The Bishop Report
Performance and Forecast of the World Connector Industry

Issue No. 366 | 2nd Quarter 2023 | April 2023

March Orders Down -14.0%
Sales Down -0.9% - The Recession Begins?

Regional Performance:
World sales declined -0.1% YTD in March, but Europe achieved the growth at +5.9%.

Worldwide, orders were down -16.9% YTD. China had the worst performance at -24.0%.

1Q23 Industry Results:
First quarter 2023 resulted in flat connector industry performance of -0.1%.

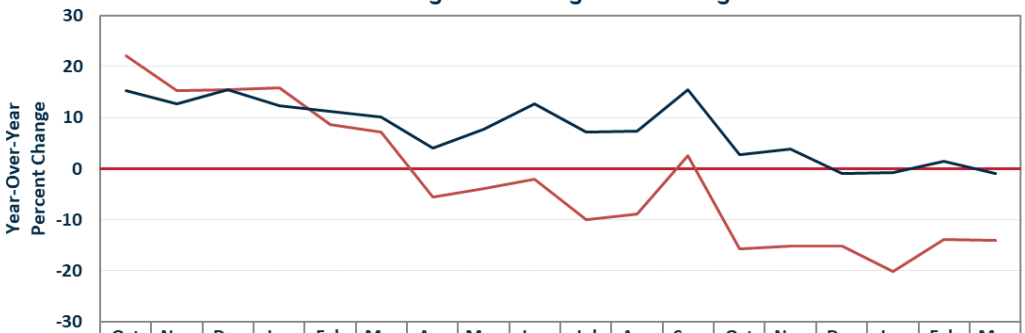
2023 Historical Outlook:
Using a historical analysis of industry sales, the full year forecast could range from $89,363 million with 6.3% growth to $83,382 million with -0.8% growth. Bishop's forecast is for +1.9% growth.

Industry Backlog:
March's backlog was $22,233 million (13.6 weeks), up from $21,422 million (12.6 weeks) in February.

2022 Currency Impact:
The industry declined -0.1% YTD in March in USD and +1.7% in local currencies.

March bookings were down -14.0%, the sixth consecutive month of double-digit declines. Billings were down -0.9%. The backlog in March increased to $22,233 million or 13.6 weeks.

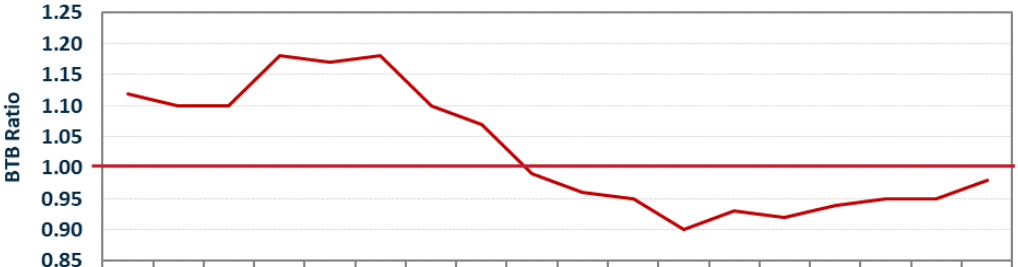
Bookings and Billings YOY Change



	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
Bookings	22.1	15.3	15.5	15.9	8.7	7.1	-5.5	-3.9	-2.1	-9.9	-8.8	2.6	-15.6	-15.2	-15.1	-20.1	-13.8	-14.0
Billings	15.3	12.8	15.5	12.4	11.2	10.2	4.1	7.7	12.7	7.1	7.3	15.5	2.8	3.9	-0.9	-0.8	1.40	-0.9

The book-to-bill ratio in March was 0.98 and YTD was 0.96.

Connector Industry Book-to-Bill



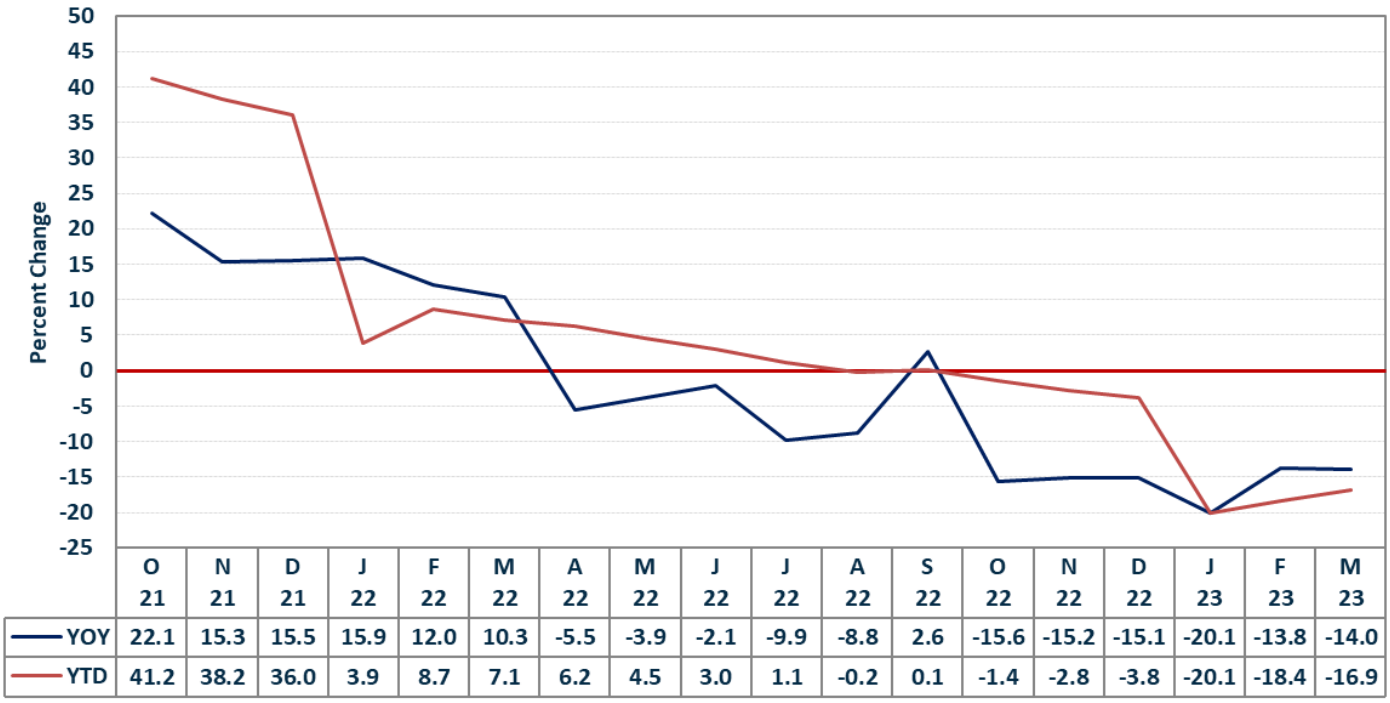
	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
BtB	1.12	1.10	1.10	1.18	1.17	1.18	1.10	1.07	0.99	0.96	0.95	0.90	0.93	0.92	0.94	0.95	0.95	0.98

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%		81.9%	-5.5%		42.9%	6.2%	
May	5.1%	7.0%		86.4%	-3.9%		50.5%	4.5%	
Jun	-8.3%	-6.7%		59.7%	-2.1%		51.9%	3.0%	
Jul	-1.9%	-9.6%		36.4%	-9.9%		49.6%	1.1%	
Aug	6.6%	8.0%		32.5%	-8.8%		47.1%	-0.2%	
Sep	-11.9%	-1.0%		19.1%	2.6%		43.7%	0.1%	
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%	

Bookings - YOY and YTD



	O 21	N 21	D 21	J 22	F 22	M 22	A 22	M 22	J 22	J 22	A 22	S 22	O 22	N 22	D 22	J 23	F 23	M 23
YOY	22.1	15.3	15.5	15.9	12.0	10.3	-5.5	-3.9	-2.1	-9.9	-8.8	2.6	-15.6	-15.2	-15.1	-20.1	-13.8	-14.0
YTD	41.2	38.2	36.0	3.9	8.7	7.1	6.2	4.5	3.0	1.1	-0.2	0.1	-1.4	-2.8	-3.8	-20.1	-18.4	-16.9

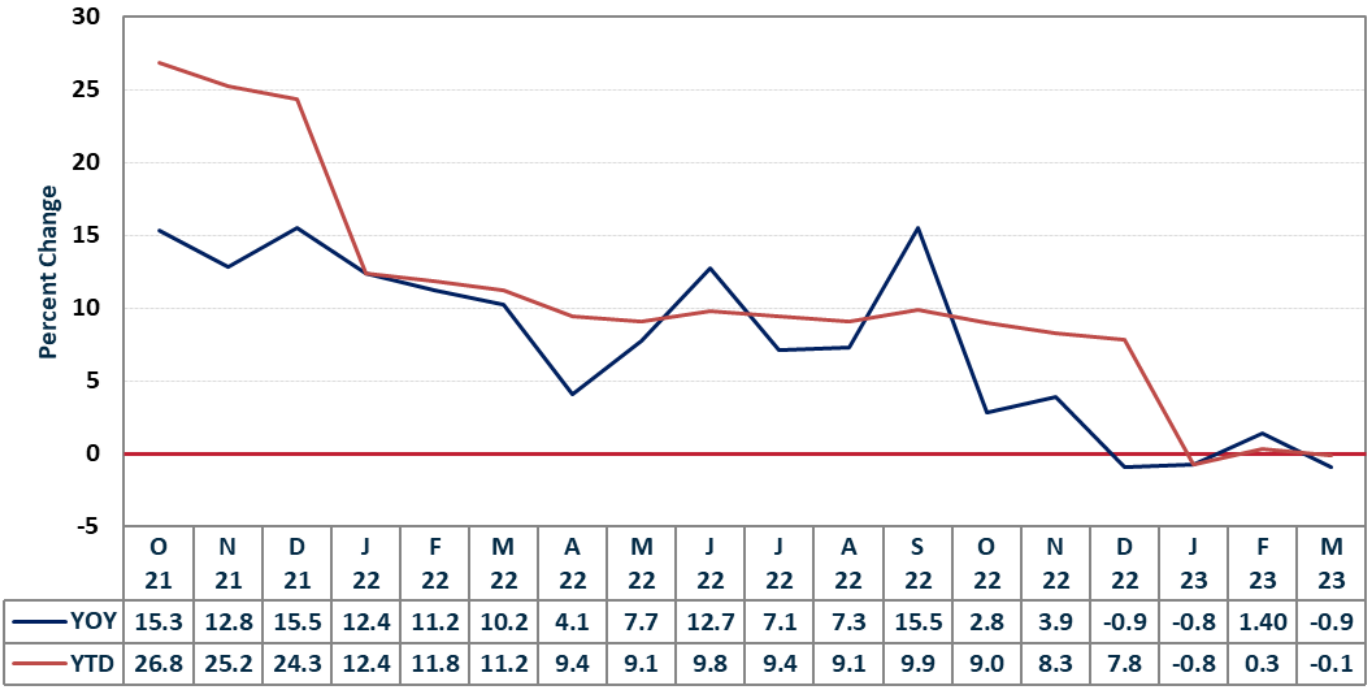
- March bookings decreased -14.0% YOY and -16.9% YTD. Orders have decreased in double-digits for the last six months.
- Orders decreased -1.8% sequentially.
- The book-to-bill ratio for March was 0.98 and YTD was 0.96.

