The Bishop Report
Performance and Forecast of the World Connector Industry

Issue No. 363 | 4th Quarter 2022 | January 2023

Sales Decline -0.9% in December Ending 27 Months of YOY Growth

Regional Performance:
World sales are up +7.8% YTD in December, with North America achieving the highest growth at +15.6%.

Worldwide, orders were down -3.8% YTD. Japan has had the worst performance at -4.6% YTD.

4Q22 Results:
4Q22 sales were up +2.0% over the prior year to $20,171 million. This resulted in sales for 2022 of $84,091 million, up +7.8%.

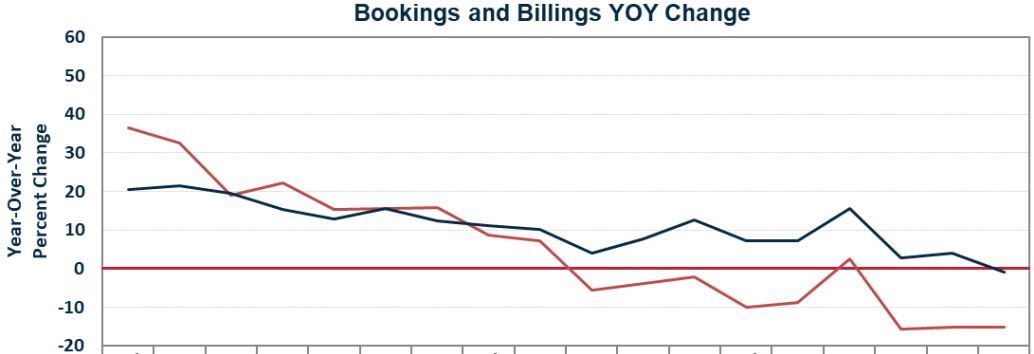
Industry Outlook:
With uncertain economic conditions, Bishop's 2023 sales forecast remains at $85,700 million, up +1.9% over 2022 sales.

Industry Backlog:
December's backlog was $22,983 million.

2022 Currency Impact:
The industry grew +7.8% YTD in December in USD and +2.0% in local currencies.

December bookings were down -15.1%. Billings were down -0.9%, ending a 27-month string of growth. The year 2022 ended with world sales up +7.8%.

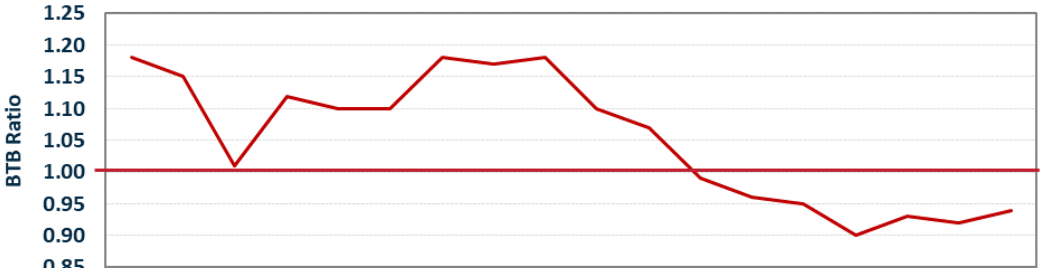
Bookings and Billings YOY Change



	Jul 21	Aug 21	Sep 21	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
Bookings	36.4	32.5	19.1	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
Billings	20.6	21.5	19.4	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

The book-to-bill ratio in December was 0.94 and YTD was 1.01.

Connector Industry Book-to-Bill



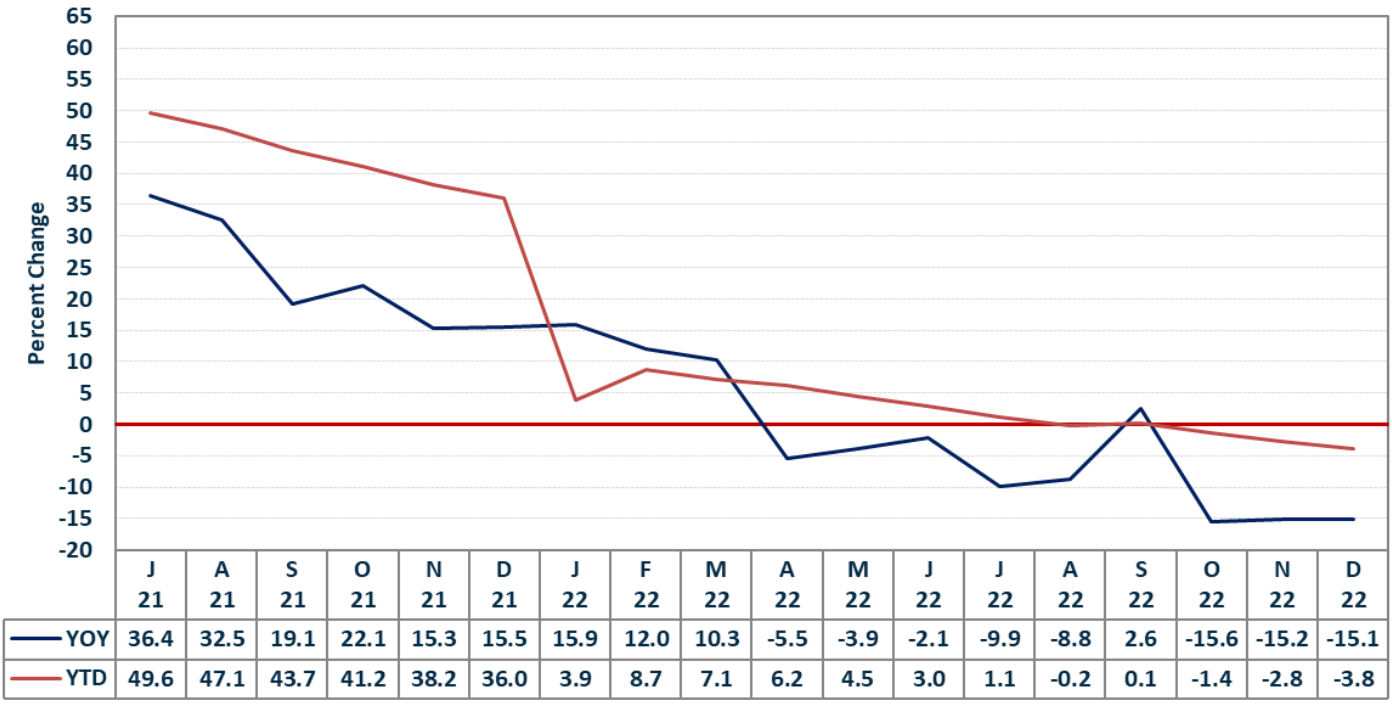
	Jul 21	Aug 21	Sep 21	Oct 21	Nov 21	Dec 21	Jan 22	Feb 22	Mar 22	Apr 22	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22
BtB	1.18	1.15	1.01	1.12	1.10	1.10	1.18	1.17	1.18	1.10	1.07	0.99	0.96	0.95	0.90	0.93	0.92	0.94

Booking Highlights and Conclusions

Sequential, Year-Over-Year, and Year-To-Date Bookings Percentage Change – 2020/2021/2022

	Sequential			Year-Over-Year			Year-To-Date		
Month	2020	2021	2022	2020	2021	2022	2020	2021	2022
Jan	0.2%	2.3%	2.6%	3.9%	24.7%	15.9%	3.9%	24.7%	15.9%
Feb	5.5%	17.7%	10.4%	1.8%	38.9%	8.7%	2.8%	32.0%	12.0%
Mar	-1.4%	-3.5%	-5.3%	5.0%	34.5%	7.1%	3.5%	32.8%	10.3%
Apr	-27.2%	3.2%	-8.5%	-21.8%	81.9%	-5.5%	-2.7%	42.9%	6.2%
May	2.9%	5.1%	7.0%	-24.8%	86.4%	-3.9%	-7.3%	50.5%	4.5%
Jun	7.0%	-8.3%	-6.7%	-11.6%	59.7%	-2.1%	-8.0%	51.9%	3.0%
Jul	15.2%	-1.9%	-9.6%	-1.0%	36.4%	-9.9%	-7.0%	49.6%	1.1%
Aug	10.7%	6.6%	8.0%	1.8%	32.5%	-8.8%	-5.8%	47.1%	-0.2%
Sep	-0.9%	-11.9%	-1.0%	8.4%	19.1%	2.6%	-4.3%	43.7%	0.1%
Oct	4.7%	6.8%	-12.1%	13.0%	22.1%	-15.6%	-2.6%	41.2%	-1.4%
Nov	15.2%	9.3%	9.8%	17.5%	15.3%	-15.2%	-0.6%	38.2%	-2.8%
Dec	-7.2%	-7.0%	-6.8%	18.3%	15.5%	-15.1%	1.0%	36.0%	-3.8%

Bookings - YOY and YTD



	J 21	A 21	S 21	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
YOY	36.4	32.5	19.1	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
YTD	49.6	47.1	43.7	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

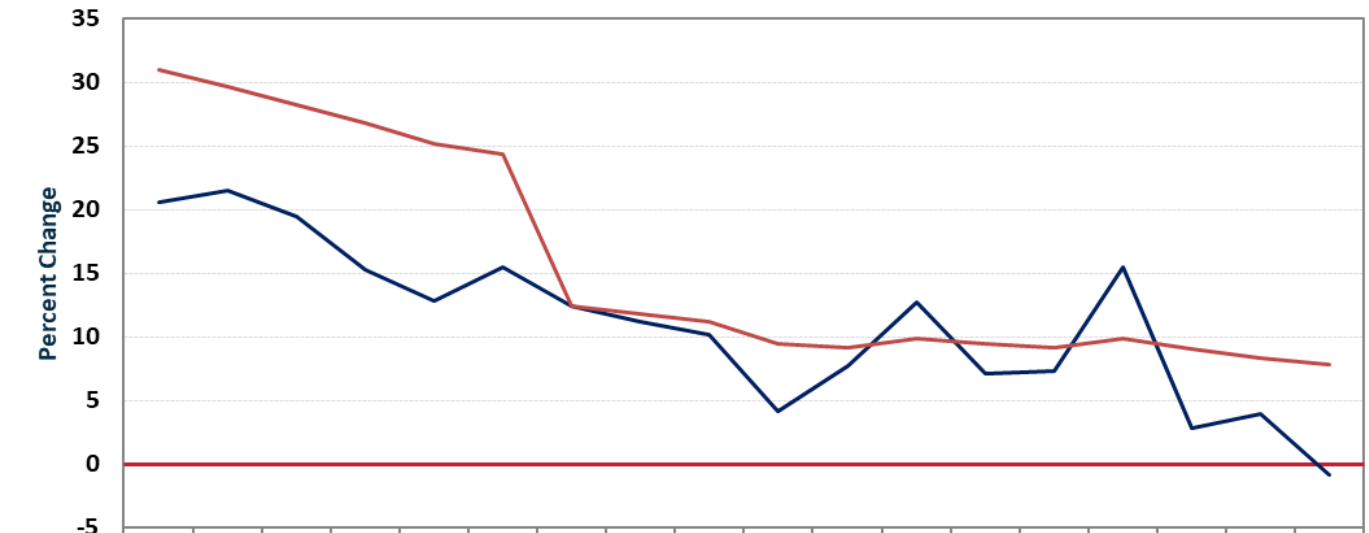
- December bookings decreased -15.1% YOY. Bookings are down -3.8% YTD.
- Orders decreased -6.8% sequentially.
- The book-to-bill ratio for December was 0.94. The YTD ratio is 1.01.

