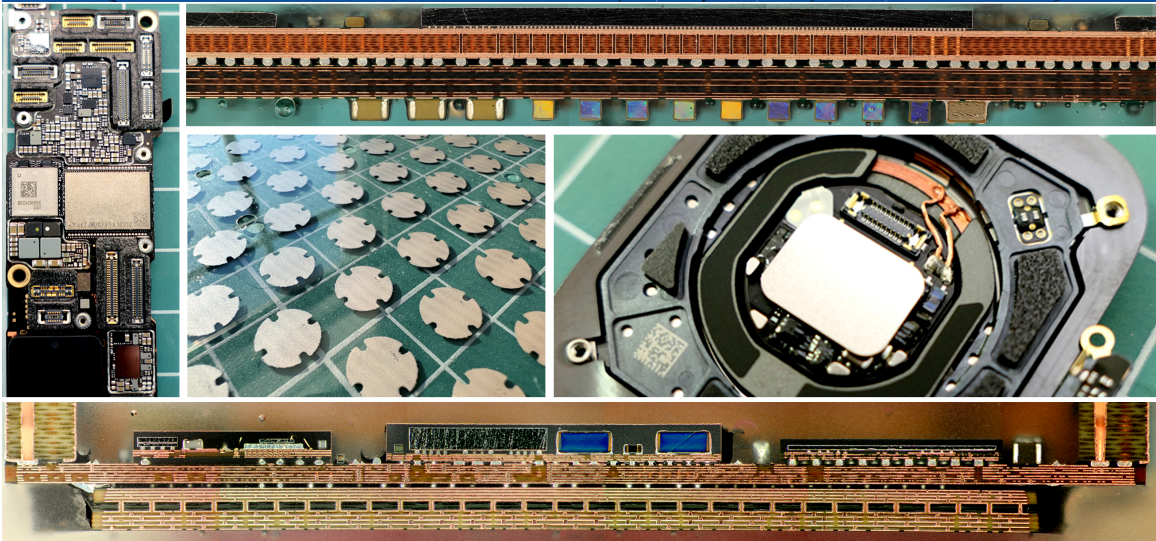


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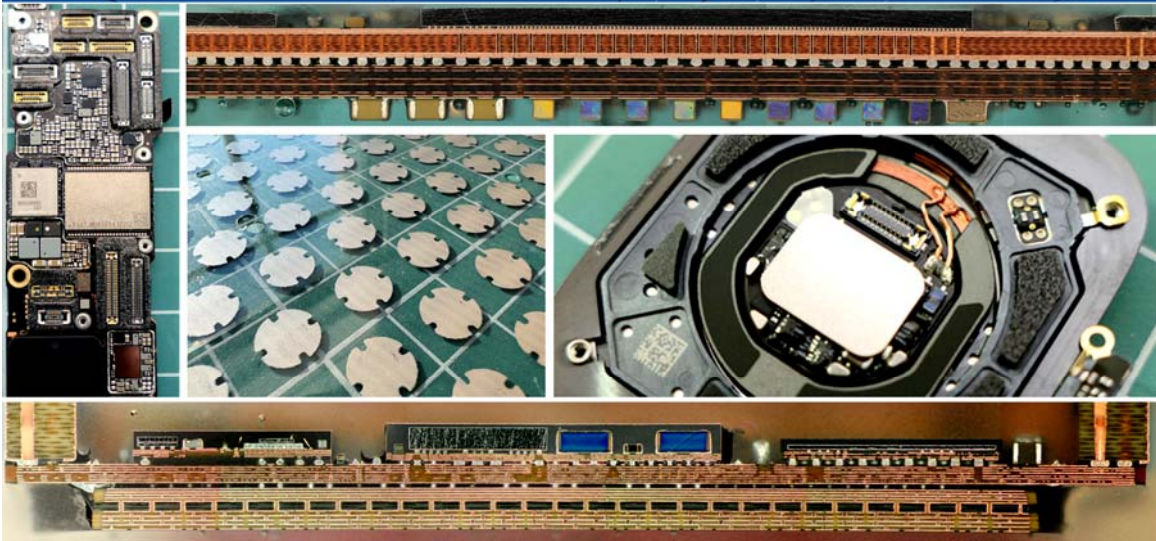
THIRD QUARTER • NOVEMBER 2023