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%		49.5%	4.1%		29.4%	9.4%	
May	7.0%	10.7%		47.1%	7.7%		32.8%	9.1%	
Jun	-3.8%	0.7%		33.5%	12.7%		33.0%	9.8%	
Jul	-2.0%	-7.1%		20.6%	7.1%		31.0%	9.4%	
Aug	8.7%	8.9%		21.5%	7.3%		29.7%	9.1%	
Sep	-2.3%	5.1%		19.4%	15.5%		28.2%	9.9%	
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



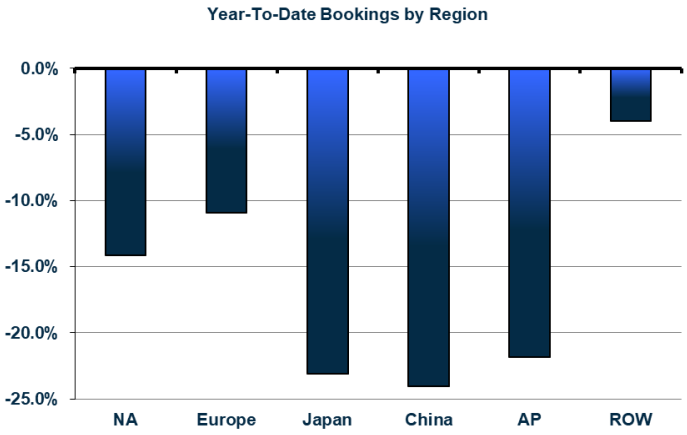
	O 21	N 21	D 21	J 22	F 22	M 22	A 22	M 22	J 22	J 22	A 22	S 22	O 22	N 22	D 22	J 23	F 23	M 23
YOY	15.3	12.8	15.5	12.4	11.2	10.2	4.1	7.7	12.7	7.1	7.3	15.5	2.8	3.9	-0.9	-0.8	1.40	-0.9
YTD	26.8	25.2	24.3	12.4	11.8	11.2	9.4	9.1	9.8	9.4	9.1	9.9	9.0	8.3	7.8	-0.8	0.3	-0.1

- March billings decreased -0.9% YOY and -0.1% YTD.
- Sequentially, billings decreased -4.4% in March.

Regional Performance: BOOKINGS

March 2023 Bookings

Region	Sequential	YOY	YTD
NA	-7.6%	-15.9%	-14.1%
Europe	1.4%	-4.8%	-10.9%
Japan	-0.6%	-17.8%	-23.1%
China	-0.3%	-20.5%	-24.0%
AP	1.7%	-18.2%	-21.9%
ROW	-5.0%	1.1%	-3.9%
Total	-1.8%	-14.0%	-16.9%



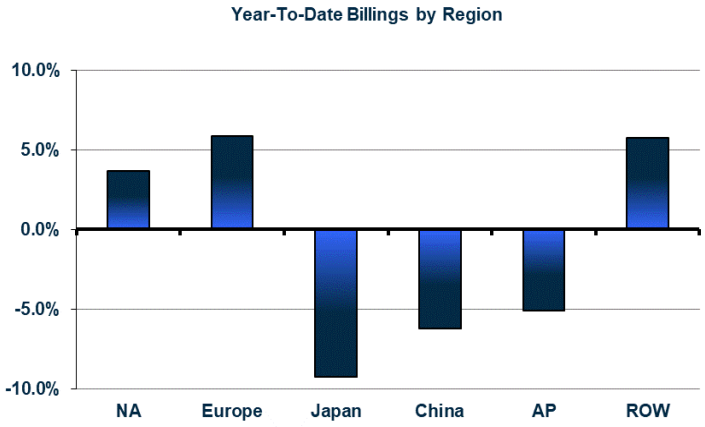
- March bookings decreased -14.0% YOY.
- YOY orders declined in all regions except ROW.
- China's YOY bookings decreased the most at -20.5%.
- All regions have negative YTD results.
- The book-to-bill ratio was 0.98, the tenth consecutive month below 1.00.

Note, orders have declined in 11 of the past 12 months, strongly suggesting that we are moving toward a recession in the industry.

Regional Performance: BILLINGS

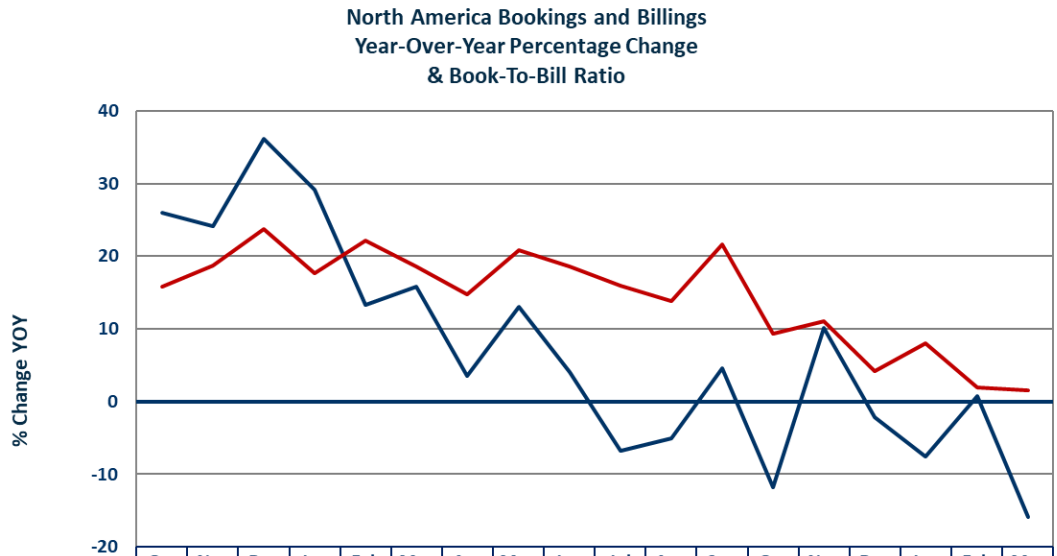
March 2023 Billings

Region	Sequential	YOY	YTD
NA	-5.1%	1.5%	3.6%
Europe	-8.0%	1.7%	5.9%
Japan	-5.5%	-10.2%	-9.2%
China	0.1%	-2.2%	-6.2%
AP	-2.9%	-5.7%	-5.1%
ROW	-5.2%	3.5%	5.7%
Total	-4.4%	-0.9%	-0.1%



- March connector sales decreased -0.9% YOY.
- All regions contracted sequentially except China.
- Three regions grew in low single-digits YOY (North America, Europe, and ROW).
- Industry growth is down -0.1% year-to-date in US dollars and up +1.7% in local currencies (see page 18).

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.

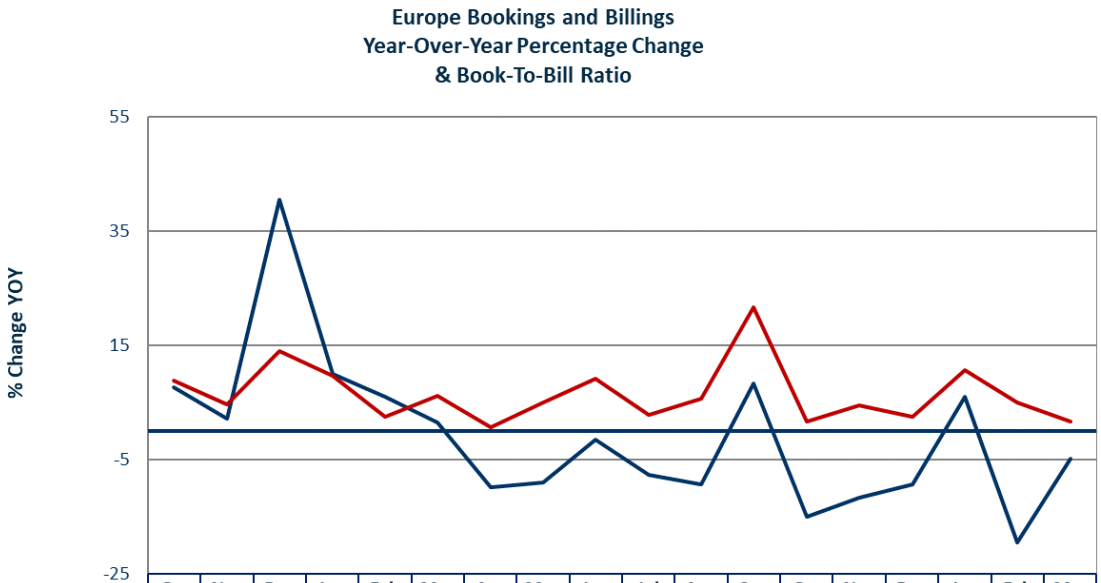


	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
Bookings	26.0	24.2	36.2	29.1	13.3	15.8	3.5	13.0	4.0	-6.7	-5.0	4.6	-11.8	10.1	-2.2	-7.6	0.7	-15.9
Billings	15.8	18.7	23.7	17.6	22.2	18.6	14.8	20.8	18.6	15.9	13.8	21.6	9.4	11.1	4.2	8.0	2.0	1.5
Billing SEQ	-4.4	7.8	-1.9	-6.9	19.1	-4.6	-7.2	14.5	-6.6	-3.9	12.7	1.2	-13.9	9.4	-8.0	-3.6	12.4	-5.1
BTB	1.14	1.11	1.07	1.25	1.10	1.16	1.11	1.06	1.04	0.94	0.95	0.87	0.94	0.91	1.00	0.96	0.98	0.95

North America Performance

- Sales grew +1.5% and orders contracted -15.9% YOY in March. North American billings were down sequentially -5.1%. The book-to-bill was 0.95.
- Preliminarily, 1Q23 US GDP grew 1.6% YOY and 1.1% sequentially.
- US inflation slowed to 5.0% in March, the lowest since May 2021. The overall inflation rate has been at or above 5% for the last 22 months. Core inflation increased to 5.6%.
- Industrial production increased 0.5% YOY in March, the smallest increase in two years.
- Manufacturing PMI went up to 50.4 in March, the first expansion of manufacturing activity in five months.
- US unemployment was down slightly to 3.5% in March.
- Retail sales were up 2.3% YOY in March.
- Housing starts were down 0.8% sequentially in March.
- US automotive sales in March increased 9.4% YOY according to MarkLines.
- Consumer confidence increased to 63.5 in April from 62.0 in March.
- The trade deficit increased to $70.5 billion in February, the highest in four months.
- The debt ceiling showdown is looming in Congress. The failure to act soon could results in a significant drop in the financial markets and wreak havoc on an already fragile economy.

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.

