The Bishop Report
Performance and Forecast of the World Connector Industry

Issue No. 372 | 4th Quarter 2023 | October 2023

Connector Demand Soft
Bishop Lowers 4Q Forecast

Regional Performance:
World sales declined -2.6% YTD in September but Europe achieved growth of +3.6%.

Worldwide, orders were down -9.0% YTD. Japan had the worst performance at -16.3%.

2023 Outlook:
YOY world sales through Q3 2023 are $62.3 million, down -4.7%. Bishop is forecasting 2023 to be $81.6 million, down -3.0%.

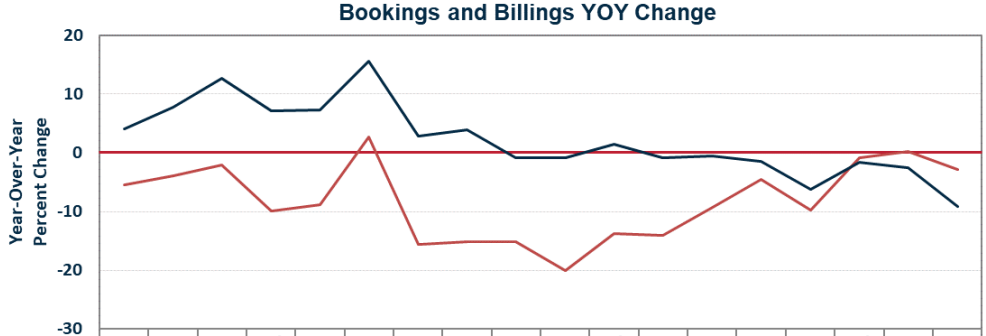
Industry Backlog:
September's backlog was $21,465 million (13.4 weeks).

2023 Currency Impact:
The industry registered a positive year-over-year increase in September, up +0.1% YTD in local currencies.

NEW BISHOP RESEARCH REPORT
Connector Types and Technologies Poised for Growth

September bookings were down -2.8% YOY. Billings were down -9.2% YOY. The backlog in September declined slightly to $21,465 million or 13.4 weeks.

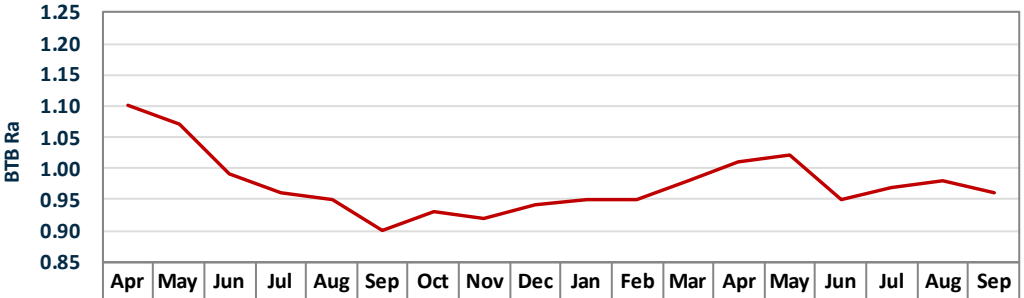
Bookings and Billings YOY Change



	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23
Bookings	-5.5	-3.9	-2.1	-9.9	-8.8	2.6	-15.6	-15.2	-15.1	-20.1	-13.8	-14.0	-9.3	-4.6	-9.8	-0.8	0.2	-2.8
Billings	4.1	7.7	12.7	7.1	7.3	15.5	2.8	3.9	-0.9	-0.8	1.40	-0.9	-0.6	-1.4	-6.2	-1.7	-2.5	-9.2

The book-to-bill ratio in September and YTD was 0.96.

Connector Industry Book-to-Bill



	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23
BtB	1.10	1.07	0.99	0.96	0.95	0.90	0.93	0.92	0.94	0.95	0.95	0.98	1.01	1.02	0.95	0.97	0.98	0.96

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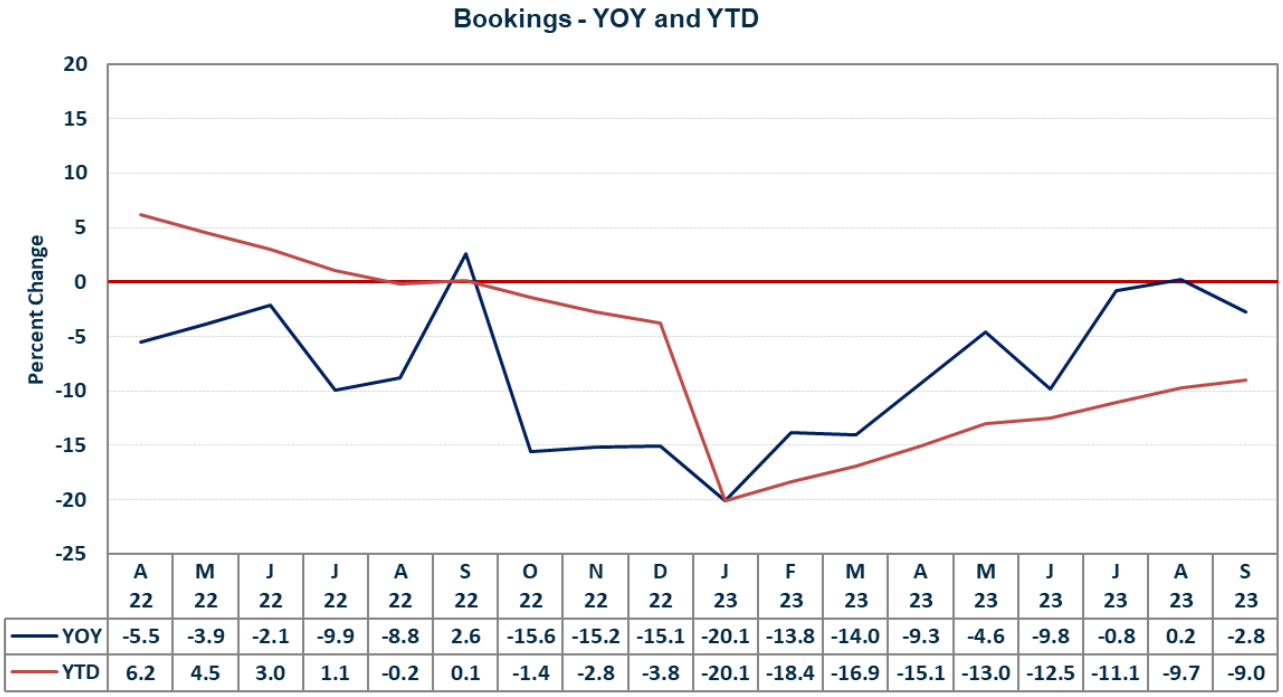
Booking Highlights and Conclusions

Sequential, Year-Over-Year, and Year-To-Date Bookings Percentage Change – 2021/2022/2023

	Sequential			Year-Over-Year			Year-To-Date		
Month	2021	2022	2023	2021	2022	2023	2021	2022	2023
Jan	2.3%	2.6%	-3.2%	24.7%	15.9%	-20.1%	24.7%	15.9%	-20.1%
Feb	17.7%	10.4%	14.4%	38.9%	8.7%	-13.8%	32.0%	12.0%	-18.4%
Mar	-3.5%	-5.3%	-1.8%	34.5%	7.1%	-14.0%	32.8%	10.3%	-16.9%
Apr	3.2%	-8.5%	-3.5%	81.9%	-5.5%	-9.3%	42.9%	6.2%	-15.1%
May	5.1%	7.0%	12.1%	86.4%	-3.9%	-4.6%	50.5%	4.5%	-13.0%
Jun	-8.3%	-6.7%	-11.6%	59.7%	-2.1%	-9.8%	51.9%	3.0%	-12.5%
Jul	-1.9%	-9.6%	-0.6%	36.4%	-9.9%	-0.8%	49.6%	1.1%	-11.1%
Aug	6.6%	8.0%	9.3%	32.5%	-8.8%	0.2%	47.1%	-0.2%	-9.7%
Sep	-11.9%	-1.0%	-4.1%	19.1%	2.6%	-2.8%	43.7%	0.1%	-9.0%
Oct	6.8%	-12.1%		22.1%	-15.6%		41.2%	-1.4%	
Nov	9.3%	9.8%		15.3%	-15.2%		38.2%	-2.8%	
Dec	-7.0%	-6.8%		15.5%	-15.1%		36.0%	-3.8%	



	A 22	M 22	J 22	J 22	A 22	S 22	O 22	N 22	D 22	J 23	F 23	M 23	A 23	M 23	J 23	J 23	A 23	S 23
YOY	-5.5	-3.9	-2.1	-9.9	-8.8	2.6	-15.6	-15.2	-15.1	-20.1	-13.8	-14.0	-9.3	-4.6	-9.8	-0.8	0.2	-2.8
YTD	6.2	4.5	3.0	1.1	-0.2	0.1	-1.4	-2.8	-3.8	-20.1	-18.4	-16.9	-15.1	-13.0	-12.5	-11.1	-9.7	-9.0

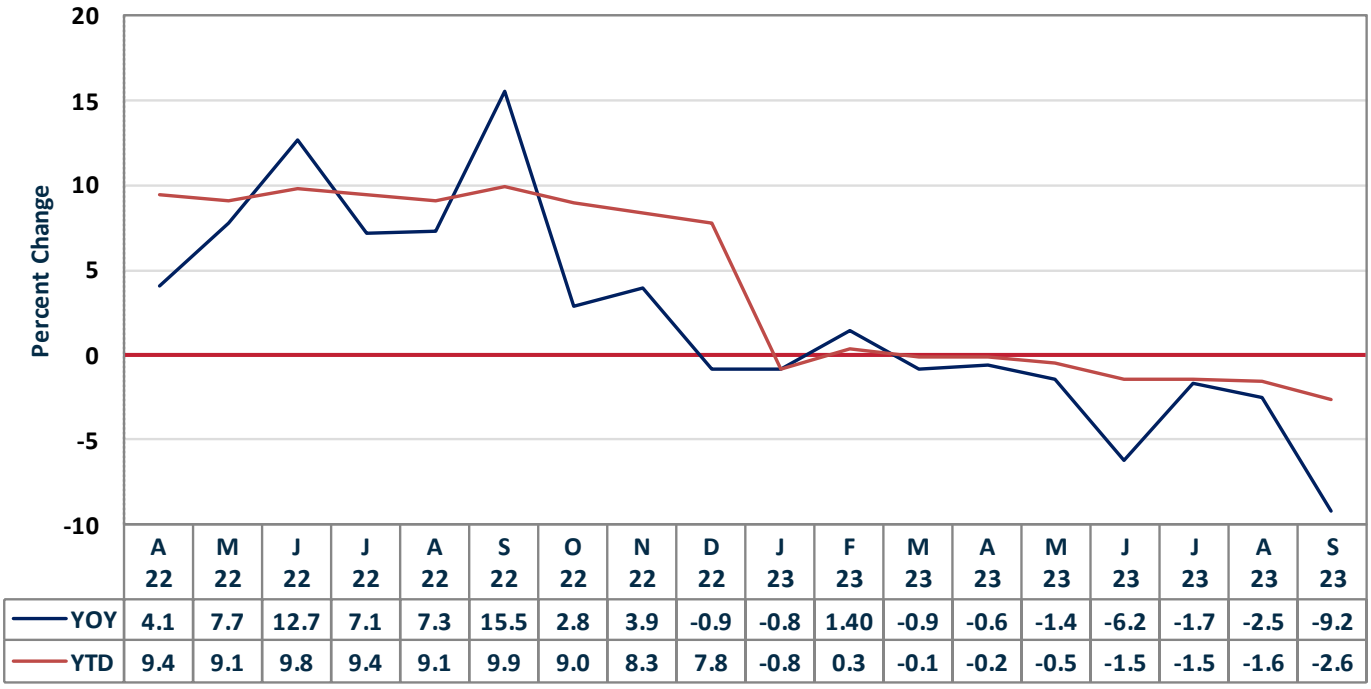
- September bookings decreased -2.8% YOY and were down -9.0% YTD.
- Orders declined -4.1% sequentially.
- The book-to-bill ratio in September was 0.96.

