AI Drives Above-Average July Chip Growth
3Q Outlook is Strong and Most Firms Beat Expectations, But Shares Decline

Yes, this is a September Monthly reflecting August metrics and events. Better late than never. Deal with it—I am.

Semiconductor industry revenue statistics for July were released early-September and the sequential growth rates was very strong at +2.7%, well above average and consistent with expectations thanks to AI. And 3Q guidance across my Universe is also solid while just-over half of reporting companies exceeded 2Q expectations. But share prices continued to decline and under-perform despite retaining impressive year-to-date outperformance.

Recall that AI is single-handedly accounting for chip industry growth expected at +16% this year driven by memory products at +77% as well as the Philadelphia Semiconductor Index Option (SOX) significantly outperforming broader equity markets thanks to NVDA, while the rest of the 'Magnificent Seven' throw tens of billions of dollars at AI infrastructure—to NVDA.

The problem is that underneath AI there isn't a whole lot going on in the rest of the semiconductor end-markets. And most companies are *not* enjoying AI enthusiasm with almost half in my Universe having missed at least part of 2Q earnings and 3Q guidance expectations and most experiencing share price declines so far this year.

The big news during August was Intel's fall from grace when it missed 2Q earnings, lowered guidance, discontinued its dividend and announced a 15% or 15,000-headcount layoff. It got worse upon further inspection. The production ramp of new parts incur under-utilization start-up costs due to low initial yields that clobber gross margins, and accelerating new product development extends those financial headwinds. So, this year's offerings become profitable next year just in time for next year's parts to offset those profits. Net-net: 2024 financials have already been clobbered; 2025 profitability is expected to stabilize amid the underlying cross currents; and profitability from accelerating new product developments won't occur until 2026. Which means the stock is dead money for at least the next several months. Oh, and the company's only board member with chip industry technology expertise other than the CEO decided to depart. Other than that . . .

I continue to hope that AI cap ex euphoria ahead of revenue streams and profits lasts long enough for PCs, smartphones, automotive and the rest of the end-markets to return to growth. In the meantime, the SOX index remains over-extended versus the S&P500 and most fundamental valuations across the sector are not attractive. I would still be very careful and extremely selective approaching potential chip sector opportunities at this time.

Geopolitical Gymnastics Review: During August both Taiwan and Spain were added to the list of countries offering significant chip industry financial incentives. Recall the new normal chaos is every semiconductor company preserving its supply chain and sales in a variety of ad hoc fashions by skipping around ever-evolving US, Chinese and European technology sanctions, embargoes and tariffs. 'De-Sinicization' describes Chinese and Taiwanese companies expanding operations to more politically neutral countries like Singapore, while 'Geopolitically Dependable Capacity' describes TI's strategy to support customer supply requirements. 'Indigenization' includes government grants and loans incentivizing domestic semiconductor operations that includes multiple billions of dollars from the US, China, Japan, India, South Korea and Malaysia. The Chinese grow-your-own category is referred to as 'Huawei-ization' due to that company's political isolation from the US.

Memories Matter: Recall that my US-equity-based Tokeneke Universe does *not* include some three-quarters of industry memory business from Samsung, SK Hynix and Kioxia. While my Universe does include Micron and Western Digital, it should under-perform expected industry growth in 2024 due to under-representation of more robust expected memory growth at +77% thanks to AI. My Tokeneke Universe also does *not* include very large international players (aforementioned memory guys plus MediaTek, Infineon, Renesas, Rohm, Winbond, Macronix, Nanya, Novatek, Realtek) although it does include wafer foundries (TSMC, UMC, GlobalFoundries, Skywater Tech, Tower Semi) and IP companies (Rambus, Xperi, Ceva, InterDigital, Arm, Adeia) that count as costs associated with manufacturing rather than industry sales. I also normalize fiscal quarters to the best fitting two out of three months. Unreported acquisition stub periods and mergers exiting the sector can also make a difference.

While these differences are significant, most US-based investors experience the sector from the Tokeneke Universe perspective. The Philadelphia Semiconductor Index Option (SOX) is similarly under-represented in memories, although this is mitigated by the inclusion of equipment firms supplying to memory firms.