- SUMMARY OF IMPORTANT DEVELOPMENTS IN Q3 2023
 - The forty leading PCB suppliers, which account for over one-half of industry sales, reported an aggregate YoY revenue decline in Q3 2023, grew QoQ. During the first three quarters of 2023, revenues for these 40 companies fell compared to the same period in 2022.
 - Weak demand, oversupplied inventories, and steep price erosion continue to pose significant challenges across the PCB industry, particularly in the package substrate segment.
 - While Q3 was another difficult quarter for the PCB industry as a whole, there were some signs of modest recovery heading into 2024
 - Only eight of the top 40 PCB companies reported positive YoY growth in Q3.
 - Altogether, the global bare board PCB market is estimated to have increased QoQ, but declined YoY.
 - Based on current trends, Prismark forecasts the PCB market to decline in value terms in 2023. In terms of board area, we project a more modest decline
 - The PCB market is likely to return to positive YoY growth against a low baseline by Q1 2024. However, given current projections for weak global economic growth in 2024, Prismark still does not anticipate a significant recovery for the PCB industry in 2024.
 - Prismark's five-year outlook has not changed from our previous report — PCB production value is forecasted to expand from 2022 to 2027, equating to a modest five-year compound annual growth
- This report provides:
 - An assessment of the geopolitical and economic trends and their impact on the global economy, electronics industry, and PCB market.
 - Comprehensive data and analysis of the PCB market, showing revised forecasts for 2023, 2024, and 2027 by PCB technology and region of production.
 - A detailed discussion of the HDI board technology.

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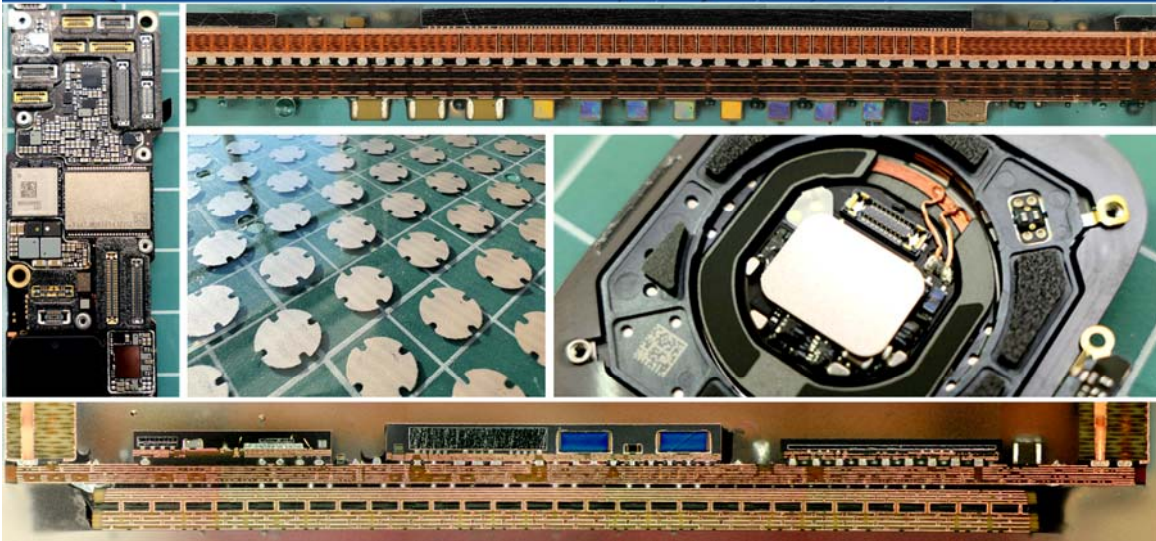
SECOND QUARTER • AUGUST 2023



