Equity Research
Global

Industry

Global Semiconductors

Global Semiconductor Research Team

Monthly

January 12, 2005

Morgan Stanley Global ChipWatch — January 2005

GLOBAL BEST IDEA	
Samsung Electronics	(005930.KS, W548,000, O)

REGIONAL BEST IDEAS	
Semiconductors - US	
National Semiconductor	(NSM, US$22, O-V)
NVIDIA	(NVDA, US$36, O-V)
Semiconductors - Japan	
NEC Electronics	(6723.T, ¥6,200, O)
Semiconductors - Europe	
ASML Holding	(ASML.AS, €14, O-V)
Semiconductor Capital Equipment - US	
KLA Tencor	(KLAC, US$43.25, O)
Semiconductor Production Equipment - Japan	
Tokyo Electron	(8035.T, ¥6,900, O)

Prices shown above are price targets.

Stock ratings are relative to the individual analyst's industry coverage universe or relevant country index and should be viewed in context with their industry views.

- **Near-term fundamentals remain challenging and earnings risk remains high**
  Although we believe that end-market demand generally met expectations in the fourth quarter, a broad-based inventory correction and the need for a high level of turns business continued to promote a large number of negative earnings surprises, and we believe that the bias to earnings estimates is still negative.
- **Inventories need to decline further, but seasonally weaker demand makes this more challenging**
  Despite seeing a meaningful reduction in supply-chain inventories during the fourth quarter, we believe that the average semiconductor company still out-shipped the key end markets by 10–15 points in 2004, and we expect the inventory correction to continue to pressure results in the first quarter.
- **Excess capacity should pressure semiconductor prices and capital spending**
  A slowdown in global GDP growth and the ongoing inventory correction has led to excess capacity, and we expect it to promote a more aggressive pricing environment once the inventory correction is completed. In addition, it should pressure semiconductor capital spending, which we expect to decline 11% in 2005.
- **Fundamentals should bottom in 1H05 and we expect 8–12% semiconductor revenue growth in 2006**
  Despite our near-term concerns about growth rates, margins, and negative earnings surprises, we expect easier comparisons and a recovery in unit demand (once the inventory correction is completed) to support a reacceleration of revenue growth in 2H05 and 2006.
- **Recent decline suggests stocks have reconnected with fundamentals again**
  After reaching a 52-week low at 351 on September 8, the SOX index rallied sharply and outperformed the overall stock market until early December, even though fundamentals were deteriorating. Since then, the SOX has declined sharply and underperformed the broad market, but we view SOX 400 as an equilibrium level.
- **Global Industry Views**
  Please see page 8 of this report for a complete list of our global industry views related to semiconductors. Our favorite global stock idea is Samsung Electronics.

Morgan Stanley Global ChipWatch — January 2005

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Table of Contents

Please see analyst certification and other important disclosures starting on page 42.

Global Industry Summary

Summary and Investment Conclusion

Last year was challenging for semiconductor stock investors, and we believe that some of the holdover effects from 2004 will likely cause near-term fundamentals to remain challenging and difficult to accurately forecast. Key factors causing us to hold this view as we enter 2005 include our expectations for a continued deceleration in revenue growth in the semiconductor industry and an actual decline in semiconductor capital equipment spending; more aggressive pricing trends; margin pressure; limited visibility caused by low backlog levels and an increased dependency on turns bookings (orders that are received and shipped for revenue in the same quarter); and a high degree of earnings risk.

Although we estimate that channel and end-market inventories were meaningfully reduced during the second half of 2004, expectations for seasonally weak end-market demand in the first quarter suggest that additional declines in inventory levels should be expected. In addition, semiconductor company inventories remain too high, and when combined with expectations for slower global GDP growth, we expect semiconductor capital spending to decline in 2005 after two years of solid growth in 2003 and 2004. Once channel and overall semiconductor company inventories have been completely purged, we expect excess capacity to promote a more aggressive pricing environment as 2005 unfolds and new orders are recorded.

In order to reflect current valuation parameters and expectations for a challenging fundamental environment this year, most of the analysts that contribute to the Global ChipWatch report have In-Line industry views on their individual sectors. The two exceptions are Korean Semiconductors (Attractive industry view) and U.S. Semiconductor Capital Equipment (Cautious industry view). The Attractive view on Korean Semiconductors is primarily driven by expectations that Samsung will continue to expand margins and benefit from its leadership positions in memory, cell phones, and flat-panel displays. The Cautious view on U.S. Semiconductor Capital Equipment is driven by the belief that the valuations of the equipment stocks will decline once investors fully discount the anticipated depth and duration of the current downturn in capital spending.

Similar to last year, we believe that the key to outperforming the semiconductor sector and the overall market this year will be through individual stock selection. Companies that can gain share by benefiting from new and/or strong product cycles, as well as those companies with reasonable valuation parameters that can hold or improve their margins this year should be in a position to provide solid relative performance. Companies that are either losing market share or destined to suffer from a meaningful decline in margins should be expected to underperform.

Semiconductor stock price performance improved in 4Q but the stocks underperformed in 2004 overall

Although final data will not be available until the end of the month, we estimate that the global semiconductor industry grew 28% in 2004 versus 18% growth in 2003 and 1% growth in 2002. Furthermore, three-month-average revenues reached a new record in November. Despite these strong results, the MSCI World Semiconductor and Semiconductor Equipment index declined 20% versus a 15% decline in the SOX index and gains of 9% in the S&P 500 and NASDAQ Composite indices in 2004 (Exhibit 1).

Exhibit 1

Semiconductor stocks have started to underperform again and reconnect with weak near-term fundamentals (as of January 12)

MSCI - Technology Sectors (US)	2002	1Q03	2Q03	3Q03	4Q03	2003	1Q04	2Q04	3Q04	4Q04	2004	1Q05 QTD
Communications Equipment	-51.9%	9.4%	27.9%	12.5%	16.6%	84.5%	8.5%	-1.4%	-12.3%	18.1%	8.6%	-5.1%
Computers & Peripherals	-33.5%	4.6%	28.8%	2.5%	11.3%	52.1%	5.6%	1.0%	-0.8%	27.4%	41.2%	-4.6%
Electronic Equipment & Instruments	-47.2%	-7.0%	35.0%	20.7%	19.3%	78.9%	3.2%	0.4%	-16.5%	13.7%	-1.6%	-6.2%
IT Services	-33.8%	-10.3%	23.7%	4.5%	8.9%	24.5%	-2.5%	5.0%	-8.0%	7.4%	0.9%	-5.0%
Internet Software & Services	-43.4%	27.9%	47.0%	2.9%	24.2%	139.3%	4.7%	35.1%	-3.5%	40.1%	86.7%	-7.5%
Office Electronics	-22.7%	8.1%	21.7%	-3.1%	34.5%	71.4%	5.6%	-0.5%	-2.9%	20.8%	23.3%	-4.7%
Semiconductors & Semiconductor Equipment	-43.3%	1.0%	28.4%	16.7%	22.8%	81.2%	-3.4%	-1.3%	-22.0%	13.8%	-16.7%	-7.3%
Software	-33.2%	-3.0%	28.9%	7.4%	13.3%	51.2%	-5.8%	-1.7%	-13.5%	24.9%	-1.3%	-6.8%
MSCI Information Technology (US)	-40.5%	-0.1%	28.3%	11.1%	17.2%	65.7%	-0.5%	1.0%	-13.9%	16.9%	1.5%	-6.3%
MSCI Semi & Semi Equipment (World)	-39.2%	-5.7%	26.4%	23.9%	14.1%	67.9%	-0.4%	-8.9%	-18.2%	8.9%	-20.0%	-5.8%
S&P 500	-23.4%	-3.6%	14.9%	2.2%	11.6%	26.4%	1.3%	1.3%	-2.3%	8.7%	9.0%	-2.0%
NASDAQ	-31.5%	0.4%	21.0%	10.1%	12.1%	50.0%	-0.5%	2.7%	-7.4%	14.7%	8.6%	-3.8%
SOX	-44.6%	2.4%	21.4%	16.7%	21.0%	75.7%	-4.1%	-0.4%	-20.8%	12.8%	-14.7%	-7.3%
Morgan Stanley US Semi Universe	-49.8%	1.9%	45.0%	22.7%	23.7%	117.2%	-0.7%	-8.5%	-23.8%	17.1%	-20.5%	-9.7%

Source: Morgan Stanley research.

Some of the underperformance in 2004 can be attributed to the strong absolute and relative gains recorded in 2003, when the MSCI World Semiconductor and Semiconductor Equipment index advanced 68% versus gains of 26% and 50% in the S&P 500 and NASDAQ Composite indices, respectively. However, we believe that much of the weakness was caused by a sharp deterioration in fundamentals that began in the second quarter and became overwhelming in the third quarter. If not for strong gains during the last four months of 2004, the underperformance of the average semiconductor stock for the overall year would have been far worse. In the fourth quarter, the MSCI World Semiconductor and Semiconductor Equipment index increased 9%, versus gains of 9% in the S&P 500 and 15% in the NASDAQ Composite. Although limited data are available, the semiconductor stocks have underperformed the broad market averages so far in 2005.

Valuations are reasonable but negative surprise potential remains high

Based on our 2005 estimates, the average stock in our U.S. semiconductor company universe is currently trading at 3.4x sales, which is close to the mid-point of the 2.5-5.0x range that we have long expected the average semiconductor stock to trade at on an ongoing basis. We currently view the 400 level on the SOX index as an equilibrium point, and generally expect the index to trade in a 350-450 range unless fundamentals either strengthen or deteriorate beyond current expectations.

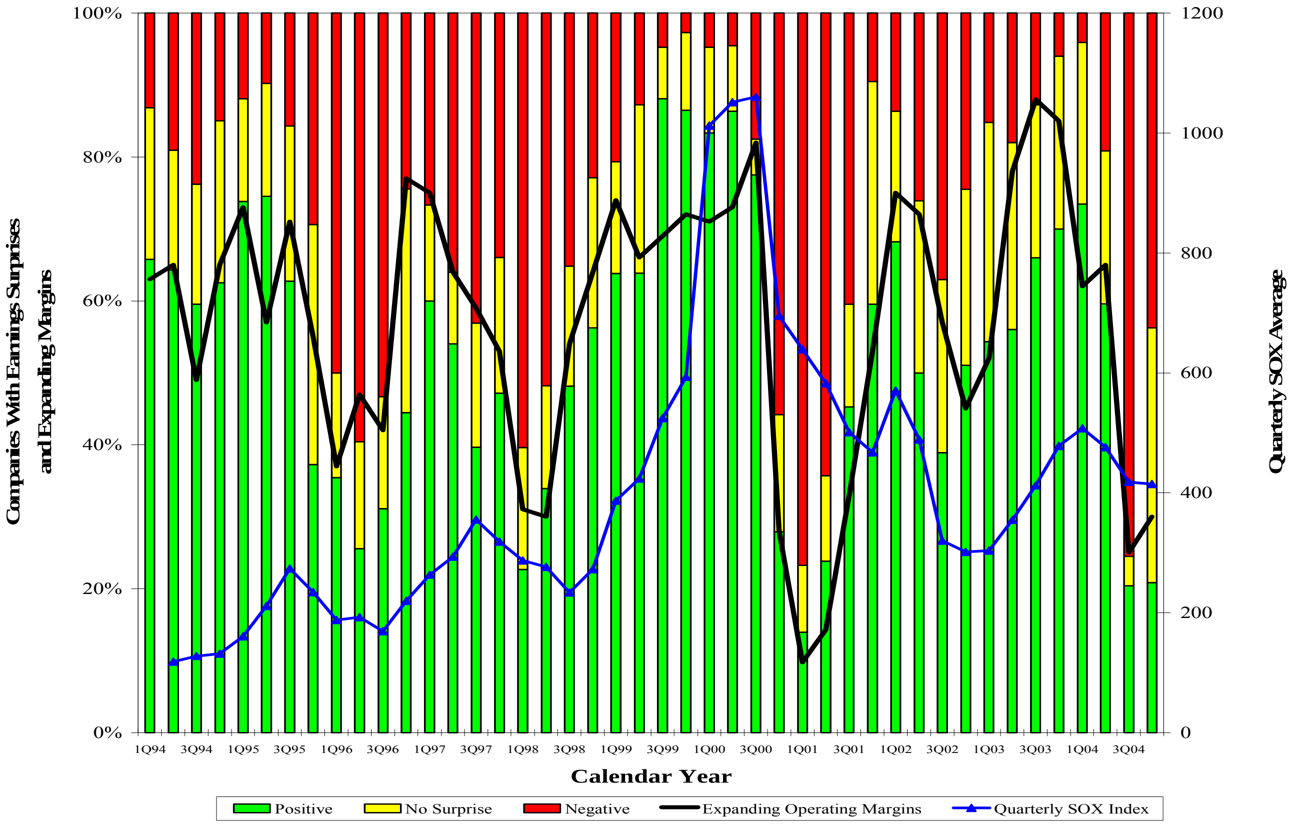
Prior to the start of the fourth-quarter earnings-reporting season, about 20 U.S. semiconductor companies preannounced negative surprises, with an average revenue miss of about 9%. In contrast, more than 40 companies preannounced negative surprises in the third quarter, with an average revenue miss of around 13%. While there were virtually no positive preannouncements in the third quarter, Intel, LSI Logic, NVIDIA, and SigmaTel preannounced fourth-quarter revenue expectations that were better than their original guidance. While the less negative surprise profile of the fourth quarter is encouraging, it appears to have been propped up by sharp downward revisions in expectations and a seasonally stronger demand environment. However, we still believe that consensus earnings estimates should have a downward bias, especially as companies face the seasonally weaker demand trends normally associated with the key end markets in the first quarter.

We estimate that approximately 45% of all U.S. semiconductor companies will have either preannounced a negative surprise or report actual results that fall short of expectations in the fourth quarter (Exhibit 2). In the third quarter of 2004, about 75% of all U.S. semiconductor companies failed to meet expectations. This was comparable to the record-high number of misses in the first quarter of 2001, and the sequential increase in the number of negative surprises was the largest we have noticed since we began keeping statistics in 1994.

Exhibit 2

The number of negative EPS surprises increased significantly in the third quarter

(Quarterly percentage of semi companies with earnings surprises and expanding operating margins)



Source: Morgan Stanley research.

While it was hard to determine a pattern to the types of companies that missed expectations in the third quarter, the companies that preannounced negative surprises in the fourth quarter tended to be very dependant on turns bookings, the distribution channel, or the digital consumer end market. We view this phenomenon as further proof that the primary reason behind the downturn in industry fundamentals was due to overly optimistic expectations for end-market demand earlier in the year and an overbuilding of inventory throughout the supply chain to react to an increase in lead times in late 2003/early 2004. Going forward, weaker pricing trends caused by excess capacity will likely become a growing reason behind potential earnings shortfalls. Nevertheless, following two quarters where a significant percentage of all companies disappointed, we see the potential for earning expectations to finally be lowered to levels that are at or below reality sometime during the first quarter.

From an end-market perspective, demand within the key computer, communications, and digital consumer markets was seasonally strong. Similar to the third quarter, there were fairly few negative surprises within the hardware sectors in the fourth quarter. Exceptions included a few semiconductor capital equipment companies, as well as ADTRAN, 3Com, and UTStarcom, while Emulex, Network Appliance, Maxtor, and Seagate preannounced positive surprises. With numerous upsides throughout the storage supply chain, it appears that the inventory correction that plagued this sector in the first half of 2004 is over, and end demand was seasonally strong in the fourth quarter. Overall PC and cellular phone demand also appeared to be seasonally strong in the fourth quarter. While certain segments of the digital consumer end markets were strong, such as digital TVs and digital audio players, the rest of the retail sector was somewhat mixed, with a sharp deceleration in desktop PCs.

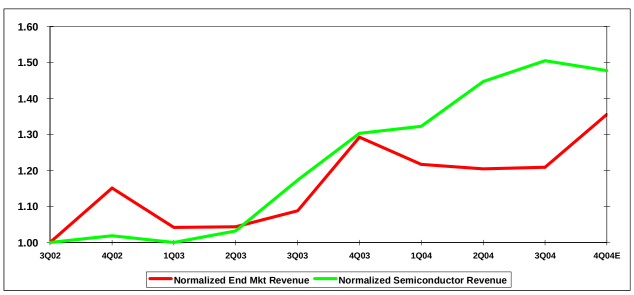
Inventories will likely need to correct further in a seasonally weak first quarter

In addition to seasonally weaker demand trends that should be expected to be evident in the first quarter, we still believe that the overall semiconductor industry out-shipped the key computer and communications end markets by 10-15 percentage points in 2004 (Exhibit 3). Provided our fourth-quarter estimates prove to be accurate, then Agere, Altera, AMCC, Analog Devices, Atheros, Broadcom, Cypress, Conexant, Intersil, Lattice, National, ON, PMC-Sierra, Silicon Laboratories, and Xilinx will have experienced a double-digit decline in their quarterly revenue run rates (from their most recent revenue peaks).

Exhibit 3

Semiconductor shipments have meaningfully exceeded end-market sales during the first three quarters of 2004

(Semiconductor industry and end-market revenues normalized to 1.0 in 3Q02)



Source: Morgan Stanley research.

In order to continue to work through excess channel inventories, we expect the overall semiconductor industry to decline at least 10% from the record highs reached in November, and many other semiconductor companies will need to experience double-digit declines before sustainable growth can resume. Based on this expectation, we believe that the bias for revenue and earnings revisions will likely be lower as the fourth-quarter reporting season unfolds. We currently expect the global semiconductor industry to be flat to down 2% sequentially in the fourth quarter of 2004, and this should at least be followed by a mid single-digit sequential decline in the first quarter of 2005. On an annual basis, we estimate that global industry revenues grew about 14% in the fourth quarter versus 28% growth in the third quarter and a cyclical peak of 40% growth in the second quarter.

Excess capacity should pressure semiconductor prices and capital spending in 2005…

Due to difficult comparisons, slower economic growth, and a less favorable pricing environment, we expect year-over-year revenue growth to continue to decline through the summer, with a trough around no growth sometime between June and August. However, we would not be surprised to see trough comparisons end up being 5-10 percentage points lower. Provided end-market demand holds up reasonably well (excluding normal seasonal weakness in the first quarter, then we would expect the current inventory correction within the overall semiconductor supply chain to be completed sometime during the next few months. Once the inventory correction is completed, we believe that excess capacity within the overall semiconductor industry will promote a more aggressive pricing environment for new orders until capacity utilization rates increase back above the 80–85% level.

Due to a significant cutback in capital spending in 2001 and 2002 and an acceleration in global GDP in 2003, capacity constraints began to develop toward the end of 2003. This phenomenon led to an increase in lead times and the incentive for OEMs and their channel partners to build inventory of semiconductor components last year. By the middle of last year, global semiconductor industry capacity utilization increased to around 95%, and as the utilization rates increased, capital-spending growth accelerated to about 46% in 2004 versus 16% in 2003. Due to the combination of a slowdown in global GDP and the ill effects of the ongoing inventory correction, we estimate that overall capacity utilization rates have declined sharply since then.

Given an increase in the level of excess capacity, we expect capital spending to decline in 2005. However, we have adjusted our global semiconductor capital spending forecast to reflect a 11% decline rather than an 18% decline previously, as several of the major memory manufacturers (such as Micron and Samsung) have increased their spending forecasts. In addition, we believe that Intel has already accrued nearly all of the capital efficiency benefits of moving to 300-mm production, and a sharp increase in their 2005 spending plans help to confirm this view. Regardless, the members of our global semiconductor capital equipment team still expect equipment orders to decline sequentially until a trough is reached in the second quarter of this year.