Very Solid July Growth: Worldwide chip industry revenues for July grew by an above-average +2.7% sequentially on a three-month rolling average basis, according to statistics released by the Semiconductor Industry Association (SIA) in early-September—which was consistent with my expectations. July has averaged growth of +1.3% with a high of +5.4%, a low of -6.3%, and eight declines in the last 38 years, including two of the last 12. The Americas led once again with growth of +4.3% followed by a rebounding Asia-Pacific at +3.9% and continued growth from Japan at +3.3% and China at +0.9%. Europe continued to lag with a decline of -0.5%.

October's release of August statistics should also be above-average given my solid 3Q Universe outlook as well as the AI/memory turbocharge. August has averaged growth of +1.7% with a high of +5.2%, a low of -3.6%, and six declines in the last 38 years, including only one in the last 22 according to industry statistics.

Even Stronger 2Q: Semiconductor industry revenue growth for 2Q finished above the high-end of expectations thanks to an AI-turbocharge from NVDA towards the end of the earnings season. The weighted average sales growth across my Tokeneke Universe finished at a sequential quarterly gain of +7.1% while SIA/WSTS industry statistics for 2Q released in August reflected a lesser gain of +6.5%. Company 2Q guidance from 1Q earnings was centered at +3.4% ranging from +0.6% to +6.1% after only four preannouncements: an increase from SIMO (again), reiterations from MRAM and WOLF, and a softening from INTC. The 2Q is seasonally a recovery quarter with an average sequential revenue increase of +4.2%, a high of +20.0%, a low of -19.9%, and eight declines in the last 38 years—including only two in the last 13, per industry statistics.

Above-Average 3Q Outlook: The 3Q revenue outlook based on management guidance across my Universe also benefited from the late AI turbocharge. The specific weighted average guidance for revenue calls for a sequential gain of +7.0% this quarter, ranging from +4.3% to +9.7%. The 3Q is seasonally the strongest of the year with an average sequential revenue increase of +5.9%, a high of +19.9%, a low of -11.3%, and only four declines in the last 38 years—including only one in the last 22, per industry statistics.

Banking Deals: During August AMD announced an agreement to buy ZT Systems for $4.9B in cash and stock in order to acquire over 1,000 design engineers from the New Jersey-based AI hyperscale systems supplier; TI expects to get $1.6B in CHIPS grants and $6B-$8B in investment tax credits for three 300mm wafer fabs under construction in Texas and Utah; and SK Hynix out of Korea got $450M in grants and $500M in CHIPS loans for a DRAM packaging facility in Indiana. Also, Japanese flash memory maker Kioxia filed to go public on the Tokyo Stock Exchange while VanEck launched a Fabless Semiconductor ETF, SMHX, complementing its existing *overall* Semiconductor ETF, SMH. Pending deals include Nokia's three-pronged offer for Infinera, Western Digital's plan to split its hard-drive and flash operations into separate companies 2H24, and Silicon Motion suing MaxLinear for backing out of its takeover.

Semiconductor Equities Decline and Underperform—Again: Semiconductor sector share prices declined and underperformed tepid broader equity markets during August, although continued to outperform on a year-to-date basis—except for my Universe that continues to underperform. During August the Philadelphia Semiconductor Index Option (SOX) fell by -1.4% while 30 out of 55 stocks in my Universe declined by an average of -0.6%. Year-to-date the SOX is significantly *out*performing broader equity markets with a gain of +23.6%, although only 28 out of 55 stocks in my Universe have advanced by an underperforming average of +4.8%. Broader equity markets have gained with the NASDAQ, S&P500 and DOW up by +18.0%, +18.4%, and +10.3%, respectively.