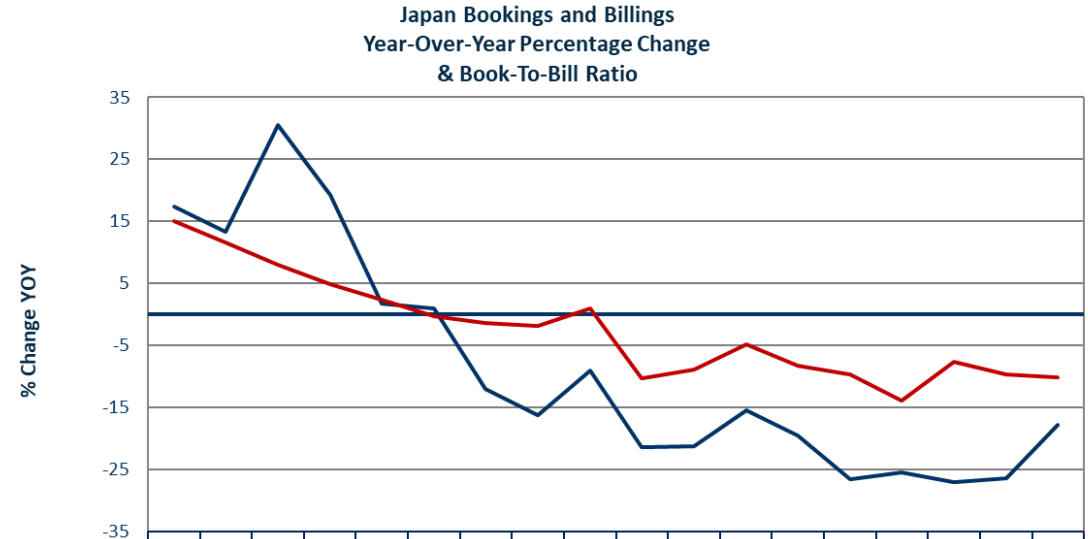


	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
Bookings	7.6	2.1	40.4	9.9	6.0	1.5	-9.8	-9.0	-1.5	-7.7	-9.3	8.3	-15.0	-11.7	-9.4	6.0	-19.6	-4.8
Billings	8.8	4.6	13.9	9.6	2.4	6.2	0.6	5.0	9.1	2.8	5.6	21.7	1.6	4.5	2.4	10.7	5.0	1.7
Billing SEQ	-7.4	12.5	-9.0	-2.3	21.7	-4.5	-13.1	15.9	-2.9	-11.3	11.9	13.1	-22.8	16.0	-10.9	5.6	14.5	-8.0
BTB	1.08	1.06	1.13	1.18	1.27	1.14	1.10	1.06	1.02	1.02	0.96	0.87	0.97	0.97	1.00	0.99	0.96	1.06

Europe Performance

- YOY billings were up +1.7% and orders were down -4.8%. The book-to-bill ratio was 1.06. Sequentially, sales were down -8.0%.
- Preliminarily, 1Q23 GDP grew 1.3% YOY and 0.1% sequentially.
- Euro Area industrial production increased 2.0% YOY in February.
- The manufacturing PMI declined to 45.8 in April and represented the tenth consecutive month of declining factory activity.
- Retail sales decreased 3.0% YOY in February, the fifth straight month of declining sales.
- The inflation rate increased to 7.0% in April from 6.9% in March. Core inflation, which excludes energy and food, eased slightly to 5.6% in April. In the UK, the inflation rate was 10.1% which was the seventh consecutive month of the rate at or above 10%.
- New car registrations grew 26.1% in March and were up 17.5% for 1Q23 according to the ACEA. Shortages of semiconductors is becoming less of an issue. Car sales have now increased for the last eight consecutive months.
- The unemployment rate decreased slightly to 6.5% in March.
- Consumer confidence was -17.5 in April, the highest rating since February 2022.

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.

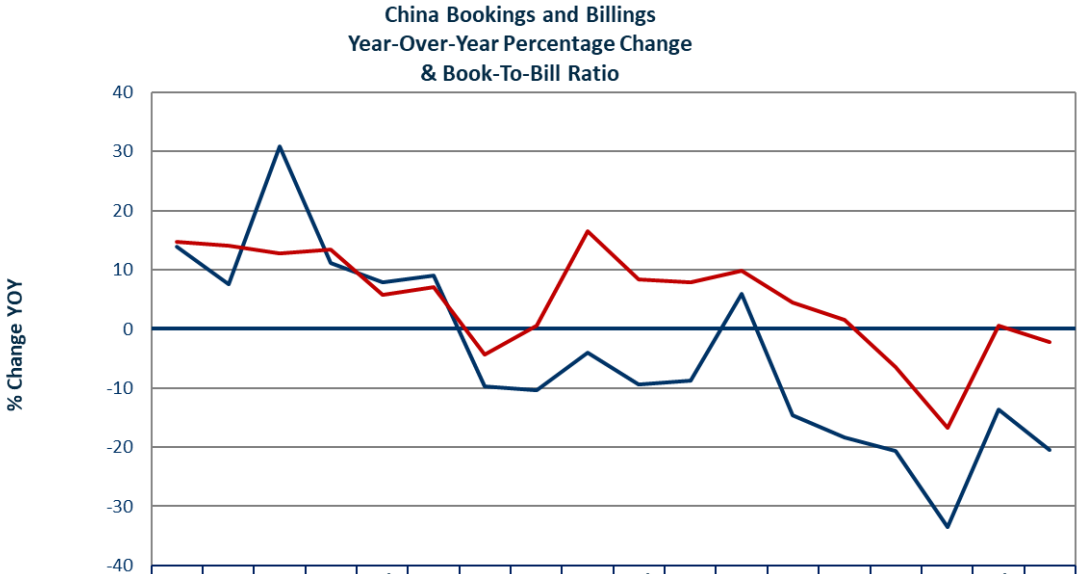


	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
Bookings	17.4	13.3	30.5	19.2	1.8	1.0	-12.1	-16.3	-9.1	-21.5	-21.3	-15.5	-19.6	-26.6	-25.5	-27.1	-26.4	-17.8
Billings	15.0	11.6	8.0	4.9	2.4	-0.3	-1.4	-1.8	0.9	-10.3	-8.9	-4.9	-8.3	-9.7	-13.9	-7.7	-9.7	-10.2
Billing SEQ	-4.5	9.7	-4.5	-11.1	15.1	-5.0	-5.0	-0.2	4.9	-9.7	7.0	0.9	-7.2	8.1	-8.9	-4.7	12.6	-5.5
BTB	1.14	1.13	1.14	1.17	1.12	1.38	1.09	1.05	0.99	1.02	0.95	0.96	1.01	0.94	0.99	0.92	0.94	0.99

Japan Performance

- Bookings were down -17.8% in March. Sales declined -10.2% YOY, and sequentially were down -5.5%. Japan's book-to-bill ratio was 0.99.
- The inflation rate in March fell to 3.2% from its high point of 4.3% in January (and 3.3% in February).
- Japan's currency devalued 5.5% against the US dollar in March YTD (far below the rates in 2022).
- The industrial production rate decreased 0.7% YOY in March. This is five consecutive months of decline.
- March's retail sales grew 7.2% YOY. This is the 13th straight month of growth.
- Exports were up 15.3% sequentially and 4.3% YOY in March.
- The April manufacturing PMI was 49.5. This was the sixth consecutive month of factory contraction.
- Housing starts were down 3.2% YOY in March.
- Consumer confidence was 35.4 in April, the highest reading since August 2022.

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.

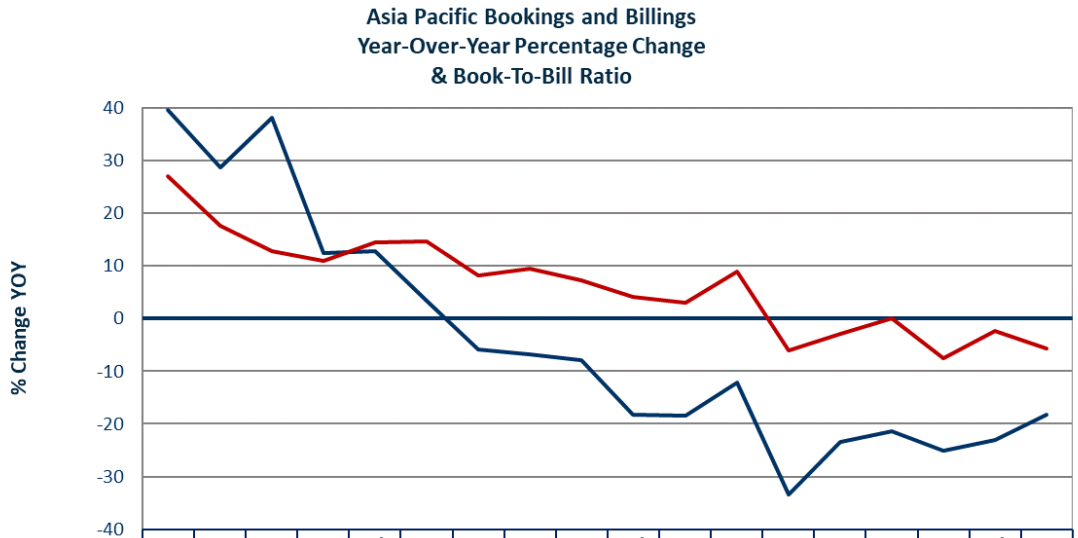


	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
Bookings	13.9	7.5	30.9	11.2	7.9	9.0	-9.7	-10.4	-4.0	-9.4	-8.7	6.0	-14.6	-18.4	-20.7	-33.5	-13.7	-20.5
Billings	14.8	14.1	12.8	13.4	5.8	7.0	-4.4	0.6	16.5	8.3	7.8	9.9	4.5	1.6	-6.5	-16.7	0.6	-2.2
Billing SEQ	-2.4	11.1	-5.2	-2.7	-3.9	3.2	-15.4	10.3	12.5	-6.6	5.2	2.9	-7.2	8.1	-12.7	-13.4	16.1	0.1
BTB	1.08	1.00	1.03	1.12	1.14	1.22	1.12	1.07	0.94	0.94	1.00	0.97	0.90	0.87	0.88	0.89	0.93	0.92

China Performance

- China's sales decreased -2.2% YOY and orders decreased -20.5% YOY. The BTB was 0.92. Sequentially, sales increased +0.1% in March.
- 1Q23 GDP grew 4.5% YOY and 2.2% sequentially with strong March performance in exports, retail sales, and industrial output.
- Industrial production grew 3.9% YOY in March.
- China's manufacturing PMI unexpectedly fell to 50.0 in March from 51.6 in February.
- Retail sales rose 10.6% YOY in March.
- Exports from China increased 14.8% YOY in March to an eight-month high of $316 billion.
- China's total vehicle sales increased 9.7% YOY in March.
- The headline inflation rate decreased to 0.7% in March, the lowest rate since September 2021. Core inflation was at 0.7%.
- The unemployment rate dropped to 5.3% in March.

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.