Billing Highlights and Conclusions

Sequential, Year-Over-Year, and Year-To-Date Billings Percentage Change – 2021/2022/2023

	Sequential			Year-Over-Year			Year-To-Date		
Month	2021	2022	2023	2021	2022	2023	2021	2022	2023
Jan	-1.6%	-4.3%	-4.4%	19.0%	12.4%	-0.8%	19.0%	12.4%	-0.8%
Feb	12.6%	11.4%	13.9%	26.7%	11.2%	1.4%	22.9%	11.8%	0.3%
Mar	-1.1%	-2.0%	-4.4%	25.5%	10.2%	-0.9%	23.8%	11.2%	-0.1%
Apr	-1.2%	-6.6%	-6.3%	49.5%	4.1%	-0.6%	29.4%	9.4%	-0.2%
May	7.0%	10.7%	10.7%	47.1%	7.7%	-1.4%	32.8%	9.1%	-0.5%
Jun	-3.8%	0.7%	-4.7%	33.5%	12.7%	-6.2%	33.0%	9.8%	-1.5%
Jul	-2.0%	-7.1%	-2.5%	20.6%	7.1%	-1.7%	31.0%	9.4%	-1.5%
Aug	8.7%	8.9%	8.0%	21.5%	7.3%	-2.5%	29.7%	9.1%	-1.6%
Sep	-2.3%	5.1%	-2.1%	19.4%	15.5%	-9.2%	28.2%	9.9%	-2.6%
Oct	-3.4%	-14.0%		15.3%	2.8%		26.8%	9.1%	
Nov	9.4%	10.6%		12.8%	3.9%		25.2%	8.6%	
Dec	-5.6%	-10.0%		15.5%	-0.9%		24.3%	7.8%	

Billings - YOY and YTD



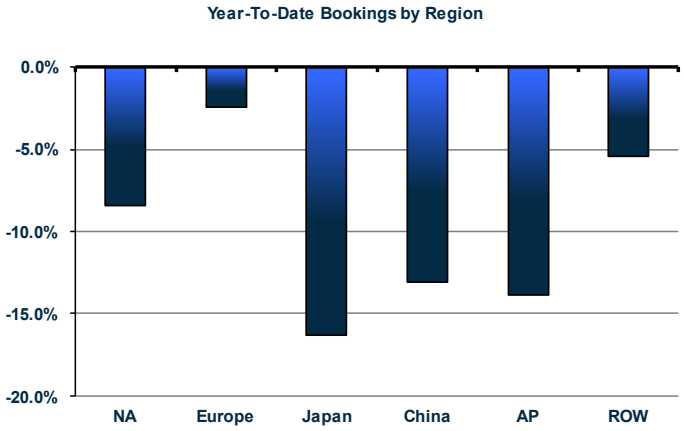
	A 22	M 22	J 22	J 22	A 22	S 22	O 22	N 22	D 22	J 23	F 23	M 23	A 23	M 23	J 23	J 23	A 23	S 23
YOY	4.1	7.7	12.7	7.1	7.3	15.5	2.8	3.9	-0.9	-0.8	1.40	-0.9	-0.6	-1.4	-6.2	-1.7	-2.5	-9.2
YTD	9.4	9.1	9.8	9.4	9.1	9.9	9.0	8.3	7.8	-0.8	0.3	-0.1	-0.2	-0.5	-1.5	-1.5	-1.6	-2.6

- September billings decreased -9.2% YOY and -2.6% YTD.
- Sequentially, billings declined -2.1% in September.

Regional Performance: BOOKINGS

September 2023 Bookings

Region	Sequential	YOY	YTD
NA	-3.5%	2.6%	-8.4%
Europe	-6.5%	-5.0%	-2.4%
Japan	2.3%	-8.1%	-16.3%
China	-1.7%	-5.2%	-13.1%
AP	-10.5%	-2.9%	-13.8%
ROW	4.3%	2.3%	-5.4%
Total	-4.1%	-2.8%	-9.0%

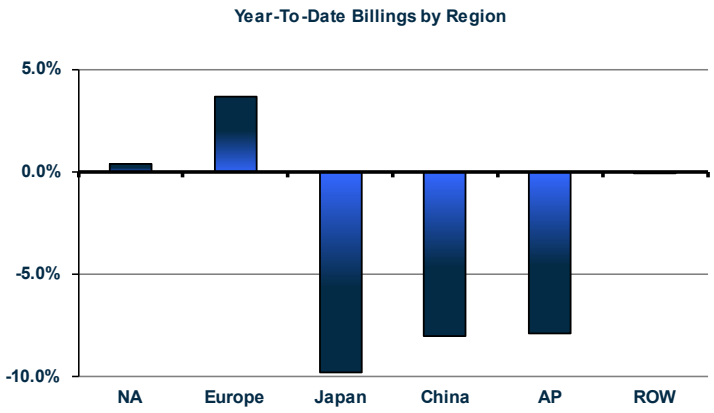


- September bookings decreased -2.8% YOY.
- YOY orders increased in North America and ROW.
- All regions have negative YTD results.
- Japan's YOY bookings decreased the most at -8.1%.
- Japan and ROW were the only regions to see sequential improvement.
- The book-to-bill ratio was 0.96.

Regional Performance: BILLINGS

September 2023 Billings

Region	Sequential	YOY	YTD
NA	-3.7%	-7.6%	0.3%
Europe	-2.3%	-5.0%	3.6%
Japan	1.0%	-13.5%	-9.8%
China	-0.9%	-13.2%	-8.1%
AP	-1.0%	-11.7%	-7.9%
ROW	-4.6%	-10.3%	0.0%
Total	-2.1%	-9.2%	-2.6%



- August connector sales decreased -3.4% YOY.
- All regions grew sequentially.
- All regions contracted YOY except Europe.
- YTD, North America, Europe, and ROW remain positive.

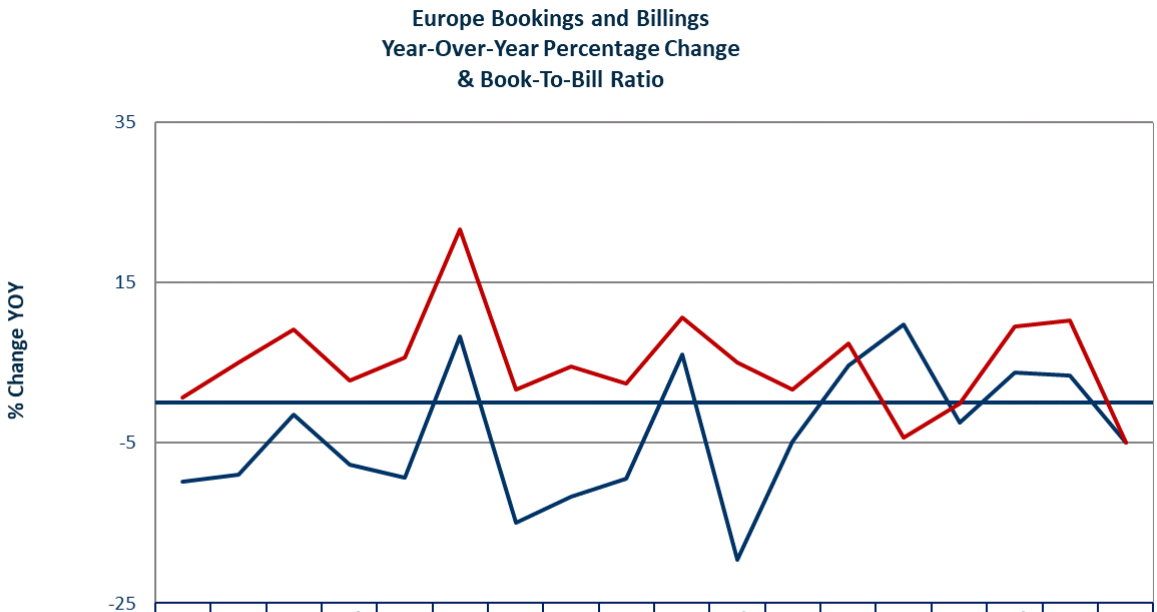
North America: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill (BTB) ratio is also displayed.

	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23
Bookings	3.5	13.0	4.0	-6.7	-5.0	4.6	-11.8	10.1	-2.2	-7.6	0.7	-15.9	-13.2	-3.0	-16.0	-0.4	-0.6	2.6
Billings	14.8	20.8	18.6	15.9	13.8	21.6	9.4	11.1	4.2	8.0	2.0	1.5	-1.7	7.8	-1.3	-0.9	-3.0	-7.6
Billing SEQ	-7.2	14.5	-6.6	-3.9	12.7	1.2	-13.9	9.4	-8.0	-3.6	12.4	-5.1	-5.9	24.9	-14.1	-3.4	10.3	-3.7
BTB	1.11	1.06	1.04	0.94	0.95	0.87	0.94	0.91	1.00	0.96	0.98	0.95	0.95	0.94	0.87	0.94	0.97	0.97

North America Performance

- In September, there was a -7.6% decrease in sales compared to the same period last year, while orders saw a 2.6% year-over-year increase. Sequentially, North American billings declined by -3.7%. The book-to-bill ratio was 0.97.
- The US inflation rate remained unchanged in September at 3.7%. Recall that inflation peaked in June 2022 at 9.1%.
- Industrial production grew 0.3% YOY in September. Manufacturing output rose 0.4% in September.
- Manufacturing PMI increased to 49.0 in September.
- US unemployment was stable in September at 3.8%
- Retail sales were up 3.8% YOY in September.
- Housing starts increased to 1358 units in September from 1269 units in August - a 7% increase sequentially.
- US new vehicle sales in September increased 18.5% YOY.
- Consumer confidence declined modestly for the third straight month to 102.6 in October from 104.3 in September according to the Conference Board.

Europe: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.