Billing Highlights and Conclusions

Sequential, Year-Over-Year, and Year-To-Date Billings Percentage Change – 2020/2021/2022

	Sequential			Year-Over-Year			Year-To-Date		
Month	2020	2021	2022	2020	2021	2022	2020	2021	2022
Jan	-2.8%	-1.6%	-4.3%	-3.1%	19.0%	12.4%	-3.1%	19.0%	12.4%
Feb	5.5%	12.6%	11.4%	-4.3%	26.7%	11.2%	-3.7%	22.9%	11.8%
Mar	-0.9%	-1.1%	-2.0%	-2.0%	25.5%	10.2%	-3.1%	23.8%	11.2%
Apr	-21.2%	-1.2%	-6.6%	-19.9%	49.5%	4.1%	-7.2%	29.4%	9.4%
May	8.8%	7.0%	10.7%	-20.0%	47.1%	7.7%	-9.9%	32.8%	9.1%
Jun	5.8%	-3.8%	0.7%	-11.6%	33.5%	12.7%	-10.2%	33.0%	9.8%
Jul	9.0%	-2.0%	-7.1%	-1.6%	20.6%	7.1%	-9.0%	31.0%	9.4%
Aug	9.0%	8.7%	8.9%	-0.3%	21.5%	7.3%	-7.8%	29.7%	9.1%
Sep	1.7%	-2.3%	5.1%	5.0%	19.4%	15.5%	-6.3%	28.2%	9.9%
Oct	-1.0%	-3.4%	-14.0%	7.6%	15.3%	2.8%	-4.9%	26.8%	9.1%
Nov	11.4%	9.4%	10.6%	9.1%	12.8%	3.9%	-3.6%	25.2%	8.6%
Dec	-7.7%	-5.6%	-10.0%	13.4%	15.5%	-0.9%	-2.2%	24.3%	7.8%

Billings - YOY and YTD



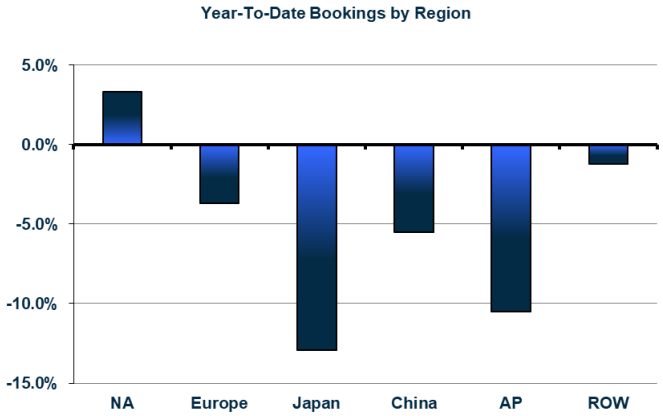
	J 21	A 21	S 21	O 21	N 21	D 21	J 22	F 22	M 22	A 22	M 22	J 22	J 22	A 22	S 22	O 22	N 22	D 22
YOY	20.6	21.5	19.4	15.3	12.8	15.5	12.4	11.2	10.2	4.1	7.7	12.7	7.1	7.3	15.5	2.8	3.9	-0.9
YTD	31.0	29.7	28.2	26.8	25.2	24.3	12.4	11.8	11.2	9.4	9.1	9.8	9.4	9.1	9.9	9.0	8.3	7.8

- December billings decreased -0.9% YOY. YTD, billings are up +7.8%.
- Sequentially, billings decreased -10.0% in December.

Regional Performance: BOOKINGS

December 2022 Bookings

Region	Sequential	YOY	YTD
NA	3.6%	-2.2%	3.3%
Europe	-6.9%	-9.4%	-3.7%
Japan	-3.7%	-25.5%	-13.0%
China	-10.7%	-20.7%	-5.5%
AP	-19.4%	-21.3%	-10.5%
ROW	-16.8%	-50.9%	-1.2%
Total	-6.8%	-15.1%	-3.8%

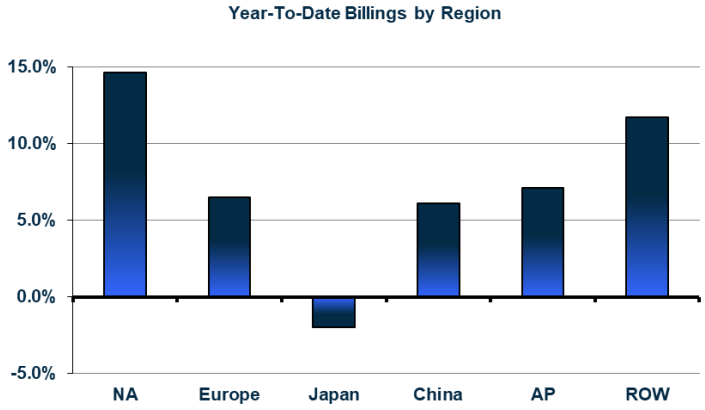


- December bookings decreased -15.1% YOY.
- All regions declined YOY, with all but North America and Europe exhibiting double-digit declines.
- ROW's YOY December bookings decreased the most at -50.9%.
- The book-to-bill ratio was 0.94, the seventh consecutive month below 1.00.
- North America was the only region that achieved order growth in 2022, up +3.3%.

Regional Performance: BILLINGS

December 2022 Billings

Region	Sequential	YOY	YTD
NA	-8.0%	4.2%	14.6%
Europe	-10.9%	2.4%	6.5%
Japan	-8.9%	-13.9%	-2.0%
China	-12.7%	-6.5%	6.1%
AP	-6.0%	0.0%	7.1%
ROW	-12.0%	4.4%	11.7%
Total	-10.0%	-0.9%	7.8%



- December connector sales decreased -0.9% YOY, ending 27 consecutive months of sales growth.
- Sales are up +7.8% in 2022.
- All regions contracted sequentially.
- Industry growth is +7.8% year-to-date in US dollars and +2.0% in local currencies (see page 15). Growth measured in units is likely negative for the year.
- North America outperformed all regions, achieving sales growth of +14.6%. Japan was the only region reporting negative sales (-2.0%) in 2022.

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.

	Jul 21	Aug 21	Sep 21	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
Bookings	42.4	35.5	28.0	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
Billings	13.4	18.2	21.1	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
Billing SEQ	-1.2	14.9	-5.3	-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
BTB	1.16	1.13	1.01	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

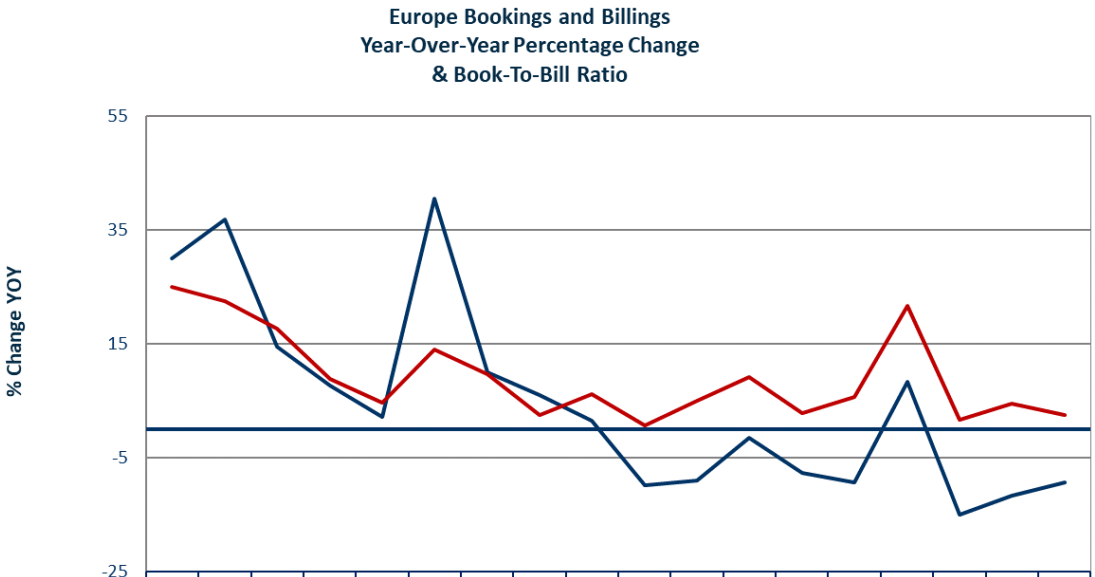
North America Performance

- Sales grew +4.2% and orders were down -2.2% YOY in December. North American billings were down sequentially -8.0%. The book-to-bill was 1.00.
- US GDP in 4Q22 increased 1.0% YOY and 2.9% sequentially. Much of the gain was derived from inventory gains and a sharp reduction in imports (so not as good). 2022 GDP finished up 2.1% YOY.
- US inflation slowed to 6.5% in December, the lowest since October 2021. November's rate was 7.1%. The overall inflation rate has been above 5% for 19 months. Core inflation decreased to 5.7%.
- Industrial production increased 1.6% YOY in December and went increased to 2.2% in November.
- Manufacturing PMI went up to 46.8 in January from 46.2 in December.
- US unemployment was down to 3.5% in December from 3.6% in November.
- Retail sales were up 6.0% YOY in December and 6.0% in November.
- Housing starts were down 1.4% YOY in December and existing home sales were down 1.5% YOY.
- US automotive sales in December increased 4.9% YOY according to TD Economics. Sales for the year were down approximately 9% from 2021.

