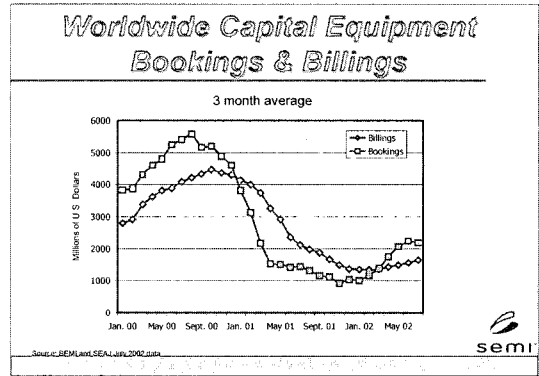
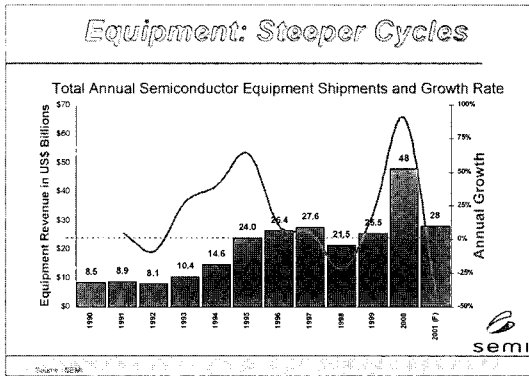


반도체장비산업현황(下)

이 주 훈*



3. Capital Equipment Trends

Cycles are amplified for the equipment sector. As already discussed, Late last year's erosion in macroeconomic conditions have impacted the equipment market which declined by 42%. Capital equipment revenues have increased 5X from 1990 to 2000. The critical importance of the SEMI member companies in advancing technology, in providing, in delivering solutions to their customers.

Q202 data is based on actual data for April and

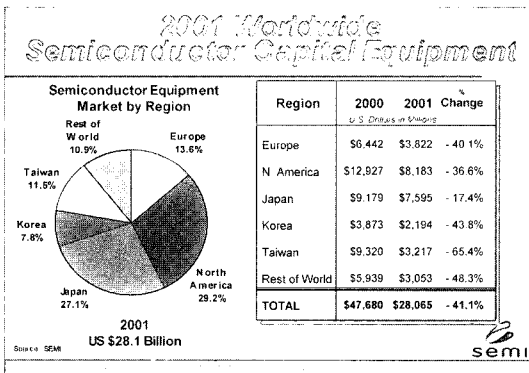
May and an estimate for June. Industry has hit the bottom and bookings are increasing slowly. There may be a delay in the billings upswing due to SAB 101. Demand for capital equipment is driven by 0.13 micron geometries, copper and low k processes (mix of both 200mm and 300mm).

North America, Taiwan and Rest of World billings and bookings are up Q102 over Q401. North America bookings were up in April 2002 over March 2002, but down slightly in May 2002 over April 2002 while billings were down in the region for the same period. Taiwanese and ROW billings and bookings were up in May 2002 over April 2002 and April 2002 over March 2002.

