



September 20, 2022

CURRENT PRICE: \$27.46

RATING: HOLD

PRICE TARGET: N/A

CURRENT YIELD: N/A

EPS Estimates

	DEC 21A	DEC 22E
1Q	\$0.61	\$0.44A
2Q	\$1.92	\$0.59A
3Q	\$0.48	\$0.61
4Q	\$0.42	\$0.66
	\$3.45	\$2.30

Trading Data

52-WEEK PRICE RANGE: **\$39.86-\$24.06**

SHARES OUTSTANDING: **48.7(M)**

MARKET CAP: **\$1,337(M)**

AVG. DAILY TRADING VOLUME: **0.32(M)**

S&P 500: **3,856**

Valuation Data

BOOK VALUE: **\$18.55**

PRICE TO BOOK: **1.48x**

DIVIDEND: **\$0.00**

COHU, Inc. (NSDQ: COHU)

2Q22 Earnings Results

Highlights

- 2Q22 earnings of \$0.59/share vs. \$1.92/share
- Semiconductor industry downturn impacts earnings
- Increased profit margins to 46.5%
- Hoping for 2023 turnaround in semiconductor industry
- Maintain HOLD rating

Investment Thesis

Use of integrated circuits throughout the world continues to accelerate as it finds its way into more products. A few decades integrated circuits were only associated with computers. However, their use has now spread into cellphones, automobiles, mobility items (i-Pads, Kindles, FitBit, etc.), communications, industrial robotics, solid state lighting (LED), and high-speed memory. The current annual semiconductor chip end user market size is estimated to grow to \$1 trillion by 2030. One way for investors to invest in this growth area is through shares of COHU which provides testing equipment for semiconductors.

Company Summary

COHU is headquartered in the greater San Diego Metropolitan area (Poway CA) and has 3,240 employees. Formerly known as Cohu Electronics, the company changed its name to Cohu, Inc. in 1972 and was originally founded in 1947. The company develops, manufactures, sells, and services products used by the semiconductor industry to automate the testing of integrated circuits, wafer-level packages (WLPs) and light-emitting diodes (LEDs) found in many consumer products (i.e., cellphones, automobile sensors, computers, i-pads, automobile sensors, and other products). The company is comprised of five operating units: 1) Final Test Handlers, 2) Contactors, 3) Automated Test Equipment, and 4) Inspection/Metrology & 5) Software Related Revenue.

For Important Disclosure information regarding the Firm's rating system, valuation methods and potential conflicts of interest, please refer to the last two pages of this report.

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COMPANY PRODUCTS

COHU's products include semiconductor test handling and back-end finishing systems, micro-electronic mechanical systems (MEMS) test modules, thermal subsystems for burn-in and system level test of integrated circuits (ICs), and test contactors. COHU's products are used in the back-end of the semiconductor manufacturing process by global-semiconductor manufacturers and test sub-contractors to automate the testing of ICs. This testing determines the quality of performance of the ICs prior to shipment to customers.

COHU sells "pick & place" and "thermal sub-systems" used for burn-in and system level testing. This unit sells its Matrix, Eclipse, T-Core, and Linx products to semiconductor manufacturers and test subcontractors. The ICs tested with COHU's products go into the mobile markets (phones, tablets, etc.), computing, the automotive area, and high-performance memory.

The company sells "gravity feed", "test- in-strip", and "micro-electronic mechanical systems" (MEMS) test solutions. Test handlers sold by this unit include Jupiter, Saturn, and Jaguar. ICs tested by these products are used in mobile products, "internet of things", and magnetic and pressure sensors used in automotive applications.

COHU also sells turrent-based test handling and back-end finishing equipment. This unit's products include NY20 and NX32 used for IC testing, LEDs, discrete devices, and sensors. ICs tested by these handlers are used in mobile products, internet of things (IoT), solid state lighting, portable wearable items (e.g, Apple Watches & Fitbit wrist bands), and cyber security.

High performance products, for the test contactor markets, were created in 2014 to drive growth in this sector. Growth of the test contactor market has made it vital for COHU to supply an integrated solution for power semiconductor testing in automotive, industrial, and LED markets. The company designs, manufactures, sells, and provides support for various lines of test contractor solutions. These are consumable electro-mechanical assemblies connecting the device under test, inside COHU's test handlers, and the automotive test equipment.

During the past 5 years management made a couple of acquisitions to increase product offerings & grow revenues. To this end, COHU acquired Kita Manufacturing Co. LTD, for \$15 million, which designs, manufactures, and sells spring probe contacts used in final test contactors, probe cards, and connectors sold to worldwide customers.