- SUMMARY OF IMPORTANT DEVELOPMENTS IN Q2 2023
- The forty leading PCB suppliers, which account for over one-half of industry sales, reported an aggregate YoY revenue decline of 20.9% in 1H 2023 (-2.9% QoQ).
- The reasons for the PCB market's 1H downturn included:
 - Falling demand across all segments of the PCB market
 - The ongoing clearance of oversupplied inventory channels
 - ASP erosion across all product segments, with particularly severe price declines for HDI, FPC, and package substrates
 - Continued soft demand in PC, smartphone, and consumer electronics markets and slowing growth in the server and infrastructure markets
- Altogether, the global bare board PCB market is estimated to have declined to \$16.5Bn in Q2 2023 – representing a -1.7% change from Q1 2023 and -19.3% from Q2 2022.
- Based on current trends, Prismark forecasts the PCB market to decline by 15.0% in value terms in 2023. In terms of board area, we project a more modest decline of -4.8%.
- Along with collapsing revenues, the PCB industry experienced a significant decline in profitability in the first half of the year. Aggregate gross margins for the leading public PCB companies fell by more than 5% YoY, from 22.6% in 1H 2022 to 17% in 1H 2023. Aggregate net profits, meanwhile, fell by -65.5% YoY.
- The PCB industry has entered a period of capex retrenchment following the record-breaking investment spree of the past two years. The aggregate capex of the leading public PCB companies fell by -12.6% YoY compared to 1H 2022.
- This report provides:
 - An assessment of the geopolitical and economic trends and their impact on the global economy, electronics industry, and PCB market.
 - Comprehensive data and analysis of the PCB market, showing revised forecasts for 2023 and 2027 by PCB technology and region of production.
 - A detailed discussion of the flexible circuit market technology.

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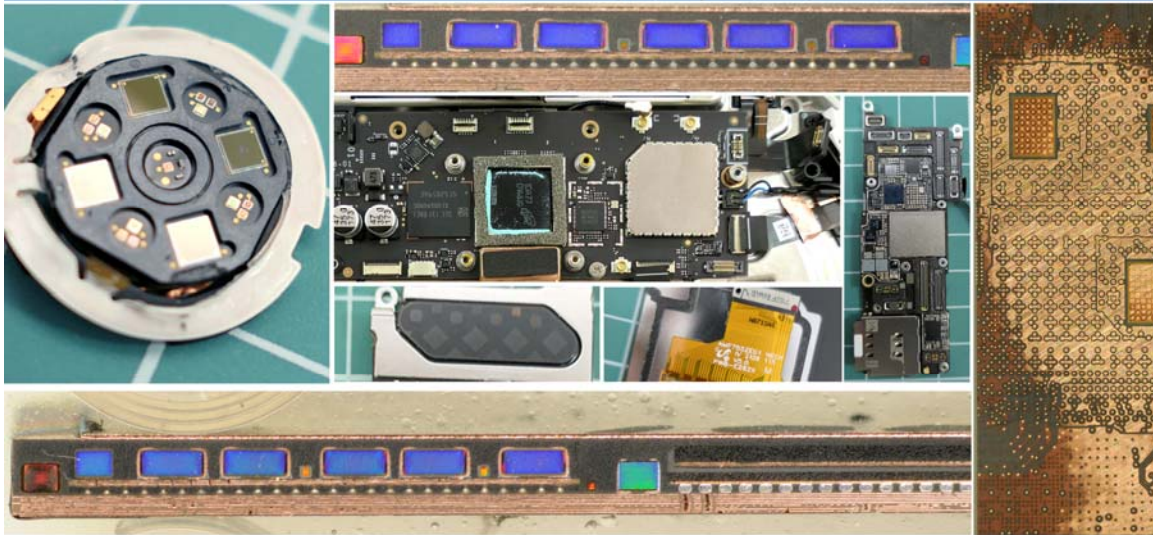
FIRST QUARTER • MAY 2023



