019 | 0.64 |
| 9/23/2020 | 0.56 |
| 9/23/2021 | 0.52 |
| 9/23/2022 | 0.48 |
| 9/23/2023 | 0.45 |
| 9/23/2024 | 0.42 |
| 9/23/2025 | 0.39 |
| 9/23/2026 | 0.37 |
| 9/23/2027 | 0.34 |
| Continuing Period | 0.32 |

| WACC Forecast | |
|-------------------|-------|
| Base Year | 13.3% |
| 9/23/2018 | 19.7% |
| 9/23/2019 | 19.6% |
| 9/23/2020 | 19.2% |
| 9/23/2021 | 19.0% |
| 9/23/2022 | 18.7% |
| 9/23/2023 | 18.6% |
| 9/23/2024 | 18.4% |
| 9/23/2025 | 18.2% |
| 9/23/2026 | 18.1% |
| 9/23/2027 | 18.0% |
| Continuing Period | 17.8% |

| Price per share Forecast | |
|--------------------------|----------|
| Base Year | \$50.82 |
| 9/23/2018 | \$65.21 |
| 9/23/2019 | \$77.43 |
| 9/23/2020 | \$89.68 |
| 9/23/2021 | \$102.13 |
| 9/23/2022 | \$115.34 |
| 9/23/2023 | \$129.19 |
| 9/23/2024 | \$143.68 |
| 9/23/2025 | \$158.77 |
| 9/23/2026 | \$174.40 |
| 9/23/2027 | \$190.50 |