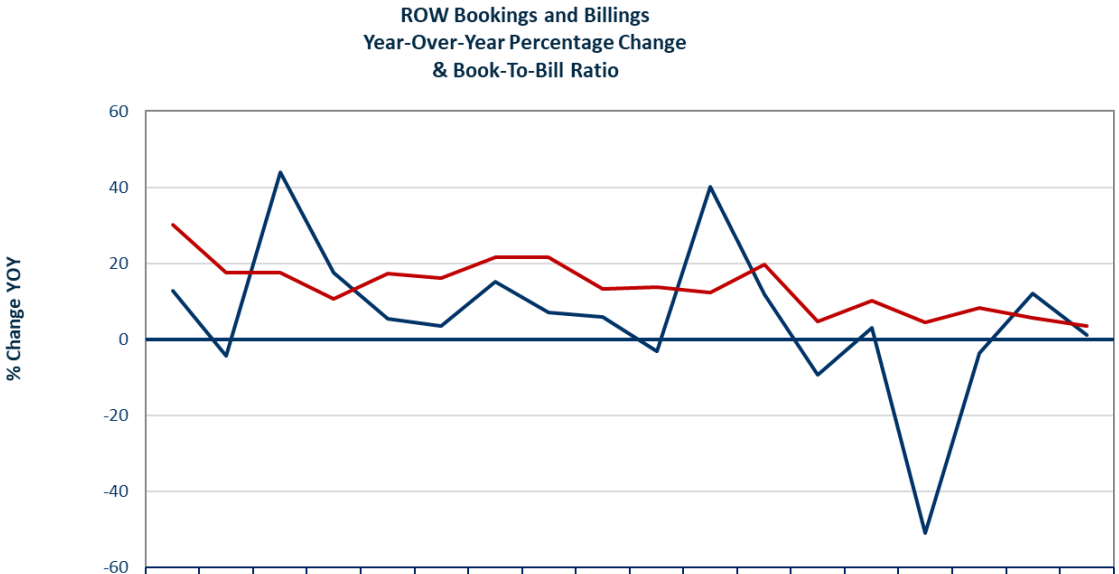


	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
Bookings	39.7	28.7	38.1	12.4	12.9	3.4	-5.9	-6.7	-7.9	-18.2	-18.4	-12.1	-33.4	-23.5	-21.3	-25.1	-23.1	-18.2
Billings	27.0	17.6	12.9	11.0	14.5	14.7	8.1	9.4	7.3	4.1	3.0	9.0	-6.0	-2.9	0.0	-7.5	-2.3	-5.7
Billing SEQ	4.7	4.4	-7.1	-2.2	5.2	0.9	-5.0	7.3	-2.9	-5.7	3.3	10.8	-11.2	9.9	-6.0	-9.9	11.3	-2.9
BTB	1.23	1.50	1.04	1.16	1.15	1.21	1.07	1.06	0.94	0.86	0.96	0.84	0.89	0.97	0.82	0.93	0.92	0.96

Asia Pacific Performance

- Orders were down -18.2% in March and sales were down -5.7% YOY. The book-to-bill ratio was 0.96. Sequentially, sales decreased -2.9%.
- India's industrial production grew 5.6% YOY in February. Exports decreased 13.9% YOY in March to $38.4 billion. Electrical and electronic equipment only represents 4.8% of total exports. The manufacturing PMI increased to 57.2 in March. There have been, however, 21 straight months of factory expansion. Inflation in March decreased to 5.66%.
- South Korea's industrial production fell 7.6% YOY in March for the sixth straight month of declines. Exports decreased 14.2% YOY in April after a 13.6% drop in the prior month. Electrical and electronic equipment comprise 31% of their exports. The manufacturing PMI was 48.1 in April for the 10th consecutive month of contracting factory activity. Inflation decreased to 3.7% in March.

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.



	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
Bookings	12.7	-4.3	44.0	17.6	5.3	3.5	15.2	7.2	5.9	-3.1	40.1	11.8	-9.3	3.0	-50.9	-3.5	12.1	1.1
Billings	30.2	17.6	17.6	10.7	17.2	16.2	21.5	21.6	13.3	13.7	12.4	19.7	4.7	10.2	4.4	8.3	5.6	3.5
Billing SEQ	1.3	1.9	-7.1	-5.8	18.5	-3.3	-5.3	13.1	-8.2	-2.2	9.6	2.0	-11.5	7.3	-12.0	-3.1	15.9	-5.2
BTB	1.01	0.85	1.89	1.16	1.20	1.07	1.11	1.06	1.02	1.10	0.92	0.86	0.90	0.97	0.89	1.04	1.04	1.04

Rest of World Performance

- Orders increased +1.1% and sales increased +3.5% YOY in March. Sequentially, sales in the region decreased -5.2%. The book-to-bill ratio was 1.04.
- Brazil's industrial production declined 2.4% YOY in February. The inflation rate decreased to 4.65% in March. The manufacturing PMI dropped to 44.3 in April, the sixth consecutive month of factory contraction. The unemployment rate rose to 8.8% in March. Exports fell 0.3% YOY in April to $27.4 billion. Retail sales grew 1.0% YOY in February.
- Russia’s economic data is still questionable but here are a few data points. 4Q22 GDP contracted 2.7% YOY. The GDP for 2022 is reported at a contraction of 2.1%. Their industrial production grew slightly in March at 1.2%, the first growth in one year. Their retail sales have shown decreasing sales for the last 11 months.

First Quarter 2023 Industry Results

The connector industry achieved sales in 1Q23 of $21,179 million, down -0.1% in US dollars compared to 1Q22, and up +5.0% sequentially.

The following table shows industry sales by quarter for 2021, 2022, and 2023.

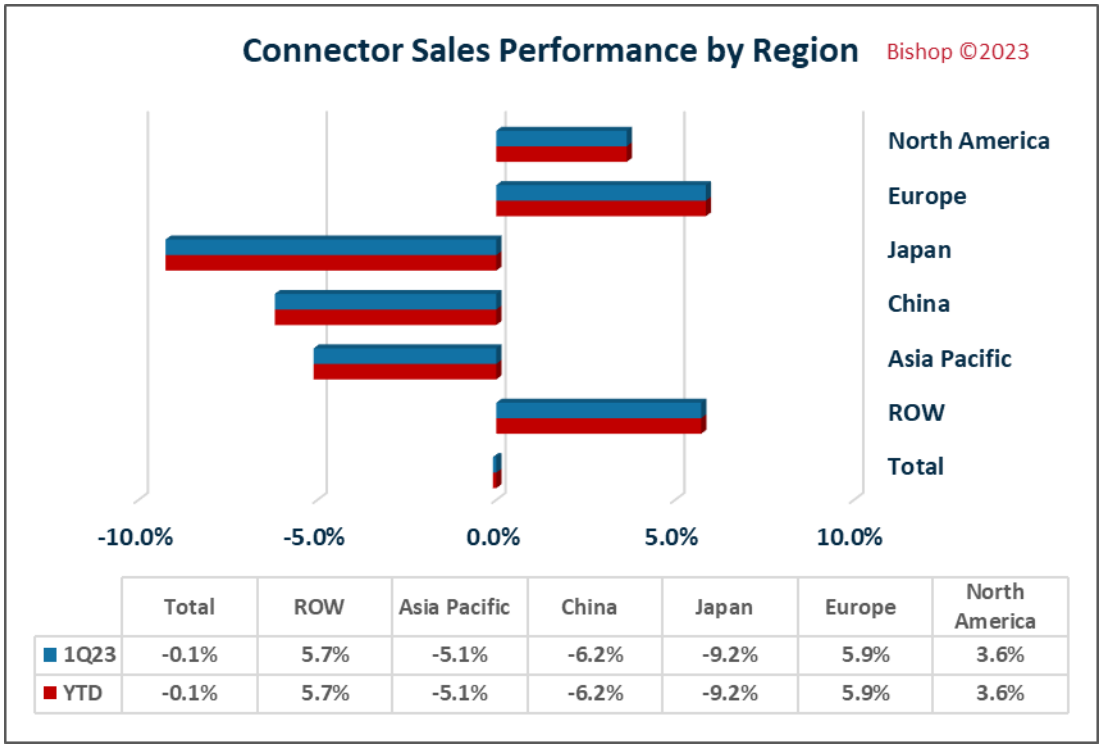
Connector Industry Quarterly Sales Results/Forecast

2021, 2022, and 2023

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%	$21,000	2.1%
3Q	$20,150	$22,160	10.0%	$21,321	-3.8%
4Q	$19,780	$20,171	2.0%	$22,200	10.1%
Total	$77,991	$84,091	7.8%	$85,700	1.9%

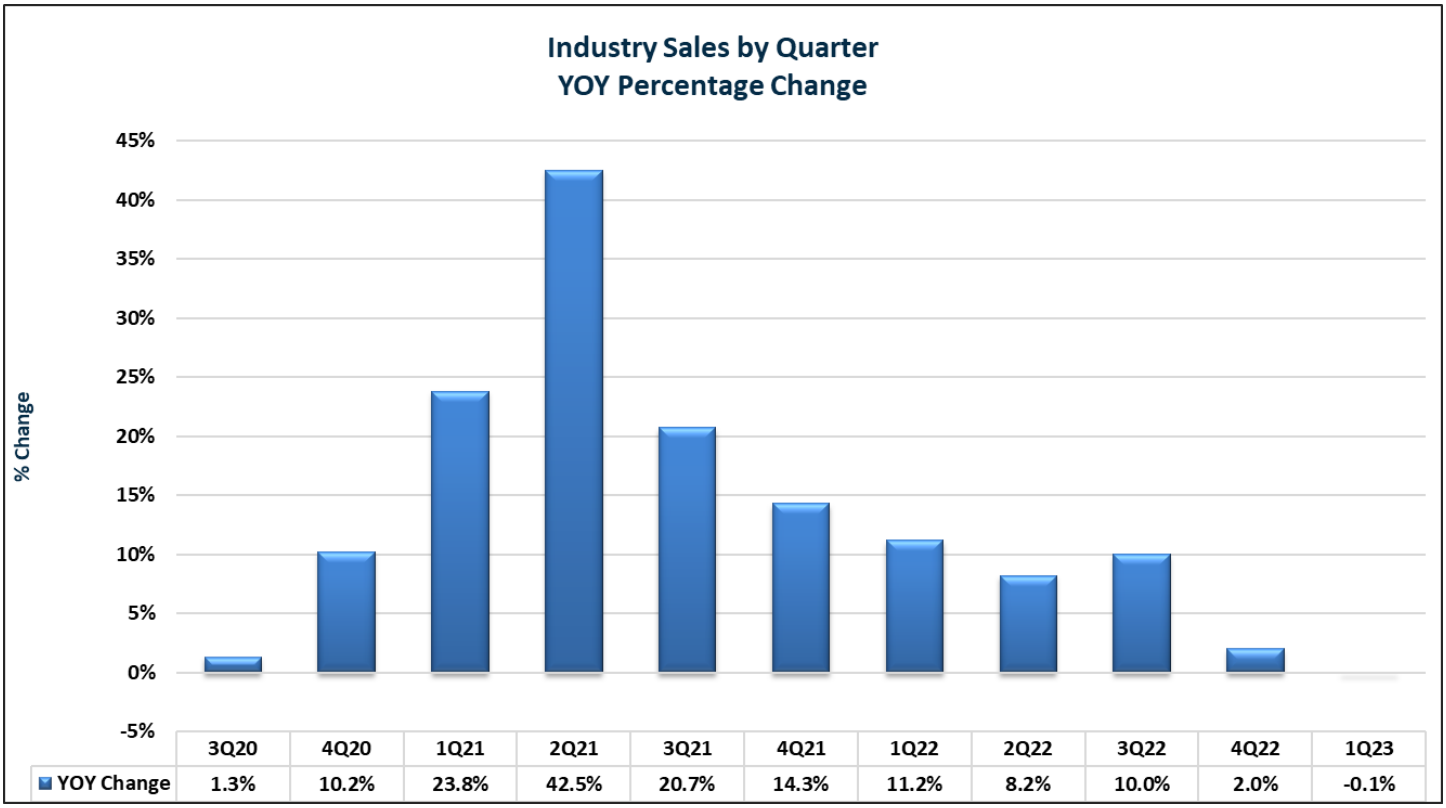
$ Million, Bishop ©2023, Forecast in Red

Year-to-date sales growth by region in the first quarter of 2023 can be seen in the following chart.



	Total	ROW	Asia Pacific	China	Japan	Europe	North America
1Q23	-0.1%	5.7%	-5.1%	-6.2%	-9.2%	5.9%	3.6%
YTD	-0.1%	5.7%	-5.1%	-6.2%	-9.2%	5.9%	3.6%

Connector industry sales growth by quarter can be seen in the following chart. In the last contraction, the industry contracted for seven consecutive quarters. Prior to that, the industry achieved 11 consecutive quarters of growth. We achieved 10 consecutive quarters of growth before the contraction in 1Q23.