Additionally, COHU purchased Xcerra for approximately \$800 million in 2018. DiamondX, a product originally developed by Xcerra, expanded COHU's testing market into data storage, power management, display driver, analog, automotive, and radio frequency for the Internet of Things (IoT). This product allows testing of different semiconductors without the need for customers buying additional product testers. Management believes the addition of Xcerra and Kita's products, as well as new products developed from their respective technologies, will help grow overall revenues by offering customers the ability to lower its testing costs with COHU's products.



COHU'S MANUFACTURING FACILITIES

- Malacca, Malaysia for test handlers
- Calamba City, Laguna, Philippines for contactors & device kits
- Osaka, Japan for contactor spring pings
- Poway, CA, Kolbermoor, Germany are limited assembly and test sites
- La Chaux-de-Fonds, Switzerland, Milipitas CA, & Norwood Ma are design and testing sites
- Automated Test Equipment (ATE) manufacturing is outsourced to Jabil in Penang, Malaysia

SEMICONDUCTOR INDUSTRY'S USE OF COHU PRODUCTS:

Back-end testing includes the final test of an IC by manufacturers, or subcontractors, before end use in cellphones, computers, tablets, wearable internet products, solid state lighting products, automotive vehicles, and cybersecurity items. COHU provides test handling equipment to automate test the final test of ICs, reducing the likelihood of faulty product shipment by semiconductor manufacturers.

The problem for IC manufacturers is the more functions a chip is asked to perform, the more heat it generates which could potentially shut-down the IC and its ability to do its programmed tasks. COHU's thermal-control products controls/lowers the temperature of these multi-function chips during the testing process, solving the "heat problem", allowing the manufacturer to produce more ICs for sales to its customers. The more chips making it through the testing period is known as "increasing yield" and increases sales/profits for IC manufacturers.

MANAGEMENT'S 3-5 YEAR OPERATING GOALS

1) To grow COHU's market share in the growing test handling market and grow its business opportunities in the semiconductor end user market which is projected to grow to \$1 trillion by 2030. End user markets for COHU products include smart phones, consumer electronics, automotive, industrial, data centers, and personal computing. COHU plans to leverage its leading "handler" market position, broad product portfolio, and thermal control technology to optimize test yield and increase its market share. 2) Expand COHU's total available market share to ~\$2 billion with expansion into Wafer Level Package (WLP) probe and additional test contacting. 3) Lowering product costs and expand COHU's gross margins by seeking low-cost in-house manufacturing opportunities. 4) If COHU achieves the goals listed above, management believes it can attain annual revenues of \$1 billion and maintain gross profit margins of 46%-49%.



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Recent Earnings

COHU reported 2Q22 GAAP earnings of \$0.59/share vs. \$1.92/share during 2Q21. The decrease was due mainly to the absence of a gain (\$75.7 million) taken during 2Q21 for the sale of the company's PCB test business. The lack of a PCB test business sale gain contributed to operating expenses during 2Q22 rising to \$180.3 million from \$130.3 million. Also reducing 2Q22's expenses were lower cost of sales, which declined to \$116.3 million from \$140.2 million, when comparing the two quarters. Revenues fell to \$217.2 million from \$244.8 million due to COHU's customers reducing demand for product testing equipment due to semiconductor industry supply chain issues. Gross profit margins improved to 46.5% from 42.7% when comparing the two quarters. Q22's non-GAAP earnings decreased to \$0.81/share from \$0.89/share during 2Q21. Total non-GAAP income from operations rose to \$49.0 million from \$40.2 million and adjustments to 2Q22's GAAP results totaled \$12.1 million.

2Q22'S EARNINGS CONFERENCE CALL

During the 2Q22 earnings call management noted the gross profit margin remained around 46.5% and expects similar margins going forward into 2H22. Helping to improve margins was the increased in-house manufacturing of the company's contactor products – now at 66% with a stated goal of raising the level to 80% by YE22. Management provided 3Q22 guidance of revenues of \$198 million-\$212 million, with operating expenses of approximately \$54 million, and a tax rate of 20%.

COHU estimated test sale utilization decreased 75 basis points to approximately 84% and was not surprised by this number given the recent softness in the mobility and consumer end markets. The DiamondX installed base has doubled during the past three years expanding its market use in analog, automotive, data storage, display driver, power management, and the IoT. COHU believes this tester product can serve customers in these markets with an estimated market size of \$1.5 billion.