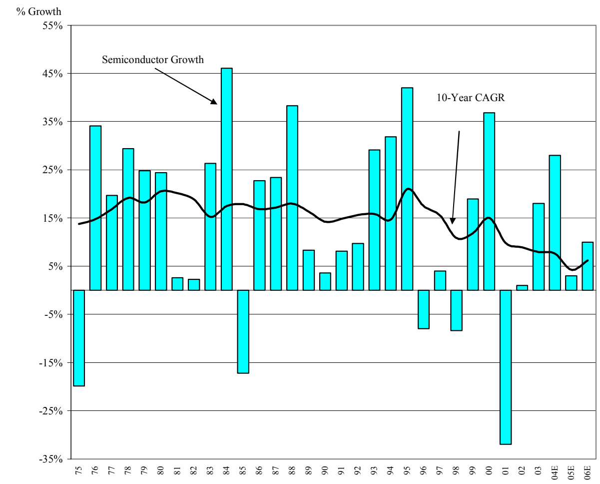
…But a better environment and higher growth should be recorded in 2006

Although the near-term challenges associated with the semiconductor industry's fundamentals are significant and they make it difficult to feel confident about longer-term projections, we believe that the environment will improve next year. Our initial estimate for global semiconductor industry revenue growth in 2006 is 8–12%, and we believe that easy comparisons and a more benign pricing environment (vis-à-vis 2005) caused by higher capacity utilization levels should help to support stronger revenue growth (Exhibit 4). From an end-market perspective, the transition to higher-content 3G cell phones, digital TVs and other high-end digital consumer electronics products, and a more aggressive roll-out of triple play (voice, video, and data) services within the digital home should represent some of the demand drivers.

Exhibit 4

Semiconductor industry revenue growth has slowed but should recover in 2006

(Year-over-year semiconductor industry revenue growth)



Source: Morgan Stanley research.

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Industry Views

US – Semiconductor Industry View: In-Line
Although valuations are reasonable, we believe that near- to intermediate-term fundamentals will remain challenging, and the potential for additional reductions in forward revenue, margin, and earnings estimates remains high.

Taiwan – Foundry Industry View: In-Line
Near term cyclical concerns are largely factored in. We believe industry valuations are reasonable.

Korea – Semiconductor Industry View: Attractive
Past investments are paying off in the form of operating leverage and earnings growth, mostly for Samsung Electronics.

Singapore – Technology Industry View: In-Line
Cyclical recovery is well priced in and inventory concerns are growing.

China – Technology View: In-Line
The China technology sector benefits from large potential market but suffers from potential overcapacity.

Europe – Semiconductor Industry View: In-line
The upside to fair value for our Universe of stocks (market-cap weighted) is now in-line with our strategists forecast for 7% upside to MSCI Europe over the next 12 months.

US – Semiconductor Capital Equipment Industry View: Cautious
We believe we are at the start of an industry downturn. Although anticipated, we conclude the depth and duration of the downturn is greater than currently discounted by the market. Investors will be disappointed at the lackluster rate of growth once the industry stabilizes, in our view. Slower industry growth means slower recovery from excess capacity.

Japan – Semiconductor Production Equipment Industry View: In-Line
We expect SPE orders will bottom out around the April-June quarter, and to recovery through the latter half of the year. However, as there do not appear to be any final products that will become major drivers of semiconductor demand, we expect only a gradual recovery in semiconductor capex.

Taiwan – System & PC Hardware Industry View: In-Line
Morgan Stanley expects the global PC industry to report 9% unit growth in 2005. Pricing environment and margin contraction remain the main issues.

Japan – Industrial Electronics Industry View: In-Line
We are maintaining our In-Line industry view. Sluggish demand for domestic heavy electrical/industrial equipment and IT software/hardware, as well as sluggish semiconductor business, should be already discounted in the share prices. Looking for bargain hunting.

Taiwan – PC-Related Chip Design Industry View: In-Line
Companies face foundry price increase pressure and an intensifying competitive landscape due to single-digit PC growth.

US – Electronics Supply Chain Industry View: In-Line
Consensus 2005 revenue estimates appear aggressive in light of cyclical pressures. However, EMS companies should at least preserve margins as we expect a milder trough combined with restructuring benefits.

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Global Best Idea

Samsung Electronics
(005930.KS, W 435,000, Overweight; target W548,000)
Samsung seems well positioned to weather a downturn in the DRAM market. Based on its technology roadmap, we believe it can withstand 30% ASP erosion in the DRAM business and 40% ASP erosion in the NAND flash business without sacrificing profit margins significantly. Samsung tends to outperform various global tech sectors during cyclical downturns due to its neutral beta and diversified profit structure. DRAM industry risks are on the positive side, in our view. While industry laggards are catching up on the 110 nano process, the speed of DRAM chips has not improved vastly. Difficulty for Samsung in ramping up its 90 nano DRAM process could be another early indication that supply side could see further constraints in 2005. Bottlenecks in DDR-2 tester capacity favor integrated DRAM producers such as Samsung. In the NAND industry, end-market demand is responding well to producer price cuts, manifesting good price elasticity. The productivity increase was much better than we expected in 3Q04, with 90 nano process technology comprising 65% of NAND output versus only 20% in the previous quarter. The product remains highly profitable despite the sharp price cuts.

The handset business should turn around in 1Q05. New product launch misses and weak domestic demand led to a shortfall in 4Q04 ASP and margins. The company plans to launch 15 new handset models at higher ASPs that are likely to reverse the margins trends in its handset business. We estimate that, at 9.2x 2005 earnings and 1.5x trailing book value, Samsung's stock fully discounts the 32% EPS decline we expect in 2005. Margins at the LCD and handset divisions look set to turn around soon, and we expect this to set a more positive tone for the share price.

Past investments are paying off in the form of better cost structure and faster technology migration, especially for Samsung Electronics. Strong global memory semiconductor demand favors Korea. With the likelihood of investors returning to global cyclical stocks at an early date and appealing valuations, we hold an Attractive view on the South Korea Semiconductor industry and maintain our Overweight rating on Samsung Electronics shares.

Upside risk to our target could come from higher global PC units shipments than our expectations and delays in flash chips by Renesas and Infineon. Downside risks could come from re-emergence of Hynix as a formidable opponent in the DRAM and NAND, and DSC inventory buildup.

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Regional Best Ideas

Semiconductors – US

National Semiconductor
(NSM, $16.95, Overweight-V; target $22)

Due to an inventory correction in the distribution channel and somewhat weaker-than-expected end demand for cell phones, PCs, displays, and consumer electronics, National Semiconductor's November quarter represented the company's second consecutive negative earnings surprise. Now that the company's revenues are 21% below the level reached two quarters earlier, we believe that most of the risk has been eliminated, and we believe that the company's overall revenues are in the process of approaching a sustainable trough. Despite the decline in revenues, National has managed to maintain solid margins, and management's actions suggest to us that the company is more focused on the bottom line than ever before. National has a strong balance sheet, with about $2.30 of net cash per share, and the stock is currently trading at a slight discount to the average 2005E P/S multiple of the stocks in our universe, while its profit margins suggest to us that it should trade at a premium. New product execution and the health of the overall economy are the primary risks we see to our earnings estimates and overall investment thesis on NSM.

NVIDIA
(NVDA, $22.03, Overweight-V; target $36)

We continue to believe that NVIDIA is better positioned now than at any time during the last couple of years. The company reported a large positive earnings surprise on strong revenue growth, expanding gross margins, and tight operating expense controls in the October quarter. A strong ramp in the company's GeForce 6000 GPU product line drove the positive surprise, and when combined with strong growth in core logic chipsets and media processors for cellular phones, we expect additional momentum to be achieved in the January quarter and positive surprise potential should remain high. We expect accelerated revenue growth and meaningful margin expansion during the next 1–2 years thanks to license and royalty revenues for Sony's PlayStation 3, media processors for cellular phones, and core logic chipsets for notebook PCs, servers, and Intel-based processors. NVIDIA has a strong balance sheet (about $3.40 of net cash per share), and NVDA is trading at a 50% discount to the average 2005E P/S multiple of the stocks in our universe. New product execution, the health of the PC market and consumer demand, and yields on the new GeForce 6000 products manufactured by TSMC and IBM are the primary risks we see to our earnings estimates and investment thesis on NVDA.

Industrial Electronics – Japan

NEC Electronics
(6723.T, ¥4,810, Overweight; target ¥6,200)

We expect that the semiconductor market will return to growth over the next year. NEC Electronics, as a specialist in this area, is a strong investment candidate, in our view. Our target price for NEC Electronics is ¥6,200, 28% higher than the current price. Risks include a delay in semiconductor recovery and related inventory build-up/sharp price erosion.

Semiconductors – Europe

ASML Holding (ASML.AS, €14.62, Overweight-V; target €14)

Although the market-share gain and higher ASP story for ASML remain compelling in the medium term, we believe earnings risk remains due to the continuing caution in the semiconductor food chain. As we believe that near-term data points are likely to remain mixed, we expect a better buying opportunity for stocks in the European semiconductor group as a whole in the first half of 2005.

Semiconductor Capital Equipment – US

KLA Tencor (KLAC, US$42.97, Overweight; target US$43.25)

Visibility for KLAC is about the best in the industry, in our view. KLA-Tencor has managed its business for the sort of cyclicality we are experiencing currently. The company has enjoyed a Book-to-Shipment ratio above 1.0 since F3Q03, and this has allowed the company to build a solid backlog of orders, which are regularly "scrubbed" to weed out those orders which management suspect may be liable to push-out or cancellation. Coupled with significant deferred revenues and stable service revenues, we conclude that the revenue outlook is robust as KLA draws on its run rate of revenues and deferred revenues to generate relatively resilient earnings performance during this down-cycle.

We remain comfortable that KLA remains well placed in the process control market and is likely to be a primary beneficiary of Intel's migration to the 65nm design node. It is able to generate attractive levels of shareholder value and we believe this value creation is a durable feature of the KLA-Tencor business model and IP portfolio. We continue to rate the stock Overweight, within our cautious view on

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the SCE industry. Our residual income valuation framework drives our price target of $43.25/share.

Semiconductor Production Equipment – Japan

Tokyo Electron

(8035.T, ¥6,040, Overweight; target ¥6,900)

We maintain our Overweight rating on Tokyo Electron. The semiconductor industry continues its transition to 300mm wafer lines, and we think that TEL will benefit from this in the medium to long term as it has taken the lead in making 300mm wafer equipment. In addition, TEL has not backed off on structural reforms. Our target price values the stock at a P/E of 26x (the previous two cycles' peak) on our F2006 estimates and a P/B of 3.7x on our F2004 estimates. The main risk factor we see is a prolonged decline in orders.

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Semiconductors — Asia/Pacific

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Key Points

Taiwan Foundry industry view remains In-Line. Near-term cyclical concerns appear to be largely factored in. We believe industry valuations are reasonable.

Korea Semiconductor industry view remains Attractive. Past investments are paying off in the form of operating leverage and earnings growth, mostly for Samsung Electronics. Strong NAND flash demand globally favors Korea.

Singapore Technology industry view remains In-Line. Stocks appear fairly valued, but the cycle is peaking.

MSCI SECTOR	TECHNOLOGY HARDWARE & EQUIPMENT
A/P Strategist	12.0%
MSCI AC Asia Pacific Weight	13.3%

Taiwan Foundry: Industry view – In-Line
TSMC (2330.TW, Overweight-V)

Decelerated Decline in December Sales
TSMC reported December sales revenue of NT$19.92 billion, down 5.1% MoM and up 5.0% YoY, roughly in-line with our expectation. Compared to the 8.6% drop in November sales, we believe that the decline in monthly revenue had been essentially decelerated. 4Q sales aggregated to NT$63.88 billion, down 8.4% sequentially, slightly ahead of our forecast of 10% decline. We now expect TSMC to deliver flat monthly revenue in January.

Rush orders exist but not significant enough
There has been some anticipation on the market of rush orders from LCD drivers and GPUs TSMC recently, which might suggest an earlier-than-anticipated recovery for TSMC. According to our latest checks, we believe rush orders from several different sectors did appear in December, but it is more likely a normal practice that happens every quarter-end. More importantly, the volume was not ample enough to offset the weakness throughout all market segments. We hence hold our expectations of mid single-digit decline for 1Q utilization rate and 10% drop in wafer shipments for TSMC. Furthermore, we believe pricing pressure on TSMC will be relatively mild in 1Q, thanks to its higher-than-average utilized capacities on advanced technologies.

High utilization in advanced technologies differentiates TSMC from peers
As we have often stated, we believe capacities for advanced technologies (0.13u and below) at TSMC are still utilized at a level exceeding 90%, especially copper/low-k production lines (close to 110%). Moreover, with 90nm volume production in place from 4Q04, we believe TSMC has been getting decent orders from customers like TI. As a result, we expect TSMC to double its 90nm wafer shipments, with sales contribution greater than 2% in 1Q05. We believe the superior customer base, technology leadership and cost advantages on 12" wafers are the keys to secure high-quality orders despite on a deteriorating environment. This is supportive to our statement earlier that TSMC is going to further differentiate itself with other foundry competitors.

Overweight on TSMC
We believe that most of the negative cyclical news about excess inventory, excess supply and pricing weakness is well understood and discounted by the market. While the risk of a cash call and sharp pricing deterioration remains high at second tier Foundries, we expect TSMC to widen its cost leadership due to its 12" Fab strategy, and improve returns to shareholders via dividends and possibly buy backs at some stage. We see any weakness in technology stocks due to excess inventory in end markets post holiday season as an opportunity to build a position in TSMC shares.

UMC (2303.TW, Equal-weight)

NT$ Appreciation Dragged December Sales Lower
UMC reported December sales of NT$8.88 billion, down 4.3% MoM and up 6.4% YoY, slightly worse than our expectation. We believe actual wafer shipments in 4Q fell in the lower end of the -15% to -17% range and ASP remion. 4Q sales aggregated to NT$28.23 billion, in-line with the company's guidance. More importantly, we believe it was NT$ appreciation that caused the lower-than-expected quarterly sales result.

Sluggish wafer demand in the near term

Based on our channel checks, we have noticed that order cuts had been largely muted in December, which suggests a flat to slightly down monthly revenue in January. Customer order forecasts seemed to remain weak and conservative due to excess inventories exiting the year-end. Fortunately, wafer bookings appeared to stabilize across the board recently. Hence, our anticipation of low-to-mid 60s utilization in 1Q (and probably 2Q) remains unchanged. Sell-through between the Christmas season last year and the coming Lunar New Year will be rather crucial in the near term.

Likely downside risk on sharper ASP decline

In order to stimulate demands for mature technologies, we believe UMC is now offering volume discounts to some major customers for products using 0.18u and 0.25u geometries. While we are not sure about the magnitude of these discounts, we believe it is possible to be at the range of 7%-10% as what we have seen in 2001. As a result, sharper ASP decline is likely to appear in 1Q05, earlier than our expectation (we expected it to happen in 2Q05 previously). Hence, apart from lower utilization rate due to excess capacity, we believe there could be some more downside risks to ASP in 1Q05.

Reiterate Equal-weight rating on UMC

We believe the near-term risk for the stock is still on the downside because of weak fundamentals and the limited long-term visibility. NT dollar appreciation and pricing pressures introduced by competitors might also impact on profit margin and hence earnings. Our Taiwan Foundry industry view is In-Line.

Singapore Technology: Industry view – In Line
United Test and Assembly (UTAC.SI, Overweight-V)

Ride with MP3 for Now, but Remember to Get Down!

UTAC announced commencement of full turnkey volume production of Sigmatel's ("SGTL") audio decoder SOC MP3 chip (D Major, ~90% of 3Q04 SGTL revenue). UTAC has previously been testing its Audio Codec chip (C Major, ~5% of 3Q04 SGTL revenue). We believe the new contract could add up to 5% additional revenue growth or US$8m to our 2005 revenue estimates of $202m (+24% YoY). However, we are keeping our estimates unchanged since this growth could be neutralized by a slowdown in orders from Freescale (CDMA chips) & UMCi (wafer probing) and potential ASP pressure on memory testing segment in 2005.

Additionally, we expect UTAC to revise up its 3Q04 and 4Q04 revenue due to inclusion of revenue from full turnkey project from 1" HDD for Seagate. But it does not have any impact on our net income expectations.

Positive Takeaways

Pragmatic to ride MP3 wave: At the time when wireless segment is struggling with inventory issues, UTAC has quickly leveraged its mixed signal expertise to tap highest growing electronics category (MP3 segment) with the help of its historical performance with the existing customer. UTAC is also seeing higher volume from another customer, Synaptics (makes touchpad for notebooks and wheelpad for iPod).

Customer acquisition is the key to success: UTAC in the last six months has successfully acquired more than five quality new customers and successfully retained them. We believe UTAC has been successful in not only the diversification of customers but also transforming itself into the Tier 1 supplier for the existing customers (Broadcom, Nanya).

No new investment required for this customer: Since the company has the requisite equipment and skills to do the full turnkey solutions for the SGTL chip, it will help increase the utilization without adding new capex.

Key Risks

Competition from existing testing partners for SGTL: Currently, SGTL outsources its chip assembly and testing services to four subcontractors including ASAT, UTAC, ASE and Signetics. Management is expecting $10–20m of revenue from SGTL, which is optimistic, in our view. Our estimate of $8m revenue for 05 is also based on the assumption of UTAC getting 30% of total outsourcing. Considering that the other three ATS players are equally competent, in our view, there could be risk to our and management expectations.

Share overhang and option dilution: Despite strong operational performance, UTAC shares have been diving down in the last six months due to share overhang (roughly 40% shares with VC and private equity). We believe this could remain a drag on the stock performance. In addition, last quarter the company issued 21 million options to 242 employees of the group at a strike price of S$0.59 in this quarter. Currently, there are 69.5m options are outstanding, which could dilute EPS by 8% if exercised. Half of the total options outstanding (36.7m) are currently deeply in the money with an exercise price of US$0.1875.

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Investment Conclusion

UTAC is currently trading at 1.0x P/BV 04E and 16.0x P/E based on 2005E. The stock has already rallied 20% since it hit the bottom of $0.44 last month. We remain constructive on the stock with an Overweight-V rating, but we caution investors to watch out for consensus earnings coming down due to high depreciation and pricing pressure.

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Semiconductors — Japan

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Key Points

Japan industrial electronics industry view is In-Line
We are maintaining our In-Line industry view. Sluggish demand for domestic heavy electrical/industrial equipment and IT software/hardware, as well as sluggish semiconductor business, should be already discounted in the share prices. Looking for bargain hunting.

Sequential recovery hoped for, but uncertain in 4Q
All industry firms hope to recover in 4Q from inventory corrections but there is a risk of an earnings shortfall if the recovery is delayed.

F1H04 aggregate semiconductor sales for Japan's five industrial electronics companies (Toshiba, NEC, Fujitsu, Mitsubishi Electric and Hitachi) increased 10.0% YoY. Growth was much stronger in real terms since, in F1H03, sales that were not yet transferred to Renesas remained with Hitachi and Mitsubishi, while Fujitsu had consolidated its JV subsidiary with AMD.

Logic, flash memory, LCD drivers, image sensors, and discrete semiconductors, which were used in cell phones, personal computers, and digital appliances all saw major YoY growth.

Segment operating income more than doubled from ¥61.6 billion in the same period a year earlier to ¥128.2 billion thanks to higher utilization of fabs and a favorable price environment. Improved profitability of semiconductor equipment at Hitachi High-Technologies also helped.

On a quarterly basis, however, the YoY revenue growth dropped from almost 12% in April-June to under 9% in July-September and operating income slumped from about ¥70 billion to roughly ¥58 billion. The reasons for this include (1) an inventory adjustment in cell phones in Japan and abroad, (2) decreased speed in drivers as oversupply of LCDs developed, and (3) production adjustments in recordable DVD players and drives. Profit margins dropped for flash memory as prices plunged toward end-quarter.