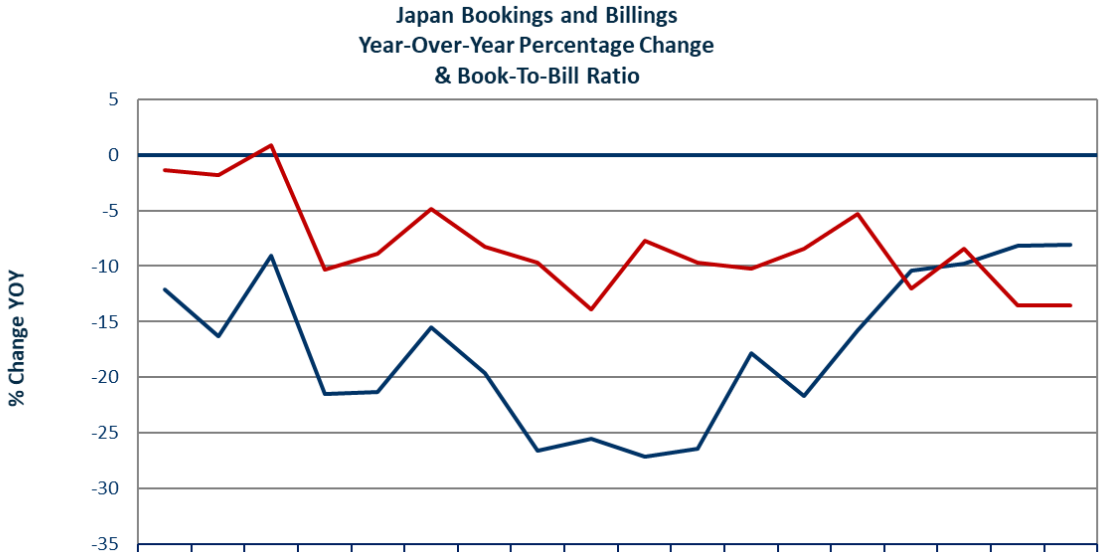


	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23
Bookings	-9.8	-9.0	-1.5	-7.7	-9.3	8.3	-15.0	-11.7	-9.4	6.0	-19.6	-4.8	4.6	9.8	-2.5	3.8	3.4	-5.0
Billings	0.6	5.0	9.1	2.8	5.6	21.7	1.6	4.5	2.4	10.7	5.0	1.7	7.4	-4.4	-0.1	9.5	10.3	-5.0
Billing SEQ	-13.1	15.9	-2.9	-11.3	11.9	13.1	-22.8	16.0	-10.9	5.6	14.5	-8.0	-5.1	3.1	1.5	-3.1	12.8	-2.3
BTB	1.10	1.06	1.02	1.02	0.96	0.87	0.97	0.97	1.00	0.99	0.96	1.06	1.07	1.21	0.99	0.97	0.90	0.86

Europe Performance

- Year-over-year, both bookings and billings saw a reversal in trend, declining by -5.0%. This resulted in a weakened book-to-bill ratio of 0.86. Sequentially, sales experienced a -2.3% decline.
- Euro Area industrial production increased 0.6% YOY in August, reversing the trend after five consecutive monthly declines.
- The Eurozone Manufacturing PMI fell to 43 in October 2023 from 43.4 in September, the lowest in three months.
- The Euro fell 1.2% in August.
- The Euro Area annual inflation rate was 4.3% in September 2023, down from 5.2% in August. A year earlier, the rate was 9.9%.
- The unemployment rate remained at 6.4% in August.
- Euro zone consumer confidence is -17.9 in September.

Japan: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.

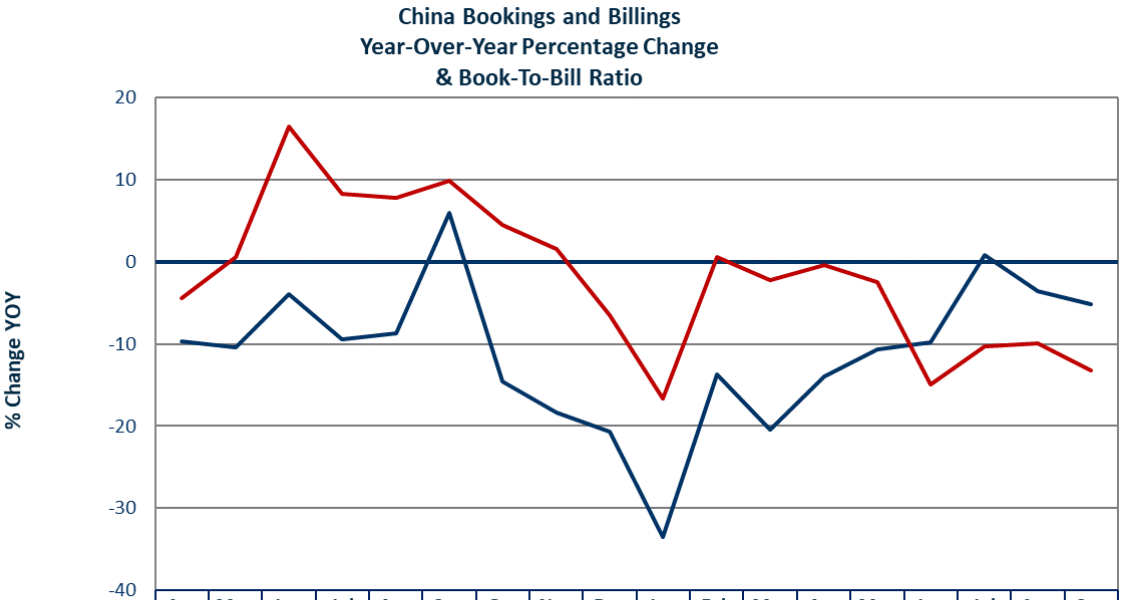


	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23
Bookings	-12.1	-16.3	-9.1	-21.5	-21.3	-15.5	-19.6	-26.6	-25.5	-27.1	-26.4	-17.8	-21.7	-15.8	-10.4	-9.8	-8.2	-8.1
Billings	-1.4	-1.8	0.9	-10.3	-8.9	-4.9	-8.3	-9.7	-13.9	-7.7	-9.7	-10.2	-8.4	-5.3	-12.0	-8.4	-13.5	-13.5
Billing SEQ	-5.0	-0.2	4.9	-9.7	7.0	0.9	-7.2	8.1	-8.9	-4.7	12.6	-5.5	-2.5	2.7	-2.4	-6.1	1.0	1.0
BTB	1.09	1.05	0.99	1.02	0.95	0.96	1.01	0.94	0.99	0.92	0.94	0.99	0.93	0.93	1.01	1.01	1.01	1.02

Japan Performance

- In September, bookings decreased by -8.1%. Year-over-year, sales declined significantly by -13.5%, but sequentially, they increased by 1.0%. Japan's book-to-bill ratio showed a slight improvement, reaching 1.02.
- The inflation rate in September dropped to 3.0% from 3.2% the prior month.
- In September, the yen hit an 11-month low against the dollar.
- Industrial production in Japan fell by 4.6% year-on-year in September 2023, coming after a 4.4% drop in August and marking the third straight month of decline.
- Retail sales in Japan rose 5.8% year-on-year in September 2023, slowing from a 7% increase seen both in July and August and roughly in line with forecasts for a 5.9% gain.
- Exports from Japan rose by 4.3% YOY to JPY 9,198.14 billion in September 2023, growing for the first time since June and reaching a record high level.
- Japan’s manufacturing PMI was revised upward to 48.7 in October 2023 from a flash figure and September’s 7-month low of 48.5.
- Housing starts were up 3.3% sequentially in August.
- The consumer confidence index in Japan increased to 35.7 in October of 2023 from September’s six-month low of 35.2.
- Japan’s unemployment rate fell to 2.6% in September 2023 from 2.7% in August.

China: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.

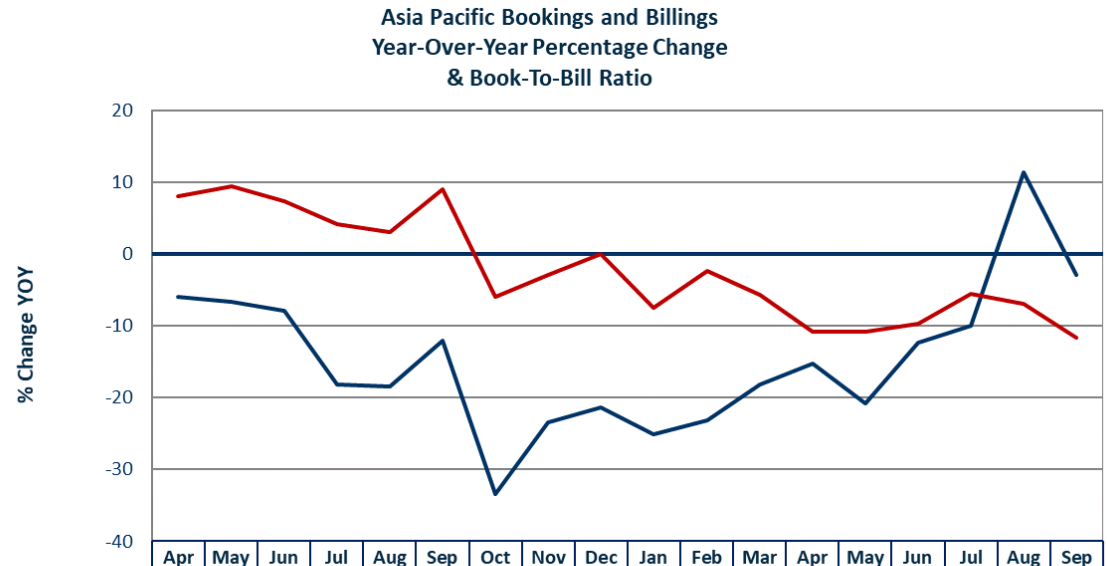


	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23
Bookings	-9.7	-10.4	-4.0	-9.4	-8.7	6.0	-14.6	-18.4	-20.7	-33.5	-13.7	-20.5	-14.0	-10.7	-9.8	0.8	-3.6	-5.2
Billings	-4.4	0.6	16.5	8.3	7.8	9.9	4.5	1.6	-6.5	-16.7	0.6	-2.2	-0.4	-2.5	-15.0	-10.3	-9.9	-13.2
Billing SEQ	-15.4	10.3	12.5	-6.6	5.2	2.9	-7.2	8.1	-12.7	-13.4	16.1	0.1	-9.5	7.5	-1.9	-1.3	5.7	-0.9
BTB	1.12	1.07	0.94	0.94	1.00	0.97	0.90	0.87	0.88	0.89	0.93	0.92	0.97	0.98	1.00	1.05	1.06	1.06

China Performance

- China's sales decreased -5.2% and orders plummeted -13.2%, YOY. The BTB was 1.06. Sequentially, sales dipped -0.9% in September.
- Industrial production remained unchanged at 4.5% YOY in September.
- China's manufacturing PMI fell to 49.5 in September.
- China's retail sales climbed by 5.5% year-on-year in September 2023, accelerating from a 4.6% gain in the prior month.
- Exports from China rose 5.0% over the prior month.
- China's vehicle sales surged by 9.5% year-on-year in September 2023, marking the second consecutive month of growth, helped by increased discounts and tax incentives for environmentally friendly electric vehicles.
- Inflation in September remained at +0.1%.
- China's surveyed urban unemployment rate declined to 5.0% in September 2023 from 5.2% in August.

Asia Pacific: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.