Conclusions

Higher prices/inflation, continuing supply chain issues, rising interest rates, and volatile financial market, and the situation in Ukraine are a few of the headwinds. The production of new vehicles is still slow due to the shortage of semiconductors. China's COVID problems continue to hamper manufacturing and logistics worldwide. These issues are negatively impacting the connector industry worldwide.

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.



	Jul 21	Aug 21	Sep 21	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
Bookings	29.9	36.8	14.5	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
Billings	25.0	22.5	17.6	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
Billing SEQ	-5.5	8.6	-1.8	-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
BTB	1.14	1.12	0.98	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

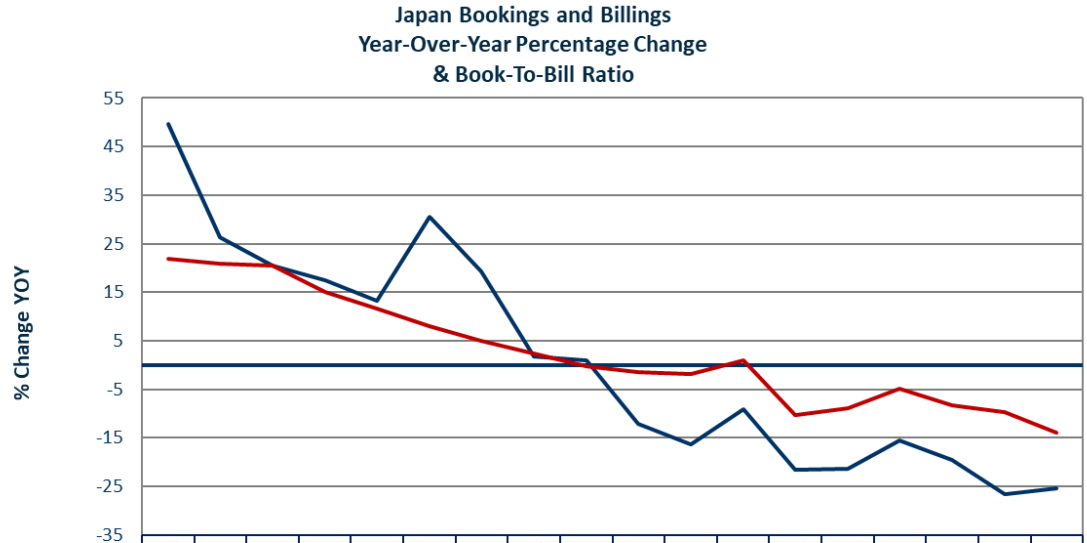
Europe Performance

- YOY billings were up +2.4% and orders were down -9.4%. The book-to-bill ratio was 1.00. Sequentially, sales were down -10.9%.
- Euro Area industrial production increased 3.4% YOY in October and 2.0% in November.
- The January manufacturing PMI was up 48.8 from 47.8 in December.
- Retail sales decreased 2.6% YOY in October and decreased 2.8% in November.
- The inflation rate declined to 10.1% in November and 9.2% in December.
- For 2022, new car registrations contracted 4.6% to 9.3 million units, the lowest level in three decades.
- The unemployment rate decreased to a revised 6.5% in November.
- After six months of decline, business activity in the euro zone's manufacturing and service sectors unexpectedly began to tickle up in January, according to S&P Global, a financial-information provider. Good economic health provided a glimmer of hope that the region could escape recession, as lower energy prices and China's reopening also bolster prospects for the global economy.

Conclusions

The connector industry appears to be headed for a difficult 2023 in Europe given the ongoing semiconductor shortages, possible energy rationing, high inflation, the situation in the Ukraine, and supply chain issues that will likely continue.

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.



	Jul 21	Aug 21	Sep 21	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
Bookings	49.7	26.3	20.4	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
Billings	21.8	20.8	20.4	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
Billing SEQ	1.0	5.4	-3.4	-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
BTB	1.17	1.10	1.08	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

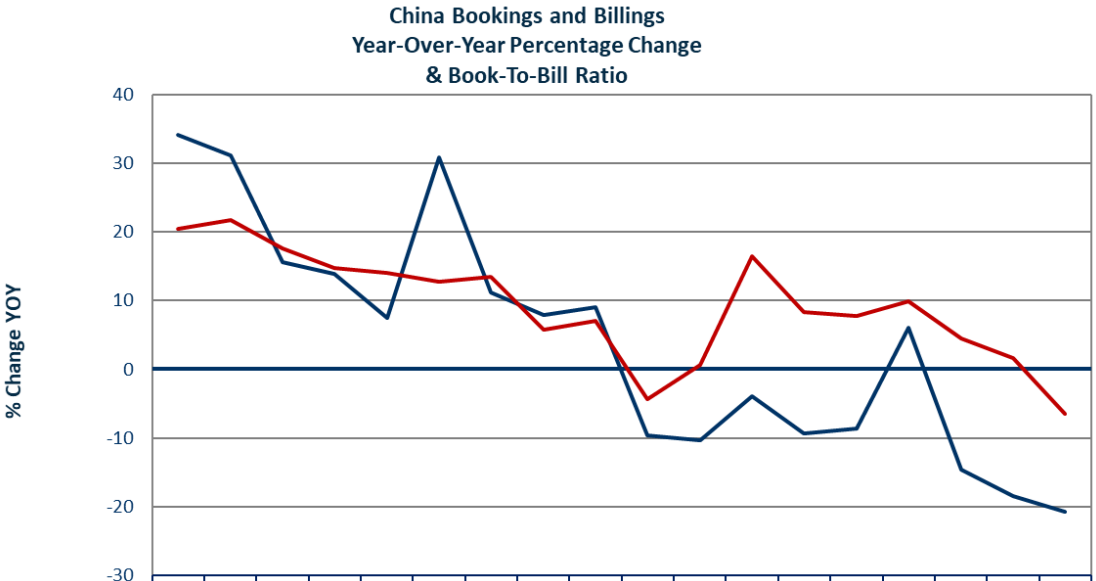
Japan Performance

- Bookings were down -25.5% in December. Sales declined -13.9% YOY, and sequentially were down -8.9%. Japan's book-to-bill ratio was 0.99.
- The inflation rate in December increased to 4.0% from 3.8% in November.
- Japan's currency devalued 22.3% against the US dollar in 2022.
- The industrial production rate decreased 0.9% YOY in November after increasing 3.0% in October.
- November retail sales grew 2.6% YOY and October grew 4.4%.
- Exports were down 0.5% sequentially in December and down 1.8% in November.
- The January manufacturing PMI was 48.9 down from December's 49.4.
- Housing starts decreased 1.4% YOY in November and went down 1.8% in October.

Conclusions

In 2022, the shortage of semiconductors held back growth in the automotive sector, Japan's largest connector market sector.

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.



	Jul 21	Aug 21	Sep 21	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
Bookings	34.2	31.1	15.5	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
Billings	20.4	21.7	17.6	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
Billing SEQ	0.3	5.6	0.9	-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
BTB	1.12	1.18	1.00	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

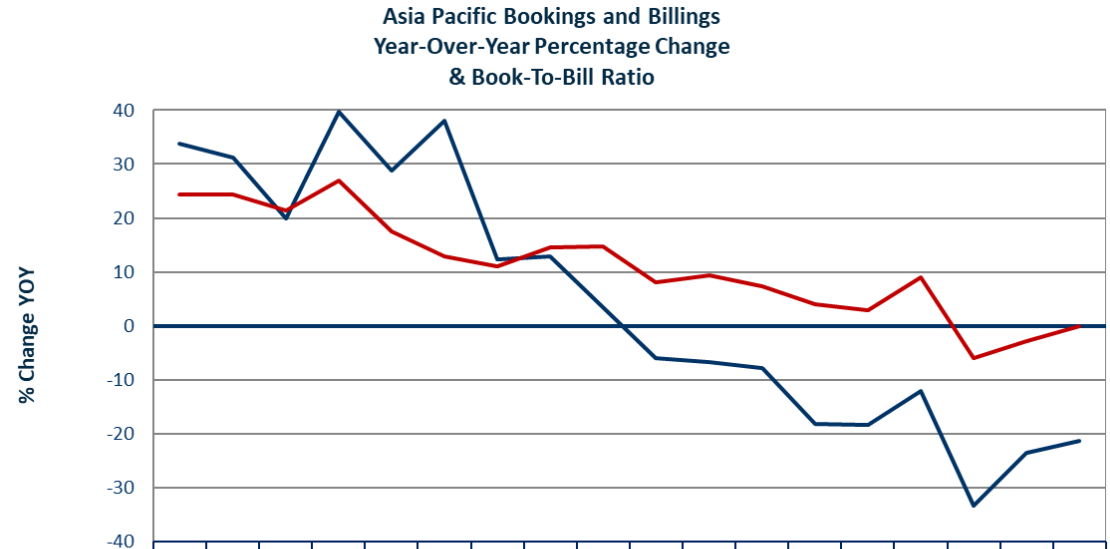
China Performance

- China's sales decreased -6.5% YOY and orders decreased -20.7% YOY. The BTB was 0.88. Sequentially, sales declined 12.7% in December.
- Industrial production decreased to 2.2% YOY in November and 1.3% in December.
- China's manufacturing PMI decreased to 49.0 in December from 49.4 in November.
- Retail sales decreased 5.9% YOY in November and decreased 1.8% in December.
- Exports from China decreased 9.9% YOY in December.
- China's total vehicle sales fell 8.0% YOY in December. Total 2022 sales are up 2.1% over 2021.
- The inflation rate declined to 1.6% in November and increased to 1.8% in December.