Semiconductor earnings are likely to deteriorate markedly in 2H. We forecast sales to dip 1% YoY and operating income to drop by nearly half. The decline is similar to 1H, which was about the same level as F2H03 earnings.

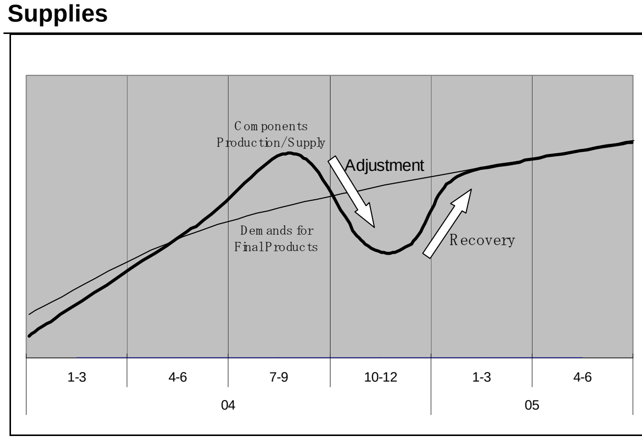
3Q looks to be especially tough, as a full-blown adjustment seems likely. Drivers for large LCD panels and logic LSIs for cell phones and digital appliances are likely to feel the effects of inventory corrections in final products. Flash memory should be strong in volume, but the decline in average unit price inherited from the 2Q will erode profitability.

All firms, however, expect to see gains in 4Q. NEC Electronics guidance projects a 4% YoY revenue drop in 3Q but a 5% YoY gain in 4Q. Behind this projection is sentiment that final product inventories are not that large and the market is headed for a recovery as the adjustment starts promptly.

We agree as far as direction is concerned. We believe that this adjustment and recovery will behave like the curve shown in Exhibit 5.

Exhibit 5

Global Demand for Final Products vs. Components Supplies



Source: Morgan Stanley Research

Evidence backing up a pattern like the exhibit includes the fact that, since last year, semiconductor monthly shipment trends have not departed far from ordinary seasonality, and the fact that US high-tech inventories are low compared to past levels, although they have somewhat increased.

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Final product demand at the beginning of this year had strength not seen in recent years. Not only were the markets for notebook PCs and high-end cell phones strong, sales of digital appliances also grew strongly, helped by the Olympics and launches of new products. This kept semiconductor demand so strong that many chipmakers had a hard time keeping up with orders, namely in image processing LSIs and LCD drivers. They thus increased production capacity.

Inventories started to grow, however, for some products between early spring and summer. This happened in cell phones (China), digital cameras (Japan and Taiwan), large LCD panels (Taiwan and South Korea), and DVD recorders (China and Taiwan).

As a result, customers brake hard for orders in cell phone LSIs, drivers for large panels LCDs, digital appliance LSIs, and flash memory; the start of an adjustment in Aug-Sep.

Although demand for final products slumped, it should not be huge in our view. We expect that when inventories of parts and products accumulated in Jul-Sep are to be exhausted, part orders will recover to the level of actual demand for final product.

The key question is the timing and extent of the recovery. If personal computers, one of the major applications that uses semiconductors, retains its relative strength, it is hard to see the semiconductor market overall falling any further.

We also have been seeing expectations for year-end demand somewhat subdued this time. Judging from the Oct-Dec guidance of many high-tech companies, neither product nor component vendors are going all out in production and shipment. If this holds up, the inventory adjustment should work out smoothly, so long as there is not a major drop in final demand. If demand instead rises even a little, manufacturers could run out of inventory at year end.

In this scenario, orders for components could return to the level of actual demand for final products quickly. This would occur in Jan-Mar at the earliest or Apr-Jun at the latest, in our view.

If the recovery does not take place in Jan-Mar period, however, there is a risk that Japanese chipmakers may warn in the coming months of earnings shortfalls for F04 ending March. Should this happen and share prices decline hereby, we view this as a good opportunity to accumulate stocks highly leveraged to semiconductors.

Exhibit 6

Semiconductors Segment: Net Sales & Earnings Trends

(¥ billion)	FY03		FY04		YoY					YoY	
FY	1H	2H	1H	2He	1H	2He	FY03	FY04e	FY05e	FY04e	FY05e
Semicon											
Consolidated Sales					YoY % change					YoY % change	
NEC	360.4	363.9	376.8	336.2	4.6%	-7.6%	724.3	713.0	750.0	-1.6%	5.2%
Fujitsu	182.3	221.6	219.9	210.1	20.6%	-5.2%	403.9	430.0	453.0	6.5%	5.3%
Hitachi	35.0	36.2	35.5	31.5	1.4%	-13.0%	71.2	67.0	70.0	-5.9%	4.5%
Toshiba	432.5	466.3	489.5	462.5	13.2%	-0.8%	898.8	952.0	1,029.0	5.9%	8.1%
Melco	65.5	58.9	62.0	74.0	-5.4%	25.6%	124.4	136.0	143.0	9.3%	5.1%
Total	1,075.7	1,146.9	1,183.7	1,114.3	10.0%	-2.8%	2,222.6	2,298.0	2,445.0	3.4%	6.4%
Consolidated OP					YoY % change					YoY % change	
NEC	24.6	32.9	30.7	5.3	24.4%	-83.8%	57.5	36.0	51.0	-37.4%	41.7%
Fujitsu	(6.7)	15.7	23.0	8.0	NM	-49.0%	9.0	31.0	35.0	244.4%	12.9%
Hitachi	(1.0)	2.2	6.4	0.6	NM	-72.7%	1.2	7.0	9.0	483.3%	28.6%
Toshiba	44.0	74.4	64.5	35.5	46.6%	-52.3%	118.4	100.0	133.0	-15.5%	33.0%
Melco	0.7	(0.7)	3.7	4.4	458.3%	NM	0.0	8.1	11.0	NM	35.7%
Total	61.6	124.5	128.2	53.9	108.2%	-56.7%	186.1	182.1	239.0	-2.1%	31.2%
Consolidated OP Margin (%)					YoY change (pp)					YoY change (pp)	
NEC	6.8%	9.0%	8.1%	1.6%	1.3%	-7.4%	7.9%	5.0%	6.8%	-2.9%	1.8%
Fujitsu	-3.7%	7.1%	10.5%	3.8%	14.1%	-3.3%	2.2%	7.2%	7.7%	5.0%	0.5%
Hitachi	-2.9%	6.1%	18.0%	1.9%	20.9%	-4.2%	1.7%	10.4%	12.9%	8.8%	2.4%
Toshiba	10.2%	16.0%	13.2%	7.7%	3.0%	-8.3%	13.2%	10.5%	12.9%	-2.7%	2.4%
Melco	1.0%	-1.1%	5.9%	6.0%	4.9%	7.1%	0.0%	6.0%	7.7%	6.0%	1.7%
Total	5.7%	10.9%	10.8%	4.8%	5.1%	-6.0%	8.4%	7.9%	9.8%	-0.4%	1.9%

Source: Company, Morgan Stanley Research

E=Morgan Stanley Research estimates

Semiconductors — Europe

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Key Points

ASML Holding: We believe ASML is likely to make a decision to enter into the LCD stepper market within the next few months.

In case of an affirmative decision, we believe the near-term financial impact will be limited. In our "most-likely" case scenario, we expect the new LCD segment to account for only 6% of group revenues.

GICS SECTOR	INFORMATION TECHNOLOGY
EU Strategist Weight	3.5%
MSCI Europe Weight	4.0%

ASML Holding: To Enter or Not to Enter?

ASML has indicated on numerous occasions that it is considering a potential entry into the market for LCD steppers. We believe the company is likely to make a decision some time over the next few months. While we originally expected the company to make a decision before the end of 2004, we believe the arrival of its new CEO, Eric Maurice, in September 2004 has potentially pushed out the announcement of the official decision by a few weeks. Nevertheless, we expect investors continue to be focused on this topic.

In our latest report on ASML entitled *"ASML Holding: To Enter or Not to Enter?"* dated December 1, 2004, we looked in detail at the potential impact on ASML's financial performance as well as the company's competitive position and the potential drivers for ASML in case of an affirmative decision.

We believe that the financial impact on ASML from a move into LCD steppers is likely to be limited in the medium term. During the period from the initial decision (2005-1H06), ASML would only manufacture a very small number of test (or beta) tools and focus on the set-up of its supply chain. However, even by 2006-08, we believe the financial impact would remain relatively limited. We model three different scenarios for potential outcomes if ASML decides to enter the LCD stepper market. In our 'Likely Scenario' we model revenues from the LCD segment of €270 million in 2008 and breakeven on the operating profit level — see Exhibit 7 (our three-stage scenario model is available in our December 1 report mentioned above). This would represent about 6% of total group revenues and would reduce the overall group EBIT margin by just 100bps in 2008.

In addition, we believe ASML is also likely to evaluate various funding options, such as government grants or funding from major clients, to limit its financial commitments.

Exhibit 7

ASML: Most Likely Scenario for the Financial Performance of the LCD Segment and ASML Group

	Most Likely Scenario		
	2006e	2007e	2008e
LCD Stepper Segment			
LCD Model	2006	2007	2008
ASML Units	3	15	30
~ Market Share (%)	2.4	8.0	17.1
ASP (€)			
ASML	6.0	7.5	9.0
~ Premium	44.0	50.0	50.0
Revenues	18.0	90.0	270.0
Gross Profit	0.9	11.3	60.8
Gross Margin (%)	5.0	15.5	25.5
Opex	25.0	35.0	60.0
Operating Income	(24.1)	(23.8)	0.8
Operating Margin (%)	-134	-26	0
IC Stepper Segment (Forecasts for this segment are independent of LCD scenario)			
Revenues	2,705.5	3,310.5	3,891.4
Gross Margin (%)	38.0	38.5	38.0
Operating Income	498.9	582.8	623.2
Operating Margin (%)	18.4	17.6	16.0
	1,843.9	1,760.4	1,601.4
Combined Entity			
Revenues	2,723.5	3,400.5	4,161.4
Gross Profit	1,029.0	1,585.8	1,539.5
Gross Margin (%)	37.8	37.8	33.0
Operating Income	474.8	559.0	623.9
Operating Margin (%)	17.4	16.4	15.0
Impact on Operating Margin (%)	**-1.0**	**-1.2**	**-1.0**

Source: Morgan Stanley Research estimates

We believe the two major risks in entering into the LCD stepper market are, first, the potential for poor internal execution leading to operating losses and, second, the likelihood that the rate of technological change (specifically the substrate size) will slow beyond 7G/7.5G. We believe there is the likelihood that 7G substrates represent the most viable solution for LCD panel manufacturers as 7G/7.5G substrates are likely to be large enough to address 90% of the display market. This would eliminate one of the drivers for LCD panel manufacturers to upgrade their lithography tools. Additional tool demand would be driven only by capacity rather than technology as well.

Why is ASML considering a move into the LCD lithography market?

As the market for LCD lithography equipment is meaningfully smaller than the market for semiconductor lithography equipment (in value as well as in unit terms), one of the major questions is why entry into this market would be attractive. Although ASML has not discussed the reasons behind its plans, we believe there are a number of drivers that have prompted ASML to look at this opportunity.

- **The LCD stepper market is profitable.** We believe that the LCD stepper business is the main driver for Nikon's profitability target for its "Precision Equipment" segment (this combines its IC and LCD steppers) of ¥0.9 billion in FY2004. Although Nikon has historically not provided a detailed breakdown of the profitability by product, it has indicated that it expects the LCD business segment, despite its smaller size, to offset a "no-better-than-break-even" situation in its IC stepper segment. In addition, we also believe Canon enjoys a better profitability structure in its LCD stepper business than in its IC stepper division.

- **Solid outlook for long-term growth rate of end markets.** Our Taiwan LCD analyst Frank Wang is positive on the long-term outlook for TFT LCD technology. He believes that this is the most economically scaleable flat panel display technology for end-products such as notebooks, monitors, and TVs. Specifically, he believes that over the next 15 years LCD TVs are likely to replace most CRT TVs.

- **Both markets have a strong focus on optical and tool engineering.** As outlined later in this report, LCD lithography has many similarities to the technology used in IC lithography. We believe ASML will benefit from its strong experience in optics and tool engineering.

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Semiconductors — Electronic Design Automation (EDA)

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Key Points

Weak 2H04 semiconductor trends lead to cautious semi R&D spending and weak EDA fundamentals. For 2004, semi R&D spending should grow about 10–11% and EDA industry revenue growth should be flat to up slightly.

EDA industry revenues should grow by low to mid-single digits in 2005, similar to semi R&D spending growth. Top fabless semiconductor companies are beginning to make an accelerated move to the 90 nm node, and overall we expect 90 nm to be a larger driver of EDA fundamentals in 2005.

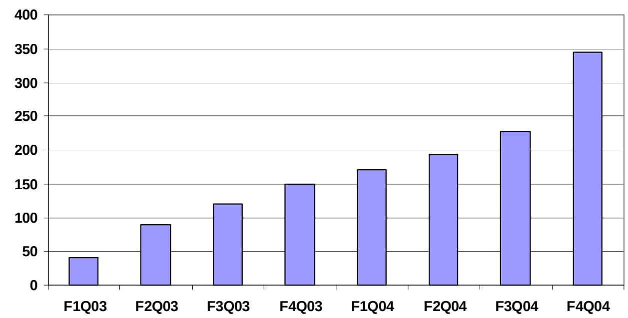
Cadence on track to deliver an in-line December quarter. We believe Cadence can deliver a positive book-to-bill, 13% se-quential revenue growth, and EPS of $0.25 per share.

GICS SECTOR	INFORMATION TECHNOLOGY
US Strategist Weight	13.6%
S&P 500 Weight	15.8%

Weak EDA fundamentals in 2004. We believe weak second-half fundamentals within the semiconductor in-dustry have resulted in tighter R&D spending controls and the elimination of discretionary spending on new chip-design tools. Although 90 nm chip-design activity continues to accelerate, the technology transition is in its infancy, and we expect 90 nm to be a larger driver of EDA fundamentals in 2005. Given the weak semiconductor trends in the second half of 2004, we believe that EDA industry revenue growth will be flat to up slightly in 2004.

Exhibit 8

90 nm Chip-Design Activity Is Accelerating



Source: Synopsys

90 nm and 65 nm chip-design activity should help drive EDA industry fundamentals in 2005. Advanced chip-design activity appears to be fairly robust (see Exhibit 8); commentary from all four of the major EDA suppliers indicates that both 90 nm and 65 nm design activity con-tinues at a healthy pace. Top fabless semiconductor com-panies are beginning to make an accelerated move to the 90 nm node, and overall we expect 90 nm to be a larger driver of EDA fundamentals in 2005. Our current 2005 R&D spending growth forecast for the 31 companies in our semiconductor universe is 4–5%, and we believe EDA industry revenue/bookings should grow by a similar amount in 2005.

Cadence Design continues to be our favorite name in the EDA space. Cadence (CDN, $13.34, Equal-weight-V, target $18) is set to report December-quarter results on February 3, and we expect the company to deliver a positive book-to-bill, 13% sequential revenue growth, and EPS of $0.25 per share. Led by a new management team, Cadence appears to be benefiting from its focus on digital integrated circuit (IC) designs at the 90 nm node, and a solid renewal cycle should help buffer the company from near-term perturbations in semiconductor industry R&D spending. Overall, we believe the company will grow bookings by 5–6% in 2004. In ad-dition to a solid bookings and earnings outlook, CDN's valuations are attractive, we believe. CDN is trading at about 16.5 times our C2005 adjusted EPS estimate of $0.80 — a 40% discount to the average stock in our universe.

Three-Month Semiconductor Billings: Jan. 2001 – Nov. 2004 (US$, '000)

	NORTH AMERICA		EUROPE		JAPAN		ASIA PACIFIC		WORLD	
	Billings	% Change	Billings	% Change	Billings	% Change	Billings	% Change	Billings	% Change
January-2001	$5,122,554	13%	$3,567,697	13%	$3,529,684	7%	$2,715,677	-30%	$16,629,419	12%
February	$4,747,327	6%	$3,344,747	6%	$3,766,898	15%	$3,623,750	-3%	$15,482,723	6%
March	$4,113,802	-11%	$3,279,523	-1%	$3,594,299	7%	$3,424,762	-10%	$14,412,386	-4%
April	$3,763,964	-19%	$3,075,073	-8%	$3,358,671	-2%	$3,539,883	-9%	$13,737,590	-10%
May	$3,352,084	-32%	$2,818,591	-17%	$3,138,873	-11%	$3,398,475	-16%	$12,708,022	-20%
June	$2,901,611	-45%	$2,502,046	-28%	$2,917,393	-21%	$3,220,260	-24%	$11,541,310	-31%
July	$2,689,406	-51%	$2,252,960	-35%	$2,771,781	-29%	$3,103,732	-30%	$10,817,879	-37%
August	$2,600,449	-55%	$2,110,313	-41%	$2,571,961	-36%	$3,162,307	-32%	$10,445,030	-42%
September	$2,438,631	-59%	$2,094,494	-42%	$2,411,495	-43%	$3,243,225	-31%	$10,187,845	-45%
October	$2,514,867	-57%	$2,201,804	-42%	$2,348,456	-46%	$3,373,972	-27%	$10,439,099	-44%
November	$2,501,564	-55%	$2,318,728	-39%	$2,324,242	-47%	$3,459,533	-22%	$10,604,067	-42%
December	$2,472,105	-55%	$2,196,026	-41%	$2,126,085	-51%	$3,385,114	-21%	$10,179,329	-43%
January 2002	$2,471,215	-52%	$2,126,767	-40%	$2,020,810	-43%	$3,399,361	25%	$10,018,153	-40%
February	$2,521,352	-47%	$2,097,270	-37%	$2,003,091	-47%	$3,406,325	-6%	$10,028,037	-35%
March	$2,611,087	-37%	$2,256,698	-31%	$2,109,193	-41%	$3,756,138	10%	$10,733,117	-26%
April	$2,615,317	-31%	$2,282,053	-26%	$2,201,244	-34%	$3,969,853	12%	$11,068,467	-19%
May	$2,648,872	-21%	$2,238,253	-21%	$2,326,822	-26%	$4,161,414	22%	$11,375,361	-10%
June	$2,584,874	-11%	$2,146,477	-14%	$2,452,241	-16%	$4,170,099	29%	$11,353,691	-2%
July	$2,597,560	-3%	$2,154,642	-4%	$2,660,508	-4%	$4,262,696	37%	$11,675,406	8%
August	$2,580,077	-1%	$2,213,996	5%	$2,754,351	7%	$4,377,584	38%	$11,926,008	14%
September	$2,632,933	8%	$2,316,440	11%	$2,828,289	17%	$4,511,825	39%	$12,289,487	21%
October	$2,646,277	5%	$2,459,336	12%	$2,851,703	21%	$4,555,107	35%	$12,512,423	20%
November	$2,693,427	8%	$2,608,623	13%	$2,847,383	23%	$4,678,461	35%	$12,827,893	21%
December	$2,596,265	5%	$2,543,211	16%	$2,774,827	31%	$4,613,843	36%	$12,528,146	23%
January 2003	$2,557,871	4%	$2,471,243	16%	$2,726,265	35%	$4,525,972	33%	$12,281,351	23%
February	$2,440,849	-3%	$2,452,177	17%	$2,720,105	36%	$4,302,668	26%	$11,915,799	19%
March	$2,458,861	-6%	$2,528,085	12%	$2,879,576	37%	$4,432,454	18%	$12,298,975	15%
April	$2,446,378	-6%	$2,543,167	11%	$2,876,221	31%	$4,534,173	14%	$12,399,939	12%
May	$2,527,425	-5%	$2,466,328	10%	$2,981,235	28%	$4,675,222	12%	$12,650,209	11%
June	$2,534,256	-2%	$2,423,888	13%	$3,024,594	23%	$4,714,323	13%	$12,697,061	12%
July	$2,554,711	-2%	$2,478,215	15%	$3,165,964	19%	$4,854,508	14%	$13,053,398	12%
August	$2,610,276	1%	$2,543,919	15%	$3,212,108	17%	$5,197,826	19%	$13,564,128	14%
September	$2,751,306	4%	$2,712,851	17%	$3,361,248	19%	$5,620,410	25%	$14,445,816	18%
October	$2,936,871	11%	$2,961,638	20%	$3,558,398	25%	$5,971,596	31%	$15,428,503	23%
November	$3,055,105	13%	$3,147,874	21%	$3,719,463	31%	$6,194,396	32%	$16,116,837	26%
December	$3,032,471	17%	$3,105,185	22%	$3,715,314	34%	$6,180,351	34%	$16,033,321	28%
January 2004	$2,934,760	15%	$2,941,629	19%	$3,614,778	33%	$6,063,900	34%	$15,555,067	27%
February	$2,931,305	20%	$2,961,724	21%	$3,555,620	31%	$6,142,970	43%	$15,591,619	31%
March	$3,076,135	25%	$3,144,343	24%	$3,606,558	25%	$6,459,900	46%	$16,286,936	32%
April	$3,191,415	30%	$3,223,835	27%	$3,669,933	28%	$6,902,617	52%	$16,987,800	37%
May	$3,197,703	27%	$3,186,391	29%	$3,721,921	25%	$7,231,822	55%	$17,337,838	37%
June	$3,287,891	30%	$3,123,128	29%	$3,834,987	27%	$7,590,354	61%	$17,836,360	40%
July	$3,295,095	29%	$3,163,242	28%	$3,915,310	24%	$7,646,082	58%	$18,019,729	38%
August	$3,417,598	31%	$3,217,855	26%	$3,975,814	24%	$7,671,071	48%	$18,282,338	35%
September	$3,420,532	24%	$3,348,456	23%	$3,953,481	18%	$7,795,491	39%	$18,517,960	28%
October	$3,512,622	20%	$3,463,804	17%	$3,882,417	9%	$7,925,989	33%	$18,784,833	22%
November	$3,454,990	13%	$3,609,033	15%	$3,913,203	5%	$8,045,341	30%	$19,022,568	18%

Source: World Semiconductor Trade Statistics (WSTS)

Please see analyst certification and other important disclosures starting on page 42.