	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23
YOY Change	1.3%	10.2%	23.8%	42.5%	20.7%	14.3%	11.2%	8.2%	10.0%	2.0%	-0.1%

We may be at the beginning of a down business cycle. Connector order have declined in 11 of the last 12 months. Semiconductor sales have declined in the past seven months. These are not good signs for future connector demand.

Industry Backlog Is 13.6 Weeks

The industry averaged $226 million in daily shipments in the first quarter of 2023. This equals $1,630 million sales per week. The ending backlog is up to $22,233 million or 13.6-weeks supply.

We ended 2022 with 14.2 weeks of backlog. The decline to 13.6 weeks is a function of flat demand based on current sales volume.

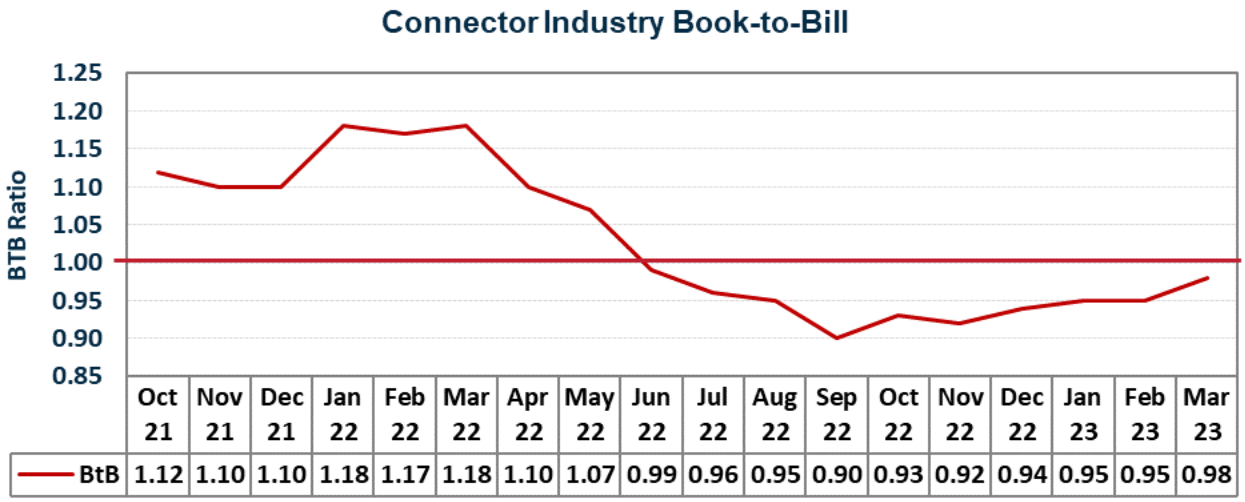
The following table compares 2022 industry backlog to the March 2023 ending backlog.

Industry Backlog

	2022	YTD Mar 2023
BtB Ratio	1.01	0.964
Beginning Backlog	$21,499	$22,983
Bookings	$85,575	$20,429
Billings	$84,091	$21,179
Ending Backlog	$22,983	$22,233
Backlog in Weeks	14.2	13.6

$ Millions

The industry has reported ten consecutive months of below 1.00 book-to-bill ratios. This is shown in the following graph. March's BTB ratio is 0.98 to 1.00.



The book-to-bill ratio has been below 1.00 for ten consecutive months beginning in June 2022.

Ending Backlog Since May 2022

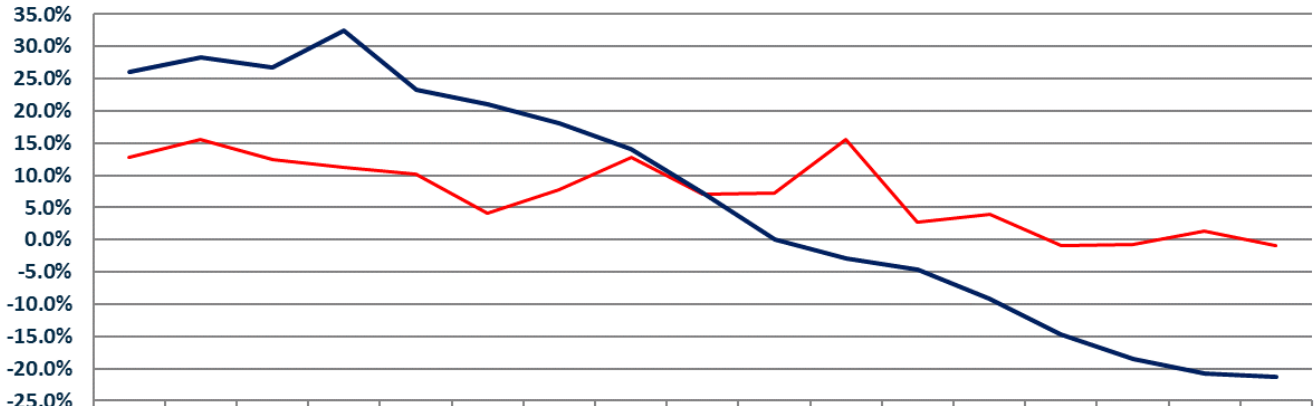
Month	Ending Backlog	BTB Ratio
May	$26,373	1.07
June	$26,302	0.99
July	$26,036	0.96
August	$25,673	0.95
September	$24,846	0.90
October	$24,396	0.93
November	$21,828	0.92
December	$22,983	0.94
January	$22,725	0.95
February	$21,422	0.95
March	$22,233	0.98

$ Millions

It is evident that demand is slowing:

- Orders were down -16.9% YTD March 2023.
- The book-to-bill ratio has been below 1.0 for ten consecutive months (see above chart).
- The two largest connector companies (TE and Amphenol) both reported low single-digit sales growth in 1Q23.
- The semiconductor industry has reported seven consecutive months of year-over-year sales declines which is never a good sign for electronics globally. (see the following chart)

Semiconductor and Connectors
Monthly Year-Over-Year Sales Performance



	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23
Conn	12.8%	15.5%	12.4%	11.2%	10.2%	4.1%	7.7%	12.7%	7.1%	7.3%	15.5%	2.8%	3.9%	-0.9%	-0.8%	1.4%	-0.9%
Semi	26.1%	28.3%	26.8%	32.4%	23.2%	21.1%	18.0%	14.1%	7.3%	0.1%	-3.0%	-4.6%	-9.2%	-14.7%	-18.5%	-20.7%	-21.3%

Connector sales performance was higher than semiconductors for the eighth month in a row. Semis sales growth has been negative for seven consecutive months.

2023 Outlook: A Historical Perspective

During the last five years (2018-2022), year-to-date March sales averaged 24.6% of the full year sales. Through March 2023, the connector industry has sold $21,179 million. Using the last five-year average as a forecasting tool, the industry will achieve 2023 sales of $86,093 million ($21,179 million divided by 24.6%). This would result in a $2,002 million sales increase from 2022 sales $84,091 million or a growth of +2.4%.

The following table presents a high, average, and low range of sales outcomes for 2023 based on March year-to-date and the five-year averages.

2023 Forecast Range

	Five Year Historical Range		
	High	**Average**	**Low**
Mar YTD Hist Sales %	23.7%	24.6%	25.4%
Mar Actual Sales	$21,179	$21,179	$21,179
Full Year Forecast	$89,363	$86,093	$83,382
2022 Actual Sales	$84,091	$84,091	$84,091
% Increase/Decrease	**6.3%**	**2.4%**	**-0.8%**

$ Millions

The following table summarizes the analysis including the Bishop forecast for 2023.

Category	2023 Forecast	% Growth
5 Year High	$89,363	6.3%
5 Year Average	$86,093	2.4%
Bishop Forecast	$85,700	1.9%
5 Year Low	$83,382	-0.8%

$ Millions

Using the historical method, the industry will achieve sales growth in the range of +6.3% to -0.8%. The Bishop forecast is for growth of +1.9%.

Note, the order demand for connectors is trending down. It would not surprise us if 2023 resulted in a decline in sales compared to 2022.

Currency Fluctuation Changes Performance from -0.1% in USD to +1.7% in Local Currencies

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

Local Currency to One USD
March 2022 versus March 2023

Currency	2022	2023	% Change
Euro	0.9233	0.9137	-1.0%
Yuan	6.4200	6.8736	7.1%
Yen	126.0493	132.9923	5.5%

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 February YTD sales performance by region in US dollars and local currencies.

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

Region	U.S.$	Local Currency
North America	3.6%	3.6%
Europe	5.9%	4.8%
Japan	-9.2%	-4.3%
China	-6.2%	0.5%
Asia Pacific	-5.1%	-5.1%
ROW	5.7%	5.7%
World	**-0.1%**	**1.7%**

Connector sales are 1.8 percentage points higher when stated in local currencies rather than in US dollars, putting industry performance at +1.7% growth in March (versus -0.1% in US dollars). This is the result of a stronger US dollar, on average, compared to the three primary currencies.

Significant Events

Intel Co-founder and Philanthropist Gordon Moore Died at 94

Gordon Moore, the Intel Corp. co-founder who set the breakneck pace of progress in the digital age with a simple 1965 prediction of how quickly engineers would boost the capacity of computer chips, has died. He was 94. Moore died Friday at his home in Hawaii, according to Intel and the Gordon and Betty Moore Foundation.

Moore, who held a Ph.D. in chemistry and physics, made his famous observation — now known as "Moore's Law" — three years before he helped start Intel in 1968. It appeared among a number of articles about the future written for the now-defunct Electronics magazine by experts in various fields. The prediction, which Moore said he plotted out on graph paper based on what had been happening with chips at the time, said the capacity and complexity of integrated circuits would double every year.

Strictly speaking, Moore's observation referred to the doubling of transistors on a semiconductor. But over the years, it has been applied to hard drives, computer monitors and other electronic devices, holding that roughly every 18 months a new generation of products makes their predecessors obsolete. It became a standard for the tech industry's progress and innovation.

Despite Growing Economic Uncertainties, the Electronics Manufacturing Industry Remains Upbeat

Per IPC's March 2023 Global Sentiment of the Electronics Supply Chain Report, the last month delivered another month of stable industry sentiment: industry demand appears to remain intact, production holds steady, and some labor challenges may be receding. Though overall sentiment is upbeat, roughly 58 percent of sentiment survey respondents expect to raise prices in 2023 with an average of an 8 percent increase.
Among other data, survey results show:

- Labor costs, orders, customer inventory, backlogs, and ease of recruitment is expected to remain relatively stable.
- Backlogs are rising more so in North America when compared to both Europe and APAC.
  - Nearly two-fifths (38 percent) of firms in North America indicate backlogs are on the rise, while a significantly lower 8 percent of European firms and 14 percent of those in APAC are experiencing a current increase.
- Material costs are declining at a faster pace among manufacturers in Europe vs. those in North America.
  - While 11 percent of firms in Europe indicate material costs are currently declining, 0 percent of firms in North America are presently reporting a decrease.
- The majority of manufacturers indicate less than 10 percent of 2022 revenue growth was attributable to pricing impacts, which holds true for manufactures in North America, Europe, and APAC.

Huawei Reports Biggest Profit Decline Ever as US Sanctions, Pandemic Controls Hit Chinese Giant

Huawei reported on Friday its biggest annual decline in profit on record as US sanctions continue to hit its business and strict pandemic controls in China weighed on the company.