Conclusions

As has been noted in the past, China's economy is slowing. Their headwinds include slowing sales domestically and internationally; recurring outbreaks of COVID variants (and strict lockdowns); supply chain issues; material shortages; power shortages; and political disagreements within the CCP. They have already stated that they do not believe they will achieve their GDP goals for 2022. These headwinds are already affecting the growth of the Chinese connector industry in 2023. China has loosened their COVID rules and restrictions in January 2023.

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.



	Jul 21	Aug 21	Sep 21	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
Bookings	33.9	31.1	20.0	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
Billings	24.3	24.3	21.4	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
Billing SEQ	-2.6	4.4	-3.1	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
BTB	1.09	1.09	1.06	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

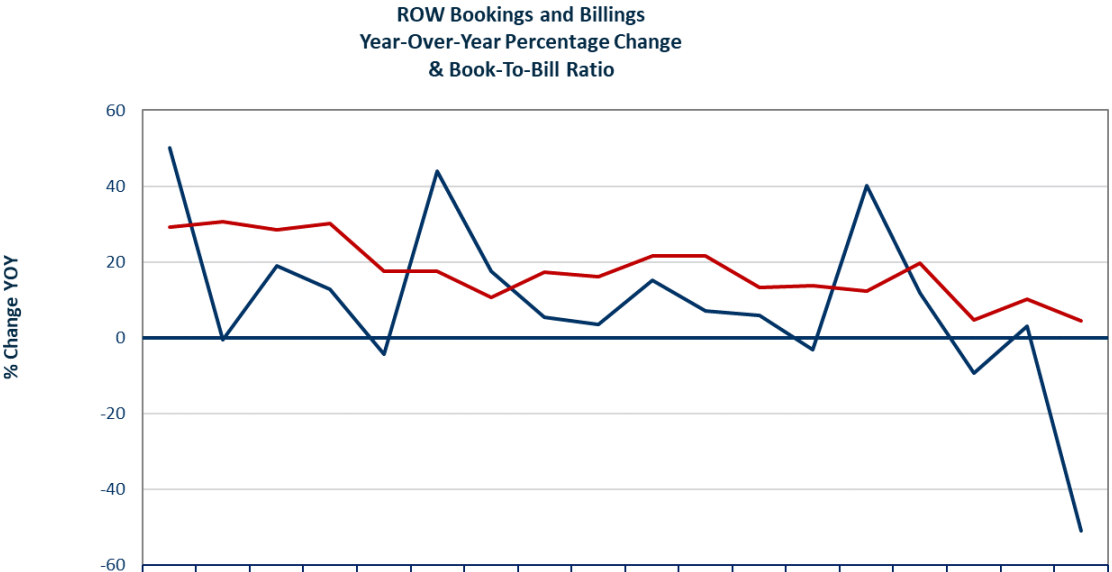
Asia Pacific Performance

- Orders were down -21.3% in December and sales were flat at 0% YOY. The book-to-bill ratio was 0.82. Sequentially, sales decreased -6.0%.
- India's industrial production grew 7.1% YOY in November after contracting 4.0% in November. Exports increased 7.8% sequentially in December and 7.4% in November. Electrical and electronic equipment only represents 4.8% of total exports. The manufacturing PMI increased to 57.8 in December from 55.7 in November. Inflation in December decreased to 5.72% from November's 5.88%.
- South Korea's 4Q22 GDP contracted 0.4% sequentially and grew 1.4% YOY. Industrial production fell 3.7% YOY in November and fell 1.2% in October. Exports decreased 9.5% YOY in December and grew 6.0% sequentially. Electrical and electronic equipment comprise 31% of their exports. The manufacturing PMI was 48.2 in December, contracting from 49.0 in November. Inflation remained at 5.0% in November and December.

Conclusions

India's and South Korea's economies continue to grow YOY but not robustly. South Korea's connector sales have a positive outlook with growth anticipated in the electronics and automotive industries. India's economic growth has been weak. India has a smaller connector market than South Korea, reducing the impact on regional connector sales.

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.



	Jul 21	Aug 21	Sep 21	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
Bookings	50.2	-0.6	18.9	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
Billings	29.1	30.6	28.6	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
Billing SEQ	-0.5	10.9	-4.3	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
BTB	1.29	0.74	0.93	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

Rest of World Performance

- Orders decreased -50.9% and sales increased +4.4% YOY in December. Sequentially, sales in the region decreased -12.0%. The book-to-bill ratio was 0.89.
- Brazil's industrial production grew 0.9% YOY in November and grew 1.7% in October. The inflation rate decreased to 5.79% in November from 5.9% in December. The manufacturing PMI dropped to 44.2 in December from 44.3 in the previous month. The unemployment rate declined to 8.1% in November.
- Russia's economic data is still reported as unreliable.

Conclusions

The region continues to experience growth within their connector industries. For the second time since November of 2020, YOY sales did not exhibit double-digit growth.

We anticipate that slowing economic growth in both countries will adversely affect connector growth in 2023. The black swan event for the region is Russia's invasion of Ukraine and the economic sanctions imposed by many NATO and Western countries on Russia. We anticipate a continued contraction of the Russian economy in the coming months although they are not a large connector market due in part to the majority of their connector sales being captive.

Fourth Quarter and 2022 Industry Results

The connector industry achieved sales in 4Q22 of $20,171 million, up +2.0% in US dollars compared to 4Q21, and up +7.8% sequentially.

The following table shows industry sales by quarter for 2020, 2021, and 2022. The full year 2022 results is $84,091 million, up +7.8% from the prior year.

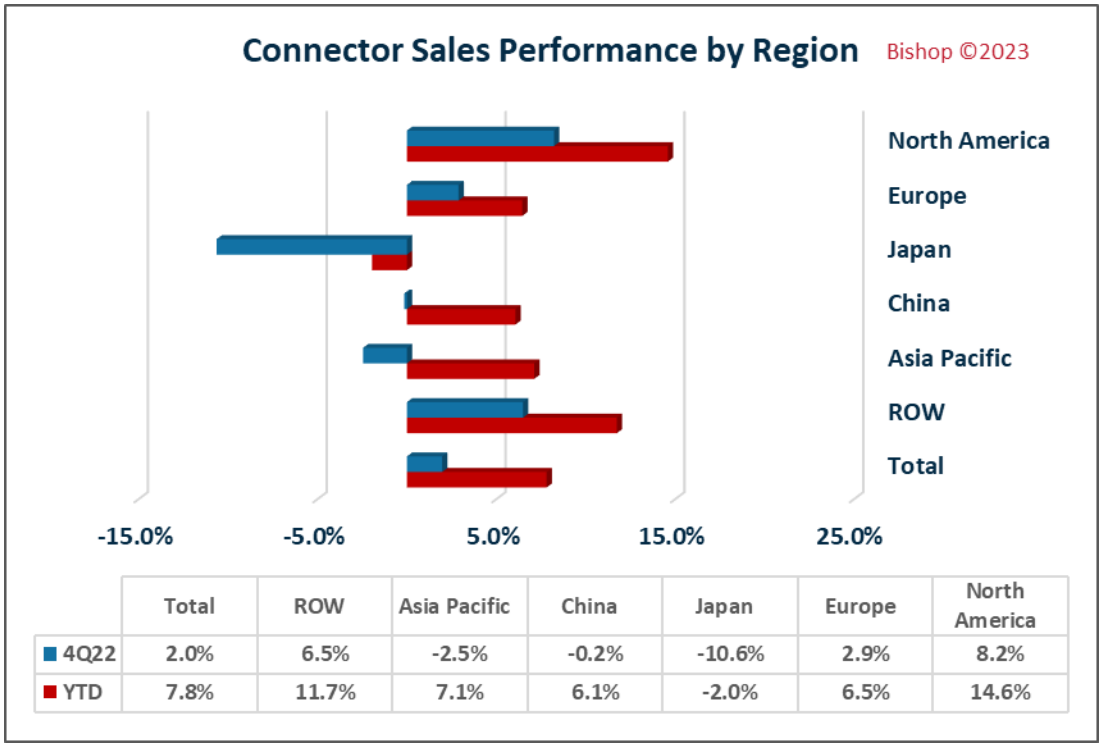
Connector Industry Quarterly Sales Results/Forecast

2020, 2021, and 2022

Quarter	2020 Actual	2021 Actual	YOY Change	2022 Actual	YOY Change
1Q	$15,397	$19,061	23.8%	$21,200	11.2%
2Q	$13,333	$19,000	42.5%	$20,560	8.2%
3Q	$16,689	$20,150	20.7%	$22,160	10.0%
4Q	$17,308	$19,780	14.3%	$20,171	2.0%
Total	$62,727	$77,991	24.3%	$84,091	7.8%