August			
Winners *(25/55)*		**Losers**	
SQNS	90.5%	WOLF	-48.3%
SMTC	38.1%	MBLY	-32.0%
SKYT	21.2%	PXLW	-29.1%
CEVA	19.4%	INTC	-28.3%
MRVL	13.8%	QUIK	-22.2%
average stock -0.6%		*SOX -1.4%*	

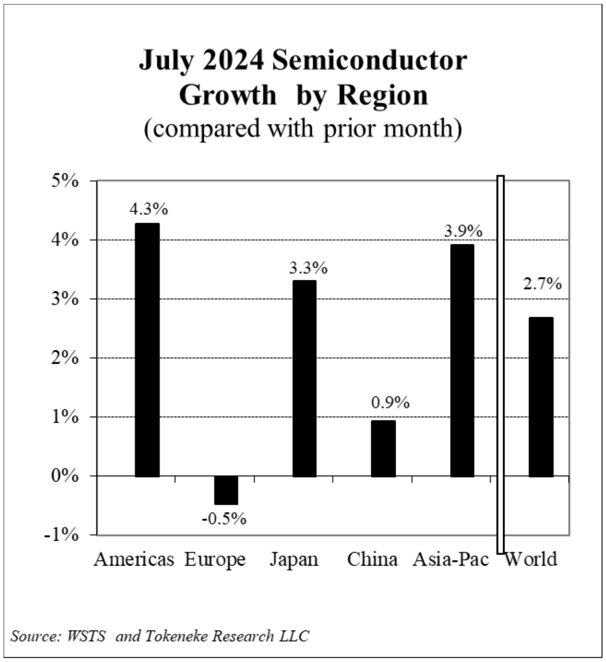
QTD *(3Q)*			
Winners *(23/55)*		**Losers**	
SQNS	98.9%	WOLF	-57.2%
SMTC	46.7%	MBLY	-49.2%
CEVA	24.1%	PXLW	-29.7%
IDCC	18.9%	ALAB	-28.8%
SKYT	17.3%	INTC	-28.8%
average stock -2.4%		*SOX -5.7%*	

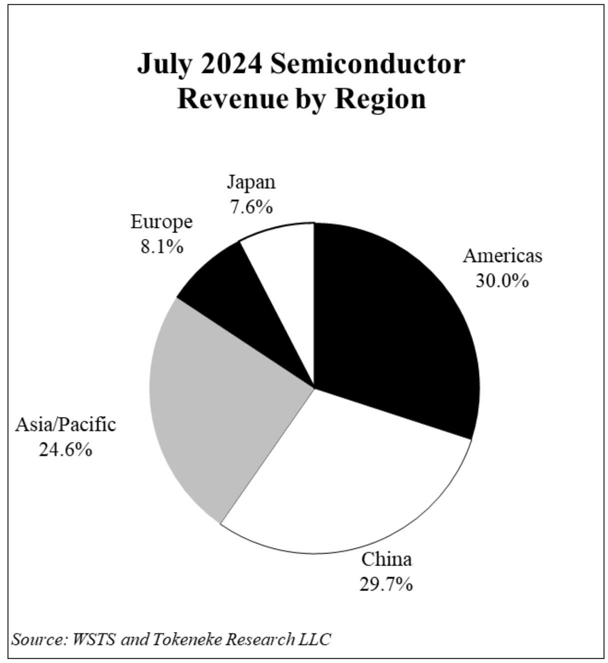
YTD			
Winners *(28/55)*		**Losers**	
NVDA	141.0%	WOLF	-77.6%
SMTC	100.0%	MBLY	-67.0%
PI	86.7%	SQNS	-64.7%
ARM	76.8%	INTC	-56.1%
CRUS	75.1%	PXLW	-47.2%
average stock +4.8%		*SOX +23.6%*	