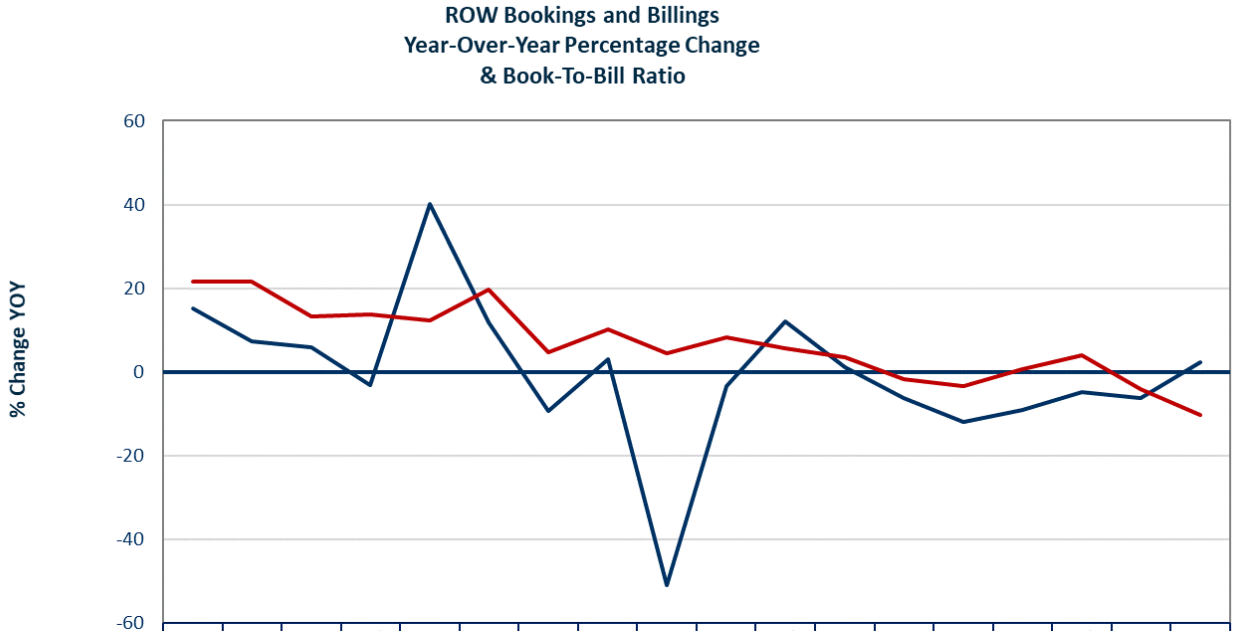


	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23
Bookings	-5.9	-6.7	-7.9	-18.2	-18.4	-12.1	-33.4	-23.5	-21.3	-25.1	-23.1	-18.2	-15.2	-20.8	-12.3	-10.0	11.4	-2.9
Billings	8.1	9.4	7.3	4.1	3.0	9.0	-6.0	-2.9	0.0	-7.5	-2.3	-5.7	-10.8	-10.8	-9.7	-5.5	-7.0	-11.7
Billing SEQ	-5.0	7.3	-2.9	-5.7	3.3	10.8	-11.2	9.9	-6.0	-9.9	11.3	-2.9	-5.6	7.1	-1.7	-1.0	1.5	-1.0
BTB	1.07	1.06	0.94	0.86	0.96	0.84	0.89	0.97	0.82	0.93	0.92	0.96	1.02	0.94	0.91	0.82	1.02	0.92

Asia Pacific Performance

- September orders declined -2.9%. Sales dropped -11.7% YOY. The book-to-bill ratio was 0.92. Sequentially, sales slipped -1.0%.
- India's industrial production climbed 10.3% YOY in August. India total exports expanded 0.8 % YOY in September 2023, compared with an increase of 8.1 % YOY in the previous month. Electrical and electronic equipment represents about 8% of total exports and 1.5% of total GDP. The manufacturing PMI dipped slightly to 55.5 in October. There have been 28 straight months of factory expansion. September inflation continued its downward trend at 5.0%.
- Industrial production in South Korea increased 0.3% in September of 2023 over the same month in the previous year. It marked the first month of rise in yearly industrial output since September 2022. Electrical and electronic equipment represents 33% of exports. South Korea manufacturing PMI fell slightly to 49.8 in October 2023 from 49.9 in September, indicating a marginal contraction in the health of the sector and extending the current run of declines to 16 months. Inflation increased a third straight month to 3.8% in October.

Rest of World: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.



	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23
Bookings	15.2	7.2	5.9	-3.1	40.1	11.8	-9.3	3.0	-50.9	-3.5	12.1	1.1	-6.2	-11.9	-9.2	-4.7	-6.3	2.3
Billings	21.5	21.6	13.3	13.7	12.4	19.7	4.7	10.2	4.4	8.3	5.6	3.5	-1.7	-3.4	0.7	4.1	-4.1	-10.3
Billing SEQ	-5.3	13.1	-8.2	-2.2	9.6	2.0	-11.5	7.3	-12.0	-3.1	15.9	-5.2	-4.7	10.8	-2.6	1.1	1.1	-4.6
BTB	1.11	1.06	1.02	1.10	0.92	0.86	0.90	0.97	0.89	1.04	1.04	1.04	1.06	0.97	0.91	1.01	0.90	0.98

Rest of World Performance

- Orders grew +2.3% whiles sales decreased -10.3% YOY in September. Sequentially, sales in the region fell -4.6%. The book-to-bill ratio was 0.98.
- Industrial production in Brazil increased 0.6% in September of 2023. The annual inflation rate in Brazil increased to 5.19% in September of 2023 from 4.61% in the previous month, the highest in seven months. Brazil manufacturing PMI fell for the second month running to 48.6 in October of 2023, down from 49 in September, pointing to a steeper decline in Brazil's factory activity. The unemployment rate decreased to 7.7% in September. Exports decreased sequentially in September to $28.4 billion. Retail sales grew 2.4% YOY in July.
- Russia’s economic data is still questionable but here are a few data points. Industrial production grew 4.9% YOY in July, the fifth straight month of growth. Retail sales increased 2.3% YOY in August.

Regional Summary Snapshot

The following table shows a snapshot of the performance of each region. The table displays the latest metric available, and the trend of the metric compared to prior months/quarters.

	North America	Europe	Japan	China	Asia Pacific	ROW
GDP Growth YOY	4.9% Improving	0.1% Slowing	1.3% Slowing	4.9% Slowing	N/A	N/A
Industrial Production Growth	0.08% Down	-0.6% Down	-4.6% Down	4.5% Stable	N/A	N/A
Manufacturing PMI*	50.0 Up	43.1 Down	48.7 Stable	49.5 Down	N/A	N/A
Inflation Rate	3.7% Stable	5.2% Slowing	2.9% Improving	-0.1% Stable	N/A	N/A
Unemployment Rate	3.8% Stable	6.4% Stable	2.7% Stable	5.0% Improving	N/A	N/A
Retail Sale Growth YOY	3.8% Up	-2.1% Down	5.8% Down	5.5% Up	N/A	N/A
YTD Connector Sales Performance	0,3% Down	3.6% Improving	-9.8% Down	-8.1% Down	-7.9% Stable	0.0% Improving
YTD Connector Orders Performance	-8.4% Improving	-2.4% Stable	-16.3% Stable	-13.1% Improving	-13.8% Down	-5.4% Improving

* Purchasing Manager Index - Below 50 is contracting factory activity

Industry Backlog Is 13.4 Weeks

The industry has shipped $1,596 million on average per week since January of 2023. The September ending backlog is $21,465 million which equates to 13.4 weeks of backlog.

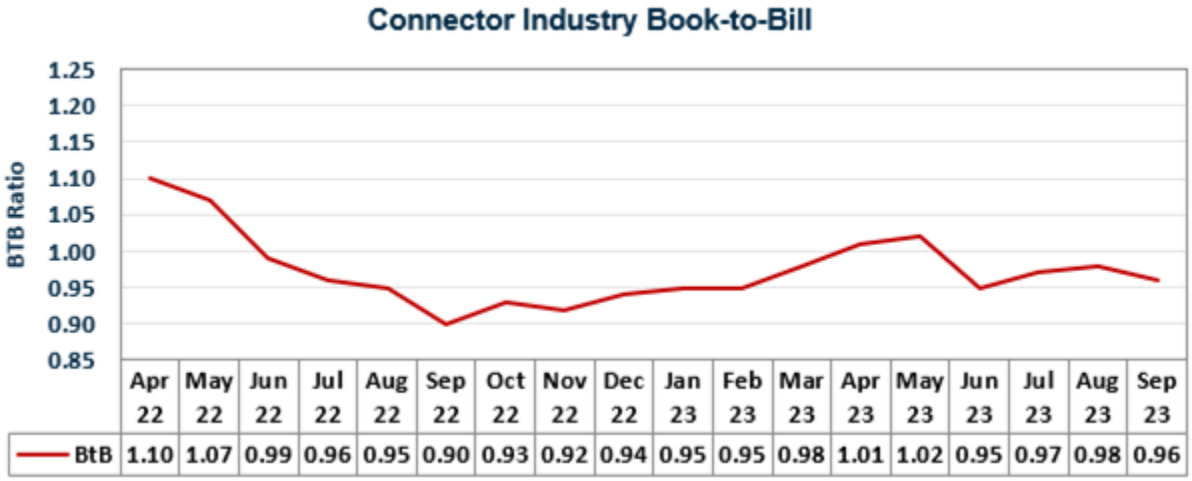
The following table compares 2022 industry backlog to the current backlog.

Industry Backlog

	YTD September	
	2022	**2023**
BtB Ratio	1.01	0.96
Beginning Backlog	$21,499	$22,983
Bookings	$85,575	$60,755
Billings	$84,091	$62,273
Ending Backlog	$22,983	$21,465
Backlog in Weeks	14.2	13.4

$ Millions

The book-to-bill ratio has been below 1.00 in 14 of the past 16 months. This is shown in the following graph.



As previously noted, the September 2023 book-to-bill ratio is 0.96. You will note in the following table, the backlog has remained in the $21 to $22 billion level since November 2022.

The following table shows backlog declined monthly from May to November of 2022, reaching a low in September of 0.90. Since then, the backlog has been relatively stable, hovering between 0.92 in November 2022 and 1.02 in May of 2023.

Ending Backlog Since May 2022

Month	Ending Backlog	BTB Ratio
May	$26,373	1.07
June	$26,302	0.99
July	$26,036	0.96
August	$25,673	0.95
September	$24,846	0.90
October	$24,396	0.93
November	$21,828	0.92
December	$22,983	0.94
January	$22,725	0.95
February	$21,422	0.95
March	$22,233	0.98
April	$22,170	1.01
May	$22,033	1.02
June	$22,102	0.95
July	$21,974	0.97
August	$21,770	0.98
September	$21,465	0.96

$ Millions

We shipped $62,273 million year-to-date in 2023. This equates to $1,569 million in sales per week.

2023 & 2024 Forecast

Connector industry sales are down -2.6% through September 2023 and orders are down -9.0%. Amphenol was down -3% in U.S. dollars and -5% organically compared to third quarter of 2022, while TE Connectivity net sales were flat and down -2% organically.

TE Connectivity forecasts 2023 calendar year 4th quarter (first quarter fiscal 2024) sales to be flat. During the same period, Amphenol is forecasting a -3% to -5% decline over the prior year quarter. For Amphenol, this would represent a full year decline of approximately -2%.

Semiconductor industry sales are down -11.8% YOY through August 2023, solidifying the fact the electronics market is experiencing a downturn.

The following table shows Bishop's outlook for the fourth quarter of 2023.

2023 Forecast by Quarter

Quarter	2021 Actual	2022 Actual	YOY Change	2023 Forecast	YOY Change
1Q	$19,061	$21,200	11.2%	$21,179	-0.1%
2Q	$19,000	$20,560	8.2%	$19,985	-2.8%
3Q	$20,150	$22,160	10.0%	$21,109	-4.7%
4Q	$19,780	$20,171	2.0%	**$19,322**	-4.2%
Total	**$77,991**	**$84,091**	**7.8%**	**$81,595**	**-3.0%**

$ Millions, Bishop ©2023 Forecast in Red

As indicated, Bishop is projecting sales in the fourth quarter to be down -4.2%. Although partially a function of tough comparison to the fourth quarter of 2022, there are also a number of other reasons Bishop anticipates 2023 will end on a negative note. These reasons include:

- Worldwide, the 5G market has not taken off as initially anticipated. In North America alone, 5G spending by the major carriers (AT&T, Verizon, T-Mobile, and Dish Network) was down 50% when compared to what was anticipated in 2022.