- The forty leading PCB suppliers, which account for over one-half of industry sales, reported an aggregate YoY revenue decline of 20.4% in Q1 2023. Compared to Q4 2022, aggregate Q1 2023 revenues decreased 19.6%.
- The reasons for the PCB market's Q1 downturn included:
 - Falling demand across all segments for PCB market, including the advanced substrate market, which was the key growth driver for the overall market in 2021 and 2022
 - The ongoing clearance of oversupplied inventory channels
 - Continued soft demand in PC, smartphone and consumer electronics market and slowing growth in the server and infrastructure markets
 - Seasonality issues and lack of new product introductions pushed back the industry recovery
- Altogether, the global bare board PCB market is estimated to have declined to \$16.8Bn in Q1 2023 – representing a -13.1% change from Q4 2022 and -20.3% from Q1 2022. These numbers reflect a severe slowdown in the PCB market's growth trajectory relative to previous quarters.
- Following a weak performance in Q4 2022, the PCB market sustained its downward trend in Q1 2023, demonstrating weakness across all segments. Based on current trends, Prismark forecasts the PCB market to decline by 9.3% in value terms in 2023. In terms of board area, we project a more modest decline of 4.9%.
- Prismark has downgraded PCB area growth in 2022 and now estimates negative volume growth in every regional PCB market, except for the US (+0.8%). Owing to weak demand and low utilization rates, Prismark's global PCB production area estimate for 2022 has been revised down to 421.5M m², which represents a drop of 9.2% from 2021. Prismark has also downgraded its 2022 volume growth estimate for Japan (from -2.3% to -4.6%), China (from -9.8% to -10.2%), and Asia (from -5.7% to -6.4%).
- This report also includes the third edition of Prismark's top 100 PCB company rankings. Zhen Ding, Unimicron, and Dongshan Precision maintained their positions as the top 3 global PCB suppliers in 2022.
- The PCB industry set another record for capex and net profits in 2022. The top 40 PCB shops spent over \$9.3Bn, up 7.9% from 2022, to expand capacities and upgrade processing capabilities. In the meantime, the top 40 PCB shops earned \$6.7Bn in net profits in 2022, up 35% from 2021.
- This report provides:
 - An assessment of the geopolitical and economic trends and their impact on the global economy, electronics industry, and PCB market.
 - Comprehensive data and analysis of the PCB market, showing revised estimation of 2022 and forecasts for 2023 and 2027 by PCB technology and region of production.
 - A detailed discussion of developments in the multilayer board market and technology.

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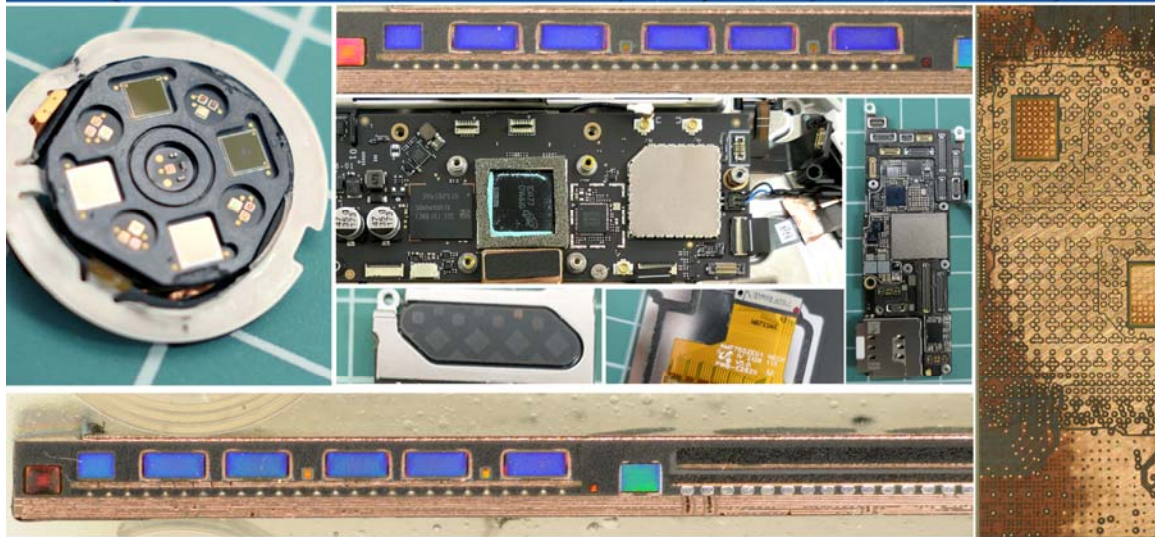
FOURTH QUARTER • FEBRUARY 2023