The Chinese telecommunications giant said net profit for 2022 totaled 35.6 billion yuan ($5.18 billion), a 69% year-on-year decline. That's bigger than the 54% annual decline in 2011, according to CNBC calculations.

However, in 2021, the company got a big bump in profit after it sold off its Honor smartphone brand to a consortium of buyers, making the comparison with 2022 quite large. Huawei also named rising commodity prices, China's strict pandemic controls last year and the rise in its research and development spend, as reasons for the profit plunge.

Huawei said revenue rose 0.9% to 642.3 billion yuan in 2022, as the company stabilized its business following a more than 28% plunge in sales in 2021. The Shenzhen, China-headquartered firm has sought to diversify its business into new areas including cloud computing and automotive after a rough few years in which US sanctions have hampered the company.

PC Pain Persists in Q1 2023 Due to Excess Inventory and Poor Demand

Weak demand, excess inventory, and a worsening macroeconomic climate were all contributing factors for the precipitous drop in shipments of traditional PCs during the first quarter of 2023 (1Q23). Global shipments numbered 56.9 million, marking a contraction of 29.0% compared to the same quarter in 2022, according to preliminary results from the International Data Corporation.

The preliminary results also represented a coda to the era of COVID-driven demand and at least a temporary return to pre-COVID patterns. Shipment volume in 1Q23 was noticeably lower than the 59.2 million units shipped in 1Q19 and 60.6 million in 1Q18.

The pause in growth and demand is also giving the supply chain some room to make changes as many factories begin to explore production options outside China. Meanwhile, PC makers are also rejigging their plans for the remainder of the year and have begun to pull in orders for Chromebooks due to an expected increase in licensing costs later this year. That said, PC shipments will likely suffer in the near term with a return to growth towards the end of the year with an expected improvement in the global economy and as the installed base begins to think about upgrading to Windows 11.

Taiwan Foundries See Surge in Orders Transferred from China

The US' escalation of the chip war with China has prompted more companies to shift their orders to Taiwan-based pure-play foundries. However, contract prices provided by TSMC and other Taiwanese foundries for orders transferred from Chinese counterparts are highly stiff, with many requesting long-term contracts, a specific scale, and even "designation fees," according to industry sources.

Europe- and US-based chip vendors including fabless firms and automotive IDMs have gradually shifted their foundry orders from China to Taiwan over the last year, the sources said. Recently, China-based companies have also begun to diversify their foundry sources in order to spread risk.

TSMC, United Microelectronics (UMC), and Vanguard International Semiconductor (VIS) have benefited the most from this round of order transfers, the sources indicated. Powerchip Semiconductor Manufacturing (PSMC) has also captured a portion of the order transfers. Taiwan-based foundries intend to accept orders transferred from Chinese peers on a conditional basis in order to safeguard their long-term commercial interests, the sources said. The majority of the orders are urgent and unclear and are intimately related to trade concerns between the US and China.

DRAM Got Cheaper and Prices Will Continue to Fall

According to a report from TrendForce, DRAM prices have fallen 20% in the first quarter of 2023. This is a continued decline for the DRAM market as sales have been slowing for all sectors of the industry. Some DRAM manufacturers have already started layoffs as they see their revenues on a steep decline. For the second quarter of 2023, TrendForce says that prices are expected to fall another 10 to 15%. Despite production cuts already in effect, PC makers still have between 9 and 13 weeks of DRAM inventory. The mobile sector seems to be having healthier levels of inventory as mobile manufacturers were more conservative in their plans. Nonetheless, mobile DRAM pricing is also expected to decline by 10 to 15%. As consumer demand for DRAM was sluggish, suppliers looked to the server side of the business for sales, however this simply resulted in a huge pile-up of inventory for server DRAM.

Europe will invest €43 billion to make its own microchips

The European Union finally agreed on a new plan to boost its microchip industry. The multi-billion investment is focused on strengthening Europe's technological leadership, the EU said, but it could very well be an attempt to put the Old Continent on par with what market leaders are already doing right now.

After spending some months negotiating between the European Council and the European Parliament, the European Union has now officially approved a plentiful subsidy plan for its semiconductor industry. The European Chips Act will put €43 billion (roughly $47 billion) to bolster Europe's "competitiveness and resilience" in the microchip business, promoting an effective digital and green transition powered by hi-tech technology.

Right now, Europe has a 10% market share of global chip manufacturing; with the EU Chips Act, Brussels plans to double the EU's production capacity to 20% of the global market by 2030. The plan is also focused on strengthening Europe's research and technology capabilities over chip advancements, building innovation capacity in design manufacturing and packaging, developing an in-depth understanding of the global semiconductor supply chain, and addressing the skills shortage by attracting new talents and growing its own skilled workforce.

Microchips already are "strategic assets for key industrial value chains," the EU said, while the digital transformation opened new markets for the chip industry such as highly automated cars, cloud, IOT, connectivity, space, defense and supercomputers. The recent global semiconductor shortages also showed how the global supply chain has an "extreme" dependency on very few actors in a complex geopolitical context.

Shipments of Smart Home Devices Fell in 2022, But a Return to Growth is Expected in 2023

Global shipments of smart home devices declined for the first time in 2022 as shipments fell 2.6% year over year to 871.8 million units, according to the International Data Corporation. Smart TVs, which represented the largest category, experienced a 4.3% decline in 2022 due to tough year-over-year comparisons as the market for TVs and other products was extremely strong in 2021 due to COVID-related purchasing. Looking ahead, IDC forecasts a modest 2.2% growth in smart home device shipments in 2023 as the global economy recovers. This growth is expected to continue through 2027 with device volumes reaching 1.23 billion in 2027.

Apart from TVs, most other smart home categories such as security cameras, connected doorbells and door locks along with smart displays are expected to grow thanks to a growing installed base, a recovering economy, and the rise of emerging markets.

Manufacturing Activity Approaches 3-Year Low

Hopes for an early recovery this year are fading as the U.S. manufacturing index in March reached its lowest level in nearly three years. Factories are laying off workers and "rightsizing" in preparation for lackluster demand through most of 2023. The Institute for Supply Management's PMI contracted for the fifth straight month in March registering 46.3, the lowest level since May 2020. Any reading below 50.0 indicates contraction.

The employment index declined by 2.2 percent to a level of 46.9.

Most of the impediments to manufacturing growth — such as shortages and lockdowns — have subsided, said Tim Fiore, chair of the ISM's manufacturing survey committee, with the exception of pricing. ISM's pricing index fell below 50 in March but at 49.2 remains higher than pre-pandemic levels. The ISM's new orders index remained in contraction territory in March at 44. 3 percent.

March's production index increased by 0.5 percent from February to 47.8 percent, and order backlogs decreased 1.2 percent to 43.9. Both imports and exports dropped last month.

Worldwide IT Spending in 2023 Continues to Slowly Trend Downward

For the fifth consecutive month, International Data Corporation has lowered its 2023 forecast for worldwide IT spending as technology investments continue to show the impact of a weakening economy. In its new monthly forecast for worldwide IT spending growth, IDC projects overall growth this year in constant currency of 4.4% to $3.25 trillion. This is slightly down from 4.5% in the previous month's forecast and represents a swing from a 6.0% growth forecast in October 2022.

After reductions to PC forecasts a month ago, IDC has now scaled back its expectations for some additional hardware categories including servers, wearable devices, and peripherals. Forecasts have been reduced for on-premise infrastructure investments by enterprise buyers, while cloud and service provider deployments remain more resilient overall.

Service provider spending is still weakening from last year's highs as the industry adjusts to slower post-COVID growth but planned investments by cloud and hyperscale providers have broadly held up since last month. Strong demand for cloud services continues to drive growth despite inflationary pressures but non-cloud spending is set to decline.

Apple's Mac Shipments Fall More Than 40%, Worse Than Major Rivals

Apple's worldwide computer shipments fell 40.5% year over year in the first quarter of 2023, amid a broader contraction in consumer demand, according to research firm IDC. All five of the largest computer makers — Apple, ASUS, Dell, HP, and Lenovo — saw double-digit drops in first-quarter shipments, reflecting weaker demand and persistent inventory woes. But Apple's decline was the biggest of the bunch.

Apple's worldwide PC market share dropped between the first quarter of 2022 and the first quarter of 2023, from 8.6% to 7.2%, according to IDC data. The company shipped 2.8 million fewer devices year over year in the first quarter of 2023, according to IDC.

Apple Triples India iPhone Output to US$7 billion in Shift Away from China

Apple Inc assembled more than US$7 billion of iPhones in India last fiscal year, tripling production in the world's fastest-growing smartphone arena after accelerating its move beyond China. The US company now makes almost 7 percent of its iPhones in India through expanding partners from Foxconn Technology Group to Pegatron Corp, people familiar with the matter said. That is a significant leap for India, which accounted for an estimated 1 percent of the world's iPhones in 2021. Apple is exploring ways to reduce its reliance on China as tensions between Washington and Beijing continue to escalate.

Its longtime partners, who make most of the world's iPhones in sprawling factories in China, have added assembly lines in other countries at a rapid pace over the past year, the people said on the condition of anonymity.

The world's most valuable company struggled last year with chaos at Foxconn's main "iPhone City" complex in Zhengzhou, which drove home vulnerabilities in Apple's supply chain and forced it to cut output estimates.

Of the total production, Apple exported US$5 billion of iPhones in the fiscal year ended last month, nearly four times as much as the previous period, the people said.

Apple is likely to manufacture the next iPhones in India at the same time as in China, sometime in the fall of this year. If so, that would be the first time that iPhone assembly begins concurrently in the two countries. If the aggressive expansion of its suppliers continues, Apple could assemble one-quarter of all its iPhones in India by 2025. Even before last year's iPhone City difficulty, Apple had recognized the need to diversify its supply chain. It successfully lobbied for incentives in India and pushed suppliers Foxconn, Pegatron and Wistron Corp to ramp up locally. The trio, which together employ about 60,000 workers in India, make models ranging from the aging iPhone 11 to the latest iPhone 14. That has helped place Apple at the heart of India's ambitions to become a major manufacturing alternative to China. Apple is among the world's most exacting when it comes to manufacturing. Its production chain encompasses hundreds of companies across the world and employs millions, much of that now in China. The migration of iPhone production represents an economic triumph for India that could have implications for how other US brands plan their futures. For Apple, the country itself represents a fount of future growth as the Chinese economy sputters.

Samsung Overtakes Apple in Phone Shipments as the Market Dips Again

The smartphone market just saw its fifth straight quarter of decline in what has become a familiar picture of phone makers experiencing the sting of low demand for their products. Changing consumer priorities made for a horror holiday quarter, but the first three months of 2023 were hardly different.

Earlier this year, we learned that smartphone shipments had dipped to the lowest point observed in a decade. Last year was a rough one for phone makers who were expecting consumers to get tired of their aging 4G handsets and give way to a new "upgrade supercycle." Companies like

Samsung saw their profits evaporate as low demand for mobile devices also translated into smaller orders for NAND, DRAM, and other components.

The trend of slowing smartphone sales continued into the first quarter of this year with a 12 percent year-over-year decline. Interestingly, Canalys analysts believe the market shows signs of stability even as they report on the fifth consecutive quarter that saw waning demand for this device category. Perhaps they are optimistic about the rough economy improving in the second half of this year like most industry watchers, but we'll have to wait and see.