- The automotive market is still facing a number of challenges. Chip shortages have not been totally alleviated, the UAW strike in North America has stalled production, and high interest rates have forced consumers to rethink automotive purchases.

- A cool down in the housing market due to higher interest rates and limited inventory has created a slowdown in the consumer market, in particular in the white goods segment.

- Lower demand for servers and computers has created a glut of memory chips, causing key suppliers like Samsung to post reduced earnings for the third quarter. Although there is hope that business will pick up in the fourth quarter, the poor performance of the global smartphone market is also creating lower demand for connector components.

2024 Forecast

Our initial forecast for 2024 was growth of 5.9%. Based on the lethargic performance of the electronic connector industry in 2023 and the present state of the worldwide economy in general, our total world forecast has dropped to growth of 4.7%.

Our 2024 forecast by region is shown below.

2023 & 2024 Forecast

	2023	Percent Change	2024	Percent Change
North America	$18,916	0.1%	$19,831	4.8%
Europe	$17,768	2.5%	$18,728	5.4%
Japan	$4,729	-8.6%	$4,866	2.9%
China	$24,756	-6.6%	$26,014	5.1%
Asia Pacific	$11,424	-6.3%	$11,863	3.8%
ROW	$4,003	-0.2%	$4,153	3.7%
Total World	**$81,595**	**-3.0%**	**$85,454**	**4.7%**

$ Millions Bishop ©2023

In 2024, Bishop anticipates all regions will achieve growth, with Europe showing the greatest growth at 5.4%, followed by China with growth of 5.1%. The lowest growth will be seen in the Japanese region, where sales are only anticipated to grow 2.9%.

Currency Flucuations Reduce Performance between USD and Local Currency

The dollar has been fluctuating against the euro, the yen, and the yuan. The following table measures the impact for September 2022 versus September 2023 and shows results for these three currencies.

Local Currency to One USD
September 2022 versus September 2023

Currency	2022	2023	% Change
Euro	1.0090	1.0679	5.8%
Yuan	7.0144	7.2858	3.9%
Yen	143.0069	147.7871	3.3%

Europe, China, and Japan account for approximately 60% of world connector sales. Currency fluctuation against the US dollar can have a significant impact on our reporting of sales performance in US dollars.

The following table shows September YTD sales performance by region in US dollars and local currencies.

Industry Sales Performance
YTD September 2023
USD-vs-Local Currencies

Region	U.S.$	Local Currency
North America	0.3%	0.3%
Europe	3.6%	9.6%
Japan	-9.8%	-6.9%
China	-8.1%	-4.5%
Asia Pacific	-7.9%	-7.9%
ROW	0.0%	0.0%
World	**-2.6%**	**0.1%**

Connector sales experience improved conditions when measured in local currencies putting industry performance at 0.1% in September (versus -2.6% in US dollars).

Significant News

PCTEL Announces Definitive Agreement to be Acquired by Amphenol Corporation

PCTEL, Inc. a leading global provider of wireless technology solutions, announced that it has reached a definitive agreement to be acquired by Amphenol Corporation, one of the world's largest providers of high-technology interconnect, sensor, and antenna solutions.

Under the terms of the agreement, which was approved by PCTEL's Board of Directors, PCTEL stockholders will receive $7.00 in cash for each share of common stock they own. The purchase price represents a premium of over 50% to PCTEL's closing stock price on October 13, 2023, the last full trading day prior to the deal's announcement.

The transaction is expected to close in the fourth quarter of 2023 or early 2024, subject to customary closing conditions, including approval by PCTEL stockholders. Upon completion of the transaction, PCTEL will no longer be listed on any public market.

Amphenol Completes Three Acquisitions in the 3rd Quarter

Amphenol announced in their 3rd quarter earnings call, "we are excited to have closed on three acquisitions since our July earnings call: Connor Manufacturing Services, Q Microwave and XMA Corporation.

Based in Illinois, Connor is a global manufacturer of power interconnect products including high voltage busbars for the automotive and industrial markets with annual sales of approximately $100 million.

Based in California, Q Microwave is a designer and manufacturer of mission-critical radio frequency components utilized in military platforms with annual sales of approximately $20 million.

Based in New Hampshire, XMA is also a provider of radio frequency components for the military and IT datacom markets with annual sales of approximately $15 million.

Connor will be included in our Interconnect and Sensor Systems Segment, while Q Microwave and XMA will be included in our Harsh Environment Solutions Segment. All these acquisitions further expand our offering of high-technology interconnect products across a variety of our markets, while adding talented management teams to the Amphenol family."

Hon Hai Q3 Sales Up Over 18% Sequentially

Hon Hai Precision Industry Co., the world's largest contract electronics maker, reported a sequential increase of more than 18 percent in sales for the third quarter of this year after its smart consumer electronics division received a boost from clients unveiling new products.

Market analysts said as Hon Hai, also known as Foxconn on the global markets, serves as the major iPhone assembler, the launch of the newest iPhone 15 series by Apple Inc. accounted for the sales growth during the July-September period.

Hon Hai is believed to be the major assembler of the popular flagship iPhone 15 Pro and iPhone 15 Pro Max, which command a higher profit margin. Market analysts estimate Hon Hai assembled 58-60 percent of the total iPhone 15 models for Apple.

In the third quarter, Hon Hai posted NT$1.54 trillion (US$47.83 billion) in consolidated sales, up 18.26 percent from the second quarter but down 11.65 percent from a year earlier. The latest third-quarter sales were the second highest ever for the three-month period after NT$1.75 trillion recorded in the same period of 2022.
Compared with the second quarter, Hon Hai said sales generated by the smart consumer electronics division, electronic components division and the computing division rose in the third quarter, while revenue posted by its cloud and networking division remained little changed.

Hon Hai said the year-on-year decline in sales in the third quarter largely reflected a relatively high comparison base over the same period of last year.

In September alone, Hon Hai's consolidated sales rose 60 percent from a month earlier to NT$660.74 billion which analysts attributed to peak season effects largely from the introduction of the new iPhone 15 models. However, September revenue fell 19.65 percent from a year earlier on weakening global demand for tech gadgets in a slowing world economy, analysts said.

On a month-on-month basis, Hon Hai's smart electronics and electronic components divisions benefited from the arrival of new products to post higher revenue in September, while its cloud and networking division saw little change in sales and the computing division reported a decline, the company said.

On a year-on-year basis, Hon Hai said its electronic components division posted an increase in September on the back of growing shipments of smart device and automotive components, while sales generated by the computing, smart consumer electronics, and cloud and networking divisions saw sales fall.

In the first nine months of this year, Hon Hai's consolidated sales stood at NT$4.31 trillion, down 7.65 percent from a year earlier as all of its major four divisions reported a decline, the company said.

Hon Hai, which has intensified efforts to enter the electric vehicle market to diversify its product portfolio, has scheduled 2023 Hon Hai Tech Day for Oct. 18, when the company is expected to unveil new EV models.

North American PCB Industry Sales Down 14 Percent in September

Total North American PCB shipments in September 2023 were down 14.6 percent compared to the same month last year. Compared to the preceding month, August shipments were up 35.7 percent. PCB bookings in September were down 32.7 percent compared to the same month last year. September bookings were up 45 percent compared to the preceding month.

“The PCB book-to-bill is relatively unchanged this month as both shipments and bookings rose,” said Shawn DuBravac, IPC’s chief economist. “However, this masks weak bookings that have finally pushed the year-to-date shipment trend negative for the first time this year.”

North American EMS Industry Down 9.8 Percent in September

IPC announced the September 2023 findings from its North American Electronics Manufacturing Services (EMS) Statistical Program. The book-to-bill ratio stands at 1.27. Total North American EMS shipments in September 2023 were down 9.8 percent compared to the same month last year. Compared to the preceding month, September shipments decreased 12.4 percent. EMS bookings in September decreased 17.4 percent year-over-year and decreased 14.2 percent from the previous month.

Global Notebook Shipments to Enjoy 3% CAGR From 2023 to 2028

Global notebook shipments are likely to expand by a compound annual growth rate (CAGR) of 3% from 2023 to 2028, according to DIGITIMES Research's latest figures from its 5-year forecast report on the global notebook market. In 2024, the shipment growth will likely reach 4.7%, driven by the easing of inflation and the introduction of new products, marking the end of a two-year decline.

In 2025, due to the economy entering a new phase of expansion, overall shipments are expected to grow by 6%, making it the year with the highest growth rate over the next five years. In 2027, a slight contraction is likely, and Korean panel makers will gradually increase their flexible OLED production capacity, with Apple's increased adoption of such panels.

Regarding notebook panel technologies, in 2023, due to poor market conditions and brand efforts to clear inventory, the share of affordable traditional amorphous Silicon (a-Si) panels is expected to increase to 76.7%. However, its share will likely decrease in the following years as it gets replaced by other advanced display technologies.

Although brands like Asustek Computer and Samsung Electronics, which previously voiced support for rigid OLED panels, are unlikely to adopt such models widely due to cost and quality issues. However, the share of flexible OLED panels will increase significantly after Korean panel makers expand their 8G flexible OLED production capacity by 2026.

In 2023, the share of notebooks built using Arm-based processors will likely decrease rather than increase because Apple, which adopts in-house designed Arm-based CPUs for most of its notebook lineups, is expected to experience a significant decline in shipments in 2023 as the US brand vendor plans to transit to CPUs built by a 3nm node at TSMC for performance upgrading in 2024. Additionally, the introduction of Qualcomm's self-developed Oryon-based CPUs is expected to increase its market share. However, it is projected that Arm-based notebook shipments will continue to grow to over 27 million units in 2026.

In 2024, major brands will likely see shipment growth compared to 2023. Specifically, Apple and Dell will probably benefit from a more noticeable recovery in the high-end consumer and commercial market segments, leading to improved sales performance.

Gartner Says Worldwide PC Shipments Declined 9% in Third Quarter of 2023

Worldwide PC shipments totaled 64.3 million units in the third quarter of 2023, a 9% decrease from the third quarter of 2022, according to preliminary results by Gartner, Inc. While the third quarter’s results mark the eighth consecutive quarter of decline for the global PC market, Gartner is expecting to see growth again starting in the fourth quarter of this year.

“There is evidence that the PC market’s decline has finally bottomed out,” said Mikako Kitagawa, Director Analyst at Gartner. “Seasonal demand from the education market boosted shipments in the third quarter, although enterprise PC demand remained weak, offsetting some growth. Vendors also made consistent progress towards reducing PC inventory, with inventory expected to return to normal by the end of 2023, as long as holiday sales do not collapse.”

The top vendors in the worldwide PC market remained unchanged in the third quarter of 2023, with Lenovo maintaining the No. 1 spot in shipments with 25.1% market share.

While Lenovo once again saw a year-over-year decline in shipments, it was eased to a single digit decrease. Meanwhile, HP was the only vendor to exhibit year-over-year growth, with shipments increasing across all regions. Dell reported a sixth consecutive quarter of shipment decline, impacted by weak enterprise PC demand given its a strong presence in the market.

Apple's shipments declined sharply compared to a year ago, in part because its shipment volume increased significantly in 3Q22 once supply disruptions from earlier in 2022 due to China's lockdown had eased. In the third quarter of 2023, Apple's shipments followed seasonal trends, primarily driven by demand from students and educators.