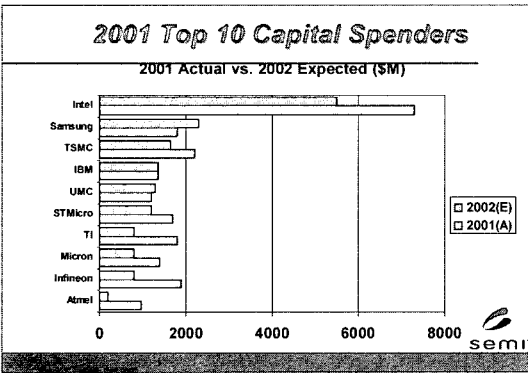
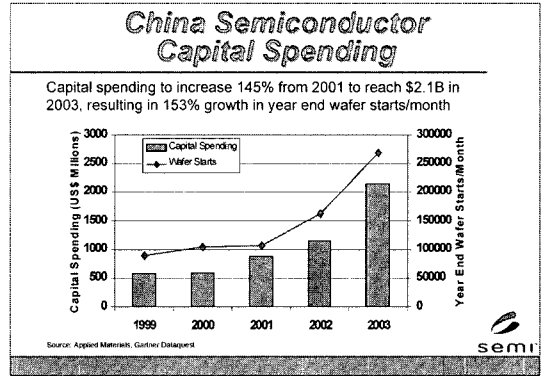
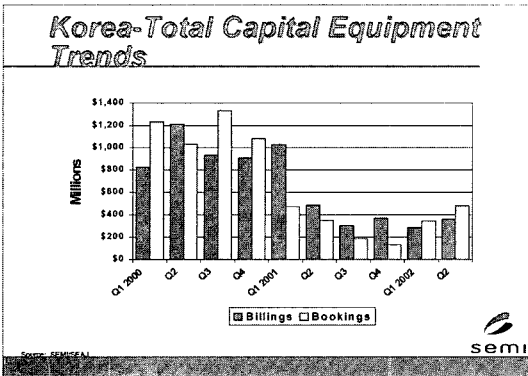
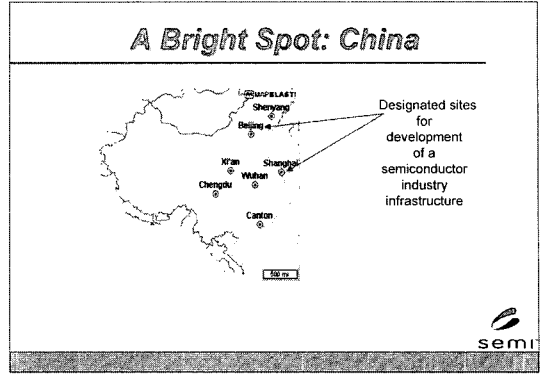
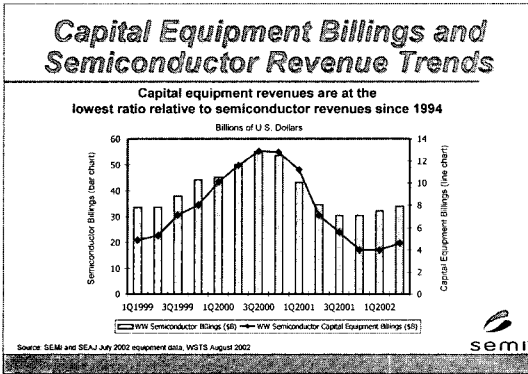
European billings were down in Q102 over Q401, while bookings were up. May bookings were up over April 2002, while billings were down for the same period over March 2002.

Japan bookings and billings were down in Q102 over Q401. However, bookings and billings in May 2002 were up over April 2002.

Korea billings were down Q102 over Q401 but bookings were up. Korea bookings increased in May 2002 over April 2002, while billings declined for the same period. Bookings down 28% over Q1 of 2001 but

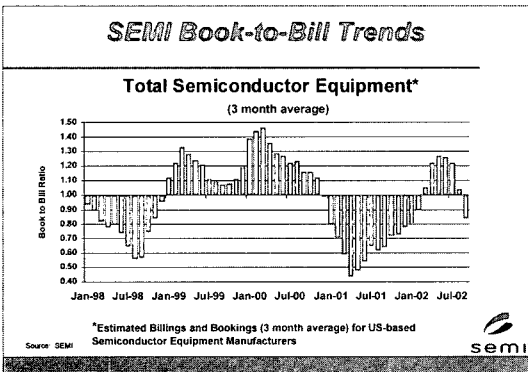


*SEMI Korea 사장



China Market Size in 2001

European and North American equipment suppliers \$640 million USD in 2001
 Japan equipment suppliers \$340 million USD in 2001
 Total billings for equipment consumed in China \$980 million USD in 2001
 Total equipment to grow 20 percent in 2002 to \$1.2 billion
 Growth rate for China will be much higher than other areas in ROW category



Semiconductor Equipment Purchases in China

Large percentage of used equipment being consumed (30%)
 Currently on 2 fabs being built
 SMIC
 Grace Semiconductor
 China tends to purchase cheaper models do not need bleeding edge tools
 Tool suppliers concerned about being paid
 Most companies expect to see slow and continual growth from China

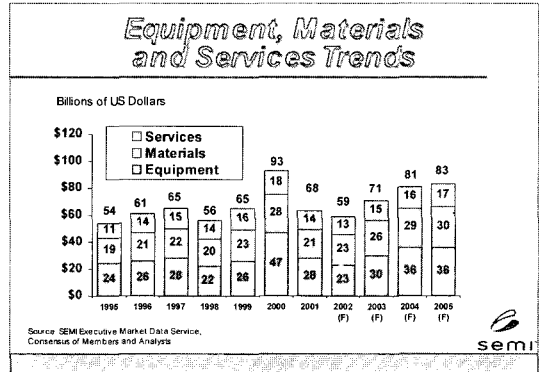
World wide SEMI Equipment Market Report

Worldwide SEMI 2002 Billings
Worldwide Semiconductor Equipment Market: Calendar by Country
(\$ in Billions of US Dollars)