Semiconductor Capital Equipment — US

Muted recovery from 2Q05 trough may pressure valuation multiples

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Conclusion

We remain concerned as to the valuation implications of a muted capex recovery in 2H05 going into 2006. Correspondingly we anticipate downside risk to stock prices from here and retain our cautious industry rating.

However, DRAM and flash memory capex in 2005 appears higher than we thought. 300mm expansion plans by memory makers are being underpinned by relatively robust DRAM pricing. In our survey estimate memory capex accounts for 33-34% of spending compared with 23-24% usually. As a result, new orders and revenues in the capital equipment sector are potentially more exposed to changes in DRAM pricing through 2005.

In addition, Intel has launched a sizeable investment program ($5.1bln) to launch 65nm production in 2005.

We prefer exposure to the process control segment of the semi cap industry as it will continue to benefit from Moore's Law and chipmakers pushing mature technologies into new process nodes. KLAC (O/W PT $43.25) remains our top pick.

What's new?

We estimate that semi cap equip bookings have declined 15-20% QoQ through December 2004 and are half way done. We calculate that order bookings have another 10-20% downside from here. We are not changing our outlook for a trough in order bookings in 2Q05 and a muted recovery through into 2006

Our proprietary 2005 Global Semi Capex survey of 90 chipmakers has been revised up by 8.3% from $37.8bln to $40.9bln. This still equates to a 10.5% decline YoY, despite the $2.9bln increase in our survey estimate.

GICS SECTOR	INFORMATION TECHNOLOGY
US Strategist Weight	13.6%
S&P 500 Weight	15.8%

Summary

We conclude that the semiconductor capital equipment industry is approaching the trough in order bookings at we go through 2Q05. This decline in bookings activity should bring the chip industry into equilibrium after it built excess capacity through 2H04.

From the trough, we calculate that the order bookings recovery will be relatively muted because low capacity utilization rates will provide plenty of headroom for the chip industry to grow into. Specifically, we expect that the 2004 peak in capital spending will not be recovered until the end of 2006, going into 2007.

In our opinion, this argues for a downward re-appraisal of valuation multiples for the group and correspondingly, we anticipate downside risk to current share prices.

Risks to Our Forecasts

The risks to our forecast are predominantly macro factors. Strong demand in end markets would drive higher semiconductor demand. This would lift capacity utilization rates more quickly than we currently anticipate and would likely result in more accelerated capital spending plans. Also, Japan capital spending may prove to be more robust than we currently anticipate.

Similarly, if end market demand is weaker than we expect, then even greater cuts to capex may occur, and the subsequent recovery will be more muted than we currently forecast.

Global Capex forecast: What has changed?

We have made a number of estimate revisions to our 2005 capex survey. Most recently, we have revised up our Intel capital spending forecast by $1.4bn to $5.1bln, as the company has launched an aggressive 65nm capacity ramp plan. The wafer fab equipment (WFE) portion of Intel's capex has also increased from around a third to almost a half for 2005.

In addition, we have reflected higher memory capacity spending than we had expected early in 4Q04. It seems that sustained DRAM pricing as well as constructive trends in NAND flash are both supportive of higher capex trends than he had previously anticipated. We have revised up our AMD capex estimate to reflect better the build out of the 300mm Dresden facility and expansion of leading edge 90-65nm capacity. Similarly, we have revised up our Micron capex estimate to reflect a more sizeable build out of their 300mm capacity.

We have lowered our Infineon US$ capex forecasts to reflect weaker USD/ EUR conversion, although the underlying capex at the Richmond facility currently appears stable. In our survey, ST Micro capex is slowing as Crolles 2 is built out and the 300mm facility at Catania remains un-equipped. Also, we have revised lower our Winbond capex estimate for 2005.

Our largest upward revision is at Samsung. Their memory expansion plans are significant, including the continued equipping of line 13 as it doubles in size. Moreover, the launch of line 14 to manufacture NAND flash (10k wspm capacity) is now fully reflected in our 2005 estimates. System LSI spending at Samsung is also larger than we had thought before, as the company spends to convert older DRAM fabs to the manufacturing of trailing edge logic devices such as LCD drivers etc.

For Inotera, we model for some capex growth as deliveries of previously ordered equipment result in higher cash outgoings as the full fab equipping continues. However, we believe that the peak in purchase orders has passed. Powerchip spending also remains firm, as they equip their second 300mm DRAM facility.

Currently, there are no changes to our Japan capex forecasts.

The aggregate of these adjustments results in a 2005 capex forecast of around $40.9 bln in 2005 compared with the $37.8 bln previously estimated. The net revision to our estimates is essentially $1.4 bln of additional Intel capex and a further $1.5 bln of incremental memory capex.

DRAM skew in capital spending is significant

The capex breakdown illustrated in our global capital spending model shows that 2005 is unusually highly skewed towards DRAM and flash memory capex. For the full year we estimate that around 33-34% of capex will be for memory applications up from a 23-24% average level over the last 5 years. We conclude that the capex outlook for any recovery in the second half of 2005 is exposed to changes in the DRAM and flash memory pricing environment and the knock on effect this could have on the capital investment plans of the industry.

"Normal" demand patterns are a key assumption. Our analysis of the inventory reduction process and modeling the subsequent recovery in capital investment is influenced significantly by our estimates of capacity utilization rates.

As a basis, we have assumed that the average sequential trends in unit demand for semiconductors remains stable going forward. We have used the average quarterly patterns established since 1991 and have assumed these to be "normal". This equates to around 12% YoY growth in unit demand. Having assumed normal demand patterns, we have also assumed that chipmakers reach their days of inventory (DoI) targets in 1H05. Using these inputs we have also plugged in our capacity expansion estimates, based on our revised capital spending forecasts. This allows us to model the corresponding fab output and utilization rates.

Valuation

Our residual-income valuation methodology suggests a fair value price target of $43.25, using an estimated WACC of 11.1% and a terminal growth rate of 5%.

Risks to Our Rating and Price Target

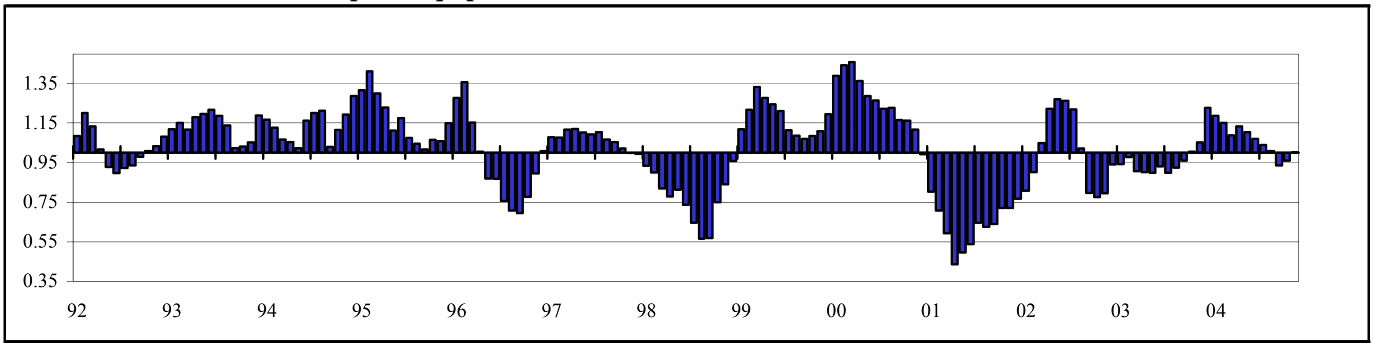
We see a number of strategic and tactical risks that we believe are relevant to our investment thesis.

1. **Weaker semi cycle than expected**.
   If the semiconductor cycle turns down faster or more deeply than we anticipate, this would have a significantly negative effect on the revenue and earnings prospects of the company.
2. **Pricing pressure**. If pricing pressure for new semiconductor capital equipment is worse than we expect, this might also result in disappointing profitability and hence a lower share price.
3. **Market-share loss.** KLA-Tencor currently dominates most of the market sub-segments in which it operates. With competitors seeking to gain share, this could result in lower growth for KLA than we currently anticipate.
4. **We may have misjudged the correct discount rate** at which to value the stock, or overestimated the company's long-run growth potential. In both instances, this would mean our price target and investment rating are too positive.

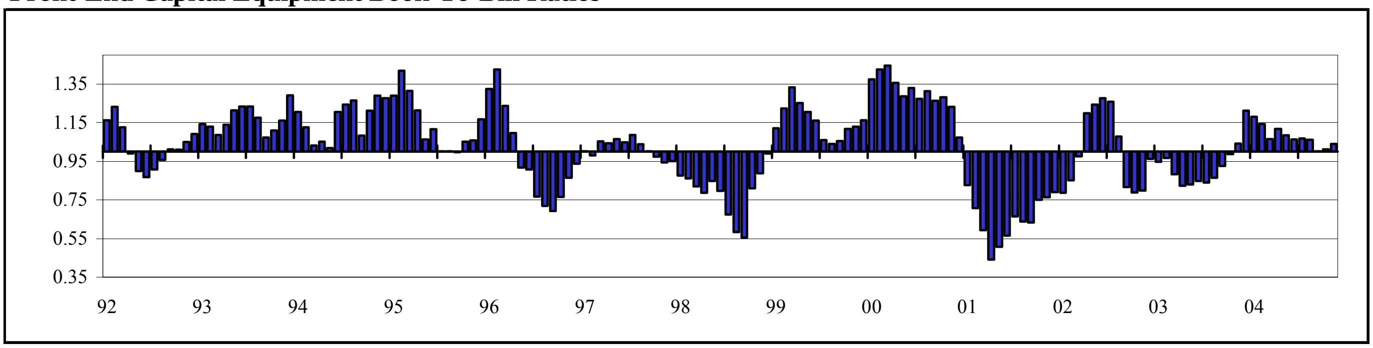
Please see analyst certification and other important disclosures starting on page 42.

US Semiconductor Equipment Book-to-Bill Ratios

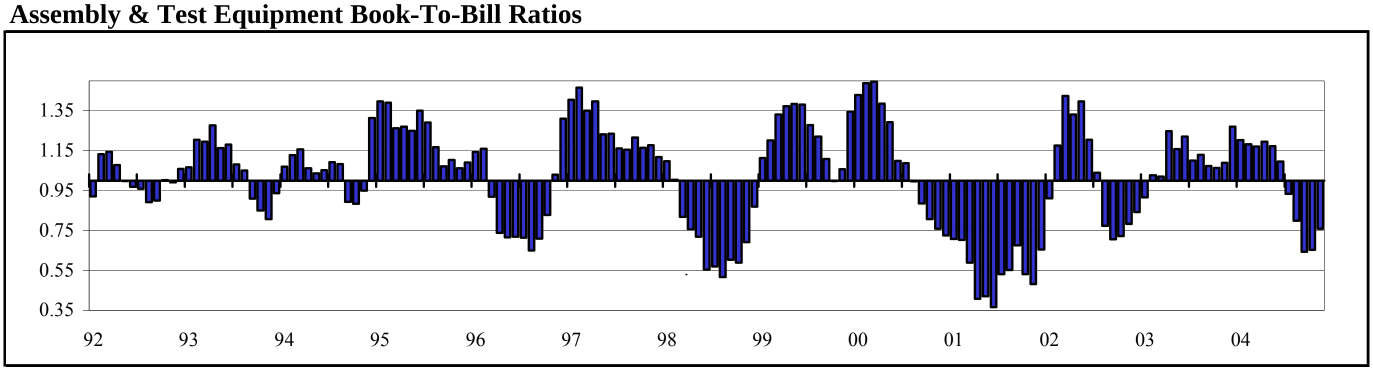
Total U.S. Semiconductor Capital Equipment Book-To-Bill Ratios



Front-End Capital Equipment Book-To-Bill Ratios



Assembly & Test Equipment Book-To-Bill Ratios

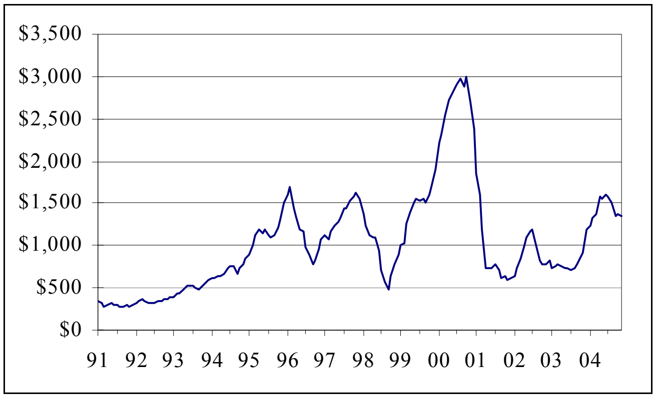


Source: SEMI

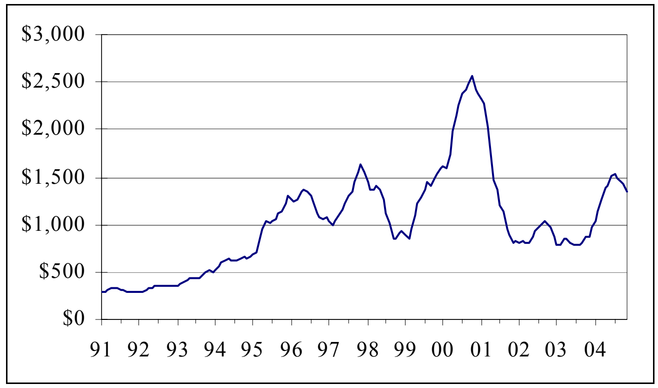
Please see analyst certification and other important disclosures starting on page 42.

US Semiconductor Equipment Bookings and Billings (US$ millions)

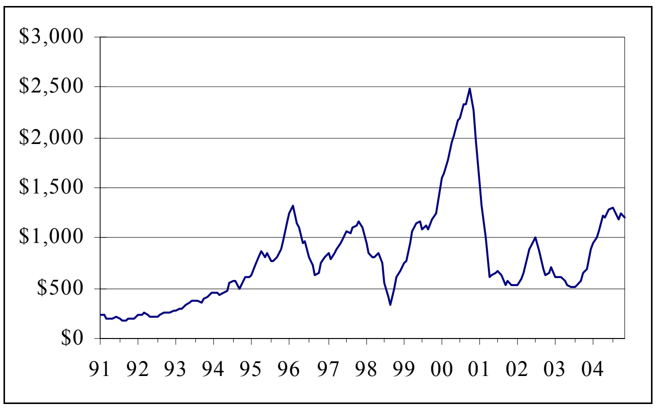
Total Equipment Three-Month Average Bookings



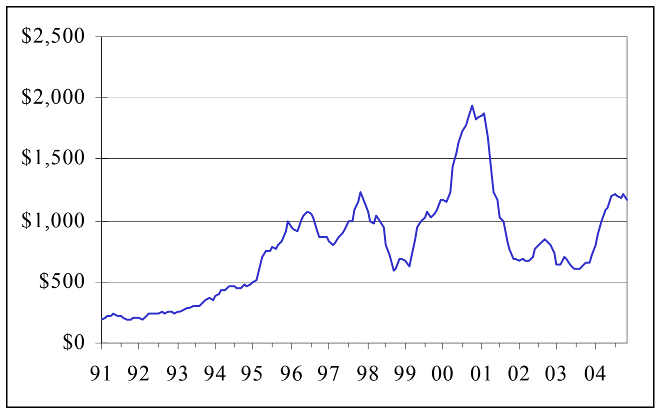
Total Equipment Three-Month Average Billings



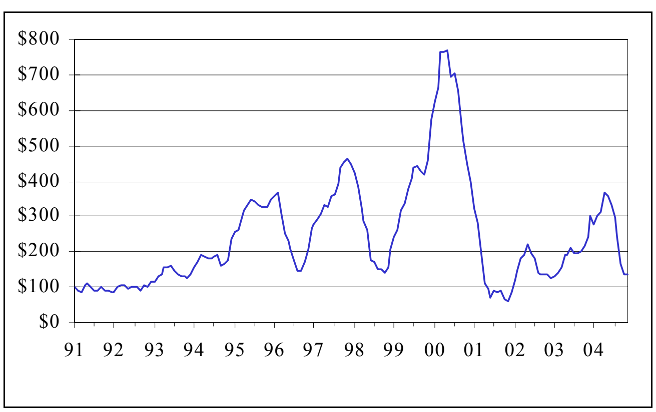
Front End Three-Month Average Bookings



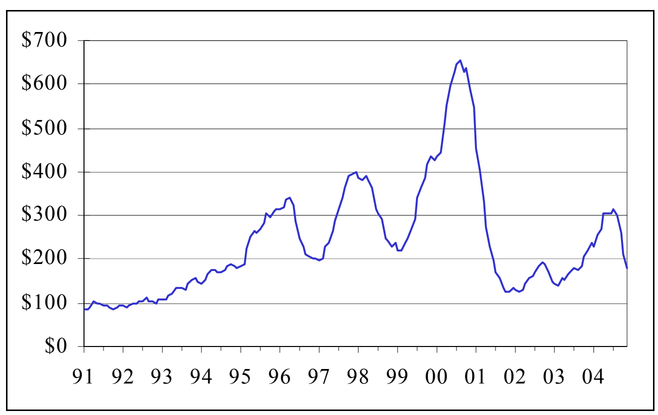
Front End Three-Month Average Billings



Assembly & Test Equipment Three-Month Average Bookings



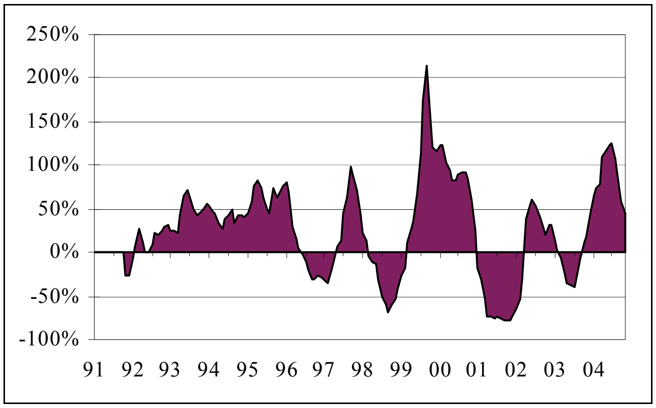
Assembly & Test Equipment Three-Month Average Billings