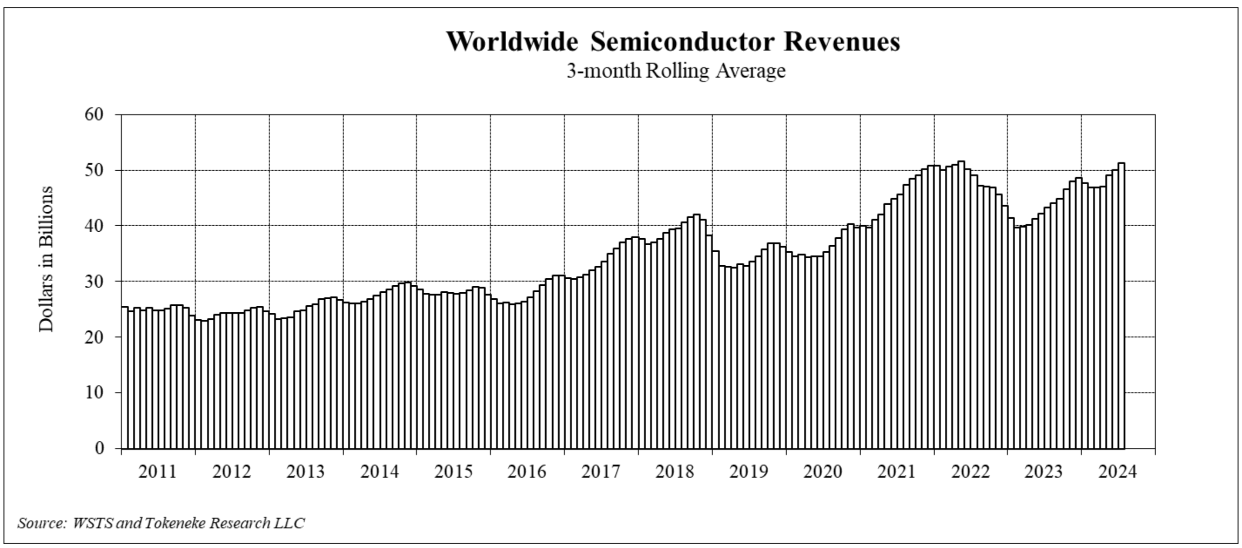
Indices			
	Aug	***QTD***	***YTD***
SOX	-1.4%	-5.7%	23.6%
SMH	-1.4%	-6.6%	39.2%
NASDAQ	0.6%	-0.1%	18.0%
S&P500	2.3%	3.4%	18.4%
DOW	1.8%	6.2%	10.3%

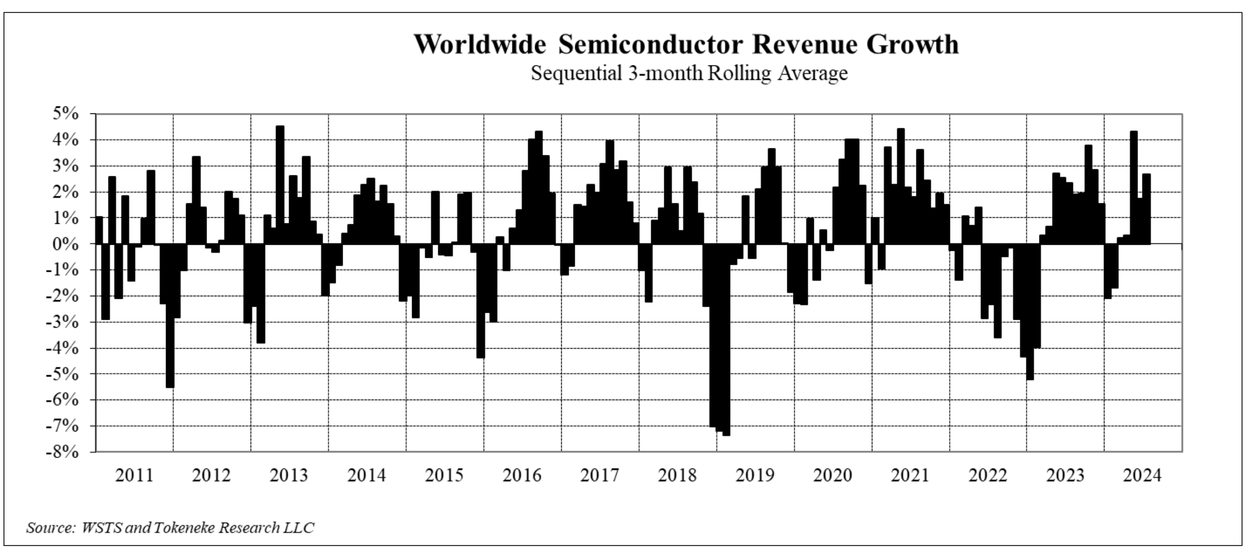
Chip Stocks Still Scary: While AI is a huge growth opportunity, the rest of the semiconductor industry's markets are experiencing malaise and/or transitions. In the meantime, the SOX index remains way over-extended versus the S&P500 (note the relative premium in the chart on Page 4), and most fundamental valuations across the sector are not attractive. I would remain extremely selective approaching potential chip sector opportunities at this time.