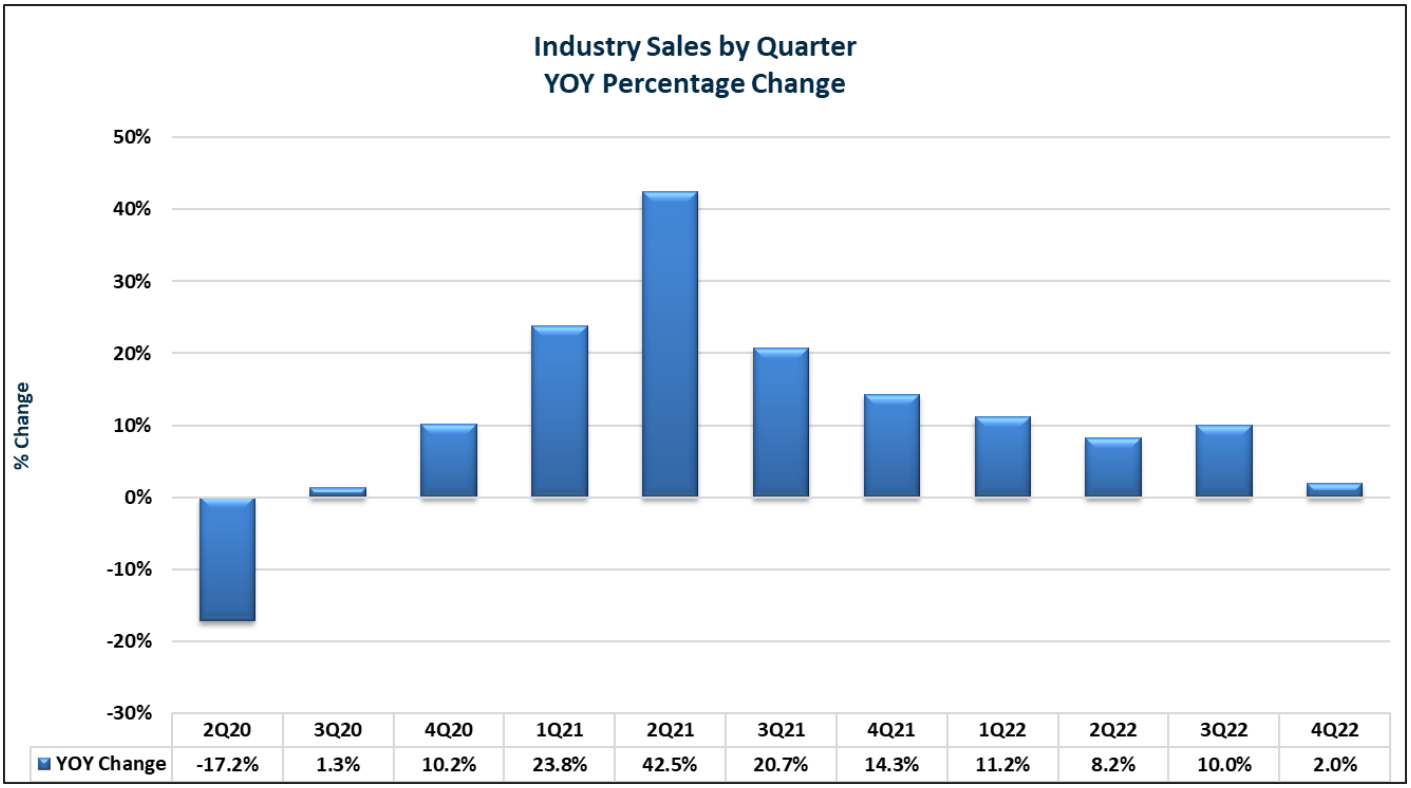
$ Million, Bishop ©2023

Year-to-date and YOY sales growth by region in the fourth quarter of 2022 can be seen in the following chart.



	Total	ROW	Asia Pacific	China	Japan	Europe	North America
4Q22	2.0%	6.5%	-2.5%	-0.2%	-10.6%	2.9%	8.2%
YTD	7.8%	11.7%	7.1%	6.1%	-2.0%	6.5%	14.6%

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 have now achieved 10 consecutive quarters of growth.



	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22
YOY Change	-17.2%	1.3%	10.2%	23.8%	42.5%	20.7%	14.3%	11.2%	8.2%	10.0%	2.0%

Industry Backlog Grows Slightly

The industry is currently shipping $1,552 million/week. The 2022 ending backlog is $22,983 million, or 14.8 weeks.

The first quarter of 2022 (1Q22) achieved sales of $21,200 million. Assuming no significant order cancellations, a backlog of $22,983 million suggests that the first quarter of 2023 (1Q23) has orders sufficient to equal sales, or slightly exceed sales, achieved in the first quarter of 2022.

Based on this logic, the first quarter of 2023 should be flat or up low single digits.

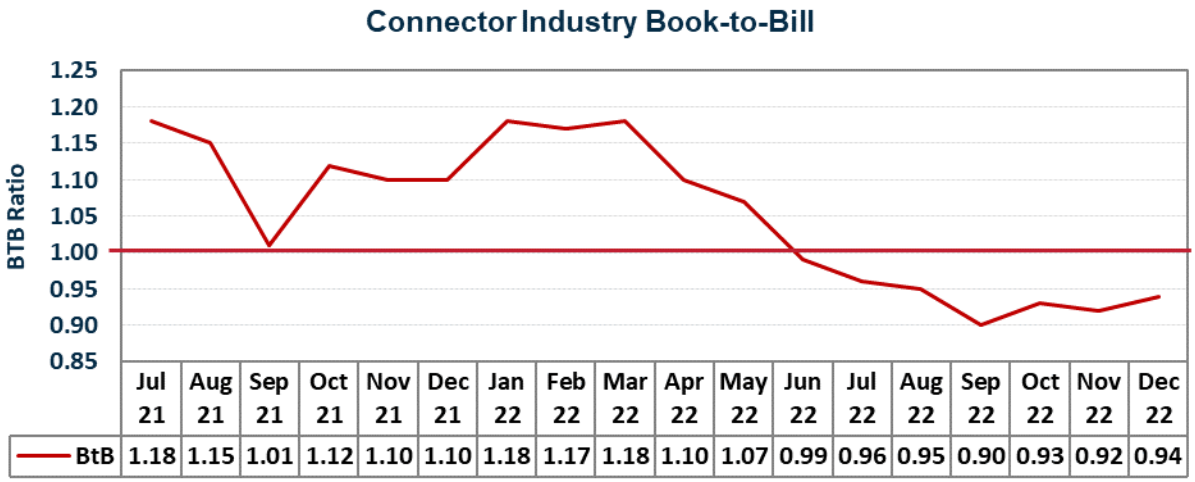
The following table displays the industry backlog year-to-date December 2022.

Industry Backlog

	2021	YTD Dec 2022
BtB Ratio	1.14	1.01
Beginning Backlog	$10,530	$21,499
Bookings	$88,910	$85,575
Billings	$77,991	$84,091
Ending Backlog	$21,499	$22,983
Backlog in Weeks	14.3	14.8

$ Millions

The industry has reported seven consecutive months of below 1.00 book-to-bill ratios. This is shown in the following graph. December's BTB ratio is 0.94 to 1.00.



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

Ending Backlog Since May

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

$ Millions

It is evident that demand is slowing down:

- Connector backlog has declined $3,390 million since May 2022.
- The semiconductor industry has reported three consecutive months of negative year-over-year sales declines (September down -3.0%, October down -4.6% and November down -9.2%). We expect that December will make four consecutive months of year-over-year sales declines..

2022 Industry Results

Connector sales were down -0.9% in December, ending the streak of 27 consecutive months of monthly sales increases.

Another sign of slowing connector demand is the decline in semiconductor demand.

For the year 2022, world connector sales are up 7.8% and the backlog is fairly strong at a 1.01 book-to-bill ratio.

The following table displays the results for the full year 2022 with growth of +7.8%. North America has the best performance with growth of +14.6%. The 2023 forecast is for +1.9% growth.

Bishop Results & Forecast by Region

	2021		2022		2023	
	Results	Change	Results	Change	Forecast	Change
North America	$16,484	22.2%	$18,889	14.6%	$19,256	1.9%
Europe	$16,278	26.8%	$17,328	6.4%	$17,502	1.0%
Japan	$5,276	19.1%	$5,173	-2.0%	$5,106	-1.3%
China	$24,978	23.8%	$26,494	6.1%	$27,166	2.5%
Asia Pacific	$11,384	25.9%	$12,195	7.1%	$12,567	3.1%
ROW	$3,590	31.2%	$4,012	11.7%	$4,103	2.3%
Total	**$77,991**	**24.3%**	**$84,091**	**7.8%**	**$85,700**	**1.9%**

$ Million, Bishop ©2023

Strong U.S. Dollar Reduces Growth from 7.8% in USD to 2.0% in Local Currencies

The dollar has been strengthening against the euro, the yen, and the yuan. The following table measures the impact for December 2021 versus December 2022 and shows results for these three currencies.

Local Currency to One USD
December 2021 versus December 2022

Currency	2021	2022	% Change
Euro	0.8846	0.9448	6.8%
Yuan	6.3703	6.9810	9.6%
Yen	113.7858	134.9773	18.6%

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

Industry Sales Performance
YTD December 2022
USD-vs-Local Currencies

Region	U.S.$	Local Currency
North America	14.6%	14.6%
Europe	6.4%	-0.9%
Japan	-2.0%	-22.3%
China	6.1%	-4.9%
Asia Pacific	7.1%	7.1%
ROW	11.7%	11.7%
World	**7.8%**	**2.0%**

Connector sales are 5.8 percentage points lower when stated in local currencies rather than in US dollars, putting industry performance at 0% growth in December (versus +8.3% in US dollars). This is the result of a stronger US dollar, on average, compared to the three primary currencies. This clearly shows no real growth in Europe, China, and Japan in unit volume.

Significant Events

Infinite Electronics Acquires Bulgin Ltd

IRVINE, Calif. (January 19, 2023) Infinite Electronics, Inc. announced today that it acquired Bulgin Ltd, a UK-based developer and manufacturer of connectors and related components for harsh-environment applications. Bulgin was previously owned by Equistone Partners Europe, a leading European mid-market private equity firm.

"By welcoming Bulgin to Infinite Electronics' growing brand portfolio, we are better positioned to meet the increasing demand for reliable connectivity solutions for harsh environments," said Infinite Electronics President and Chief Executive Officer Penny Cotner. "Bulgin's focus on mission-critical, customizable components with outstanding design and customer support aligns with our own longstanding reputation for delivering our customers what they need, when they need it most."

Bulgin has a century of experience designing, developing, and manufacturing IP66, IP67, IP68, and IP69K harsh environment connectivity solutions for end-users across a wide range of industries. Bulgin's business focuses on bespoke services and custom capabilities with quick prototyping and a Rapid Response Team (RRT) to address customers' urgent needs. Since Equistone's acquisition of the business in 2019, Bulgin has grown significantly, opening a new site in Tunis, Tunisia, and new headquarters in Cambridge, UK.

"Joining Infinite Electronics' portfolio provides the Bulgin brand with the scale to leverage opportunities required to accelerate business growth globally," said John Wilson, Bulgin's Chief Executive Officer. "Infinite Electronics and Bulgin share much in common, such as ambitious global growth plans and customer-centric values. This is an exciting milestone in the Bulgin journey."

Today, Bulgin has more than 600 distributor locations spanning 60 countries and six continents. It employs 680 people globally, including its U.K. headquarters, operations in Tunisia, and Santa Fe Springs, California, as well as a presence in the Asia-Pacific region.