"The good news for PC vendors is that that the worst could be over by the end of 2023," said Kitagawa. "The business PC market is ready for the next replacement cycle, driven by the Windows 11 upgrades. Consumer PC demand should also begin to recover as PCs purchased during the pandemic are entering the early stages of a refresh cycle."
Gartner is projecting 4.9% growth for the worldwide PC market for 2024, with growth expected in both the business and consumer segments.

Worldwide Smartphone Shipments Declined 0.1% Year Over Year to 302.8 million Units in the Third Quarter of 2023

Although macroeconomic uncertainties linger as markets struggle with soft demand, inflation, and geopolitical tensions, healthy inventory and the slower pace of decline are encouraging some vendors to increase shipments.

"We are seeing a strong ramp up of shipments in emerging markets by vendors like Xiaomi and Transsion," said Nabila Popal, research director with IDC's Mobility and Consumer Device Trackers. "While this is a good sign of approaching recovery, vendors must keep a close eye on sell-throughs to avoid falling into excess inventory again, as demand is still weak in many regions. Meanwhile, on the other end of the spectrum, we see Apple growing in all regions except China, where it's facing renewed competition from Huawei as well as heightened macroeconomic uncertainties that are causing consumers who once used to rush for the latest iPhones to pause and think more carefully about their purchases."

China saw shipments fall 6.3% year over year in 3Q23, marking the tenth consecutive quarter of decline. Climbing youth unemployment, the ongoing real estate crisis, and deflation have significantly damped consumer spending and broader macroeconomic environment in China. Elsewhere, shipments in Europe, Japan, and the U.S. declined 8.6%, 5.3%, and 1.1% respectively. But emerging markets like the Middle East and Africa (MEA), Latin America (LA), and Asia/Pacific (excluding Japan and China) saw 3Q23 shipment growth of 18.1%, 8.2%, and 1.3% respectively.

German PC Market Will Rebound in 2024, Driven by Healthy Deal Pipeline and Inventory

According to the latest International Data Corporation forecast, the German PC market is expected to continue declining in the third quarter of 2023, at a year-on-year rate of 6.2%. The outlook for the rest of the year remains bleak, with shipment volume forecast at 9.6 million units in 2023, a 14.8% drop compared to last year, as vendors and distributors remain cautious in face of the German economic recession. However, IDC expects the PC shipment contraction in the second half of 2023 to be less severe than in the previous 12 months, as the basis for comparison is now lower.

"The German PC market is expected to return to positive growth in the fourth quarter of 2023, after six consecutive quarters of year-on-year decline," says Malini Paul, senior research manager for European

Devices at IDC. "The PC market recovery will continue in 2024 and beyond at a slow pace, thanks to an anticipated healthy inventory and a strong pipeline of deals".

IDC projects 8.1% year-on-year growth for the German PC market in 2024, as shipment seasonality is expected to normalize after years characterized by a lockdown-induced boom-and-bust cycle. The supply chain constraints during the boom period led to a backlog, which has been deployed in the bust phase, resulting in large inventories.

“The market hasn’t really returned to normal since the pandemic hit,” says Daniel Goncalves, senior research manager, European Devices, IDC. “As inventory returns to healthy levels and all participants in the PC supply chain keep adjusting to the current reality of demand, PC sell-in will start aligning with sell-out."

Germany's market dynamics reflect that of the overall Western European (WE) region, where a sudden drop in demand led to aggressive pricing strategies and curtailment of shipments by vendors. IDC projects a year-on-year decline of 5.6% in the WE PC market in Q3 2023 and a double-digit decline for the whole of 2023.

Global Smartphone Market to Continue Witnessing On-year Shipment Decline in 2H23

Going into the second half of 2023, most markets are still struggling with soaring inflation and weakening consumption with emerging markets having taken a serious hit. Based on DIGITIMES Research's statistics, second-quarter 2023 global smartphone shipments amounted to 250 million units, down 8.7% from a year ago.

A total of 567 million smartphones are projected to be shipped in 2H23, down 2.7% compared to the level seen in the corresponding period of 2022.

DIGITIMES Research has adjusted the forecast for whole-year 2023 global smartphone shipments downward from the projection given in June by 20 million units to 1.08 billion.

Concerning smartphone shipments to China, DIGITIMES Research adjusted the forecast on second-quarter 2023 smartphone shipments to China moderately upward from the projection given in June to 62.8 million units, representing a 2.2% on-year decline. The forecast for second-quarter 2023 smartphone shipments to markets outside of China was lowered to 187 million units, representing a 10.7% on-year decline.

As to whole-year 2023 global 5G smartphone shipments, DIGITIMES Research has lowered the forecast to 564 million units from the projection of 577 million units given in June. The volume represents a 4.2% decline from the 2022 level.

US Manufacturing Inches Toward Recovery

US manufacturing inched closer toward a rebound in September with employment and production levels rising and prices on the decline. The Institute for Supply Management’s factory index, the PMI, reached 49 percent last month – its highest reading since November 2022.

The sector remains in contraction, however, as a reading of 50 or above signals growth. September represents the 11th month of contraction, though the PMI grew by 1.4 percent. New orders, which increased 2.4 percent, reached 49.2 last month. Production, at 52.5, increased by 2.5 percent. Prices decreased by 4.6 percentage points to 43.8.
Among the 11 industries reporting contraction were computer and electronic products, machinery, electrical equipment, appliances, and components.

Manufacturing employment grew by 2.7 percent to 51.2 but doesn't necessarily reflect hiring in the sector. Manufacturers are relying on attrition to reduce headcount and the rate of people leaving the workforce increased in September, Fiore said. More companies are implementing hiring freezes to manage headcount, he added.

The UAW's strike against automotive manufacturers did not impact September's data but is of high concern among respondents. "Some things to watch include the Panama Canal (drought), US-China relations, and the impact the UAW (United Auto Workers) strike could have on suppliers of ours who support automotive production. But overall conditions feel stable," said an executive in miscellaneous manufacturing.

As welcome as the price decline was in September, they are likely to go up again. Oil prices are increasing, which will raise energy and transportation costs. Oil is also a big component in the production of chemicals and plastics.

Component Sales a Mixed Bag as Q3 Ends

Electronics component sales underperformed expectations in September as the ECIA sales sentiment survey dipped 3.6 points to 87.6. However, respondents expect sentiment will grow closer to 100 – the demarcation line between contraction and growth—next month to 94.0.

Interestingly, electronics distributor and manufacturer expectations aligned last month for the first time since April. The index scores from distributors are at or above 100 for nearly every component category in September. The manufacturer scores are also strong and come in around 100. ECIA Chief Analyst Dale Ford said this indicates that distributors are successfully balancing inventory.

Although the U.S. manufacturing industry — including the computer and electronics sector — remains in contraction, there was positive movement in the September PMI, which read 49. Any reading above 50 signals growth. The Institute for Supply Management's production and employment indexes inched up in September and prices registered a decline.

Expansion in the ECIA's component categories was mixed. Electro-mechanical/connector components improved by 13.8 points to reach 98.7 for September and the outlook calls for this segment to break into positive growth territory in October. Semiconductors lost all their gains from August and fell back to a score of 77.4, but the outlook for October increases by 15.7 points.

Passive components also saw their August gains evaporate in September with expectations of slight improvement in October.

ECIA's overall end-market index saw a jump up to 91.4 in September and sustains this level in the October outlook, said Ford. Scores and improvements are uneven across the different market segments. Avionics/military/space sustained and improved its score above 100. Medical equipment and industrial electronics achieved scores in the mid- to high- 90s in September. The most positive result from the end

market survey is the expectation of large improvements in the index in every category including some double-digit increases expected for October, he added.

Independent distributor Fusion Worldwide noted, in its monthly Greensheet, similar spottiness across end-markets. Demand has begun to wane for industrial, EV, and solar power ICs. Meanwhile, automotive demand stays strong, and lead times remain extended.

Across the CPU segment, demand outpaces availability, causing unpredictable delivery timeframes for certain medium core count MPNs and entry-level server and workstation series. Activity in the PC and server market is still slow, Fusion added, and may not recover until the end of the year.

The picture for product lead time trends has improved considerably, ECIA reports. Stable lead times dominate the responses with stable average lead times jumping from 61 percent in August to 69 percent in September responses. There were zero reports of increasing lead times for every passive component category in September. In addition, there were zero reports of increasing lead times in the MPU, MCU and discrete categories.

The typical lead times for most integrated circuits are approximately 28 to 30 weeks, Fusion reported. There is the potential for shorter lead times for parts on suppliers' high-runner lists, but this is case-by-case and depends on overall demand. In addition, the offered lead times may not necessarily result in lower prices compared to the vendor's stock, primarily because of cost increases incurred by manufacturers over the past few years.

Samsung Expected to Report 80% Profit Plunge as Losses Mount at Chip Business

Samsung Electronics earnings are expected to plunge nearly 80% in the third quarter, according to analyst forecasts, as the company's biggest profit-driving segment — semiconductors — continues to come under pressure.

The South Korean technology giant will issue earnings guidance on Wednesday. Analysts polled by LSEG expect operating profit of 2.3 trillion Korean won ($1.7 billion) for the September quarter, a 78.7% year-on-year decline. Revenue is expected to come in at 67.8 trillion won, a fall of 11.6%, according to LSEG consensus forecasts.

Samsung is the world's largest maker of memory chips, used in products ranging from laptops to servers. It is also the world's biggest smartphone player.

Samsung's semiconductor business — typically the company's cash cow — is expected to post a more than 3 trillion won loss for the third quarter, according to analyst forecasts, as it continues to face headwinds.

Memory chip prices have fallen dramatically this year due to a glut caused by oversupply and low demand for end products like smartphones and laptops.

This has hit Samsung's profits hard. In its last earnings reports in July, the company predicted a pick-up in demand for chips in the second half of the year, although this does not appear to be playing out as fast as many had hoped.
The tech giant has cut production in a bid to help shore up prices, though the effect is not likely to be seen in the third-quarter results.

There could be two potential bright spots for Samsung in the September quarter, however. Firstly, its display business could see quarter-on-quarter growth due to the release of Apple's iPhone 15 series; Samsung sells displays to Apple for iPhones. Secondly, Samsung's smartphone unit could see improving margins due to the high-end foldable phones it launched in July.

China's Factory Activity Levels Slow

A private gauge of China's manufacturing activity slowed its pace of expansion last month, suggesting there is still room for caution as the nation charts its economic trajectory for the rest of the year. The Caixin manufacturing purchasing managers' index (PMI) was 50.6 last month, Caixin and S&P Global said in a statement yesterday — dipping closer to the 50 line, below which indicates contraction from the month before. Caixin's services index was 50.2 for the month, still in expansion but also suggesting that the pace of growth in activity is losing momentum. The figures show a slightly precarious recovery even as China has rolled out a stimulus.

The World Will Pay a High Price if China Cuts Off Supplies of Chipmaking Materials

Just one month after China announced it would curb exports of germanium and gallium, both essential for making semiconductors, its overseas shipments of the materials fell to zero. Beijing says it has since approved some export licenses, but the restrictions are a stark warning that China has a powerful weapon it can deploy in the escalating trade war over the future of tech. The curbs came after the United States, Europe, and Japan restricted sales of chips and chipmaking equipment to China to cut off its access to key technology that can be used by the military.

China enjoys a near monopoly on the production of the two elements. Last year, it accounted for 98% of the global production of gallium and 68% of refined germanium production, according to the US Geological Survey (USGS). While there are alternatives for the United States and its allies, constructing an independent supply chain for gallium and germanium processing could require a "staggering" investment of over $20 billion, according to Marina Zhang, an associate professor at University of Technology Sydney. And it could take years to develop.