The decline, they say, was the expected result of high inflation, changing consumer priorities, and general chaos along the supply chain. Despite an oversupply of chips and other components as well as aggressive marketing campaigns, people are holding onto their phones for longer and viewing them as commodities that see incremental improvements with each new generation that comes out. Still, with every passing quarter, there's an increasing chance that some consumers will need to upgrade.

When zooming in, Apple and Samsung fared better than other smartphone vendors. Samsung even managed to improve quarter-over-quarter and capture 22 percent of the global market, surpassing the Cupertino giant in the process. That said, strong sales of the iPhone 14 Pro helped Apple secure second place with a 21 percent market share. Then we have Xiaomi, Oppo, and Vivo with 11 percent, 10 percent, and eight percent of global shipments, respectively.

Canalys says most brands are taking measures to reduce existing inventories and adjust their manufacturing volume to match the lower demand. The most glaring example is Samsung, which has scaled back memory chip production until prices stabilize and demand grows again. Other suppliers will likely follow suit in the coming months.

Overall, this is a familiar picture that describes not only smartphones but the health of the entire tech industry. Worldwide IT spending is expected to take another hit in the coming months, and the most optimistic predictions point to an eventual recovery towards the end of the year.

China Leads Asian Factory Slide as Demand Slumps

China's manufacturing activity unexpectedly eased last month, a private survey showed, leading a slide in factory gauges across Asia as the global economic outlook darkened.

China's Caixin manufacturing purchasing managers' index (PMI) — which covers mainly smaller and export-oriented businesses — eased slightly last month as new orders and output both declined, registering a 50 reading, the line between expansion and contraction.

The PMIs for factories across Asia showed a continued divergence between north and south last month. Taiwan, Japan, and South Korea all stayed in contraction while much of Southeast Asia's factory outlooks remained in expansion, although at a slightly slower or little changed pace from the previous month, S&P Global said yesterday.

India's PMI was an outlier, showing more resilience, with last month's reading jumping further in expansion to 56.4 from 55.3.

Asia's export powerhouses are experiencing subdued demand amid a global economic outlook beset by elevated inflation, borrowing costs and risks of recession. North Asian economies also are dealing with geopolitical risk and volatility in the semiconductor industry.

An oil-price pop on OPEC+'s decision to slash supply by 1 million barrels has added to challenges in the global economic outlook.

In China, latest indicators show the post-reopening recovery is being led mainly by the non-manufacturing sectors, particularly consumer spending on services and a pickup in construction.

The Caixin PMI index — which was lower than February's 51.6 and the 51.4 median in a Bloomberg survey of economists — was also weaker than the official PMI for manufacturing, released on Friday. That index showed an expansion in manufacturing activity last month, although at a slightly slower pace than the previous month. The non-manufacturing index surged to its highest point in more than a decade, official data showed last week. The PMI reading indicated there were signs of a weakening in China's rebound, Caixin Insight Group senior economist Wang Zhe said in a statement accompanying the release. Taiwan's factory gauge last month stayed in contraction — below 50 — sliding to 48.6 from 49 the previous month, data showed on Friday. Japan's PMI was at 49.2 last month, up from 47.7 in the previous month. South Korea slipped to 47.6 from 48.5, the worst since September last year. There was a brighter outlook in Indonesia, Southeast Asia's largest economy, where the PMI ticked up to 51.9 from 51.2, the best showing since September last year. Thailand and the Philippines eased slightly while staying in expansion. Vietnam fell to 47.7 from 51.2, while Malaysia posted a contraction at 48.8.

Worldwide Shipments for Foldable Phones Forecast to Reach 48.1 million Units with a Market Value of $42 Billion in 2027

International Data Corporation expects worldwide shipments of foldable phones, including flip and fold form factors, to reach 21.4 million units in 2023. This represents an increase of more than 50% over the 14.2 million units shipped in 2022. An updated IDC forecast projects that foldable phone shipments will reach 48.1 million units in 2027 with a compound annual growth rate (CAGR) of 27.6% from 2022 to 2027.

Foldable phones remain the one positive talking point in a market that declined more than 11% in 2022. This segment's recent success and forecast growth highlight a healthy demand for this growing form factor. Although average selling prices (ASPs) are dropping slightly, foldables remain in the premium price segments in all regional markets. Despite the expected drop in ASP (-6.8% in 2023), IDC has witnessed vast improvements in durability and build while the overall user experience has been elevated with advancements in software and hardware across all vendors. More models from both new and current vendors are expected to bring further improvements and enhancements to the category to help drive continued adoption.

Samsung Faces Weakest Quarter Since 2009 as Memory Chip Market in 'worst slump in decades'

Samsung could report its worst profit in 14 years this week, as prices for memory chips, its biggest business, continue to fall, while demand stays weak.

The South Korean technology giant guided earlier this month that it would post operating profit of 600 billion Korean won ($449 million) for the first quarter. If Samsung reports this number, it would be the company's lowest profit since the first quarter of 2009.

Samsung releases preliminary earnings guidance but does not give detailed figures. It reports its full first quarter earnings on Thursday.

Samsung is the world's largest maker of memory chips, which go into everything from PCs to servers in data centers.

During the height of the pandemic, demand for consumer electronics was high, as people stayed home. Electronics companies piled up chips to go into these products. But buyers are now cutting back on purchases of these goods due to inflation and macroeconomic concerns, leading to somewhat of a memory chip glut.

For example, PC shipments fell 29% year-on-year in the first quarter, according to IDC data. Prices of memory chips have dropped over the past few months due to high inventories and lack of demand.

"The memory market is in the midst of its worst slump in decades. Even as EV (electric vehicle) markets grow, consumer electronics and traditional server markets are experiencing some of the most severe slowdowns," CrispIdea said in a research note published last week.

Analysts at Mirae Asset Securities estimate that Samsung's chip division will post a 4.4 trillion Korean won loss in the first quarter.

Wearables to Resume Growth This Year

Wearables sales will grow 6.3% this year after the market's first-ever contraction in 2022, according to IDC. Although 442.7 million devices are forecast to be sold this year. Q1 will see a decline in shipments thanks to excess inventory which is depressing both shipments and ASPs. IDC expects these wrinkles to be ironed out by H2 with growth to continue well beyond 2023 as shipments reach 644.5 million in 2027 with a CAGR of 5.4%.

300 million Jobs Could be Affected by Latest Wave of AI, says Goldman Sachs

As many as 300 million full-time jobs around the world could be automated in some way by the newest wave of artificial intelligence that has spawned platforms like ChatGPT, according to Goldman Sachs economists.

They predicted in a report that 18% of work globally could be computerized, with the effects felt more deeply in advanced economies than emerging markets. That's partly because white-collar workers are seen to be more at risk than manual laborers. Administrative workers and lawyers are expected to be most affected, the economists said, compared to

the “little effect” seen on physically demanding or outdoor occupations, such as construction and repair work.

In the United States and Europe, approximately two-thirds of current jobs “are exposed to some degree of AI automation,” and up to a quarter of all work could be done by AI completely, the bank estimates.

If generative artificial intelligence “delivers on its promised capabilities, the labor market could face significant disruption,” the economists wrote. The term refers to the technology behind ChatGPT, the chatbot sensation that has taken the world by storm.

Further use of such AI will likely lead to job losses, the Goldman Sachs economists wrote. But they noted that technological innovation that initially displaces workers has historically also created employment growth over the long haul. While workplaces may shift, widespread adoption of AI could ultimately increase labor productivity — and boost global GDP by 7% annually over a 10-year period, according to Goldman Sachs.

Tesla to Open a New Megapack Battery Factory in Shanghai

Tesla will open a new Megafactory in Shanghai that is capable of producing 10,000 Megapacks a year. A Megapack is a very large battery for utilities that stores energy, helps stabilize the power grid and prevents outages. These batteries enable grid operators to move extra capacity between counties or states and ensure that power from intermittent sources can be stored and used when demand is higher, or when there are unplanned outages in a transmission network.

Tesla currently has a Megafactory in Lathrop, California, that is capable of producing 10,000 Megapacks units each year, according to the company’s website. Tesla CEO Elon Musk said the factory in China will supplement output from the factory in California.

The company is planning to start constructing the factory during the third quarter of this year, and it will aim to begin production around halfway through 2024, Chinese state media outlet Xinhua reported from a signing ceremony in Shanghai.

Walmart Will Add 'Thousands' of EV Charging Stations to Its Stores by 2030

The largest retail chain in the U.S. announced that it would add more charging stations to its 4,635 Walmart and Sam's Club stores.

"By 2030, we intend to build our own EV fast-charging network at thousands of Walmart and Sam's Club locations coast-to-coast," said Vishal Kapadia, Senior Vice President, Energy Transformation. "This would be in addition to the almost 1,300 EV fast-charging stations we already have available at more than 280 U.S. facilities."

Why is Walmart betting on plugging in?

The company has looked at the data and calculated that more charging stations would not just be good for the planet — but also good for business. By 2030, over one in four new passenger cars will be an electric vehicle, according to a report by S&P Global Mobility. The data company

believes that the "tipping point" for EV adoption will come as early 2026, when Americans feel more comfortable with the technology and the charging infrastructure to accommodate them. Walmart wants to be ready when that time comes.

"With a store or club located within 10 miles of approximately 90% of Americans, we are uniquely positioned to deliver a convenient charging option that will help make EV ownership possible whether people live in rural, suburban, or urban areas," said Kapadia.

Walmart joins other major businesses accelerating into the charging game. Last October, Taco Bell announced adding charging stations to their stores. Starbucks, 7-Eleven, Target, Pilot Flying J, Love's Travel Stops & Country Stores have also launched EV charging initiatives.

Ford Establishes New Division for AI & Autonomy

To put in the dedicated longer-term effort needed to get robots on the road, Ford formed Latitude, a leading team of machine learning, robotics, software, sensor, systems engineering, and operations professionals. This recruitment is aimed at expanding Ford's development efforts in automated driving technology. Already, the company has made significant progress with its BlueCruise system, which has accumulated over 50 million miles of hands-free driving.

"We see automated driving technology as an opportunity to redefine the relationship between people and their vehicles," said Doug Field, chief advanced product development and technology officer at Ford Motor Company. "Customers using BlueCruise are already experiencing the benefits of hands-off driving. The deep experience and talent in our Latitude team will help us accelerate the development of all-new automated driving technology — with the goal of not only making travel safer, less stressful and more enjoyable, but ultimately over time giving our customers some of their day back."

One thing that gave them a running start was their prior investment in Argo AI. Ford has hired more than 550 employees from Argo AI to join the Latitude team, bringing with them their experience in automated driving. This includes expertise in areas such as machine learning, robotics, cloud platforms, mapping, sensors and computer systems, test operations, systems engineering, and safety engineering. The team has utilized these skills to focus on developing advanced driver-assist systems (ADAS).

Sammy Omari, executive director of ADAS Technologies at Ford, serves as the CEO of Latitude. Peter Carr is appointed as the chief technology officer to oversee product and technical development, while David Gollob takes on the role of president with responsibility for business operations.

"We believe automated driving technology will help improve safety while unlocking all-new customer experiences that reduce stress and, in the future, will help free up a driver's time to focus on what they choose," said Omari. "The expertise of the Latitude team will further complement and enhance Ford's in-house global ADAS team in developing future driver assist technologies, ultimately delivering on the many benefits of automation."
Latitude is headquartered in Pittsburgh, with engineering hubs located in Dearborn, Michigan; and Palo Alto, California. The company also operates a state-of-the-art highway-speed test track facility in Greenville, South Carolina.