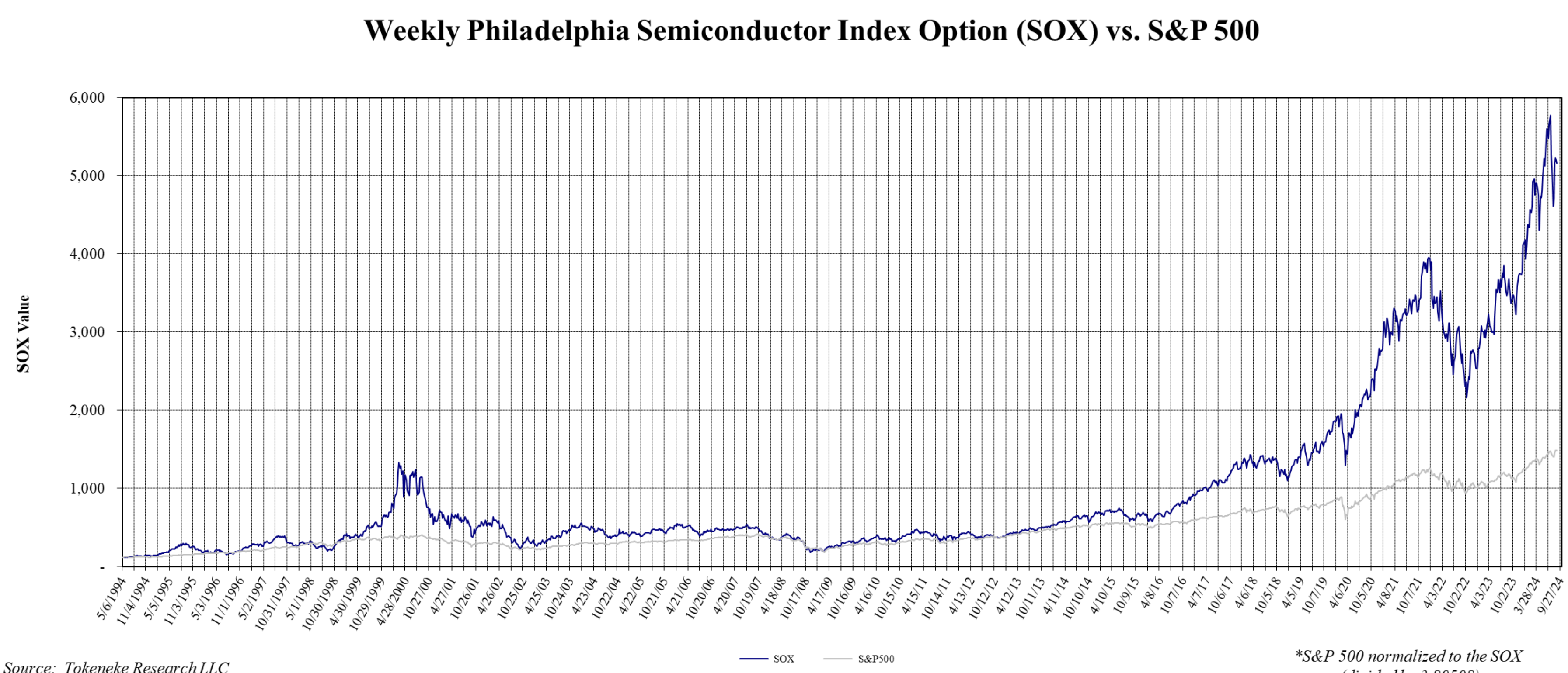
—Dan K. Scovel
Semiconductor Analyst


July 2024 Semiconductor
Growth by Region
(compared with prior month)
5%
4%
3%
2%
1%
0%
-1%
4.3%
-0.5%
3.3%
0.9%
3.9%
2.7%
Americas
Europe
Japan
China
Asia-Pac
World
Source: WSTS and Tokeneke Research LLC