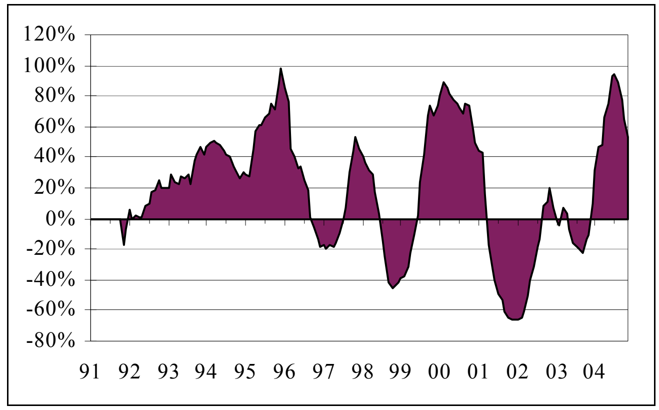
Source: SEMI

US Semiconductor Equipment Bookings and Billings (YoY Change)

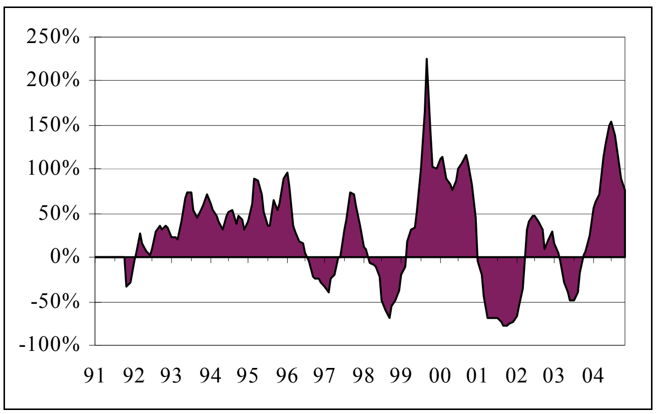
Year-Over-Year Change In Total Equipment Bookings



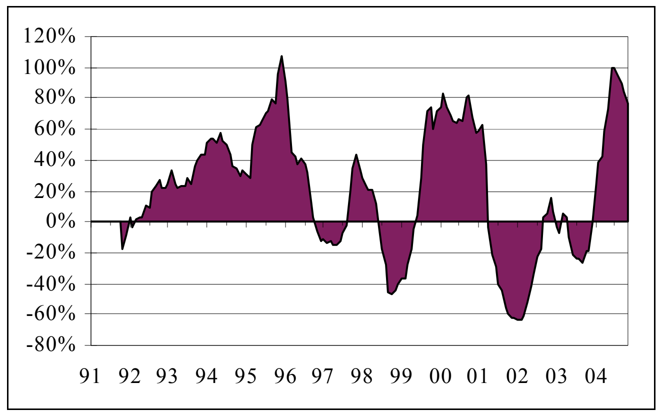
Year-Over-Year Change In Total Equipment Billings



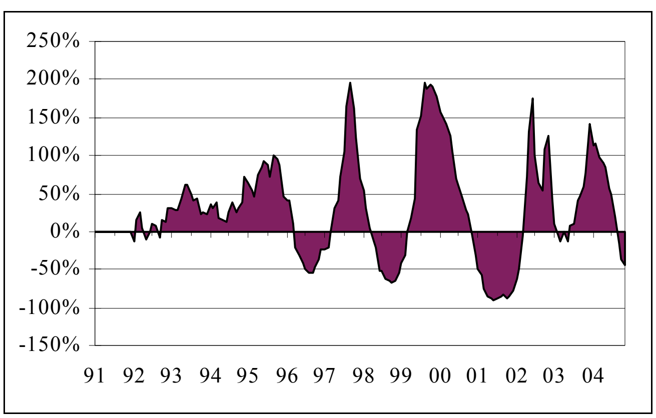
Year-Over-Year Change In Front End Equipment Bookings



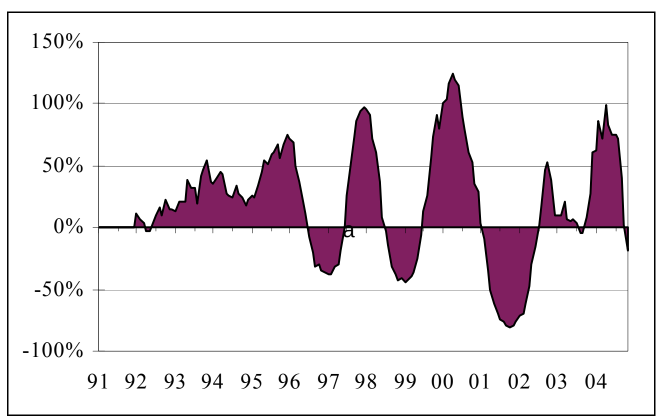
Year-Over-Year Change In Front End Equipment Billings



Year-Over-Year Change In Assembly & Test Equipment Bookings



Year-Over-Year Change In Assembly & Test Equipment Billings



Source: SEMI

Semiconductor Production Equipment — Japan

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Kazuo Yoshikawa (Kazuo.Yoshikawa@morganstanley.com)

Key Points

Our view of the semiconductor production equipment industry remains In-Line. We expect SPE orders will bottom out around the April-June quarter, and to recovery through the latter half of the year. However, as there do not appear to be any final products that will become major drivers of semiconductor demand, we expect only a gradual recovery in semiconductor capex.

The decline in orders in Oct-Dec was mild. We expect Oct-Dec orders at semiconductor production equipment companies under our coverage to be down moderately, by some 10% sequentially. Investment by foundries in low-end logic chips remained weak, but investment in DRAMs, NAND flash memories, and MPUs was firm, though hardly strong. If the DRAM market weakens, there is risk that C1H05 could see a severe drop in orders.

Our view of the semiconductor production equipment industry remains In-Line

SPE orders have been declining since mid-year 2004, and we expect that they will continue to do so in Jan-Mar and Apr-Jun 2005, as we expect utilization rates to decline, mainly at foundries. During this cycle, however, inventory adjustment has begun early for both semiconductors and final products. So we expect inventory adjustment will also finish early. In addition, the industry has maintained a cautious stance on semiconductor capex through this cycle, and we have not seen the kind of excessive investment that characterized previous cycles. So SPE orders are expected to recover during the latter half of the year. However, as there do not appear to be any final products that will become major drivers of semiconductor demand, we expect SPE capex to drop 11% in 2005, and then to rebound modestly in 2006.

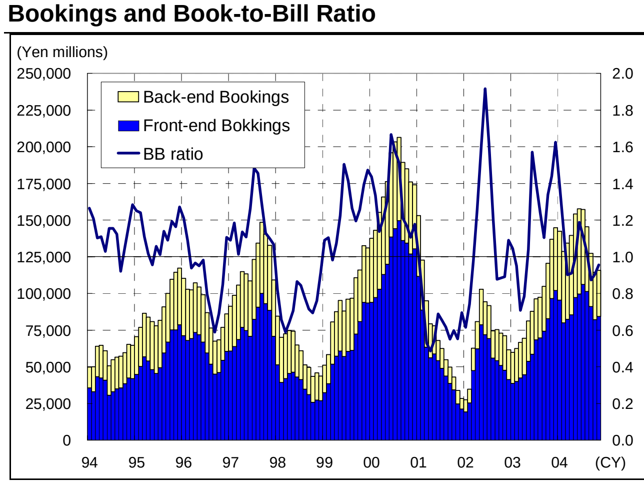
Japanese SPE stock prices have been rebounding off a bottom reached in August 2004, and are currently trading at an average P/B of 2.9 on our F2004 estimates. This multiple does not look overvalued, but stock prices could go through another period of weakening, given that we expect orders to continue declining in Jan-Mar and Apr-Jun 2005. Currently we expect only a moderate order recovery, and so we see only limited upside for stock prices even at the time of the rebound. For this reason, we maintain our In-Line view.

Only moderate order decline expected for Oct-Dec 2004

Companies are slated to release Oct-Dec order results from the middle of January, and we expect the firms to post moderate sequential order declines, limited to some 10%, due to firm investment in memories, primarily DRAMs. However, if the DRAM market weakens, there is risk that C1H05 could see a severe drop in orders.

Exhibit 9

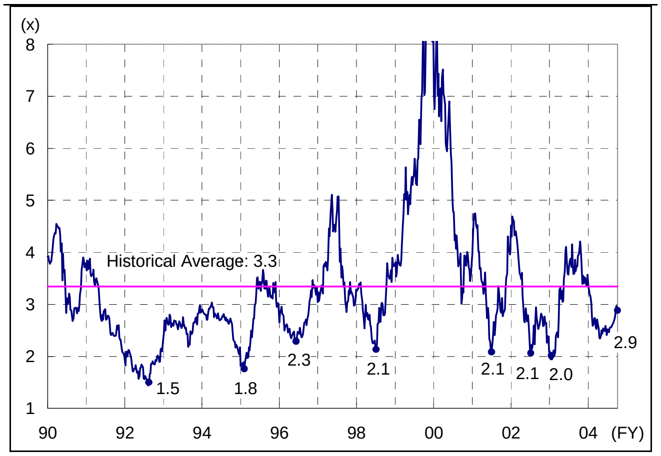
Japanese Semiconductor Production Equipment: Order Bookings and Book-to-Bill Ratio



Source: SEAJ, Morgan Stanley Research

Exhibit 10

Japan Semiconductor Production Equipment: PB Ratio



Note: Market cap average of TEL, Advantest, Hitachi Kokusai and Nikon.

Source: FactSet, Morgan Stanley Research

Tokyo Electron: We think parent SPE-FPD orders for Oct-Dec now look set to dip by about ¥13.0 billion to ¥120 billion, vs. our previous estimate of ¥110 billion, with SPE orders down by ¥13.0 billion to ¥114 billion and flat panel display production equipment (FPD) orders flat at about ¥6.0 billion. SPE orders are supported by ongoing active investment in DRAMs, NAND flash memories and other memories. On the other hand, foundry investment remains lackluster, limited basically to leading edge technology.

We expect orders for Jan-Mar to dip about ¥20 billion sequentially to ¥100 billion, as memory investment should be somewhat weak.

Advantest: We look for Oct-Dec consolidated orders to be about ¥43 billion (-4¥billion or so sequentially). Although firms are still actively investing in memory (DRAM, NAND Flash etc), we think investment in LCD drivers to remain slack.

Advantest assumes Jan-Mar orders will be about ¥55-60 billion, due to increased investment in DDR-II DRAM (+¥12-17 billion sequentially). We, however, look for the slump to continue, and assume ¥40 billion or so (-¥3 billion).

Hitachi Kokusai Electric: Oct-Dec parent SPE orders look to come in slightly above the company's assumed ¥12 billion or so (+¥2 billion or so QoQ), due to active investment by Korean DRAM manufacturers.

At the time of its Nov. 1H earnings announcement, the firm estimated Jan-Mar parent SPE orders would be about ¥7 billion (-¥5 billion). Since this figure didn't assume a significant amount of orders from major Korean DRAM makers, however, we see some upside here.

Exhibit 11

Japanese Semiconductor Production Equipment: Order Bookings and Sales

	Annual			Quarter				Month					
(¥ billion)	FY02	FY03	FY04	2003	2004			2004					
FY			YTD	10-12	1-3	4-6	7-9	6	7	8	9	10	11
Order Bookings	**894.0**	**1,415.4**	**1,091.9**	**434.2**	**402.9**	**472.8**	**382.4**	**164.5**	**153.2**	**118.5**	**110.7**	**114.3**	**122.3**
Front-end Equipment	629.6	951.3	748.5	305.9	246.9	299.1	273.3	107.4	110.0	86.7	76.6	82.8	93.3
Back-end Equipment	264.4	464.1	499.4	128.3	156.0	173.7	109.1	57.1	43.2	31.8	34.0	31.5	29.0
Sales	**857.5**	**1,167.1**	**1,030.4**	**267.4**	**447.0**	**397.7**	**437.6**	**157.0**	**142.4**	**127.2**	**168.1**	**84.3**	**110.8**
Front-end Equipment	600.4	773.7	667.4	172.8	297.4	252.7	278.0	102.0	91.6	78.8	107.6	59.3	77.4
Back-end Equipment	257.1	393.5	362.9	94.6	149.6	145.0	159.6	55.0	50.8	48.3	60.5	25.0	33.4
YoY % change													
Order Bookings	**43%**	**58%**	**25%**	**135%**	**101%**	**79%**	**21%**	**80%**	**55%**	**16%**	**-3%**	**-21%**	**-19%**
Front-end Equipment	30%	51%	22%	147%	94%	70%	23%	72%	46%	22%	0%	-18%	-17%
Back-end Equipment	86%	76%	30%	111%	115%	97%	19%	96%	87%	2%	-9%	-29%	-25%
Sales	**-3%**	**36%**	**70%**	**58%**	**58%**	**137%**	**54%**	**94%**	**84%**	**64%**	**29%**	**35%**	**20%**
Front-end Equipment	-14%	29%	64%	42%	52%	148%	38%	97%	65%	38%	21%	49%	20%
Back-end Equipment	36%	53%	82%	98%	73%	120%	91%	90%	135%	137%	46%	11%	21%
Sequential % change													
Order Bookings	**-**	**-**	**-**	**38%**	**-7%**	**17%**	**-19%**	**7%**	**-7%**	**-23%**	**-7%**	**3%**	**7%**
Front-end Equipment	-	-	-	37%	-19%	21%	-9%	6%	2%	-21%	-12%	8%	13%
Back-end Equipment	-	-	-	40%	22%	11%	-37%	8%	-24%	-26%	7%	-7%	-8%
Sales	**-**	**-**	**-**	**-6%**	**67%**	**-11%**	**10%**	**26%**	**-9%**	**-11%**	**32%**	**-50%**	**32%**
Front-end Equipment	-	-	-	-14%	72%	-15%	10%	27%	-10%	-14%	36%	-45%	31%
Back-end Equipment	-	-	-	13%	58%	-3%	10%	24%	-8%	-5%	25%	-59%	34%
Book-to-Bill Ratio	**1.04**	**1.21**	**1.06**	**1.62**	**0.90**	**1.19**	**0.87**	**1.19**	**1.11**	**1.02**	**0.87**	**0.91**	**0.96**
Front-end Equipment	1.05	1.23	1.12	1.77	0.83	1.18	0.98	1.18	1.16	1.12	0.98	1.00	1.03
Back-end Equipment	1.03	1.18	0.95	1.36	1.04	1.20	0.68	1.20	1.02	0.86	0.68	0.73	0.80

Note: Book-to-Bill ratio is based on 3-month moving average bookings and billings.

Source: SEAJ, Morgan Stanley Research

PC Systems & Hardware — Taiwan

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Howard Kang (Howard.Kang@morganstanley.com)

Key Points

The top four MB companies likely shipped 7.87 million units of MBs in December, down 11% MoM and up 24% YoY; this falls within the historical range of -8%~-14% MoM.

Shipments from top four MB companies grew at 15% QoQ during 4Q, which is at the mid-lower part of the historical range of 12-20%; this was mainly caused by the less compelling platform migration despite component shortage strengthen 4Q outlook to certain extent.

We think double ordering resulting from component shortage as well as mismatch between chipset and CPU likely support strong 1Q for MB, we expect the shipment from top 4 MB makers to drop by 8% QoQ.

January MB shipments from the top four in Taiwan likely come in at 7.30 million units, down 7% MoM, up 10% YoY as a result of regular seasonality and pull-in effect prior to Chinese New Year.

December shipments from top six NB makers should decline by 7% MoM and up 35% YoY mainly due to seasonal effect, the number ourperformed our previous estimate of down 10% MoM given component supply from Intel eased off in December thus make up upside.

Based on preliminary number, our 4Q NB model suggests up 21% QoQ, falls in line with our previous expectation of 20-23% growth.

We expect January Top 6 NB shipments from top six will likely be 2.75 million, down 6% MoM and 50% YoY, in line with the historical pattern. For 1Q05, the NB shipments should decline by 13% QoQ due to normal seasonality.

Motherboard Sector Update

From our preliminary datapoints, Asustek, Gigabyte, Microstar and Elite (ECS) likely shipped 7.87 million MB units in December, down 7% MoM and up 24% YoY. This was in line with our prior expectation of 10% MoM decline, but a better YoY increase volume (18% YoY prior estimate) given a stronger November shipment base. The magnitude of sequential decline in December is within the historical range of -8~-14% MoM, suggesting that 4Q was performing at a regular seasonal pattern. According to our data, 4Q MB seasonality came in around the mid-lower end of the historical range. In the past, top four MB makers 4Q QoQ growth was in the range of 12-20%, but due to less than compelling platform migration and low acceptance of Intel 915 platform, 4Q top four MB maker grew at 15% QoQ, which is at mid-lower end of the historical range. The 4Q number was consistent with our expectation.

Looking forward, we think that potential double booking will likely support strong 1Q05 for the MB segment: Our conversations with industry sources indicate that ***recent Intel 865 chipset shortfall*** (given Intel push to migrate more sales mix to Intel 915 chipset platform) and ***mismatch between CPU socket type and chipset*** will likely see double-ordering in 1Q05 to smooth 1Q05 shipment prospect. MB makers mentioned they see wide availability for Intel socket 478 CPUs in the market, which require greater supply of Intel 865 chipset based MBs. Nonetheless, Intel 865 chipset supply still remains as major bottleneck. To prevent potential 1Q05 shipment disorder and reduce planning risk for platform migration risk, MB makers will likely increase chipset inventory for both ***Intel 865 chipset*** (and third party's 865 equivalent chipset) for Intel socket 478CPU platform and ***Intel 915 chipset*** (for Intel LGA775 CPU platform). Meanwhile, the clone market will likely place orders more aggressively toward both platforms to build up some buffer.

Our industry sources suggest chipset inventory overbuild by the end of 1Q05 of about 20–30%. Based on recent observations, January MB orders will likely remain strong (flat MoM) as a result of 4Q disorder in 865 shortage. Despite 1Q05 visibility remaining poor, we think we are likely to see strong 1Q05 MB shipment outlook (decline high single digit), which is inflated. We expect top four MB shipments in January to drop 7% sequentially on top of

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some potential pull-in effect. We look for 1Q05 shipments to decline by 8% — this is roughly within the historical pattern of a 5–13% sequential decline for the top four MB makers in Taiwan.

However, blended ASP for MB may see a significant correction in 1Q05: MB ASP in 1Q05 will likely decline by 15% QoQ given the significant ASP erosion for 915-based MBs (and Intel also launched 915PL-low cost version) to accelerate 915 migration.

Asustek: The company shipped 4.03 million units of MB during December, down 10% MoM and up 42% YoY, outperforming our expectation of 3.89 million. Based on our data collection, AsusTek 4Q MB shipment grew over 26% QoQ, outperforming other MB makers thanks to noticeable market-share gain. According to our estimate, January MB shipments should land at 3.9 million, down 3% MoM, and up 18% YoY; 1Q05 shipments should decline by 7% QoQ.