William Blair served as exclusive financial advisor and Cleary Gottlieb Steen & Hamilton as the legal advisor to Infinite on the transaction.

This acquisition further establishes Infinite Electronics' presence in Europe and comes after the company announced it entered into a definitive agreement to acquire Cable Connectivity Group (CCG) from Torqx Capital Partners and TKH Group NV, a leader in the production, distribution and assembly of specialty cables and cable connectivity solutions. These acquisitions are the latest milestones in Infinite Electronics' rapid growth over the past six years.

Smiths Interconnect Acquires Plastronics Sockets & Connectors

Smiths Interconnect, a division of Smiths Group plc, announced that it has completed the acquisition of Plastronics Sockets & Connectors, a leading supplier of burn-in test sockets and patented spring probe contacts for the semiconductor test market segment, as well as custom connectors for industrial applications.

Plastronics' technology, products, and capabilities complement and strengthen Smiths Interconnect's existing portfolio of products and support the company's ambition to be the partner of choice for semiconductor test customers around the world.

The acquisition brings growth opportunities for both semiconductor test and connectors. It also provides cross selling opportunities in both Asia and the US by leveraging the combined sales and manufacturing footprint of the companies.

Smiths Interconnect President Julian Fagge said: “I am delighted to welcome Plastronics to the Smiths Interconnect family of technology brands. We are proud of our heritage supplying technically differentiated components critical to our customers’ products and operations. Plastronics fits very well with our long-term strategy, adding new technology, products and capabilities to the business and strengthens our position across our customer base”.

Plastronics is headquartered in Irving, Texas.

Wieland Acquires Heyco Metals and National Bronze Manufacturing

With the acquisition of Hummock Industries, Wieland has acquired Heyco Metals, a leader in light and medium gauge copper, copper alloy, and stainless-steel strip processing, and National Bronze, a manufacturer and distributor of bronze-based bearing products. Hummock Industries is a family-owned holding company focused on long-term investments in North American-based manufacturing companies. These complementary operations will further strengthen Wieland’s market position with expanded product offerings, manufacturing capabilities, and distribution networks in North America.

Heyco Metals, founded in 1969, operates a re-roll mill in Reading, Pennsylvania, and delivers premium quality products to customers in the automotive, electronics, industrial, and medical markets.

Founded in 1911 and headquartered in Roseville, Michigan, National Bronze is a well-known U.S. manufacturer and distributor of bronze bushings, bearings, and other industrial components for customers in a large range of industries. In addition, they operate a metal service center with bar stock of various non-ferrous materials.

“Like Wieland, Heyco Metals and National Bronze are recognized for exceptional quality and service. Our ambitious growth plans include the continued diversification of product categories and manufacturing capabilities, allowing Wieland to support the growing and challenging needs of our customers today and, more importantly, well into the future,” says Dr. Erwin Mayr, CEO of Wieland. “This acquisition also reaffirms Wieland’s commitment to continued investment and growth in North America.”
The transaction officially closed on December 30, 2022.

Capvis Acquiring Majority Interest in SCHURTER Group

Swiss investor Capvis, a specialist in midcap investments, is acquiring a majority interest in the Lucerne-based SCHURTER Group. The transaction will not have any impact on the group’s organizational structure and jobs. The founding family and current owner of the group will be retaining an interest and will be represented on the Board of Directors by Thomas Schurter. CEO Ralph Müller and his management team will continue to manage SCHURTER in the future.

Based in Lucerne with a total of 20 subsidiaries in 17 countries, the SCHURTER Group is a successful producer of components for ensuring the clean and safe supply of power, input systems and sophisticated integrated electronic solutions. It generated revenues of around CHF 330 million in the 2022 financial year. The company has been in the hands of the Schurter family since its foundation. Now there is to be a change in the ownership structure. Capvis, a well-known Swiss investor company based in Baar (canton of Zug), is acquiring a majority interest in SCHURTER Holding AG. The transaction is expected to be completed in spring 2023 following the necessary (European) regulatory approval process.

"In the interests of business continuity, the family had jointly decided a number of years ago that Cyrill Schurter, as a representative of the fourth generation, would assume management responsibility for the company in the medium to long term. The necessary steps had already been initiated and even finalized. After his tragic death in May 2021 as a result of an accident, there were no other potential successors from within the family as the other members of the fourth generation were already pursuing other career paths," explained Thomas Schurter, Chairman of the Board of Directors. "Following intensive discussion and careful consideration, the owner family decided to sell a majority interest in order to ensure the company's continued success."

Subsequently, the family selected a partner which, as the new majority owner, will continue to expand the company as an independent group. "Capvis offers the ideal basis for keeping SCHURTER on its growth path. Capvis is known for advancing the development of successful, internationally active companies together with the management team," said Thomas Schurter.

Capvis specializes in holding majority interests in leading SMEs in Switzerland, Germany, Austria and Italy. It predominantly invests capital provided by institutional investors such as pension funds, asset managers and family offices. The international trade press has repeatedly named Capvis the top private equity company in Switzerland.

Boris Zoller, Managing Partner of Capvis: "I'm greatly looking forward to advancing SCHURTER's development together with its management team. SCHURTER is a good fit for Capvis and Capvis is a good fit for SCHURTER. Entrepreneurship, Swiss quality, and innovation are our guiding principles. SCHURTER has been demonstrating this for years with its successes and is thus ideally positioned to continue performing successfully on growth markets around the world." Certified management systems ISO 9001 / IATF 16949 / ISO 14001 / ISO 45001 / ISO 13485

The Schurter family will remain an important shareholder in the group, which will continue to be managed by the existing management team led by CEO Ralph Müller. In line with the Capvis strategy, he will also be taking a stake in the company. Ralph Müller: "I'm proud of the global SCHURTER teams. Capvis' decision to invest in the company is a recognition of the performance and expertise of our employees."

"The acquisition of a majority interest in the SCHURTER Group marks an important step for Capvis," explains Andreas Simon, who as a Capvis partner is responsible for industrial technology investments. "The group has been successful in the key industries of electronics, automation and digitization technology for many years and has the right employees and technologies to add further chapters to its success story."

The transaction will not have any impact on the group's organizational structure or its approximately 2,200 jobs. The company's headquarter will remain in Lucerne. The established SCHURTER brand will also be retained. As a further sign of continuity, Thomas Schurter will remain on the Board of Directors, while Ralph Müller and his management team will continue to manage the company.

The parties have agreed not to disclose the financial details of the transaction.

Dell to Phase Out Chinese Chips by 2024

Dell Technologies Inc is planning to stop using Chinese-made chips by next year and has told suppliers to reduce the amount of other made-in-China components in its products amid concerns over US-China tensions, the Nikkei reported yesterday. The computer maker late last year told suppliers that it aims to meaningfully lower the amount of Chinese-made chips it uses, including those produced at facilities owned by non-Chinese chipmakers, the report added, citing three people with direct knowledge of the matter. Dell

has also asked suppliers of other components, such as electronic modules and print circuit boards, and product assemblers to help prepare capacity in countries beyond China, such as Vietnam, the report said.

The report came after the US last month added Chinese memory chip maker Yangtze Memory Technology Corp and 21 “major” Chinese players in the artificial intelligence chip sector to a trade blacklist.

PC maker HP Inc, one of Dell’s rivals, has also begun surveying its suppliers to gauge the feasibility of moving production and assembly away from China.

PC Shipments Dipped 28% During the Holidays as the Pandemic Boom Ends

The pandemic boom for the PC market has come to an end as evident by the latest market report from IDC. Global shipments of traditional PCs slid to 67.2 million units in the fourth quarter of 2022. That's down 28.1 percent versus the same period in 2021 and is comparable to the fourth quarter of 2018 when Intel was strolling with its supply of processors. Lenovo led the way in Q4, shipping 15.5 million PCs followed by HP with 13.2 million units. Dell placed third with 10.8 million systems shipped during the holiday quarter while Apple moved 7.5 million Macs over the same period. All experienced negative growth compared to Q4 2021. With 292.3 million units shipped for the full year, the market is well above pre-pandemic levels. Still, there's reason for concern as IDC points out that many users have relatively new PCs, and the global economy isn't in great shape. According to the market research firm, the general consensus is that segments of the PC market could return to growth by the end of 2023 with a broader market recovery to follow sometime in 2024.

Tesla’s Price Cuts Accelerate the EV Market’s First Real Recession Stress Test

As electric-car stocks plummeted in late 2022, the rout evoked comparisons to the dot-com stock bust two decades ago. Like the internet industry then, the EV industry boasts companies, notably Tesla, that look like long-term winners, but it is also made up of young companies that may not have the cash to ride out a downturn, as well as in-between players like Lucid Group, Fisker and Rivian Automotive, that have done their best to prepare, and whose fate may depend on how bad things get.

With the economy at an inflection point between receding inflation fears and broad expectation of a recession beginning in 2023, the market doesn’t know what to make of moves like Tesla’s big price cuts, first in China and then on Jan. 13, in the U.S. and Europe. Analysts like Guggenheim Securities’ Ronald Jesikow said it could push Tesla’s profit margins 25% lower than Wall Street consensus and drain profits from all of Tesla’s competitors. But optimists like Wedbush analyst Dan Ives think it’s the right, aggressive move to jumpstart the EV transition amid macro uncertainty.

What happens next — whether battered EV stocks rebound, whether young companies that need more funding will be able to get it, and whether the sector becomes the jobs engine Washington was counting on when it passed the Inflation Reduction Act last summer, laden with tax credits for EVs — depends on the economy first, and the markets second.

Smartphone Shipments Dip to Lowest Seen in a Decade, 17-percent decline from 2021

High inflation and a foreboding economic forecast for 2023 had consumers shifting spending away from luxury items such as high-end smartphones to more necessary purchases like gas and food in 2022. While giants like Apple and Samsung picked up a few points in market share, the overall industry saw declines in the fourth quarter not seen in 10 years.

Smartphone vendors are licking their wounds after an all-around lousy year in sales. Analysts at Canalys estimate worldwide shipments for Q4 2022 dipped 17 percent compared to 2021. Full-year sales were

down to less than 1.2 billion, a decline of 11 percent year-over-year. The worst performance the industry has seen in a decade.