Management noted its COHU interface business saw greater demand from the electric vehicles market and from industrial power applications, capturing multiple systems orders for a US-base customer scaling manufacturing of silicon carbide power devices. In the Inspection & Metrology area, COHU's neon platform qualified with two new customers during 2Q22 while launching 6 new customer evaluations which should conclude during the next 3 quarters.

In the Software Services, COHU increased the penetration of its DI-Core data analytics to two new customers-both in the automotive semiconductor market and is part of a larger \$1.5 billion industrial analytics market. This market is estimated to be growing at an annual rate of 21%.

COHU believes, going forward, there will be ongoing softness in the mobility and end-users markets. However, absent a recession, they anticipate auto, industrial, and data could remain strong for the next few quarters. While not forecasting 2023, management believes there could be ramp-up in customer demand based on early customer projections and increasing wafer manufacturing capacity sometime during mid-2023. This may be driven by high-



end smartphone demand, continued growth of the automotive ADAS, electric vehicles, and strong demand from industrial and data center customers.

Our Thoughts

Overall, in our opinion, a good earnings report by COHU despite the slowdown in customer orders due to chip supply chain issues across the semiconductor industry. While GAAP and non-GAAP earnings were lower, \$0.59/share vs. \$1.92/share and \$0.81/share vs. \$0.89/share, respectively, gross profit margins rose to 46.5% from 42.7%. Furthermore, management 3Q22 guidance anticipates gross profit margin will remain around 46.5% with revenues between \$198 million - \$212 million. COHU has lowered expenses, for example, by using more in-house manufacturing, to offset the decline in customer orders resulting from the semiconductor industry's supply chain issues.

Lowering costs could set up COHU for healthy earnings growth in mid-2023, assuming revenues accelerate, based on supply chain issues dissipating for the semiconductor industry, and the avoidance of a US recession based on higher interest rates. Under this bullish earnings scenario, semiconductor companies would increase semiconductor chip purchases to place in consumer products, subsequently increasing its need for COHU's testing products. We expect a continuation of volatility in COHU's shares and recommend aggressive/speculative investors await lower entry point levels for this stock, and to see if a recession materializes in the US. We currently rate COHU a HOLD.



Risks

There are no guarantees COHU will be able to grow future earnings. Declining customer orders, increasing commodity prices, and rising operating costs could negatively affect the company's profits. Economic slowdowns, downturns in the semiconductor industry, and political change in Europe and Asia could have adverse effects on earnings. Currency fluctuations could influence earnings. New products from competitors, or changing industry trends/technology, are risks for COHU's ability to sell its products. Negative equity markets, rising interest rates, terrorist attacks, and failure to comply with the Sarbanes Oxley Act could cause a decline in COHU's share price. Given the relatively small amount of daily trading activity in COHU's stock, any increase in trading volume could significantly accelerate the volatility of its share price movement.

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COHU, Inc.
(in thousands, except per share figures)