Gigabyte: We estimate that the company shipped 1.23 million MBs in December or down 15% MoM and 17% YoY, running in line with our previous expectation. We estimate Gigabyte 4Q MB shipments to grow to 4.18 million MBs, up 11% QoQ and 14% YoY. We expect Gigabyte January shipment to decline 10% MoM, or 1.44 million. For 1Q05, we estimated Gigabyte shipments to decline by 10%.

Microstar: Microstar's December MB shipments likely to land on 1.10 million units, this is in line with our previous expectation. We estimate MSI's 4Q shipments to drop by 1% QoQ. For January, we expect shipments to be flat. Due to regular seasonality, 1Q05 shipments should be similar to its peers, down by 10%.

Elite (ECS): We estimate that December shipments will drop by 6% MoM, to 1.50 million, better than our previous expectation of 1.15 million. We estimate ECS 4Q shipments to grow 7% QoQ. For January, we expect shipments to drop 13% MoM or a shipment of 1.30 million MBs.

Exhibit 12

Quarterly Shipments Growth by Taiwan's Top-Four Motherboard Makers, 1Q 2002 - 1Q (E) 2005 (000 units)

QoQ	Asustek	Gigabyte	Microstar	Elite	Total
1Q02	-13%	-11%	-17%	-3%	-11%
2Q02	-12%	-13%	-7%	-19%	-13%
3Q02	22%	39%	37%	30%	31%
4Q02	3%	24%	14%	29%	17%
1Q03	7%	-7%	8%	-21%	-5%
2Q03	19%	-18%	-22%	-15%	-7%
3Q03	40%	21%	4%	10%	21%
4Q03	19%	4%	12%	16%	14%
1Q04	5%	-1%	-8%	-14%	-2%
2Q04	-17%	-10%	-11%	-9%	-13%
3Q04	22%	15%	19%	12%	18%
4Q04	26%	11%	-1%	7%	15%
1Q05E	-7%	-10%	-10%	-10%	-8%

Source: Company Data, Morgan Stanley Research

E=Morgan Stanley Estimates

Exhibit 13

Monthly Shipments by Taiwan's Top-Four Motherboard Makers, Jan 2002-Jan(E) 2005 (000 units)

(k units)	Asustek	MoM%	Gigabyte	MoM%	MSI	MoM%	ECS	MoM%	Top 4	MoM%	YoY%
02-01	1,449	6	950	30	925	-12	1,750	30	5,074	13	41
02-02	1,236	-15	800	-16	880	-5	1,200	-31	4,116	-19	-4
02-03	1,419	15	810	1	900	2	1,250	4	4,379	6	-11
02-04	1,261	-11	730	-10	800	-11	1,050	-16	3,841	-12	8
02-05	1,174	-7	780	7	820	2	1,200	14	3,974	3	23
02-06	1,190	1	710	-9	900	10	1,150	-4	3,950	-1	21
02-07	1,491	25	900	27	1,050	17	1,200	4	4,641	18	26
02-08	1,450	-3	1,050	17	1,100	5	1,440	20	5,040	9	15
02-09	1,490	3	1,130	8	1,300	18	1,790	24	5,710	13	20
02-10	1,850	24	1,360	20	1,550	19	2,030	13	6,790	19	25
02-11	1,400	-24	1,250	-8	1,400	-10	1,800	-11	5,850	-14	10
02-12	1,330	-5	1,200	-4	1,000	-29	1,880	4	5,410	-8	20
03-01	1,650	24	1,250	4	1,350	35	1,887	0	6,137	13	21
03-02	1,400	-15	1,000	-20	1,300	-4	1,400	-26	5,100	-17	24
03-03	1,850	32	1,300	30	1,600	23	1,200	-14	5,950	17	36
03-04	1,850	0	920	-29	1,180	-26	1,140	-5	5,090	-14	33
03-05	1,890	2	950	3	1,000	-15	1,350	18	5,190	2	31
03-06	2,100	11	1,050	11	1,150	15	1,340	-1	5,640	9	43
03-07	2,580	23	1,190	13	1,081	-6	1,408	5	6,259	11	35
03-08	2,560	-1	1,150	-3	1,167	8	1,300	-8	6,177	-1	23
03-09	3,020	18	1,185	3	1,203	3	1,495	15	6,902	12	21
03-10	3,780	25	1,374	16	1,500	25	1,710	14	8,364	21	23
03-11	3,100	-18	1,237	-10	1,300	-13	1,750	2	7,387	-12	26
03-12	2,840	-8	1,050	-15	1,050	-19	1,400	-20	6,340	-14	17
04-01	3,300	16	950	-10	1,100	5	1,260	-10	6,610	4	8
04-02	3,300	0	1,280	35	1,200	9	1,500	19	7,280	10	43
04-03	3,600	9	1,400	9	1,260	5	1,410	-6	7,670	5	29
04-04	3,000	-17	1,220	-13	1,071	-15	1,340	-5	6,631	-14	30
04-05	2,710	-10	1,050	-14	964	-10	1,273	-5	5,997	-10	16
04-06	2,800	3	1,000	-5	1,150	19	1,180	-7	6,130	2	9
04-07	3,100	11	1,100	10	1,200	4	1,260	7	6,660	9	6
04-08	3,400	10	1,210	10	1,100	-8	1,340	6	7,050	6	14
04-09	3,910	15	1,451	20	1,500	36	1,630	22	8,491	20	23
04-10	4,560	17	1,500	3	1,350	-10	1,440	-12	8,850	4	6
04-11	4,480	-2	1,450	-3	1,300	-4	1,600	11	8,830	0	20
04-12	4,032	-10	1,233	-15	1,105	-15	1,500	-6	7,870	-11	24
05-01E	3,900	-3	1,000	-19	1,100	0	1,300	-13	7,300	-7	10

Source: Company Data, Morgan Stanley Research E=Morgan Stanley Estimates

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Notebook Segment Update

From our preliminary data points, the top-six notebook PC makers — Quanta, Compal, Wistron, Inventec, Arima and Asustek — likely shipped a total of 2.92 million notebook PC units in December, down 7% MoM and up 35% YoY, outperforming our earlier expectation of down 10% MoM. Overall the NB segment has outperformed our expectation during December, as the shortage constraints from Intel has eased off in December, thus making up some upside for December.

Based on our 4Q estimate, 4Q top six NB shipment should grow over 21% QoQ and 40% YoY, in line with our previous expectation of 20-23% QoQ. The Intel 865 chipset tightness also resulted in aggressive ordering so far, and we think the sell-through strength may kick in during the latter part of the year.

For 1Q05, the visibily generally is poor so far especially March outlook and so far, Christmas sales from the consumer channel look soft but commercial/SMB segment look quite on track. We think that combined top six NB shipments should decline by 13%, in line with a normal seasonal pattern from previous years. The risk we see for a huge inventory correction for the NB segment is less severe compared to 1Q04, as ODM producers has lowered their expectations for 1Q05 following strong 4Q prospects. Although Intel will likely launch the Sonoma platform with the Intel Alviso chipset around January 20, ODM producers think this is unlikely to trigger demand substantially in 1Q05 given the initial price premium. The Sonoma major ramping may take 1-2 quarters to reach mainstream pricing points.

Quanta: December NB shipments dropped by 3% MoM and were up by 36.7% YoY to 1.17 million units, a bit lower than our previous expectation. This is mainly due to the shortage of the Intel chipset. Based on our 4Q estimate, we believe that 4Q shipments grew over 30% QoQ, in line with company guidance. We expect January shipments to drop slightly, by 6% MoM, or shipment of 1.1 million, due to the regular seasonality factor. The company guided that it would not be a surprise if the 1Q05 shipment dropped by a magnitude of 10% due to regular seasonality.

Compal: Compal shipped 760,000 NB units in December, down 12% MoM, but up 7% YoY; the number was well above our expectation of 728,000 NB units. This is because the seasonality was more amplified than our expectation previously as a result of less severe component shortage. The strength is mainly supported by Dell, as we notice the company barebone mix was up to 45% in December up from 40% in November. We expect January shipement to be down by 5%, or a level of 720,000 units. Compal's 4Q05 shipment grew by 21% QoQ and this is a bit better than our expectation. Overall, we expect 1Q05 NB shipments to drop by 15% QoQ due to normal seasonality. Compal normally has higher exposure to the consumer segment, so we believe the 1Q correction shall be higher than at Inventec or Quanta.

Inventec: December NB shipments will likely come in at 300,000 units, flat from last month, but up 100% YoY; the number was in line with our expectation. For January, the NB shipment should land around 300,000 units, flat from December. The company's seasonal pattern is less amplified compared to its peers, because its commercial NB percentage in the product mix is higher than peers. For 4Q, the company shipments should drop by 1% QoQ, again less amplified than its peers. For January, we expect shipment to come in at 300K, flat from December, and 87.5% YoY. For 1Q05, the company's shipment should decline slightly, by 1%, as Inventec clients aggressively prepare Alviso chipset platform models.

Asustek: According to our company check, Asustek's December shipment is likely to be at 297,000 units, down by 10% MoM, but up 48.5% YoY, in line with the regular seasonality factor. We expect 4Q shipments at AsusTek to grow 27% QoQ. January shipments should drop by 10% MoM. Overall, Asustek's 1Q05 shipments should decline by 12%.

Wistron: Wistron shipped 310,000 units NB in December, down 11% MoM, but up 55% YoY, in line with our previous expectation. Wistron's 4Q04 shipments grew 7% QoQ, less than Taiwan Top 6 makers' total growth of 21% MoM. For January, we expect shipments to drop to 280K, or down -10% MoM. Wistron's 1Q05 shipments are likely to drop by 13% QoQ as a result of the normal seasonality pattern.

Arima: December NB shipments should be 80K, down 20% MoM and up 54% YoY, a bit less than our previous expectation. 4Q05 shipment should come in around 260K, 37% QoQ, highly above peers' growth rates due to the new orders. We expect January shipments to stay flat with December's 80K. We expect 1Q05 NB shipments to drop by 2%, in line with the regular seasonal pattern.

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Exhibit 14

Quarterly Shipments Growth by Taiwan's Top-Six Notebook PC Makers, 1Q2002–1Q (E) 2005

QoQ	Quanta	Wistron	Inventec	Compal	Arima	Asustek	Top 6
1Q02	-12%	8%	22%	5%	57%	NA	12%
2Q02	-2%	36%	4%	6%	-7%	-33%	2%
3Q02	21%	-13%	-12%	0%	11%	13%	5%
4Q02	43%	17%	27%	15%	23%	39%	28%
1Q03	4%	-17%	5%	-14%	-51%	7%	-9%
2Q03	10%	-8%	9%	10%	20%	-21%	7%
3Q03	23%	17%	3%	37%	-48%	173%	26%
4Q03	3%	20%	24%	32%	4%	8%	14%
1Q04	-20%	-3%	17%	-23%	-5%	-14%	-16%
2Q04	6%	18%	18%	10%	7%	30%	12%
3Q04	24%	37%	40%	20%	6%	0%	23%
4Q04	30%	7%	-1%	21%	37%	27%	21%
1Q05E	-14%	-15%	-1%	-15%	-8%	-12%	-13%

e = Morgan Stanley Research estimates

Source: Company Data, Morgan Stanley Research

Exhibit 15

Monthly Shipments by Taiwan's Top-Six Notebook PC Makers, January 2002-January (E) 2005 (000 units)

(k units)	**Quanta**	**MoM**	Wistron	MoM	**Inventec**	**MoM**	Compal	MoM	**Arima**	**MoM**	**A**sustek	MoM	**Top 5/6**	**MoM**	YoY
02-01	385	-9	120	-8	85	6	345	15	120	71	85		1,140	13	119
02-02	380	-1	135	13	85	0	280	-19	130	8	80	-6	1,090	-4	67
02-03	350	-8	165	22	110	29	320	14	190	46	83	4	1,218	12	39
02-04	360	3	170	3	85	-23	400	25	130	-32	50	-40	1,195	-2	52
02-05	360	0	220	29	95	12	300	-25	120	-8	60	20	1,155	-3	36
02-06	370	3	182	-17	110	16	300	0	160	33	57	-5	1,179	2	33
02-07	390	5	150	-18	80	-27	330	10	190	19	60	5	1,200	2	53
02-08	430	10	165	10	70	-13	345	5	130	-32	60	0	1,200	0	57
02-09	500	16	180	9	105	50	330	-4	135	4	69	15	1,319	10	61
02-10	600	20	200	11	90	-14	400	21	210	56	80	16	1,580	20	59
02-11	650	8	209	4	125	39	400	0	210	0	95	19	1,689	7	58
02-12	635	-2	170	-19	110	-12	360	-10	140	-33	87	-8	1,502	-11	49
03-01	620	-2	160	-6	110	0	350	-3	80	-43	110	26	1,430	-5	25
03-02	640	3	165	3	100	-9	300	-14	95	19	90	-18	1,390	-3	28
03-03	700	9	155	-6	130	30	350	17	100	5	80	-11	1,515	9	24
03-04	700	0	150	-3	135	4	400	14	110	10	70	-13	1,565	3	31
03-05	675	-4	145	-3	120	-11	350	-13	120	9	75	7	1,485	-5	29
03-06	790	17	145	0	115	-4	345	-1	100	-17	75	0	1,570	6	33
03-07	890	13	150	3	120	4	480	39	70	-30	180	140	1,890	20	58
03-08	810	-9	145	-3	120	0	480	0	30	-57	200	11	1,785	-6	49
03-09	960	19	220	52	140	17	540	13	70	133	220	10	2,150	20	63
03-10	940	-2	220	0	160	14	600	11	60	-14	240	9	2,220	3	41
03-11	950	1	200	-9	160	0	670	12	65	8	210	-13	2,255	2	34
03-12	855	-10	200	0	150	-6	710	6	52	-20	200	-5	2,167	-4	44
04-01	725	-15	170	-15	160	7	550	-23	52	0	180	-10	1,837	-15	28
04-02	730	1	200	18	180	13	460	-16	57	10	180	0	1,807	-2	30
04-03	730	0	230	15	210	17	520	13	60	5	200	11	1,950	8	29
04-04	810	11	250	9	190	-10	530	2	60	0	250	25	2,090	7	34
04-05	716	-12	200	-20	190	0	510	-4	60	0	250	0	1,926	-8	30
04-06	795	11	260	30	270	42	640	25	60	0	230	-8	2,255	17	44
04-07	880	11	270	4	300	11	720	13	80	33	200	-13	2,450	9	30
04-08	900	2	330	22	300	0	630	-13	70	-13	230	15	2,460	0	38
04-09	1,100	22	370	12	310	3	660	5	40	-43	300	30	2,780	13	29
04-10	1,375	25	380	3	300	-3	800	21	80	100	300	0	3,235	16	46
04-11	1,200	-13	350	-8	300	0	865	8	100	25	330	10	3,145	-3	39
04-12	1,169	-3	310	-11	300	0	760	-12	80	-20	297	-10	2,916	-7	35
05-01E	1,100	-6	280	-10	300	0	720	-5	80	0	267	-10	2,747	-6	50

e = Morgan Stanley Research estimates/ Source: Company Data, Morgan Stanley Research

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Electronics Supply Chain

Bernie Mahon (Bernie.Mahon@morganstanley.com)

Key Points

Initiated coverage of Computer Distributors: Ingram Micro and Tech Data with Underweight ratings, and CDW with an Equal-weight rating.

Monthly US printed circuit fabrication book-to-bill fell to 0.96 in November from 1.05 in October

Industry view: In-Line. For the EMS companies, consensus 2005 revenue estimates appear aggressive in light of cyclical pressures. For the computer distributors valuations appear stretched, particularly at the two-tier distributors.

Secular Headwinds Mute Growth

We have initiated coverage of three leading IT distribution stocks. We rate shares of direct marketer CDW Equal-weight, and shares of two-tier distributors Ingram Micro and Tech Data Underweight. The three stocks have risen sharply over the last few months, and we expect a pullback given relatively lackluster growth prospects and valuations near the high end of historical ranges, particularly at the two-tier distributors.

We expect revenue growth at the two-tier distributors (IM and TECD) to lag 1−2% behind growth of IT spending at small and medium businesses (SMB), their primary market, due to structural headwinds. Overall, we expect headwinds to slow long-term revenue growth at Ingram Micro and Tech Data to just 4% annually. We expect CDW to continue to gain market share and to increase revenue by roughly 10−12% annually.

Large, stable, addressable target market

We view the small and medium business (SMB) market as the sweet spot for the one and two-tier distributors, accounting for roughly 80% of CDW's business — all North America (NA) — and 50−70% of Tech Data's and Ingram Micro's end customer demand, we estimate. The SMB market represents approximately 40—45% of total IT spending in both NA and Western Europe, or around $222 billion. There is still room for the distributors to grow within this market, although we believe two-tier distributors are losing share to Dell and the direct marketers. Additionally, we view the SMB end market as less cyclical than other segments, with a solid, diverse base of customers, as evidenced in the 2001—2003 downturn.

IPC US Book-to-Bill Ratio Down in November

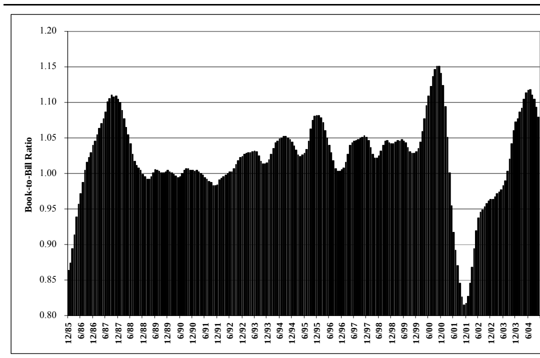
The IPC industry association released its November book-to-bill statistics for the US printed circuit board (PCB) fabrication industry. The three-month average ratio was 0.96, down from 1.05 in October.

The IPC estimates that it captures around 60% of the U.S. market for rigid and flexible printed circuit boards. We estimate that the US accounts for about 20–25% of the world's total PCB fabrication market, although this is likely trending lower as production is being shifted to lower cost locations such as Asia, including China.

Exhibit 16

US PCB

3-Month Book-to-Bill Ratio 1985–2004



Source: Morgan Stanley Research, IPC

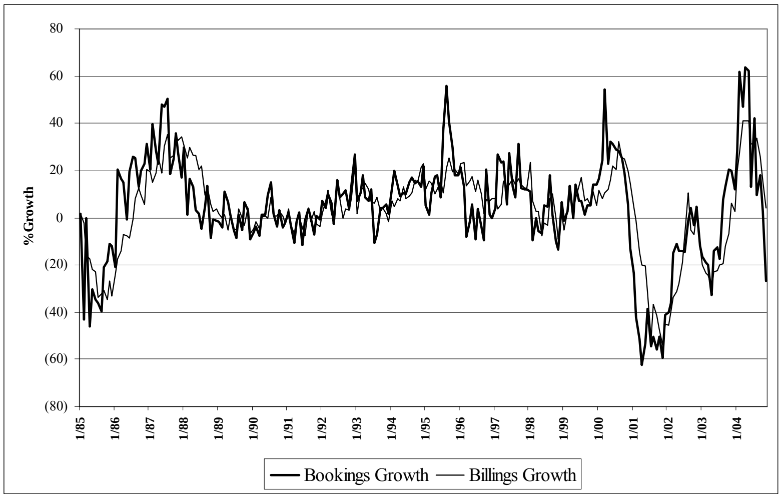
Sequential Increase in Bookings and Billings

In November, total billings were up 5% sequentially after a 16% decline in October. Bookings declined another 23% sequentially in November after a 17% decline the previous month. Historically, bookings have grown sequentially in November after declining in October. Billings have been up in November in the last three years, although historically they have declined sequentially. Year over year, billings increased 4% in November compared to an increase of 15% last month, and bookings declined 27% compared to a 3% increase in October.