Although the minerals account for only "several hundred million dollars" in global trade, according to Zhang, they are critical to the supply chains of the international semiconductor, defense, electrical vehicle, and communications industries, which are each worth hundreds of billions of dollars.

Other suppliers

There are alternative suppliers, though. According to the USGS, Russia, Japan, and Korea produced a combined 1.8% of global gallium in 2022. For germanium, Canada's Teck Resources is one of the world's largest producers. American company Indium Corporation is also a top global manufacturer of germanium compounds and alloys. And Canada's 5NPlus and Belgium's Umicore produce both elements.

Global mining companies can get into the business of selling germanium and gallium if China seeks to choke off supply, said Gregory Allen, director of Wadhwani Center for AI & Advanced Technologies at CSIS. "This would not be instantaneous, but some global mining and refining firms have signaled their intent to do so."

Two Leading Countries to Command 72% of Foundry and 68% of Assembly and Test Markets

IDC's latest report, The Impact of Geopolitics on Asia's Semiconductor Supply Chain: Trends and Strategies, unveils significant changes in the global semiconductor landscape. With the implementation of the chip acts and semiconductors policies by various countries, semiconductor manufacturers have been required to set

"China + 1" or "Taiwan + 1" production plans. This overhaul has driven a new global layout for the foundry and assembly/test industry, leading to a regional development in the semiconductor industry chain.

"Geopolitical shifts are fundamentally changing the semiconductor game. While immediate impacts might be subtle, long-term strategies are focusing more on supply chain self-reliance, security, and control. The industry operation will move from global collaborations to multi-regional competitions. says Helen Chiang, Asia Pacific semiconductor research lead and Taiwan country manager.

Major industry players are making strategic moves. In terms of Foundry, TSMC, Samsung, and Intel, are spearheading advanced processes in the United States, which will gradually exert influence in the foundry field. Meanwhile, even as China grapples with the development of advanced processes, its mature processes have developed rapidly under the impetus of its domestic demand and national policies. Based on the categorization by production location, China's proportion of overall industrial areas will continue to increase, reaching 29% in 2027, an increase of 2% from 2023, and Taiwan's market share will fall from 46% in 2023 to 43% in 2027. The United States will make some gains in the advanced process part, and its share for 7nm and below is expected to reach 11% in 2027.

In terms of semiconductor assembly and test, given the influence of geopolitics, technological development, and talents, leading integrated device manufacturers (IDM) in the United States and Europe have begun to invest more in the Southeast Asia market, and OSAT companies have begun to shift their attention from China to Southeast Asia. Thus, Southeast Asia is projected to play an increasingly important role in the semiconductor assembly and test market, especially in Malaysia and Vietnam, which will be the key areas that deserve special attention in the future development of this field. Southeast Asia's share of the global semiconductor assembly and test will reach 10% in 2027, while Taiwan's share will decline to 47% in the same year from 51% in 2022.

World's Largest Chipmaker TSMC Sees Biggest Drop in Profit in Nearly Five Years

Taiwan Semiconductor Manufacturing Company reported a third-quarter profit of 211 billion New Taiwan dollars ($6.69 billion) on Thursday as weak demand for consumer electronics persists. Even though it was the largest profit decline since the first quarter of 2019, the world's largest contract chipmaker bested analysts' expectations.

TSMC reported revenue slipped 10.83% from a year ago to NT$546.73 billion, while net income fell 24.87% from a year ago to NT$211 billion. That compares with TSMC's guidance for third-quarter revenue between $16.7 billion and $17.5 billion.

"Our business was supported by the strong ramp of our industry-leading 3-nanometer technology and higher demand for 5-nanometer technologies, partially offset by customers' ongoing inventory adjustment," said TSMC in its earnings report.

The chip giant said that revenue increased 13.7% in the third quarter as compared to the second quarter. In the second quarter, the Taiwanese firm reported a decline in quarterly profit for the first time in four years due to a post-pandemic plunge in the demand for consumer electronics like smartphones and laptops. But analysts have said chip inventories at smartphone and PC makers are running down and they expect restocking demand to come back.

How Micron is Building the Biggest Chip Fab in US History Despite a China Ban and Smartphone Slump

Memory chips are at the center of all devices, helping store and access data in smartphones, computers and the servers training generative artificial intelligence models.

Just three companies make more than 90% of the world's dynamic random-access memory, or DRAM, chips. With Samsung and SK Hynix both headquartered in South Korea, Idaho-based Micron is the only manufacturer in the U.S. — that has made it the latest target of China's bans on U.S. technologies.

About a quarter of Micron's revenue comes from China, and "about half that revenue is at risk," Micron CEO Sanjay Mehrotra told CNBC in an interview.

Meanwhile, Micron is doubling down on U.S. manufacturing. Its current leading-edge chips are made in Japan and Taiwan, but Micron is aiming to bring advanced memory production to the U.S. starting in 2026 with a new $15 billion chip fabrication plant in Boise, Idaho. Micron celebrated its 45th anniversary in October by pouring the first cement at the new fab.

The facility is located next to Micron's huge research and development facility, where CNBC got a behind-the-scenes tour.

DRAM and NAND memory chips are a cheaper type of semiconductor than the high-powered central processing units from Intel and AMD and graphics processing units that sparked Nvidia's growth. But multiple memory chips are needed to support each GPU or CPU, so making memory requires more fab space.

That's why Micron is planning the biggest chip project in U.S. history, spending $100 billion over 20 years to build four 600,000 square foot fabs in upstate New York.

Mehrotra told CNBC that Micron's goal is to vastly increase the U.S. share of DRAM production, which he said currently sits at just 2%. That production comes from Micron's fab in Manassas, Virginia. The company is getting assistance from the federal CHIPS and Science Act, which offers billions of dollars to incentivize domestic production.

"With Micron's investments through CHIPS support in Boise, Idaho, as well as in Syracuse, New York, that 2% over the course of nearly 20 years will be changing to about 15% of the worldwide production coming from the U.S.," Mehrotra said.

The U.S. share of overall chip manufacturing has plummeted from 37% to 12% in the last three decades, largely because it costs at least 20% more to build and operate a new fab in the U.S. than in Asia. Labor is also cheaper there; the supply chain is more accessible and government incentives have been far greater. That's why the CHIPS and Science Act set aside $52.7 billion for companies that manufacture in the U.S.

China to Increase Rare Earth Production by 14% to Facilitate EV Growth

China's Ministry of Commerce announced the restrictions on germanium and gallium material exports starting on August 1, 2023, making industries concerned about whether the control will expand to other rare earth materials. According to Reuters, China's customs data showed the country exported 8.6% more rare earth in the first eight months of 2023 from 2022.

The data also showed China's rare earth exports in August increased by 30% year-over-year. The possibility of hoarding is not ruled out.

According to United States Geological Survey (USGS) estimates, China accounted for 70% of global rare earth product production in 2022. Since the Chinese government strictly controls production, the rare earth policies will reflect if the country tends to cut the production volume significantly or even ban exports.

Nikkei Asia reported that China's Ministry of Industry and Information Technology and the Ministry of Natural Resources recently adjusted the rare earth metal production quota for 2023, increasing the volume by 14% from 2022 to 240,000 tonnes.

However, China did not increase quotas for elements like dysprosium, used in magnets for EV motors, according to Nikkei Asia. The quota for medium and heavy rare earths also remained under 20,000 tonnes. Medium and heavy rare earths are essential materials for high-tech products and weapons.

As the world's largest EV producer, China is trying to boost domestic sales and scale up in foreign markets. Therefore, the country would require more rare earth supplies. Nikkei Asia reported that the rise of the quota represented another continuous rare earth production growth since 2018.

Meta Trained its AI Assistant Using Your Public Facebook and Instagram Posts

A hot potato: Meta has announced that it used public posts from Facebook and Instagram to train parts of its new AI virtual assistant. The social media giant emphasized that it did not include users' private posts or messages shared with friends and family as part of its training data.

Speaking in an interview with Reuters at Meta's Connect conference last week, Nick Clegg, the company's president of global affairs, said "We've tried to exclude datasets that have a heavy preponderance of personal information." The former UK Deputy Prime Minister added that the "vast majority" of the data used by Meta for training was publicly available.

Meta announced last Wednesday that it was introducing a beta version of Meta AI, an advanced conversational assistant available on WhatsApp, Messenger, and Instagram, and coming to Ray-Ban Meta smart glasses and Quest 3. Available only in the US, the assistant offers real-time information and generates photorealistic images from text prompts.

Meta AI is powered by its LLaMA 2 language model released in July, along with the Emu text-to-image model, both of which have been trained on public Facebook and Instagram posts.

Clegg said LinkedIn was an example of a website whose content Meta purposely did not use for data training due to privacy concerns.

One of the many controversial elements of generative AI remains the copyright questions relating to content their LLMs are trained on. Artists have launched copyright lawsuits against Stable Diffusion and Midjourney this year, while authors including John Grisham and George R.R. Martin have sued OpenAI. Clegg said he expects a "fair amount of litigation" over the matter of "whether creative content is covered or not by existing fair use doctrine."

"We think it is, but I strongly suspect that's going to play out in litigation," Clegg said.

Meta isn't the only company using user content to train its AI. Elon Musk's xAI is doing the same thing with users' tweets, while Google's policy update in July confirmed that all posted user content will be used for AI training.

Microsoft's AI Boost Helped Cloud Business Outpace Rivals Amazon and Google in Latest Quarter

In the high-stakes cloud-computing battle, Microsoft is outpacing its top rivals. Third-quarter results are in for most mega-cap tech companies after a big week for tech earnings. On the cloud side, Microsoft reported growth of 29% at Azure. That's faster than Google Cloud's 22% growth and more than double the pace of expansion at Amazon Web Services, which reported 12% growth.

While AWS still leads the pack in terms of overall market share, one reason Microsoft may be picking up business is that companies want to run their artificial intelligence models on Azure. Microsoft already provides the underlying computing power for the popular ChatGPT chatbot and other products from OpenAI, which it has funded since 2019.

Around 3 percentage points of Azure's growth was tied to AI, higher than the 2 points management had forecast. The growth rate accelerated from 26% in the prior quarter, while Google decelerated from about 28%. AWS was in line with second-quarter growth.

Google Paid $26 billion in 2021 to Become the Default Search Engine on Browsers and Phones

Google paid $26.3 billion to be the default search engine on mobile phones and web browsers in 2021, according to a slide made public Friday in a federal antitrust trial against the company.

The number is a more granular look into how much Google pays partners, including Apple, to be the default search engine on their products. The U.S. Department of Justice and a coalition of state attorneys general have argued in the case that Google has illegally maintained its monopoly power in general search by leveraging its dominance to lock rivals out of key distribution channels, such as Apple's Safari web browser.

The $26.3 billion figure does not represent the payments to any one company, but Apple likely represents the largest recipient. Bernstein previously estimated Google could pay Apple as much as $19 billion this year for the out-of-the-box default placement on Apple devices.

"Google pays billions of dollars each year to distributors—including popular-device manufacturers such as Apple, LG, Motorola, and Samsung; major U.S. wireless carriers such as AT&T, T-Mobile, and Verizon; and browser developers such as Mozilla, Opera, and UCWeb—to secure default status for its general search engine and, in many cases, to specifically prohibit Google's counterparties from dealing with Google's competitors," the DOJ complaint reads.

Google has argued that users can still opt to change their default search engine with a few clicks.