Apple Turns to Recycled Gold, Tin, and Rare earth Materials to Go Green

In another major move to become greener, Apple announced plans to incorporate more recycled materials into its products, targeting 2025 to attain 100 percent recycled cobalt in all Apple-designed batteries in a press release.

Further plans involving a shift to magnets made of recycled rare earth elements and printed circuit boards using 100 percent recycled tin soldering and gold plating were disclosed, giving all Earth lovers a reason to cheer.

“Every day, Apple is innovating to make technology that enriches people’s lives, while protecting the planet we all share,” said Tim Cook, Apple’s CEO. “From the recycled materials in our products to the clean energy that powers our operations, our environmental work is integral to everything we make and who we are. So we’ll keep pressing forward in the belief that great technology should be great for our users, and the environment.”

Over the years, Apple has significantly expanded its use of recycled materials and now sources two-thirds of all aluminum used from 100 percent recycled material. This is in line with the company’s 2030 goal of achieving carbon neutrality with every product.

Furthermore, the company aims to eliminate plastics from its product packaging by 2025 and is currently developing fiber alternatives that will replace packaging components such as screen films and foam cushioning.

This comes after developing a custom printer that will print directly onto the boxes of iPhone 14 and iPhone 14 Pro, a bid to phase out labels, among other innovations that helped avoid over 1,000 metric tons of plastic and over 2,400 metric tons of carbon dioxide.

China doesn't want American Cars Anymore — That's Bad News for Ford and GM

Chinese automakers are giving US car companies a run for their money, especially as the momentum behind electric vehicles accelerates — and that could force Ford and GM to make some hard decisions.

Other than Tesla, popular US auto brands lost major ground in China last year, the world's largest car market that's critically important to manufacturers. GM's car sales there fell by 20% from 2021, while Ford's declined by 33.5%, according to advisory firm Automobility Ltd.

"The market has totally changed," Jim Farley, the CEO of Ford, told reporters at a Thursday charity event in Detroit. "We're going to have to rethink what the Ford brand means in a place like China."

That's especially true as EVs take center stage, Farley said, noting that he has learned the luxury brands that sell only electric vehicles do best in Chinese markets.

Chinese EV-maker market share in China rose by 17% in 2022, while that of foreign automakers dropped by 11%. Some of this can be attributed to Chinese car companies' ability to build better and cheaper cars, especially EVs, that consumers are keen to buy.

Car companies will double down on US buyers and EVs

As the industry bounced back from the Great Recession, and China became the fastest-growing — and most EV-friendly — car market in the world, American car companies rushed to enter the market.

But as political tensions intensify between China and the US, operating in China is starting to become more of a risk for US companies.

Add in the fact that Chinese brands spent the last several years sapping up industry know-how from joint ventures with US brands, and the Chinese market suddenly becomes a much more hostile place for American companies.

That means that US companies will redouble their EV efforts at home, where they can count on a more reliable and loyal customer base. The one kink in that plan is Elon Musk and his ongoing price war.

"Price wars are breaking out everywhere. Who's going to blink for growth?" Farley said at the Thursday event.

The China versus America face-off is at a stalemate – for now

While American companies lose ground in China, there is a bright spot. The pandemic forced automakers to make more with less, by shifting their supply chains and focusing on the markets where they make the biggest profit margins.

GM largely led the charge to exit money-losing markets, pulling out of Europe in 2017 and later leaving Russia, India, and Australia. The company still operates in China but is struggling to defend its market share. GM's China sales fell 25% in the first quarter of 2023 after retreating 20% last year.

The retreat from China and a hyper-focus on the US could be risky.

Making up the difference in Europe isn't likely to be an option for US car companies — Europe's a market that Chinese car makers are already aggressively chasing after, and the competition is increasingly fierce.

While there aren't currently any Chinese car brands for sale in the US, the concern is that eventually, Chinese automakers could eventually make a play to upend the US market.

ChatGPT App Has Phenomenal Growth

With an artificial intelligence chatbot, you can do everything from holding a conversation to writing an entire term paper in minutes. Plus, ChatGPT can do many things you didn’t know it could, like create a brand logo and compose music.

Bill Gates says ChatGPT is one of the two technological advancements he has seen that struck him as revolutionary in his lifetime.

“The first time was in 1980 when I was introduced to a graphical user interface – the forerunner of every modern operating system, including Windows,” Gates says.

The second time was when he witnessed the capabilities of ChatGPT. “The whole experience was stunning,” he said. Gates continues, “This inspired me to think about all the things that AI can achieve in the next five to 10 years. It will change the way people work, learn, travel, get health care, and communicate with each other.” Adding more, Gates says, “Entire industries will reorient around it. Businesses will distinguish themselves by how well they use it.”

An analysis by Swiss bank UBS shows ChatGPT is the fastest-growing app ever. In January, only two months after its launch, ChatGPT had 100 million active users. As a comparison, it took nine months for TikTok to reach 100 million users and two and a half years for Instagram.

WORLD CONNECTOR STATISTICS

REGIONS – PRODUCTS – MARKET SECTORS
2013 – 2023F and 2028 FORECAST

World Connector Market Handbook - 2023

Bishop & Associates has just released the 2023 edition of the World Connector Market Handbook. This comprehensive seven-chapter, 229-page report analyzes all aspects of the world electronic connector market. This report provides detailed connector statistics by equipment sector and product category for North America, Europe, Japan, China, Asia Pacific, and the ROW region. Included is a complete chapter on worldwide connector industry results by region, equipment sector, and product category. Data is provided for the years 2013 – 2022, and projections for 2023 and 2028 (including five-year CAGRs).

ANALYSIS OF THE WORLD ELECTRONIC CONNECTOR MARKET

Increasing $6.1 billion in US dollars, connector industry sales increased +7.8% from 2021 to 2022. All regions except Japan recorded an increase with North America showing the greatest increase in sales, growing +14.6% followed by the ROW region with growth of +11.7%. Japan, the only region showing a decline in sales, saw sales decrease -2.0% or $102.9 million. In US dollars, North American sales increased $2,405 million, followed by China, where sales increased $1,516 million.

World Connector Market by Region
2021 to 2022 with Percent Change

Region	2021	2022	Percent Change
North America	$16,484.0	$18,889.0	14.6%
Europe	$16,278.4	$17,328.5	6.5%
Japan	$5,275.7	$5,172.8	-2.0%
China	$24,978.3	$26,494.3	6.1%
Asia-Pacific	$11,383.9	$12,194.7	7.1%
ROW	$3,590.3	$4,011.7	11.7%
Total	**$77,990.6**	**$84,091.0**	**7.8%**

$ Millions

Regional Summary

As the tables below indicate, the continued growth in 2022, provided an increase in the five-year, 10-year, and 20-year compound annual growth rates in North America and Europe. Japan's double-digit growth from 2020 to 2021, allowed the 5-year CAGR to turn positive, but previous low growth, prevented the 10-year CAGR from turning positive. China, who has seen percentage growth decrease over the last 20 years, saw CAGR decline from 11.4% for the period 2002 through 2022, to 6.8% for the period 2017 through 2022.

Regional Growth Rates
2022 – 2023F

Region	2022	2023F	% Change	Past 5 Year CAGR	Past 10 Year CAGR	Past 20 Year CAGR
North America	$18,889.0	$XX,XXX.X	X.X%	X.X%	Y.Y%	Z.Z%
Europe	$17,328.5	$XX,XXX.X	X.X%	X.X%	Y.Y%	Z.Z%
Japan	$5,172.8	$X,XXX.X	X.X%	X.X%	Y.Y%	Z.Z%
China	$26,494.3	$XX,XXX.X	X.X%	X.X%	Y.Y%	ZZ.Z%
Asia-Pacific	$12,194.7	$XX,XXX.X	X.X%	X.X%	Y.Y%	Z.Z%
ROW	$4,011.7	$4,102.5	2.3%	X.X%	Y.Y%	Z.Z%
Total	**$84,091.0**	**$XX,XXX.X**	**X.X%**	**X.X%**	**Y.Y%**	**Z.Z%**

$ Millions

Regional Growth Rates
2021 – 2022

Region	2021	2022	% Change	Past 5 Year CAGR	Past 10 Year CAGR	Past 20 Year CAGR
North America	$16,484.0	$18,889.0	14.6%	8.8%	6.4%	3.7%
Europe	$16,278.4	$17,328.5	6.5%	7.1%	5.3%	5.0%
Japan	$5,275.7	$5,172.8	-2.0%	1.1%	-2.1%	1.6%
China	$24,978.3	$26,494.3	6.1%	6.8%	7.7%	11.4%
Asia-Pacific	$11,383.9	$12,194.7	7.1%	6.9%	4.9%	7.2%
ROW	$3,590.3	$4,011.7	11.7%	8.0%	3.9%	5.2%
Total	**$77,990.6**	**$84,091.0**	**7.8%**	**6.9%**	**5.4%**	**5.8%**

$ Millions

End-Use Equipment Sectors

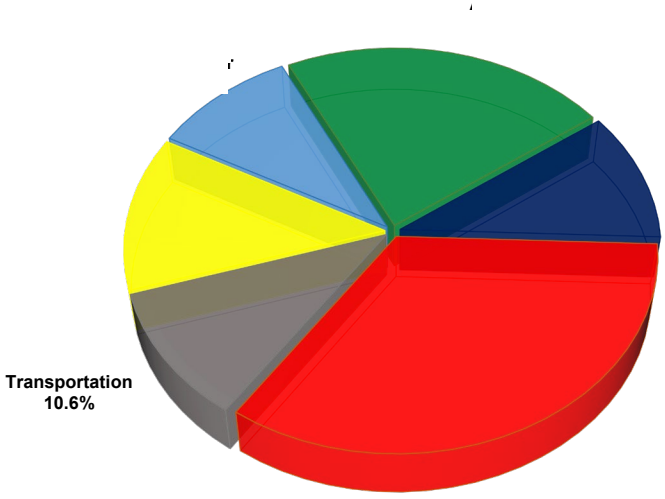
Telecom/datacom was the largest end-use equipment sector for electronic connector products with 2022 shipments of $XX,X22.8 million. Telecom/datacom was followed by automotive, where 2022 sales grew Y.1% to $XX,X88.1 million. It is anticipated in 2023, that telecom/datacom will remain the largest end-use equipment sector, once again followed by automotive. Showing the smallest growth in 2022 was business/office equipment, where sales grew to $XX.3 million, an increase of Y.9% over 2021.

World Connector Market by Equipment Sector

Sector	2022	2023F	Percent Change
Computers & Peripherals	$X,XXX.X	$X,XXX.X	Y.Y%
Business/Office Equipment	$922.3	$X,XXX.X	Y.Y%
Instrumentation	$X,XX6.8	$X,XXX.X	Y.Y%
Medical Equipment	$X,XXX.X	$X,XXX.X	Y.Y%
Industrial	$X,XXX.X	$X,XXX.X	Y.Y%
Automotive	$XX,435.X	$XX,XXX.X	Y.Y%
Transportation (non-auto)	$X,XXX.X	$X,XXX.X	Y.Y%
Military/Aerospace	$X,XXX.X	$X,XXX.X	Y.Y%
Telecom/Datacom	$X,XXX.X	$XX,XXX.X	Y.Y%
Consumer	$3,967.0	$X,XXX.X	Y.Y%
Other	$3,158.3	$3,187.6	0.9%
Total	**$84,091.0**	**$XX,XXX.X**	**Y.Y%**

$ Millions

World Connector Market - Top Five Equipment Sectors – 2022



World Connector Market Handbook

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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**.

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