Exhibit 17

US Total PCB

3-Month Y/Y Bookings and Billings Growth 1985–2004



Source: Morgan Stanley Research, IPC

Global Valuation Table

Company	Fx	Price 1/7/2005	Rating	Ticker	Local Curr Target Price	Industry View	S/O (million)	Market Cap (US$ million)	% Price Change 1M	% Price Change 3M	% Price Change 12M	% Prem./Disc. to 52 Wk Hi	% Prem./Disc. to 52 Wk Lo
Semiconductors													
Analog/ Mixed-Signal													
Analog Devices	US$	36	E	ADI	42	I	389	13,840	-8%	-11%	-26%	32%	13%
Intersil	US$	16	E	ISIL	18	I	146	2,274	-8%	-7%	-42%	47%	4%
Linear Technology	US$	37	E	LLTC	42	I	317	11,713	-8%	-3%	-15%	18%	9%
Maxim Integrated Products	US$	39	E	MXIM	48	I	345	13,486	-7%	-13%	-25%	30%	1%
National Semiconductor	US$	17	O-V	NSM	22	I	374	6,343	2%	5%	-16%	30%	43%
NEC Electronics	Yn	4810	O	6723	6500	I	124	5,666	-1%	-23%	-37%	44%	5%
Rohm	Yn	10,190	E	6963	10800	I	119	11,546	4%	-9%	-17%	32%	10%
Semtech	US$	20	O-V	SMTC	26	I	78	1,524	-11%	-5%	-18%	29%	23%
STMicroelectronics*	US$	18	U	STM.PA	18.56	I	891	16,314	-10%	2%	-35%	39%	12%
Texas Instruments	US$	23	E	TXN	28	I	1,759	40,316	-10%	-1%	-24%	33%	27%
Communication													
Agere Systems	US$	1	--	AGR	NA	I	1,723	2,464	7%	12%	-55%	65%	43%
Applied Micro Circuits	US$	4	U-V	AMCC	NA	I	310	1,141	0%	16%	-42%	60%	32%
Atheros	US$	10	E-V	ATHR	NA	I	52	501	-21%	-2%	NA	51%	53%
Broadcom	US$	33	E-V	BRCM	NA	I	347	11,429	-7%	3%	-12%	30%	30%
Conexant Systems	US$	2	E-V	CNXT	NA	I	495	856	-12%	-1%	-68%	78%	26%
PMC-Sierra	US$	10	U-V	PMCS	NA	I	188	1,869	-14%	6%	-51%	60%	21%
Qualcomm	US$	43	U-V	QCOM	NA	I	1,692	73,128	-1%	3%	59%	4%	55%
Silicon Laboratories	US$	32	E-V	SLAB	42	I	55	1,728	-4%	-11%	-30%	47%	18%
Foundry													
Chartered Semiconductor	US$	1	U	CSMF.SI	0.85	I	1,536	1,490	-9%	-13%	-45%	50%	8%
TSMC	NT$	48	O	2330.TW	56	I	21,125	29,700	-2%	6%	-17%	20%	17%
UMC	NT$	20	E	2303.TW	18.5	I	15,633	9,104	-3%	-7%	-31%	39%	3%
IP													
ARM Holdings plc	£	1	NAV-V	ARM.L	1.0825	I	1,018	2,076	4%	22%	-16%	26%	38%
Memory													
Hynix Semiconductor	Won	11700	U	000660.KS	--	A	523	5,168	13%	-1%	91%	23%	80%
Infineon	€	8	U-V	IFXGn.DE	7.96	I	721	7,506	-6%	-9%	-32%	39%	5%
SanDisk	US$	24	E-V	SNDK	NA	I	189	4,519	-5%	-25%	-27%	34%	24%
Microcomponent/ PC													
Adv. Micro Devices	US$	20	E-V	AMD	NA	I	418	8,319	-21%	41%	26%	20%	85%
Intel	US$	23	E	INTC	25	I	6,352	144,826	-6%	6%	-32%	34%	16%
NVIDIA	US$	22	O-V	NVDA	36	I	173	3,811	3%	47%	-9%	19%	137%
VIA Technology	NT$	18	U	2388.TW	15	I	1,270	654	0%	-23%	-61%	65%	7%
Programmable													
Altera	US$	19	E-V	ALTR	23	I	380	7,091	-20%	-8%	-20%	30%	7%
Lattice Semiconductor	US$	5	E-V	LSCC	NA	I	113	547	-17%	-11%	-56%	64%	22%
Microchip Technology	US$	25	E-V	MCHP	32	I	211	5,186	-12%	-12%	-27%	30%	0%
Xilinx	US$	27	E-V	XLNX	30	I	358	9,779	-15%	-7%	-31%	40%	8%
Other													
Atmel	US$	3	U-V	ATML	NA	I	477	1,626	-12%	-9%	-47%	57%	14%
Cypress Semiconductor	US$	10	E-V	CY	NA	I	164	1,712	-2%	11%	-52%	57%	23%
Epcos	€	11	U-V	EPCGn.DE	10	I	65	968	-6%	-15%	-42%	51%	4%
Integrated Device Technology	US$	10	E-V	IDTI	NA	I	108	1,104	-14%	-1%	-40%	52%	15%
International Rectifier	US$	39	E-V	IRF	NA	I	76	2,970	-12%	5%	-24%	29%	25%
LSI Logic	US$	6	E-V	LSI	NA	I	385	2,244	1%	24%	-42%	49%	45%
ON Semiconductor	US$	4	E-V	ONNN	NA	I	331	1,195	-12%	10%	-42%	60%	45%
Philips	€	19	NR	PHG.AS	18.95	I	1,277	31,773	-5%	-3%	-19%	28%	7%
SiRF Technology	US$	12	E-V	SIRF	14	I	51	610	-14%	-18%	NA	36%	37%
SOITEC*	€	5	U-V	SOIT.LN	5.4	I	56	394	2%	18%	23%	2%	44%

*Source: *SOITEC data is based on Fiscal Year; Industry views: A=Attractive, I=In Line, C=Cautious. Stock ratings: O=Overweight, E=Equal-weight, U=Underweight, V=More Volatile, NM=Not meaningful, NA=Not applicable, E=Morgan Stanley Research Estimates. Source: Company data and Morgan Stanley Research*

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Global Valuation Table (continued)

Company	EPS C03A	EPS C04E	EPS C05E	P/E C03A	P/E C04E	P/E C05E	Local Curr C2003A EBITDA	Mkt. Cap/ EBITDA	5 yr. Est. Grth (%)	C2004E P/E to Growth	C2005E P/E to Growth	C2004E Mkt. Cap/ Sales	C2005E Mkt. Cap/ Sales	FY End
Semiconductors														
Analog/ Mixed-Signal														
Analog Devices	0.96	1.45	1.22	37.0	24.5	29.1	635	21.8	20%	1.2	1.5	5.3	5.6	Oct
Intersil	0.67	0.62	0.53	23.2	25.1	29.3	155	14.7	20%	1.3	1.5	4.2	4.2	Dec
Linear Technology	0.84	1.22	1.25	44.0	30.3	29.6	394	29.7	20%	1.5	1.5	12.3	11.4	Jun
Maxim Integrated Products	0.99	1.50	1.59	39.5	26.1	24.6	556	24.3	25%	1.0	1.0	8.1	7.8	Jun
National Semiconductor	0.32	1.05	0.76	53.0	16.1	22.3	367	17.3	15%	1.1	1.5	3.0	3.3	May
NEC	240.60	253.40	333.10	20.0	19.0	14.4	138863	4.3	NA	NM	NM	0.4	0.4	Mar
Rohm	457.6	508.5	457.10	22.3	20.0	22.3	140000	8.6	NA	NM	NM	3.2	3.1	Mar
Semtech	0.49	0.75	0.69	40.1	26.2	28.5	53	28.7	25%	1.0	1.1	6.0	6.0	Jan
STMicroelectronics*	0.47	0.72	0.60	38.9	25.4	30.5	1769	9.2	15%	1.7	2.0	1.9	1.8	Dec
Texas Instruments	0.53	1.04	1.10	43.2	22.0	20.8	2535	15.9	17%	1.3	1.2	3.2	3.0	Dec
Communication														
Agere Systems	(0.07)	--	--	NM	NA	NA	211	11.7	--	NA	NA	NA	NA	Sep
Applied Micro Circuits	(0.13)	(0.02)	(0.04)	NM	NM	NM	(80)	(14.3)	25%	NM	NM	4.8	4.5	Mar
Atheros	(0.79)	0.26	0.25	NM	36.8	38.3	(8)	(64.6)	35%	1.1	1.1	2.9	2.5	Dec
Broadcom	0.49	1.22	1.15	67.1	27.0	28.6	254	45.0	20%	1.3	1.4	4.8	4.6	Dec
Conexant Systems	0.05	(0.04)	(0.16)	34.6	NM	NM	31	28.1	10%	NM	NM	1.0	1.2	Sep
PMC-Sierra	(0.02)	0.18	0.12	NM	55.2	82.8	22	84.1	25%	2.2	3.3	6.2	6.5	Dec
Qualcomm	0.75	1.02	1.13	57.6	42.4	38.2	1830	40.0	30%	1.4	1.3	14.4	12.7	Sep
Silicon Laboratories	1.18	1.40	1.20	26.9	22.6	26.4	103	16.8	25%	0.9	1.1	3.8	3.7	Dec
Foundry														
Chartered Semiconductor	(0.11)	(0.01)	(0.05)	NM	NM	NM	166	9.0	--	NM	NM	1.6	1.7	Dec
TSMC	2.33	3.99	3.06	20.5	12.0	15.6	114434	8.8	--	NA	NA	4.0	4.2	Dec
UMC	0.92	2.27	1.64	21.5	8.7	12.1	45792	6.8	--	NA	NA	2.5	2.4	Dec
IP														
ARM Holdings	0.02	--	--	53.4	NM	NA	38	29.4	25%	NM	NA	NM	NA	Dec
Memory														
Hynix Semiconductor	(435.67)	(304.03)	--	NM	NM	NA	(664564)	(9.2)	--	NM	NA	1.4	NA	Dec
Infineon	(0.23)	0.53	(0.14)	NM	15.0	NM	1223	4.7	15%	1.0	NM	0.8	0.9	Sep
SanDisk	1.22	1.30	1.40	19.6	18.4	17.1	280	16.1	30%	0.6	0.6	2.6	2.2	Jun
Microcomponent/ PC														
Adv. Micro Devices	(0.85)	0.40	0.40	NM	49.8	49.8	756	11.0	15%	3.3	3.3	1.7	1.6	Dec
Intel	0.86	1.18	1.15	26.5	19.3	19.8	13155	11.0	15%	1.3	1.3	4.2	3.9	Dec
NVIDIA	0.50	0.47	0.95	44.1	46.9	23.2	176	21.7	20%	2.3	1.2	1.9	1.5	Jan
VIA Technology	(1.48)	(1.15)	0.05	NM	NM	350.0	(819)	(27.1)	35%	NM	10.0	1.1	0.9	Dec
Programmable														
Altera	0.41	0.65	0.65	45.5	28.7	28.7	235	30.2	25%	1.1	1.1	7.0	6.7	Dec
Lattice Semiconductor	(0.13)	(0.12)	(0.17)	NM	NM	NM	17	32.2	20%	NM	NM	2.4	2.5	Dec
Microchip Technology	0.67	1.03	1.12	36.6	23.8	21.9	298	17.4	23%	1.0	1.0	6.2	6.0	Mar
Xilinx	0.65	0.97	0.88	42.0	28.2	31.1	347	28.2	25%	1.1	1.2	6.2	6.1	Mar
Other														
Atmel	(0.26)	(0.02)	(0.05)	NM	NM	NM	204	8.0	25%	NM	NM	1.0	1.0	Dec
Cypress Semiconductor	0.19	0.41	0.11	54.9	25.4	94.8	161	10.6	15%	1.7	6.3	1.8	1.8	Dec
Epcos	0.34	0.65	0.51	NA	NM	22.2	175	4.2	13%	NM	1.8	NM	0.6	Dec
Integrated Device Technology	(0.25)	0.31	0.20	NM	33.1	51.3	4	283.1	15%	2.2	3.4	2.8	2.7	Mar
International Rectifier	1.08	2.13	2.32	36.3	18.4	16.9	169	17.6	15%	1.2	1.1	2.5	2.3	Jun
LSI Logic	(0.04)	0.08	0.20	NM	72.9	29.2	185	12.2	20%	3.6	1.5	1.3	1.3	Dec
ON Semiconductor	(0.51)	0.13	0.10	NM	27.8	36.1	145	8.2	17%	1.6	2.1	0.9	1.0	Dec
Philips	0.76	1.61	1.52	NA	11.8	12.5	2878	8.4	10%	1.2	1.3	0.8	0.8	Dec
SiRF Technology	0.28	0.57	0.43	42.9	21.1	27.9	17	35.9	25%	0.8	1.1	5.1	4.4	Dec
SOITEC*	(0.64)	(0.21)	0.27	NA	NM	19.9	(14)	(21.3)	10%	NM	2.0	3.4	3.4	Mar

*Source: *SOITEC data is based on Fiscal Year; Industry views: A=Attractive, I=In Line, C=Cautious. Stock ratings: O=Overweight, E=Equal-weight, U=Underweight, V=More Volatile, NM=Not meaningful, NA=Not applicable, E=Morgan Stanley Research Estimates. Source: Company data and Morgan Stanley Research*

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Global Valuation Table (continued)

Company	Fx	Price 1/7/2005	Rating	Ticker	Local Curr Target Price	Industry View	S/O (million)	Market Cap (US$ million)	% Price Change 1M	3M	12M	% Prem./Disc. to 52 Wk Hi	52 Wk Lo
Semiconductor Capital Equipment													
Front-End													
Applied Materials	US$	16	E	AMAT	14.5	C	1,680	27,136	-8%	-6%	-32%	35%	5%
ASM International	€	12	E	ASMI.AS	11.69	I	49	801	-6%	3%	-33%	47%	15%
ASML Holding	€	11.24	O-V	ASML.AS	11.4	I	482	7,097	-10%	1%	-31%	37%	16%
Cymer	US$	26.00	O	CYMI	28	C	37	947	-21%	-14%	-46%	48%	9%
Hitachi Kokusai Elec.	Yn	909	E	6756	900	I	105	912	10%	25%	24%	2%	38%
KLA-Tencor	US$	43	O	KLAC	43.25	C	195	8,291	-10%	0%	-27%	32%	23%
Lam Research	US$	26	U	LRCX	19.2	C	135	3,439	-10%	15%	-23%	27%	31%
Nikon	Yn	1226	U	7731	920	I	370	4,326	4%	11%	-27%	32%	29%
Novellus	US$	26	E	NVLS	23.5	C	140	3,608	-11%	-6%	-39%	42%	13%
Tokyo Electron	Yn	6040	O	8035	6900	I	181	10,404	3%	7%	-26%	29%	18%
Back-End													
Advantest	Yn	8,550	E	6857	8000	I	100	8,137	10%	19%	1%	11%	39%
Conglomerates													
Fujitsu	Yn	654	U	6702	680	I	2,070	12,912	0%	0%	1%	17%	8%
Hitachi	Yn	697	E	6501	690	I	3,368	22,390	5%	1%	3%	18%	11%
Mitsubishi	Yn	496	U	6503	410	I	2,147	10,157	2%	-7%	6%	24%	7%
NEC	Yn	616	E	6701	660	I	1,929	11,335	-1%	-9%	-23%	34%	11%
Samsung Electronics	Won	440,500	O	005930.KS	548,000	A	176	65,556	5%	-10%	-4%	31%	10%
Toshiba	Yn	438	O	6502	520	I	3,219	13,447	-1%	4%	5%	24%	16%
Electronics													
Design Automation													
Cadence Design	US$	13	E-V	CDN	18	I	302	4,007	-7%	-2%	-28%	32%	16%
Synopsys Inc.	US$	18	E-V	SNPS	NA	I	152	2,728	-2%	6%	-50%	52%	25%
EMS													
Celestica	US$	13	E	CLS	--	I	226	2,934	-15%	-3%	-25%	40%	7%
Flextronics	US$	13	E	FLEX	--	I	582	7,374	-10%	-10%	-21%	36%	25%
Hon Hai	NT$	137	E	2317.TW	138.7	I	2,869	11,561	4%	13%	15%	7%	43%
Jabil	US$	23	O	JBL	30	I	206	4,787	-12%	-4%	-23%	29%	20%
Sanmina-Sci	US$	8	E	SANM	--	I	522	3,963	-8%	4%	-42%	49%	25%
Solectron	US$	5	U	SLR	--	I	967	4,837	-19%	-6%	-24%	40%	13%
Venture	S$	16	E	VENM.SI	17	I	269	2,455	-1%	-5%	-23%	34%	7%
Hardware													
Asustek	NT$	85	E	2357.TW	85.2	I	2,282	5,704	10%	9%	24%	1%	35%
BenQ Corporation	NT$	34	E	2352.TW	40.91	I	1,805	1,810	-1%	-6%	-12%	30%	13%
Compeq	NT$	10	E	2313.TW	20	I	870	255	-11%	-12%	-49%	55%	6%
Daeduck Electronics	Won	8,560	O	008060.KS	12,000	I	49	352	3%	-5%	-21%	43%	15%
Legend Holdings	HK$	2	E	0992.HK	2.41	I	7,487	2,074	-20%	-20%	-40%	45%	10%
LG Electronics	Won	65,400	-	066570.KS	72,000	I	157	8,653	-22%	-3%	11%	20%	39%
Samsung Electro-Mechanics	Won	26,600	E	009150.KS	27,000	I	81	1,807	2%	-12%	-35%	47%	13%
Samsung SDI	Won	102,500	O	006400.KS	142,000	I	48	4,164	-2%	-17%	-30%	42%	8%
Unimicron	NT$	21	E	3037.TW	23	I	866	542	1%	-6%	-20%	26%	35%

*Source: *SOITEC data is based on Fiscal Year; Industry views: A=Attractive, I=In Line, C=Cautious. Stock ratings: O=Overweight, E=Equal-weight, U=Underweight, V=More Volatile, NM=Not meaningful, NA=Not applicable, E=Morgan Stanley Research Estimates. Source: Company data and Morgan Stanley Research*

Please see analyst certification and other important disclosures starting on page 42.