According to the slide shown in court Friday — titled "Google Search+ Margins," which primarily refers to Google's search business — that division's 2021 revenue was more than $146 billion, while the portion of traffic acquisition costs was more than $26 billion.

The slide included numbers dating back to 2014, when Google booked revenue of roughly $47 billion for the division and paid about $7.1 billion for the default status. That means revenue for Search+ roughly tripled between 2014 and 2021, while this portion of TAC costs nearly quadrupled.

While Google regularly reports overall TAC, that number also includes the amount Google pays to network partners for ads shown on their properties, according to its 10-K filing with the U.S. Securities and Exchange Commission.

The other portion of the overall TAC figure Google reports in earnings consists of the payments it makes to "distribution partners who make available our search access points and services," according to the 10-K. Google says its "distribution partners include browser providers, mobile carriers, original equipment manufacturers and software developers." This is the portion of TAC that appeared to be represented by the slide, which referred only to Search+ revenue.

Toyota Joins the Crowd to Adopt Tesla Charging Connector in 2025

Toyota Motor announced on October 19 that it will adopt Tesla's North American Charging Standard (NACS) in North America, just like Ford, General Motors, and many other competitors. Toyota and Lexus drivers will be able to charge at Tesla Supercharger stations starting in 2025.

According to an announcement, Toyota will integrate NACS connectors into the design of certain Toyota and Lexus battery EVs in 2025. One of the vehicles will be a new three-row battery SUV that will be assembled at the carmaker's plant in Kentucky, the US.

Toyota also said it will provide adaptors to its existing vehicles equipped with the Combined Charging System (CCS), another charging connector used in the US, so they can also charge at Tesla Superchargers.

According to the carmaker, Toyota and Lexus customers can charge at 84,000 level 2 and DC fast chargers across North America. The NACS adoption will gain drivers access to over 12,000 Tesla Superchargers.

Apple Watch Faces US Import Ban as Time Runs Out for Biden Veto

A potential ban on bringing Apple Watches into the US moved a step closer to reality this week when the US International Trade Commission (USITC) issued a limited exclusion order set to come into effect in 60 days. Cupertino's biggest hope appears to be President Joe Biden, who has the power to veto the ban before it is implemented.

Apple has found itself in the current situation as a result of the action by Masimo. The medical device company made a complaint to the USITC in 2021 claiming Apple infringed on one of its light-based pulse oximetry patents.

The technology at the center of the dispute arrived in the Apple Watch Series 6 in the form of sensors on the back of the device for reading wearers' blood oxygen levels. It's been used in all Series and Ultra editions of the smartwatch since then but is missing from the cheaper SE models.

In January, a judge ruled that Apple had infringed on one of Masimo's pulse oximeter patents, leaving the USITC to consider an import ban on the devices.

On Thursday, the USITC upheld the judge's ruling and issued a limited exclusion order on the infringing Apple Watches that will come into effect after a 60-day Presidential review period lapses and any appeals have failed.

It's noted that Presidents don't typically veto USITC decisions. But former President Obama vetoed a potential ban on iPhone and iPad imports in 2013 after the agency ruled that Apple infringed on Samsung's patents. Apple said that it would appeal the latest order in federal court.

If there is no veto and the appeals fail, Apple could be banned from bringing devices featuring light-based pulse oximetry functionality – i.e., not the SE - into the US or creating new devices using the technology. However, it's likely that Masimo would license its tech to Apple for a large sum.

The World Has to Add or Replace 50 million Miles of Transmission Lines by 2040

The world must add or replace 49.7 million miles of transmission lines by 2040 in order for countries to meet their climate goals and to achieve energy security priorities, according to a new report published by the International Energy Agency.

That amount is roughly equivalent to the total number of miles of electric grid that currently exists in the world currently, according to the IEA.

This remarkable scale up in the construction of transmission lines across the globe will require the annual investment in electric grids of more than $600 billion per year by 2030, which is double what current global investment levels are in transmission lines, the IEA says.

It will also require changes in how the electric grid in each country is operated and regulated.

The global focus on some clean energy technologies — including wind, solar, electric vehicles and heat pumps — is impressive, but investment in transmission lines has been insufficient and will ultimately become an ever-larger bottleneck, the IEA says.

“The recent clean energy progress we have seen in many countries is unprecedented and cause for optimism, but it could be put in jeopardy if governments and businesses do not come together to ensure the world’s electricity grids are ready for the new global energy economy that is rapidly emerging,” Fatih Birol, executive director of the IEA, said in a written statement published alongside the new report.

“This report shows what’s at stake and needs to be done. We must invest in grids today or face gridlock tomorrow,” Birol said.

There are currently 1,500 gigawatts of renewable clean energy projects in what the IEA calls “advanced stages of development” that are waiting to get connected to the electric grid around the world. For some sense of perspective, a mid-size city needs a gigawatt of electricity, Microsoft co-founder and climate investor Bill Gates said in his book, “How to Avoid a Climate Disaster.”

The 1,500 gigawatts of renewable clean energy projects waiting to be connected to the electric grid is five times the total wind and solar power added around the globe in 2022, the IEA says.

Demand for electricity is going to continue to rise as more sectors of the global economy transition to electric power.

Also, the electric grids were constructed to bring electricity from locations where fossil fuels were burned to where that electricity was needed. As the world works to transition toward a clean energy economy, the

electric grid will increasingly need to run from where wind and solar farms are constructed to where electricity is used.

The consequences of falling further behind in building transmission lines is dire, the IEA says.

If the electric grid grows slowly, a scenario which the IEA called the “Grid Delay Case,” then an extra almost 60 billion metric tons of carbon dioxide emissions will be released between 2030 and 2050, the IEA says. That is equal to the amount of emissions the power sector across the entire world has released over the past four years, the IEA says.

Part of the challenge is that transmission lines take so long to build, especially compared to other parts of the energy infrastructure.

Building new transmission lines takes between five and 15 years, with planning and permitting included. By contrast, new renewable energy projects take between one and five years, and new infrastructure for charging electric vehicles takes less than two years, the IEA says. Therefore, investing in transmission line infrastructure improvement and growth must happen now or it will become an ever larger and more limiting factor in global decarbonization plans.

Connector Types and Technologies Poised for Growth

Connector Types and Technologies Poised for Growth

Bishop & Associates has just released a new market research report that identifies 13 connector types that are expected to grow at a significantly faster rate than the general market over the next three to five years. ***Connector Types and Technologies Poised for Growth*** is an 18-chapter, 308-page report that defines the key characteristics of each connector, as well as typical applications, major manufacturers, along with projected market values and five-year CAGR. This report also reviews emerging trends and technologies that are likely to have a significant impact on connector design and applications over this same period.

Despite the current unsettled economic and political environment, including elevated interest rates, the on-going wars in Ukraine, and Israel, potential takeover of Taiwan by China, and a highly contentious presidential election in 2024, development of advanced electronics continues at a furious pace. Potentially disruptive technologies such as artificial intelligence, autonomous transportation and quantum computing are driving manufacturers of electronic components to upgrade existing devices and introduce new products that can support them.

The imperative to constantly develop new interconnect technology to keep pace with escalating design requirements remains a core value of the electronic interconnect industry. The connector industry has continued to invest in the development and tooling of many upgraded and new connectors that support demands for faster speed, higher current, longer reach, improved signal integrity, and greater packaging density. Demand for increased Internet bandwidth and capacity is driving massive expansion of hyperscale data centers enabled by expanded use of fiber optic links and new architectures utilizing silicon photonics. The imperative to reduce system power consumption and resulting heat are also impacting connector selection.

The bump in personal computer sales stimulated by the pandemic work from home movement has ended as employers try to entice or mandate return to the office. On the other hand, the war in Ukraine and the Middle East is depleting the existing. stockpile of weapons which should translate to improved business conditions in the advanced military equipment and arms market for several years.

Each of the 13 connector types and 15 technologies identified in this new report include a product description with key mechanical and electrical performance characteristics. This report also pinpoints significant packaging and semiconductor trends that are influencing the basic system architecture of next generation high-performance computing and data center networks. Emerging applications across multiple market segments are also identified. Global market values and forecasts covering the years 2022 through 2028, with a five-year CAGR, document our growth expectations for each product type.

Issues explored in this report include:

1. Which existing connector types are poised for exceptional sales growth and why?

2. What new electronic products and technologies are driving connector growth?

3. Which industry segments will utilize these connectors? Will certain segments require the development of entirely new connectors to address specific applications?

4. Who are the leading manufacturers of these connectors? What competitive advantages do they offer?

5. Will advanced material technology change the way connectors are designed, fabricated, and utilized?

6. In which applications have the performance advantages of fiber optic interfaces reached applied cost parity with traditional copper circuits?

7. What improvements are connector manufacturers making in the performance of their flagship backplane connector families to support next generation applications?

8. What technology is a work in progress but introduces another solution to supporting next generation ASICs?

9. Which of the many pluggable small form factor transceivers are leading in high-bandwidth applications?

10. What factors may limit the use of pluggables in next generation high-performance applications?

11. How is the design imperative to reduce system power consumption translating to component selection?

12. Will new “cobots” or robots using AI technology fill the current gap in blue collar workers?

13. What potentially disruptive technologies may impact connector design and utilization over the next five years?

14. Which connectors defined by an updated industry standard or supported by an industry consortium show exceptional growth?

The term “connectivity” has become the mantra for the expanding universe of electronic devices that pervade our world today. People-to-people, machine-to-machine, as well as people-to-machine communication is spawning entirely new classes of electronic devices. Capabilities such as facial recognition, location awareness, and artificial intelligence can provide much enhanced interaction with our devices, while creating new vulnerabilities for hackers to target.

Electronic connectors now play an increasingly critical role in the performance of the end device as well as the infrastructure that supports it. Development of a new connector typically is the result of an identified gap in the mix of current interfaces in terms of bandwidth, physical size, pin count, durability, current rating, termination method, and price. Connector manufacturers are constantly on the outlook for new technology that may require a unique set of performance requirements as well as disruptive technologies that could quickly make a current product obsolete.

Connectors and Technologies Poised for Growth provides useful insight on key interconnects and technologies that we anticipate will propel the electronics industry over the next five years.

The following table of contents shows the detail provided in this new report.

Table of Contents

To Order *Connector Types and Technologies Poised for Growth*

Research Report P-606-23, ***Connector Types and Technologies Poised for Growth*** is available for $5,285. If you would like additional information about this report, or would like to place an order, please complete the following form, and email or mail it to Bishop & Associates, Inc. To place your order on our website: **http://store.bishopinc.com/**.

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What's New ?

Bishop & Associates has recently completed several new research reports about the worldwide connector industry. A table of contents for each report can be found at **https://store.bishopinc.com**.

☐ **Report P-606-23**	**Connector Types and Technologies Poised for Growth (October 2023) NEW**
☐ **Report M-121-23**	**2023 Top 100 Connector Manufacturers (August 2023) NEW**
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☐ **Report M-310-21**	**Instrumentation Market for Connectors (June 2021)**
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THE BISHOP REPORT - CONNECTOR INDUSTRY YEARBOOK

An annual corporate subscription to *THE BISHOP REPORT* (12 issues) is available for $2,950, which includes an unlimited number of subscribers and one PDF version of the ***Connector Industry Yearbook*** report (normally $1,500).

The Bishop Report subscription includes access, through ***Bishopinc.com***, to prior issues of The Bishop Report, 30-40 yearly News Briefs, Industry Financial Benchmarks, and various connector industry indices.

Click here to view an expanded report description, and a complete table of contents, for all Bishop & Associates' research reports.

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