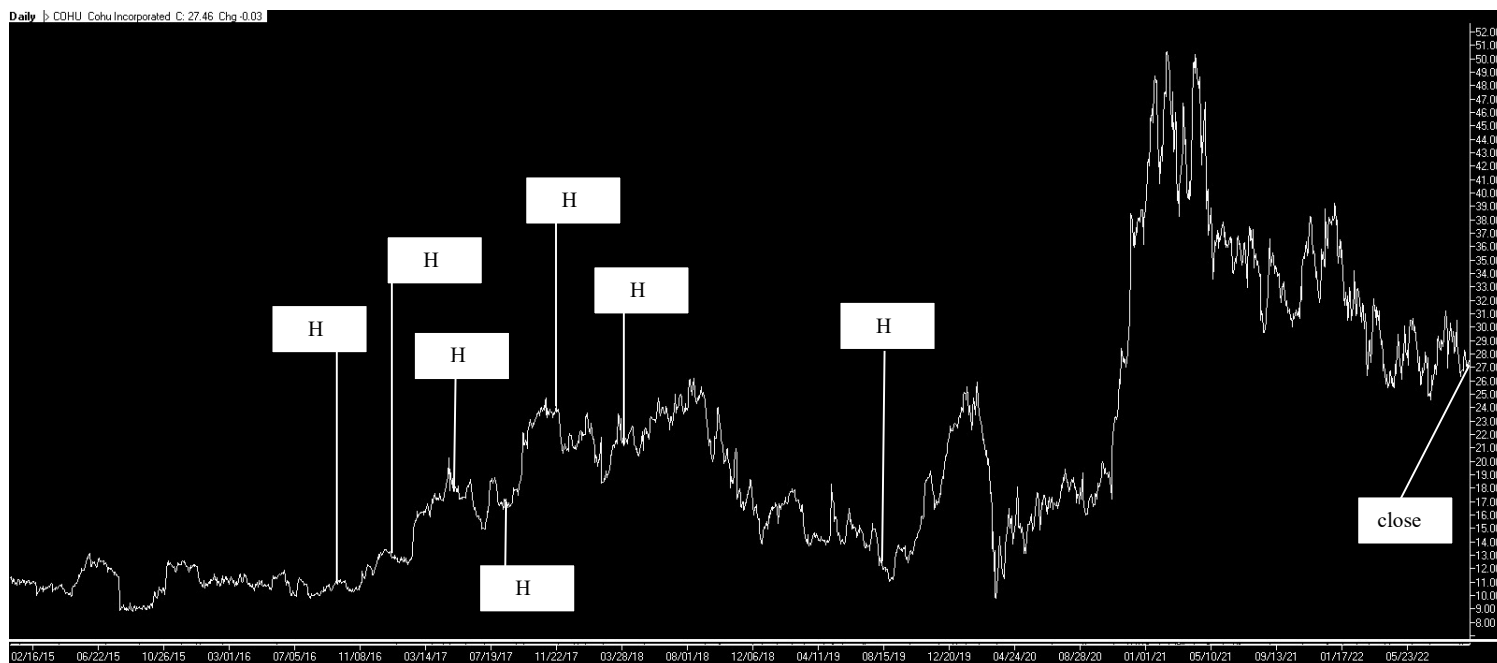
	1Q21	2Q21	3Q21	4Q21	2021	1Q22	2Q22	3Q22e	4Q22e	2022e
Revenues	\$225,488	\$244,803	\$225,063	\$191,860	\$887,214	\$197,757	\$217,226	\$215,867	\$217,658	\$848,508
Cost of Sales	123,283	140,146	129,358	107,466	500,253	106,601	116,273	115,488	114,377	452,739
Research & Development	23,152	23,423	22,792	22,596	91,963	23,106	23,160	22,927	22,969	92,162
Selling, general, & Administrative	32,739	32,834	30,377	31,123	126,958	31,246	32,531	32,156	32,318	128,251
Impairment of goodwill/assets				100	100					
Amort of purchased intangible assets	9,244	9,045	8,879	8,246	35,414	8,535	8,341	8,266	8,294	33,436
Restructuring charges	1,340	617	90	165	1,823	576	7			583
Gain on sale of PCB business		75,779		4,939	70,815					
Total costs/expenses	189,758	130,286	191,347	174,305	685,696	170,064	180,312	178,837	177,958	707,171
Gain/(loss) from Operations	35,730	114,517	33,716	17,555	201,518	27,693	36,914	37,030	39,700	141,337
Interest expense	2,575	1,831	966	1,041	6,413	981	919	928	944	3,772
Interest & other, net	50	94	53	42	239	111	308	253	319	991
Foreign transaction gain (loss)	-262	25	28	726	411	1,144	1,491	1,066	1,258	4,959
Gain on debt extinguishment	-1,761		-1,650		-3,411	-104	-128	-112	-103	-447
Gain/(loss) from Cont. operations pre-tax	31,182	112,755	31,125	17,282	192,344	27,863	37,666	37,309	40,436	143,274
Income tax/benefit	-3,575	-17,659	-7,392	3,607	-25,019	-6,294	-8,898	-7,462	-8,087	30,741
Gain/(loss) from Cont. operations	27,607	95,096	23,733	20,889	167,325	21,569	28,768	29,847	32,349	112,533
Discontinued operations										
Income from dis. Ops pre-tax										
Income (loss) from discontinued Ops.										
Net Gain/(loss)	27,607	95,096	23,733	20,889	167,325	21,569	28,768	29,847	32,349	112,533
Net income (loss) attrib. Non-contrlling int.										
Diluted earnings per s are (GAAP)	\$0.61	\$1.92	\$0.48	\$0.42	\$3.45	\$0.44	\$0.59	\$0.61	\$0.66	\$2.30
Income from Discontinued Ops.										
Non-GAAP earnings per share	\$0.89	\$0.89	\$0.70	\$0.72	\$3.20	\$0.66	\$0.81	\$0.85	\$0.91	\$3.23



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Important Disclosures



12/31/15 \$12.07 initiate with HOLD rating

Ratings-

BUY: B

HOLD: H

SELL: S

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