Global Valuation Table (continued)

Company	EPS C03A	EPS C04E	EPS C05E	P/E C03A	P/E C04E	P/E C05E	Local Curr C2003A EBITDA	Mkt. Cap/ EBITDA	5 yr. Est. Grth (%)	C2004E P/E to Growth	C2005E P/E to Growth	C2004E Mkt. Cap/ Sales	C2005E Mkt. Cap/ Sales	FY End
Semiconductor Capital Equipment														
Front-End														
Applied Materials	0.26	0.92	0.48	62.1	17.6	33.6	707	38.4	1%	13.5	25.9	3.3	4.5	Oct
ASM International	(0.48)	0.67	0.91	NM	17.4	12.8	58	9.9	15%	1.2	0.9	0.8	0.7	Dec
ASML Holding	(0.21)	0.53	0.50	NM	21.2	22.5	31	172.9	20%	1.1	1.1	2.3	2.5	Dec
Cymer	(0.21)	0.94	0.43	NM	27.7	60.5	(4)	(258.7)	3%	11.1	24.2	2.5	2.9	Dec
Hitachi Kokusai Elec.	46.00	52.30	41.20	19.8	17.4	22.1	10604	9.0	NA	NM	NM	0.6	0.6	Mar
KLA-Tencor	0.69	1.98	1.30	62.3	21.7	33.1	230	36.5	8%	2.9	4.4	4.5	5.2	Jun
Lam Research	0.16	1.71	1.10	161.1	15.1	23.4	49	70.3	10%	1.5	2.3	2.5	3.0	Jun
Nikon	(30.80)	8.20	10.80	NM	149.5	113.5	34069	13.3	NA	NM	NM	0.7	0.7	Mar
Novellus	0.24	1.10	0.54	107.8	23.5	47.9	57	64.0	3%	7.6	15.5	2.7	3.3	Dec
Tokyo Electron	82.00	416.60	145.50	73.7	14.5	41.5	47280	23.1	NA	NM	NM	1.8	2.0	Mar
Back-End														
Advantest	190.3	431.9	276.0	44.9	19.8	31.0	17877	47.7	NA	NM	NM	3.5	4.5	Mar
Conglomerates														
Fujitsu	24.8	35.3	38.0	26.4	18.5	17.2	350342	3.9	NA	NM	NM	0.3	0.3	Mar
Hitachi	4.8	31.6	34.9	145.2	22.1	20.0	620800	3.8	NA	NM	NM	0.3	0.3	Mar
Mitsubishi	20.9	36.3	39.7	23.7	13.7	12.5	211017	5.0	NA	NM	NM	0.3	0.3	Mar
NEC	23.7	30.7	44.5	26.0	NM	13.8	361412	3.3	NA	NM	NM	NM	0.2	Mar
Samsung Electronics	33,225	65,822	45,643.2	NM	6.7	9.7	10848873	NM	--	NM	NA	1.3	1.4	Dec
Toshiba	9.0	14.5	26.5	48.7	30.2	16.5	423417	3.3	NA	NM	NM	0.2	0.2	Mar
Electronics														
Design Automation														
Cadence Design	0.51	0.64	0.80	26.0	20.8	16.6	386	10.4	15%	1.4	1.1	3.4	3.2	Dec
Synopsys Inc.	1.57	0.74	0.30	11.5	24.3	59.9	550	5.0	15%	1.6	4.0	2.6	2.8	Oct
EMS														
Celestica	(0.11)	0.39	0.78	NM	33.3	16.7	161	18.3	NA	NM	NM	0.3	0.3	Dec
Flextronics	0.34	0.62	0.79	36.9	20.2	15.9	609	12.0	NA	NM	NM	0.5	0.4	Mar
Hon Hai	7.96	6.72	8.32	17.2	20.4	16.5	26123	15.0	13%	1.6	1.3	0.9	0.7	Dec
Jabil	0.80	1.08	1.26	28.6	21.3	18.3	441	10.7	NA	NM	NM	0.7	0.6	Aug
Sanmina-Sci	0.09	0.28	0.45	84.0	28.0	17.4	377	10.9	NA	NM	NM	0.3	0.3	Sept
Solectron	(0.20)	0.14	0.22	NM	36.1	22.5	145	33.1	NA	NM	NM	0.4	0.4	Aug
Venture	0.95	0.76	0.89	16.7	20.9	17.9	299	NM	--	NA	NA	1.3	1.1	Dec
Hardware														
Asustek	4.65	4.84	5.23	18.3	17.6	16.3	12812	15.1	12%	1.5	1.4	0.8	0.7	Dec
BenQ Corporation	3.45	3.54	3.92	9.9	9.6	8.7	6516	9.4	--	NA	NA	0.4	0.3	Dec
Compeq	(3.35)	0.25	0.74	NM	39.8	13.4	765	11.3	--	NA	NA	0.5	0.5	Dec
Daeduck Electronics	478.3	803.7	936.0	NM	10.7	9.1	40428	10.3	--	NA	NA	1.3	1.1	Dec
Legend Holdings	0.14	0.14	0.14	15.4	15.4	15.4	1127	NM	--	NA	NA	0.7	0.7	Mar
LG Electronics	4,227.40	9,352.62	7,830.37	15.5	NA	8.4	1715094	6.0	--	NA	NA	0.4	0.4	Dec
Samsung Electro-Mechanics	(2,718.8)	1,129.4	1,048.9	NM	23.6	25.4	59792	35.8	--	NA	NA	NA	0.6	Dec
Samsung SDI	13,491	16,648	17,338	7.6	6.2	5.9	1358671	3.6	--	NA	NA	0.5	0.5	Dec
Unimicron	1.39	1.87	1.57	15.3	11.4	13.6	2241	NM	--	NA	NA	1.1	1.0	Dec

*Source: *SOITEC data is based on Fiscal Year; Industry views: A=Attractive, I=In Line, C=Cautious. Stock ratings: O=Overweight, E=Equal-weight, U=Underweight, V=More Volatile, NM=Not meaningful, NA=Not applicable, E=Morgan Stanley Research Estimates. Source: Company data and Morgan Stanley Research*

Please see analyst certification and other important disclosures starting on page 42.

Global Semiconductor Capital Spending, 2000-2005E

North America Semiconductor Capital Spending

(Millions of U.S. Dollars Calendarized Data)

	2000	2001	2002	2003	2004E	2005E
Agere	$1,150	$565	$182	$170	$113	$125
Agilent	$200	$140	$100	$80	$80	$80
Amkor	$480	$159	$95	$231	$350	$230
AMD	$805	$679	$705	$586	$1,500	$1,500
Analog Devices	$373	$170	$55	$80	$163	$186
Atmel	$961	$818	$102	$53	$150	$190
ChipPac	$93	$46	$79	$80		
Conexant	$296	$101	$18	$20	$24	$20
Cypress Semiconductor	$339	$177	$168	$78	$180	$90
Freescale Semiconductor	$2,406	$613	$220	$310	$400	$310
Intersil (ISIL)	$53	$41	$53	$59	$21	$37
IBM Microelectronics	$2,000	$1,400	$1,000	$1,150	$1,400	$1,150
Integrated Device Technology	$112	$63	$31	$40	$45	$35
Intel	$6,674	$7,309	$4,700	$3,700	$3,800	$5,100
International Rectifier	$86	$93	$63	$85	$92	$102
Linear Technology	$143	$55	$7	$8	$53	$91
LSI Logic	$277	$262	$39	$90	$100	$60
Maxim Integrated Products	$231	$257	$93	$130	$219	$172
Microchip Technology	$476	$74	$72	$57	$68	$70
Micron Technology	$1,475	$1,164	$904	$756	$1,400	$1,300
National Semiconductor	$232	$176	$181	$175	$228	$175
On Semiconductor	$199	$118	$32	$56	$100	$60
Texas Instruments	$2,762	$1,790	$802	$800	$1,300	$1,000
Vitesse Semiconductor	$139	$110	$56	$20	$20	$20
Total USA	**$21,964**	**$16,380**	**$9,756**	**$8,813**	**$11,805**	**$12,103**
Year-Over-Year Change	*80%*	*-25%*	*-40%*	*-10%*	*34%*	*3%*

Japan Semiconductor Capital Spending

(Millions of U.S. Dollars Fiscal Year)

	2000	2001	2002	2003	2004E	2005E
Elpida Memory	$0	$240	$345	$912	$1,091	$909
Fujitsu	$1,773	$977	$312	$266	$500	$455
Hitachi	$1,982	$176	$197	$0	$0	$0
Matsushita	$1,351	$575	$451	$451	$818	$636
Mitsubishi	$1,351	$480	$205	$44	$45	$45
NEC	$1,955	$651	$503	$912	$1,518	$909
OKI	$251	$117	$125	$136	$159	$136
Renesas				$1,062	$818	$727
Rohm	$1,126	$346	$332	$504	$640	$410
Sanyo	$510	$224	$159	$231	$286	$227
Sharp	$332	$252	$214	$96	$245	$273
Sony	$811	$400	$336	$619	$909	$636
Toshiba	$1,532	$400	$541	$1,487	$1,627	$1,182
SCE	$901	$320	$279	$929	$818	$591
UMCJ	$224	$145	$154	$167	$121	$91
Total Japan	**$14,100**	**$5,301**	**$4,153**	**$7,816**	**$9,595**	**$7,227**
Year-Over-Year Change	*77%*	*-62%*	*-22%*	*88%*	*23%*	*-25%*
Exchange Rates:	*¥111*	*¥125*	*¥122*	*¥113*	*¥110*	*¥110*

Europe Semiconductor Capital Spending

(Millions of U.S. Dollars. Calendarized Data.)

	2000	2001	2002	2003	2004E	2005E
Infineon	$2,100	$1,900	$653	$1,000	$1,400	$900
ESM	$80	$60	$0	$0	$0	$0
Philips	$1,615	$1,100	$410	$325	$400	$400
Communicant		$25	$100	$500	$500	$500
STMicroelectronics	$3,300	$1,700	$995	$1,221	$2,000	$1,500
Tower Semiconductor	$50	$400	$570	$350	$420	$350
Total Europe	**$7,145**	**$5,185**	**$2,728**	**$3,396**	**$4,720**	**$3,650**
Year-Over-Year Change	*126%*	*-27%*	*-47%*	*24%*	*39%*	*-23%*
Exchange Rates:		€ 0.80	€ 0.90	€ 1.00	€ 1.20	€ 1.20

Korea Semiconductor Capital Spending

(Millions of U.S. Dollars. Calendarized Data.)

	2000	2001	2002	2003	2004E	2005E
Anam Industrial	$300	$20	$20	$0	$0	$0
Dongbu		$300	$392	$325	$350	$325
Hynix	$1,593	$250	$400	$583	$1,050	$1,000
LG Semicon	$0	$0	$0	$0	$0	$0
Samsung	$4,170	$2,170	$1,800	$3,633	$4,328	$5,100
Total Korea	**$6,063**	**$2,740**	**$2,612**	**$4,541**	**$5,728**	**$6,425**
Year-Over-Year Change	*80%*	*-55%*	*-5%*	*74%*	*26%*	*12%*
Exchange Rates:	*W1175*	*W1274*	*W1274*	*1200*	*1200*	*1200*

Taiwan Semiconductor Capital Spending

(Millions of U.S. Dollars Calendarized Data)

	2000	2001	2002	2003	2004E	2005E
Acer (TASMC)						
ASE Inc.	$549	$125	$293	$424	$700	$424
ASE Test	$417	$104	$124	$171	$250	$171
Macronix	$410	$289	$235	$80	$80	$80
Mosel-Vitelic	$7	$22	$22	$20	$20	$20
NanYa Tech	$645	$287	$232	$333	$260	$100
Inotera (NanYa-Infineon)				$413	$882	$1,000
OSE Taiwan	$186	$62	$20	$30	$30	$30
Powerchip Semicon	$328	$203	$350	$377	$800	$1,000
ProMOS	$400	$506	$223	$230	$310	$600
PSI Technology	$49	$23	$12	$15	$15	$15
Siliconware	$348	$163	$154	$165	$176	$165
SIS			$200	$54	$54	$54
TSMC	$3,500	$2,200	$1,600	$1,100	$2,400	$2,000
UMC	$2,800	$1,100	$800	$370	$1,220	$1,000
Vanguard	$170	$54	$35	$35	$35	$35
WaferTech		$40	$0	$0	$0	$0
Winbond	$403	$150	$100	$150	$121	$691
WSMC						
Total Taiwan	**$10,212**	**$5,328**	**$4,400**	**$3,967**	**$7,353**	**$7,385**
Year-Over-Year Change	*63%*	*-48%*	*-17%*	*-10%*	*85%*	*0%*
Exchange Rates:	*NT32.5*	*NT32.5*	*NT32.5*	*NT32.5*	*NT32.5*	*NT32.5*

^ Included in TSMC

Asia Pacific Semiconductor Capital Spending

(Millions of U.S. Dollars Calendarized Data)

SINGAPORE	2000	2001	2002	2003	2004E	2005E
Chartered	$450	$290	$420	$221	$700	$500
Chartered Silicon Partners (	$550	$200		$0	$0	$75
Silicon Manufacturing Partn	$400			$0	$0	$0
STATS	$300	$56	$113	$363	$345	$340
Tech Semicon	$300	$300	$150	$100	$100	$100
SSMC (TSMC/Philips JV)	$810	$400	$150	$100	$250	$185
UMCi			$75	$234	$720	$240
THAILAND						
Submicron Tech	$0	$0	$0	$0	$0	$0
MALAYSIA						
1st Silicon	$540	$360	$375	$150	$225	$150
Silterra	$400	$350	$332	$350	$375	$350
CHINA						
ASAT	$110	$40	$10	$20	$20	$20
Grace Semiconductor	$82	$116	$750	$275	$425	$280
CSMC		$0	$0	$165	$165	$80
Huajing Electronics Group		$200		$340	$340	$300
ADT			$80			
ASMC			$33	$300	$325	$300
SGNEC	$40	$50	$50	0	0	0
Shanghai Hua Hong	$400	$50	$150	0	$500	150
Shanghai Belling	$115		$176	$75	$75	$75
SMIC		$543	$750	$500	$1,950	$1,000
Total Asia/Pacific	**$4,497**	**$2,955**	**$3,614**	**$3,193**	**$6,515**	**$4,145**
Year-Over-Year Change	*20%*	*-34%*	*22%*	*-12%*	*104%*	*-36%*

Total Semiconductor Capital Spending

(Millions of U.S. Dollars. Calendarized Data)

	2000	2001	2002	2003	2004E	2005E
Total USA	**$21,964**	**$16,380**	**$9,756**	**$8,813**	**$11,805**	**$12,103**
Year-Over-Year Change	*80%*	*-25%*	*-40%*	*-10%*	*34%*	*3%*
Percent of Total	*34%*	*43%*	*36%*	*28%*	*26%*	*30%*
Total Japan	**$14,100**	**$5,301**	**$4,153**	**$7,816**	**$9,595**	**$7,227**
Year-Over-Year Change	*77%*	*-62%*	*-22%*	*88%*	*23%*	*-25%*
Percent of Total	*22%*	*14%*	*15%*	*25%*	*21%*	*18%*
Total Korea	**$6,063**	**$2,740**	**$2,612**	**$4,541**	**$5,728**	**$6,425**
Year-Over-Year Change	*80%*	*-55%*	*-5%*	*74%*	*26%*	*12%*
Percent of Total	*9%*	*7%*	*10%*	*14%*	*13%*	*16%*
Total Taiwan	**$10,212**	**$5,328**	**$4,400**	**$3,967**	**$7,353**	**$7,385**
Year-Over-Year Change	*63%*	*-48%*	*-17%*	*-10%*	*85%*	*0%*
Percent of Total	*16%*	*14%*	*16%*	*13%*	*16%*	*18%*
Total Asia/Pacific	**$4,497**	**$2,955**	**$3,614**	**$3,193**	**$6,515**	**$4,145**
Year-Over-Year Change	*20%*	*-34%*	*22%*	*-12%*	*104%*	*-36%*
Percent of Total	*7%*	*8%*	*13%*	*10%*	*14%*	*10%*
Total Europe	**$7,145**	**$5,185**	**$2,728**	**$3,396**	**$4,720**	**$3,650**
Year-Over-Year Change	*126%*	*-27%*	*-47%*	*24%*	*39%*	*-23%*
Percent of Total	*11%*	*14%*	*10%*	*11%*	*10%*	*9%*
Total Worldwide	**$63,980**	**$37,889**	**$27,263**	**$31,726**	**$45,716**	**$40,935**
Year-Over-Year Change	*74.3%*	*-40.8%*	*-28.0%*	*16.4%*	*44.1%*	*-10.5%*

E = Morgan Stanley Research Estimates Source: Company and Morgan Stanley Research

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Morgan Stanley ModelWare[SM]

ModelWare is a proprietary framework for financial analysis created by Morgan Stanley Research. This new framework rests on the principles of comparability, transparency, and flexibility, and aims to provide investors with better tools to view the anticipated performance of an enterprise. The result of an 18-month global effort, ModelWare harmonizes the underlying data and calculations in Morgan Stanley models with a broad set of consistently defined financial metrics. Our analysts have populated the database with over 2.5 million data points, based on an extensive taxonomy of more than 3,500 unique metrics and more than 400 Morgan Stanley calculations. The ModelWare framework will also have the flexibility to allow analysts and investors to quickly customize their own analytical approach.

What makes the ModelWare architecture distinctive lies in the separation of data from calculations. Its transparency will permit users to see every component of every calculation, to choose elements or recombine them as they wish without laborious adjustments or recalculations. When choices must be made in defining standard or industry-specific measures, ModelWare defaults to economic logic, rather than favouring one accounting rule over another. This discipline facilitates comparability across sectors and regions. Underlying the ModelWare data is a new set of systems that check the internal consistency of forecast data in each of our analyst's models.

ModelWare EPS illustrates the approach taken. It represents ModelWare net income divided by average fully diluted shares outstanding. ModelWare net income sums net operating profit after tax (NOPAT), net financial income or expense (NFE), and other income or expense. ModelWare adjusts reported net income to improve comparability across companies, sectors, and regions. These adjustments include the following: We exclude goodwill amortization and items deemed by analysts to be "one-time" events; we capitalize operating leases where their use is significant (e.g., in transportation and retail); and we convert inventory to FIFO accounting when LIFO costing is used. For more information on these adjustments and others, as well as additional background, please see "Morgan Stanley ModelWare (ver. 1.0): A Road Map for Investors," by Trevor Harris and team, August 2, 2004.

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Global Stock Ratings Distribution

(as of December 31, 2004)

	Coverage Universe		Investment Banking Clients (IBC)		
Stock Rating Category	Count	% of Total	Count	% of Total IBC	% of Rating Category
Overweight/Buy	632	34%	249	38%	39%
Equal-weight/Hold	880	47%	310	47%	35%
Underweight/Sell	374	20%	99	15%	26%
Total	1,886		658		

Data include common stock and ADRs currently assigned ratings. For disclosure purposes (in accordance with NASD and NYSE requirements), we note that Overweight, our most positive stock rating, most closely corresponds to a buy recommendation; Equal-weight and Underweight most closely correspond to neutral and sell recommendations, respectively. However, Overweight, Equal-weight, and Underweight are not the equivalent of buy, neutral, and sell but represent recommended relative weightings (see definitions below). An investor's decision to buy or sell a stock should depend on individual circumstances (such as the investor's existing holdings) and other considerations. Investment Banking Clients are companies from whom Morgan Stanley or an affiliate received investment banking compensation in the last 12 months.

ANALYST STOCK RATINGS

Overweight (O). The stock's total return is expected to exceed the average total return of the analyst's industry (or industry team's) coverage universe, or the relevant country MSCI index, on a risk-adjusted basis over the next 12-18 months.

Equal-weight (E). The stock's total return is expected to be in line with the average total return of the analyst's industry (or industry team's) coverage universe, or the relevant country MSCI index, on a risk-adjusted basis over the next 12-18 months.

Underweight (U). The stock's total return is expected to be below the average total return of the analyst's industry (or industry team's) coverage universe, or the relevant country MSCI index, on a risk-adjusted basis over the next 12-18 months.

More volatile (V). We estimate that this stock has more than a 25% chance of a price move (up or down) of more than 25% in a month, based on a quantitative assessment of historical data, or in the analyst's view, it is likely to become materially more volatile over the next 1-12 months compared with the past three years. Stocks with less than one year of trading history are automatically rated as more volatile (unless otherwise noted). We note that securities that we do not currently consider "more volatile" can still perform in that manner.

Unless otherwise specified, the time frame for price targets included in this report is 12 to 18 months. Ratings prior to March 18, 2002: SB=Strong Buy; OP=Outperform; N=Neutral; UP=Underperform. For definitions, please go to www.morganstanley.com/companycharts.

ANALYST INDUSTRY VIEWS

Attractive (A). The analyst expects the performance of his or her industry coverage universe to be attractive vs. the relevant broad market benchmark over the next 12-18 months.

In-Line (I). The analyst expects the performance of his or her industry coverage universe to be in line with the relevant broad market benchmark over the next 12-18 months.

Cautious (C). The analyst views the performance of his or her industry coverage universe with caution vs. the relevant broad market benchmark over the next 12-18 months.

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