Apple and Samsung fared slightly better than the rest, with the Cupertino company wresting away 25 percent of the market over the Korean OEM's 20 percent — both gains in the industry. Chinese manufacturers Xiaomi, Oppo, and Vivo all took a hit, falling to 11, 10, and 8 percent market share, respectively. Apple's recent release of the iPhone 14 line contributed to it stealing Samsung's thunder, at least until the Galaxy S23's upcoming release.

Manufacturers were able to reduce inventory on high-end inventories through the holiday season, but overall, "Q4 2022 stands in stark contrast to Q4 2021's" high demand and ebbing supply constraints. Even low- to mid-range demand fell sharply in the first three quarters. Folks in 2022 were more concerned with paying their rising bills rather than upgrading to the latest and greatest.

Microsoft Quarterly Profit Falls 12% But Cloud Computing Business Shows Strength

Microsoft on Tuesday posted weaker-than-expected revenue and a double-digit percentage drop in profit for the final three months of last year amid broader economic uncertainty and reduced demand for personal computers and software.

The tech giant reported revenue of $52.7 billion for the quarter, a modest 2% increase from the year prior but slightly less than analysts had expected. It reported net income of $16.4 billion, a 12% decline from the year prior.

The earnings results come at a turbulent moment for Microsoft, and the tech industry as a whole. Microsoft said last week that it plans to lay off 10,000 employees as part of broader cost-cutting measures. In his explanation of the cuts, CEO Satya Nadella pointed to changing demand for digital services years into the pandemic as well as looming recession fears.

Demand for personal computers, and the Microsoft operating systems that power them, has pulled back after experiencing a boom early in the pandemic. Consulting firm Gartner said earlier this month that worldwide PC shipments fell more than 28% in the fourth quarter of 2022 compared to the same period the prior year. This marked the largest quarterly shipment decline since Gartner began tracking the PC market in the mid-90s.

On Tuesday, Microsoft reported revenue declines from its Windows OEM operations and from its Xbox content and services lines. Microsoft also said it would incur $800 million in severance expenses from the layoffs announced this month, as well as charges from “changes to our hardware portfolio, and costs related to lease consolidation activities.”

But the earnings report had some bright spots. Revenue from its cloud computing division, a key area of focus for Microsoft in recent years, increased 22% from the prior year. An analyst at Evercore described the results as “a sigh of relief.”

Samsung Drives 63% Surge in Foldable Phone Wales in Q3

Global shipments of foldable smartphones shot up more than 60 percent in the third quarter this year, despite the stagnant smartphone market, owing to high sales of Samsung Electronics’ foldable devices, according to industry tracker Counterpoint Research. From July to September, foldable smartphone shipments worldwide surged about 63 percent on-year to 6.08 million units. Although the global smartphone market posted stagnant

sales, foldable items accounted for 2 percent of the total smartphone sales during the cited period, up from last year's 1.1 percent, the report showed.

This phenomenon was largely due to robust demand for Samsung's Galaxy Z Fold 4 smartphones. The foldable device's shipment jumped over 60 percent through the cited period. Foldable phone shipments by

Chinese companies also attributed to increasing the figure. While Samsung has been a dominant leader in the world's foldable smartphone market, global foldable phone competitors rush to roll out new devices to compete against the world's No. 1 player. They seek to sharpen competitiveness with less expensive and high-spec phones.

Apple Wants to Manufacture 25% of its iPhones in India

Apple is looking to manufacture 25% of all of its iPhones in India, the country's commerce minister said. Piyush Goyal, India's minister of commerce and industry, called Apple "another success story" as he talked up the business credentials of the world's fifth-largest economy.

"They're [Apple] already at about 5-7% of their manufacturing in India. If I am not mistaken, they are targeting to go up to 25% of their manufacturing," Goyal said at a conference.

Last year, Apple began assembling its flagship iPhone 14 in India. It was the first time the tech giant produced its latest model in India so close to its launch. Apple has been manufacturing iPhones in India since 2017, but these were usually older models.

Taiwanese firm Foxconn, the main assembler of Apple's iPhones, is manufacturing the smartphones at its Sriperumbudur factory on the outskirts of Chennai in eastern India.

JPMorgan analysts said in a note from September that Apple could make 25% of all iPhones globally in India by 2025.

Apple has been looking to diversify production away from China, where it currently makes the bulk of its iPhones. Fragilities in China were exposed last year after a Covid outbreak and worker protests at the world's largest iPhone factory in Zhengzhou, China, which is also run by Foxconn, disrupted production.

Last year, CNBC reported that India is exploring bringing some of Apple's iPad production to the country from China.

Apple has just a 5% market share in India's smartphone market, but CEO Tim Cook has long-seen India as a potential area for growth.

Hon Hai Faces Loss of iPhone Pro Exclusivity

Due to escalating political tensions and COVID-19 employment shortages, the company is to expand iPhone production outside China Key iPhone assembler Hon Hai Precision Industry Co saw its shares drop below the NT$100 mark after a report said the company might no longer be the sole assembler for iPhone Pro models next year.

However, because of the growing concern about geopolitical tensions, Apple is expected to markedly expand the number of overseas production sites that are outside China, the report said. Apple is expected to double its device production capacity in India next year and would see factories in Vietnam start making contributions

by the middle of the year, adding that at least 30 to 35 percent of Apple's entire device production capacity is expected to come from India and Vietnam in the next few years.

As China's supply chain has started to experience a labor shortage this month due to the abrupt change in the country's COVID-19 policy and the approach of the Lunar New Year holiday next month, Apple is facing a lack of workers, constraining its device production. Global iPhone shipments in the first quarter of next year are expected to drop 22 percent year-on-year to 47 million units.

Apple Contractor Foxconn Offers 5,000 Yuan Subsidy to Retain Workers

Foxconn Technology Group's plant in the central Chinese city of Zhengzhou, site of the world's largest iPhone factory, is offering a 5,000-yuan (US$718) bonus for employees who agree to work until late March, signifying persistent labor problems at the plant. Foxconn's Zhengzhou facility is still struggling to resume full capacity after workers clashed with guards over draconian Covid-19 controls last month, in scenes that shocked the world. Since then, the sudden relaxation of China's zero-Covid policy by Beijing has led to a surge in infections across the country. Apple's stock price has also hit its lowest level since the summer of 2020, partly due to concerns about supply disruptions. Apple said in early November that the exodus of workers at Foxconn's Zhengzhou factory had caused "significant" disruptions to its iPhone shipments.

Autonomous Vehicles Eye Bigger Business Opportunities

Autonomous driving vehicles may be more ubiquitous much sooner than we originally expected. The commercialization of self-driving technology is expected to gain momentum in China in the next few years, thanks to continuous technological innovation and considerable policy support, industry experts said.

China has taken the lead in the research and development as well as application of autonomous driving technology around the world and it is the first country to allow fully driverless paid robotaxi operations, as the market potential of this technology continues to grow in the nation, they added.

The self-driving industry is set to witness robust growth in the coming years. The market size of China's self-driving taxi services is expected to surpass 1.3 trillion yuan ($188.6 billion) by 2030, accounting for 60 percent of the country's ride-hailing market by then, said a report by global consultancy IHS Markit.

It is noteworthy that the domestic robotaxi market will eventually be dominated by two to three major service providers, with the top providers occupying more than 40 percent of the total market share. Chinese tech companies have been striving to advance the technology and accelerate the commercial use of autonomous driving vehicles. Baidu Inc recently announced it plans to put an additional 200 fully autonomous driving robotaxis into operation across the country in 2023 and build the world's largest fully driverless ride-hailing service area.

Foxconn to Use Nvidia Chips to Build Autonomous Vehicle Platforms

Chipmaker Nvidia and electronics manufacturer Foxconn announced a partnership to develop autonomous vehicle platforms. Foxconn said it will manufacture electronic control units (ECUs) for cars based on Nvidia's DRIVE Orin chip made specifically for computing in connected and autonomous vehicles. The ECUs will serve the global automotive market, Foxconn said.

Companies developing electric and autonomous cars have struggled to bring products to the market in recent years as they grapple with rising costs and difficulties in ramping up production. Nvidia said its technology, which includes chips to process information from sensors in real time, will help Foxconn overcome some of those challenges. It sees a market opportunity of $300 billion in the automotive sector and reported revenue

of $251 million in the third quarter from the segment. The chipmaker said the tie-up will allow it to scale efforts to meet growing demand for chips made for autonomous and connected vehicles.

Foxconn, which operates a vehicle manufacturing facility in Ohio, said its vehicles will contain ECUs based on DRIVE Orin and Nvidia's DRIVE Hyperion sensors for autonomous driving.

How 6G Technology Could Impact the Autonomous Vehicle Industry: Bosch's Research

German technology giant Bosch is already working on the level of 6G connectivity for cars. This is being developed through a project called 6G-ICAS4Mobility, financed with public funds, which basically seeks to establish a closer connection between vehicles and the so-called Internet of Things (IoT).

IOT is a network of objects, machines, and people that communicate through an interface to exchange data and carry out specific tasks. 6G, which can offer speeds up to 1 terabit per second, could play a key role in enabling cars to interact with the environment and other vehicles.

This technology is expected, in this case, to allow cars to communicate with each other, to receive real-time information about the environment in which they circulate, as well as to locate and detect objects in the environment. This will enable a more efficient and safe driving experience, by alerting drivers to possible risks and improving the accuracy of traffic information.

In the context of 6G-ICAS4Mobility, Bosch is currently researching the technology in an industrial environment and continues to expand the project. This new expanded network will allow fully autonomous circulation in environments specially built for that purpose, such as factories or very specific parts of cities, as of now. Its operation will actually be much simpler than expected: the set of elements located in a specific environment, such as a street, will be read through a series of sensors and radars attached to the vehicle itself.

At the same time, the traffic lights and vehicles will be connected to each other through the 6G network and will also be able to communicate with each other. In this way, a more precise digital image is created and a complete map of the environment in which they are located is digitally visualized.