- The forty leading PCB suppliers, which account for over one-half of industry sales, reported an aggregate YoY revenue decline of 12.8% in Q4 2022. Compared to Q3 2022, aggregate Q4 2022 revenues decreased 7.4%. Revenues for the full year 2022 grew by 4% relative to 2021.
- The reasons for the PCB market's Q4 downturn included:
 - Slowing volume demand for package substrates and sudden ASP declines for both ABF and BT substrates
 - Continued deterioration in conventional rigid PCB value due to persistent weak demand for PCs, handsets, and consumer electronics
 - Weakening FPC demand mainly due to the contraction of the Chinese smartphone market and weaker-than-expected performance by Apple
 - Currency depreciation relative to the US dollar further impacted the performance of many suppliers based outside the US
- Altogether, the PCB market is estimated to have declined to \$19.3Bn in Q4 2022 – representing a -7.7% change from Q3 2022 and -14.6% from Q3 2021. These numbers reflect a severe slowdown in the PCB market's growth trajectory relative to previous quarters.
- Following a surprisingly strong performance in Q3, the PCB market began to show significant weakness in Q4, with every segment, including the previously resilient substrate market, yielding negative growth. Accordingly, Prismark has downgraded its aggregate estimate for the 2022 PCB market, with sales expected to grow by 1.0%, compared to the previous forecast of 2.9%.
- Prismark now estimates negative growth in every regional PCB market, except the US (+3.8%) and Asia – ex. China and Japan (+5.9%). The Chinese market—previously projected to grow by 0.1%—is now estimated to have declined by 1.4% due to steep cuts in rigid board production. Prismark has also downgraded its 2022 growth estimate for Japan (from +3.7% to -0.4%) and Europe (-1.8% to -5.9%). Prismark's estimate for the US PCB market improved (+2.6% to +3.8%) due primarily to increasing demand from military end-users.
- This report provides:
 - An assessment of the geopolitical and economic trends (inflation and monetary tightening, US export controls, Ukraine conflict) and their impact on the global economy, electronics industry, and PCB market.
 - Comprehensive data and analysis of the PCB market, showing forecasts for 2022 and 2027 by PCB technology and region of production.
 - A detailed discussion of developments in the Package Substrates market and technology.

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THIRD QUARTER • NOVEMBER 2022



- The forty leading PCB suppliers, which account for over one-half of industry sales, reported aggregate YoY revenue growth of 3.2% in Q3 2022. Compared to Q2 2022, aggregated Q3 2022 revenues increased 11.0%. Revenues for the first three quarters of 2022 increased by 11.3% over the same period in 2021.
- The key growth drivers for the PCB market in Q3 included:
 - Resilient demand for packaging substrates, reflected by strong performances by Unimicron, Nan Ya, Kinsus, AT&S, Simmtech, and Daeduck.
 - Apple's outstanding Q3 demand, which boosted sales for its key PCB suppliers, including Zhen Ding, Dongshan Precision, Compeq, FLEXium, and AKM Meadville.
 - Exceptional growth performances by a handful of FPC companies, including BH, Sumitomo Electric Industries, and Career Technology.
 - Acquisition-driven revenue growth (TTM, Summit, and Olympic)
- Altogether, the PCB market is estimated to have reached \$21.18Bn in Q3 2022 – up 3.6% from Q2 2022, but down 1.7% from Q3 2021. These numbers reflect a significant slowdown in the PCB market's growth trajectory relative to previous quarters.
- The PCB market outperformed expectations by a substantial margin in Q3, despite increasing signs of an impending global economic slowdown. Prismark has upgraded its aggregate forecast for the 2022 PCB market, with sales expected to grow by 2.9%, compared to the previous forecast of 1.5%.
- Prismark now projects positive growth in every regional PCB market, except Europe (-1.8%). The Chinese market—previously projected to decline by 1.2%—is now forecast to grow by 0.1% due to higher-than-anticipated HDI and FPC production. Prismark has also upgraded its 2022 growth forecast for the Americas (+2.6%) and Japan (+3.7%).
- In this report:
 - An assessment of the geopolitical backdrop (inflation and monetary tightening, US export controls, Ukraine conflict, China's COVID policy adjustments) and their impact on the global economy, electronics industry, and PCB market.
 - Comprehensive data and analysis of the PCB market, showing forecasts for 2022 and 2026 by PCB technology and region of production.
 - A detailed discussion of developments in the HDI market and technology.



*CONSULTANTS TO THE ELECTRONICS INDUSTRY
BUSINESS OPPORTUNITY FROM TECHNOLOGY AND
MARKET CHANGES*

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