July 2024 Semiconductor
Revenue by Region
Japan
7.6%
Europe
8.1%
Americas
30.0%
Asia/Pacific
24.6%
China
29.7%
Source: WSTS and Tokeneke Research LLC


Worldwide Semiconductor Revenues
3-month Rolling Average
Dollars in Billions
60
50
40
30
20
10
0
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Source: WSTS and Tokeneke Research LLC


Worldwide Semiconductor Revenue Growth
Sequential 3-month Rolling Average
5%
4%
3%
2%
1%
0%
-1%
-2%
-3%
-4%
-5%
-6%
-7%
-8%
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Source: WSTS and Tokeneke Research LLC



Source: Tokeneke Research LLC

The Tokeneke Universe:
55 companies/tickers as of 6/12/24

Company	Ticker	Company	Ticker	Company	Ticker
Adeia	ADEA	Microchip Technology	MCHP	Rambus	RMBS
Analog Devices	ADI	Monolithic Power Systems (MPS)	MPWR	Silicon Motion	SIMO
Astera Labs	ALAB	Everspin Technologies	MRAM	SiTime	SITM
Ambarella	AMBA	Marvell	MRVL	SkyWater Technology	SKYT
Advanced Micro Devices (AMD)	AMD	M/A-COM Technology	MTSI	Silicon Laboratories	SLAB
Alpha Omega Semiconductor	AOSL	Micron Technology	MU	Semtech	SMTC
Arm Holdings	ARM	MagnaChip	MX	Sequans Communications	SQNS
Broadcom	AVGO	MaxLinear	MXL	STMicroelectronics	STM
CEVA	CEVA	Netlist	NLST	Skyworks Solutions	SWKS
Cirrus Logic	CRUS	NVIDIA	NVDA	Synaptics	SYNA
Diodes	DIOD	NXP Semiconductors	NXPI	Tower Semiconductor (TowerJazz)	TSEM
GlobalFoundries	GFS	ON Semiconductor	ON	Taiwan Semiconductor Mfg. Corp. (TSMC)	TSM
GSI Technology	GSIT	Impinj	PI	Texas Instruments (TI)	TXN
Himax Technologies	HIMX	Power Integrations	POWI	United Microelectronics Corp. (UMC)	UMC
InterDigital	IDCC	Pixelworks	PXLW	Vishay Intertechnology	VSH
Infinera	INFN	QUALCOMM	QCOM	Western Digital	WDC
Intel	INTC	Qorvo	QRVO	Wolfspeed	WOLF
Lattice Semiconductor	LSCC	QuickLogic	QUIK	Xperi	XPER
Mobileye Global	MBLY				

The Company
Tokeneke Research is an independent research firm specializing in semiconductor industry business issues, providing fundamental research focused on US equities across all market capitalizations within the sector to investors. The company was founded in 2005 and is based in Connecticut.

My Background
I have an electrical engineering degree, nearly 12 years of semiconductor industry experience, and was on Wall Street for nearly eight years where I was selected as Best On The Street semiconductor analyst by The Wall Street Journal in 2002.

I obtained my undergraduate BS degree in electrical engineering from the University of Washington, and my MBA from Santa Clara University. My industry experience consists of nearly 12 years in various technical sales and marketing roles at four different semiconductor firms located in Silicon Valley beginning with Advanced Micro Devices in 1984, followed by two small start-up companies, and ending at Cirrus Logic where I supported the firm's Japanese market development. I joined Fahnestock & Co. as a senior semiconductor analyst in 1996 and was recruited by Needham & Co. in April 2000.

My formal coverage as a sell-side analyst included the following: AMD, ALSC, ALTR, ARTI, ATML, CUBE, CY, ESST, GNSS, INTC, ISSI, LSI, MOSY, MU, OIIM, OVTI, RMTR, SIII, SMSC, STEC, SVTG, TDFX, TSRA, TXN, and ZRAN.

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