The 6G-ICAS4Mobility project aims for vehicles to send their different readings to the “cloud” and for everyone else to access this data individually. This will be of great help in the event of an accident, for example, since the cars involved in the collision will be avoided by the other drivers, who in turn will be able to find an alternative route so as not to congest the surroundings.

Over the next three years Bosch will continue to develop the foundations of this technology, to implement it in future electric and autonomous cars. Their goal is to do so by the end of this decade or in the early 2030s. However, to achieve this they will need not only for the vehicles that move through any given environment to have this technology incorporated, but also for other elements or at least parts of the driving paths to include it as well.

Big Tech's Pandemic Bubble Burst

In January 2021, Microsoft CEO Satya Nadella spoke in lofty terms about how the first year of the pandemic had sparked a staggering shift toward online services, benefiting his company in the process. "What we have witnessed over the past year is the dawn of a second wave of digital transformation sweeping every company and every industry," he said.

Two years later, the situation appears much starker. This week, Microsoft said it planned to lay off 10,000 employees as businesses rethink their pandemic-era digital spending and confront broader economic uncertainty. Microsoft's customers, Nadella said, are now trying "to do more with less."

Days later, Google-parent company Alphabet followed suit, saying it plans to cut around 12,000 jobs, amounting to more than 6% of its staff.

Over the past three months, Amazon, Google, Microsoft, and Facebook-parent Meta have announced plans to cut more than 50,000 employees from their collective ranks, a stunning reversal from the early days of the pandemic when the tech giants were growing rapidly to meet surging demand from countless households living, shopping, and working online. At the time, many tech leaders seemed to expect that growth to continue unabated.

By September of 2022, Amazon had more than doubled its corporate staff compared to the same month in 2019, hiring more than half a million additional workers and vastly expanding its warehouse footprint.

Meta nearly doubled its headcount between March 2020 and September of last year. Microsoft and Google also hired thousands of additional workers, as did other tech firms like Salesforce, Snap and Twitter, all of which have announced layoffs in recent weeks, too. But many of those same leaders appear to have misjudged just how much growth spurred by the pandemic would continue once people returned to their offline lives.

In recent months, higher interest rates, inflation and recession fears causing a pullback in advertising and consumer spending have all weighed on tech companies' profits and share prices. Wall Street analysts now project single-digit revenue growth during the all-important December quarter for Google, Microsoft and Amazon, and declines for Meta and Apple, when they report earnings in the coming weeks, according to Refinitiv estimates.

The recent cuts in most cases amount to a relatively small percentage of each company's overall headcount, essentially erasing the last year of gains for some but leaving them with tens or in some cases hundreds of thousands of remaining workers. But it nonetheless upends the lives of many workers now left to search for new jobs after their employers exit a period of seemingly limitless growth.

Apple remains an outlier as the one major tech company that has yet to announce layoffs, although the iPhone maker has reportedly instituted a hiring freeze of all areas except research and development. Apple grew its staff by 20% from 2019 through last year, markedly less than some of its peers.

World RF Coax Connector Market 2023

To cover the significant changes of the last several years, Bishop & Associates, Inc. is pleased to announce the release of its newest, technically intensive, 13-chapter, 434-page research report on the World RF Coax Connector Market. Advancing technologies and expanded applications make this a challenging growth time for the RF coax connector industry. The report presents the latest sales results and forecasts, plus details on the newest coax connector product developments from the smallest MHF*, to higher frequency 1.35, 0.8-, and 0.6-mm connectors, and industry standards including IEEE-287-2021 and MIL-Spec revisions, plus application discussions, and primary suppliers. The report was delayed and revised so that effects of the COVID-19 pandemic, advances in potential sub-THz for 6G, and the current effects of inflation and component costs could be included.

This extensive encyclopedia-type volume provides an in-depth review and forecast of the RF coax connector industry. Sales results and forecasts are provided for RF coax connector families and product types for total world and by region. Coax connector sales are recapped for 2020 and 2021 with a forecast for 2022 and 2027F. Projected usage and new product technology in the sub-THz range includes information on waveguides and WG-to-coax plus review of RF cable assemblies.

Projections include a discussion on how IoT including implementation of 5G and 6G concepts, plus VITA and SOSA, EICA/EIA, IEEE, updated MIL-specs, etc., will support new programs, plus trends for miniaturization, COTS, SATCOM, higher frequencies, higher RF power needs, broader bandwidths, and international shifts, will affect markets, both overall and for specific connector types. With a forecasted CAGR of **over 6**% from 2022 to 2027, growth of the world RF coax connector market is projected to exceed many other connector types.

World RF Coax Connector Market 2023

This report's results and forecasts are based upon actual manufacturers' data augmented by related historical knowledge and expert inputs. In 2021, *RF coax connectors* were one of the world's top five connector categories, offering a significant business potential for those knowing market(s) direction and product details.

Sales of electronic connectors continue to advance and match industry needs. The RF coax connector market is increasing in importance as the number of wireless enabled devices, and the amount of data consumed expands at an almost unfathomable rate. This report examines which RF coax interconnect products are expected to achieve growth, versus those that may be static, or in decline. In addition to worldwide and regional marketplace sales data, supportive chapters on connector technology and specific product families, plus their primary suppliers, are included to provide an understanding of the coax connector industry, the products involved, how they are used, and what affects their sales.

A sampling of the RF coax connector types included in this report is shown below.

Primary RF Family	Connector Series (Family Grouping)
Ultra-Microminiature	U.FL, MHF, X.FL, UMCC, AMC, UMP, SW*
Microminiature	MCX, MMCX, QSL, SuperMini 0.9 mm, MOEBIUS
Subminiature	QMA, SMA, SSMA, SMB, SSMB, SMC, SSMC, SMD, FAKRA, mini-FAKRA, 1.0/2.3, 1.5/3.5, 1.6/5.6
Miniature	BNC/Mini BNC/HD-BNC, UHF/Mini-UHF, MHF, SHV, F, G, 2.2/5
Medium	TNC/RP-TNC, N, QN, HN, ZMA, SMPKey, 4.3/10, 4.1/9.5 Mini-DIN, NEX10, QLI
Large	DIN 7/16, 13/30, L, C, SC, LC, LT
Precision	7mm, 3,5mm, 2.92mm, 2.40mm, 1.85mm, 1.35mm, 1mm, 0.9mm, 0.8mm, 0.6mm
Blindmate	BMA (OSP), BMMA (OSSP), SBMA, BZ, BMZ
Board-to-Board	SMP (GPO), SMPM, SMP3, IMP, MMBX, MBX, SSBB, Compression Types

The level of numerical detail included in this report includes:

2020, 2021, 2022F and 2027F RF Coax Connector Sales by Region
With Percent Change and Five-Year CAGR

Region	2020	2021	Percent Change	2022F	Percent Change	2027F	5-Year CAGR
North America	$XXX.X	$XXX.X	YY.Y%	$XXX.X	-YY.Y%	$X,XXX.X	YY.Y%
Europe	$XXX.X	$XXX.X	-Y.Y%	$XXX.X	-YY.Y%	$X,XXX.X	YY.Y%
Japan	$XXX.X	$XXX.X	-Y.Y%	$XXX.X	-YY.Y%	$XXX.X	YY.Y%
China	$X,XXX.X	$X,XXX.X	-YY.Y%	$XXX.X	-YY.Y%	$X,XXX.X	YY.Y%
Asia Pacific	$XXX.X	$XXX.X	Y.Y%	$XXX.X	-YY.Y%	$XXX.X	YY.Y%
ROW	$XXX.X	$XXX.X	-Y.Y%	$XXX.X	-YY.Y%	$XXX.X	YY.Y%
Total World	**$X,XXX.X**	**$X,XXX.X**	**-Y.Y%**	**$X,XXX.X**	**-YY.Y%**	**$X,XXX.X**	**YY.Y%**

$ Millions

2021 and 2022F RF Coax Connectors By Region with Percent Change

Product Type	Europe			Japan		
	2021	2022F	% Chg.	2021	2022F	% Chg.
Large Coax						
DIN 7/16 (incl. Low PIM)	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
LC/LT, C/SC Series	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Triaxial	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Others & Custom Lrg RF (incl. Sizes 8-12 for Multi-**Port**), etc.	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Total Large	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**
Precision Coax						
1.0mm W (110 GHz)	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
1.85mm V (65 GHz)	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
2.4mm (50 GHz)	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
2.9mm (K) (40 GHz)	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
3.5 mm	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
7.0 mm / APC-7 (18 GHz)	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Proprietary (Custom)	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Other Precision:**1.35mm**, 0.8mm, 0.6mm, Size 20 Multi-Port, etc	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Total Precision	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**
Blind-mate Coax						
GPO/SMP/SMPM/SMP3/SMMP Types	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Others, BZ, BMZ, BMA, BMMA, SFB, etc.	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Total Blindmate	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**
Between Series Adaptors	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**
Other Adapters, Inline, T, etc.	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**
Other Special Design	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**
Attenuators, Terminations, Dummy Loads, Shorting Caps	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**
Total RF Coax Connectors	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**

$ Millions

2022F and 2027F Connector Sales by RF Product Family by Region With Five-Year CAGR

RF Product Family	North America			Europe		
	2022F	2027F	CAGR	2022F	2027F	CAGR
Ultraminiature Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Board-to-Board Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Microminiature Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Subminiature Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Miniature Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Medium Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
DIN Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Large Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Precision Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Blind-mate Coax	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Accessories, Adaptors, & Customs	$XX.X	$XX.X	Y.Y%	$XX.X	$XX.X	Y.Y%
Total RF Coax Connectors	**$XX.X**	**$XX.X**	**Y.Y%**	**$XX.X**	**$XX.X**	**Y.Y%**

$ Millions

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

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Chapter 13 – User "Helps" and Suggestions

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Research Report P-780-23, ***World RF Coax Connector Market 2023*** is available for $5,525. If you would like additional information about this report, or would like to place an order, please complete the following information, and email or mail it to Bishop & Associates, Inc. To place your order on our website: **http://store.bishopinc.com/**.

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For Questions in **Europe:**
Mr. Arthur Visser
Bishop & Associates, Inc.
Phone: (32) 2.660.3696
Email Arthur Visser

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☐	**Report F-2022-02**	**Connector Industry Forecast (November 2022) NEW**
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