Region	2001	2002	2003 (F)	2004 (F)	2005 (F)
Total Equipment	219,642	219,214	220,997	222,827	222,582
Europe	27,918	27,918	28,000	28,000	28,000
Japan	74,487	74,487	74,487	74,487	74,487
North America	56,748	56,748	56,748	56,748	56,748
Rest of World	159,889	159,889	159,889	159,889	159,889
Asia	99,871	99,871	99,871	99,871	99,871
Europe	100,000	100,000	100,000	100,000	100,000
ROW	118,018	118,018	118,018	118,018	118,018
Total	\$1,443,209	\$1,443,209	\$1,443,209	\$1,443,209	\$1,443,209

Region	2001	2002	2003 (F)	2004 (F)	2005 (F)
Europe	\$4,822	\$4,822	\$4,822	\$4,822	\$4,822
Japan	7,471	7,471	7,471	7,471	7,471
North America	42,898	42,898	42,898	42,898	42,898
Rest of World	2,465	2,465	2,465	2,465	2,465
Asia	16,188	16,188	16,188	16,188	16,188
Europe	3,300	3,300	3,300	3,300	3,300
Total	\$76,907	\$76,907	\$76,907	\$76,907	\$76,907

World Manufacturing Equipment
Revenue: \$B \$M \$B \$M \$B



bookings are up 157% over Q4 2001.

The book-to-bill is an indicator published by SEMI and is based on data submitted by North American capital equipment companies. It is based on a three-month average of bookings to billings. A book-to-bill ratio greater than 1 signifies an expanding market. Over the past three months, bookings have declined. This is another sign that the expected recovery in 2002 has stalled. September's book to bill fell 0.84. Device complexity and continued device scaling has reached some fundamental technological limits. There are several new enabling materials technologies that are being implemented for 90 nm devices (Feel free to mention a couple of these bullets).

All of these require investment, collaboration across the ecosystem and novel strategies for partnering and profitability. 2002 has been another challenging year for the SEMI members. Though the capital equipment market bottomed out on a quarterly basis in late 2001, 2002 will prove to be a down year.

The SEMI mid-year forecast estimated about a 20%

decline in capital equipment revenues. As new bookings have stalled, it is now reasonable to expect a steeper decline. Since semiconductor units are expected to grow in 2002, we expect a modest recovery in materials revenues.

The expectation is for stronger recovery next year, but current economic and business conditions cloud the near-term view of the future.

4. FPD Trends and Outlook

Large-Area TFT Q2 02 Results

>10 TFT LCD shipments rose 9.5% to 17.6 million units (record high)

Non-PC modules 25% Q/Q unit growth

LCD monitor modules 10% Q/Q

Notebook modules 8%

Large-area TFT LCD revenues rose 24% to record \$5.03 billion

Q3 02 outlook weak, however, due to inventory concerns

Large-area shipments expected to fall 7.8% Q/Q

Fab utilization expected to fall from 92% to 86%

Source: DisplaySearch, August 27, 2002



New Material Applications Emerging

Decade of the Materials

- 300mm Production Ramp Underway
- Silicon-on-Insulator (SOI) and Silicon Germanium Wafers
- Low ? Intermetal Dielectrics
- High ? for Gate Capacitors, for Memory Capacitors
- 193nm \Rightarrow 157nm \Rightarrow EUV Lithography
- Flip Chip, Wafer-Level, and Green Packaging



Small/Medium Displays Q2 02 Results

Application	Units (000s)	Y/Y Unit Growth	Revenue (\$US million)	Y/Y Revenue Growth
Mobile Phones	99,681	18.2%	\$909.2	15.4%
PDAs	3,465	44.9%	\$141.1	45.9%
Automotive Monitors	1,470	17.2%	\$132.8	-5.1%
Video Cameras	3,870	33.1%	\$86.2	8.9%
Digital Still Cameras	5,940	41.9%	\$82.7	18.7%

Q2 02 small/medium display shipments reached 114.4 million units up 20.3% Y/Y

Q2 02 revenues of \$1.4 billion up 15.1% Y/Y

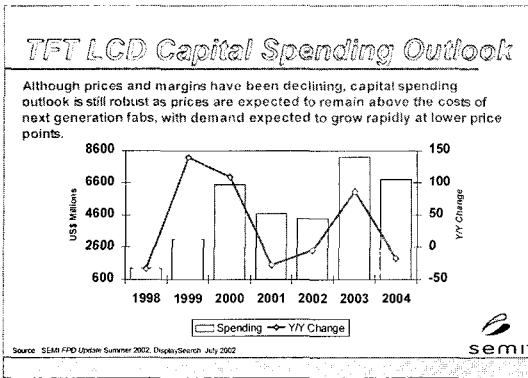
Growth expected to continue through remainder of year

Q3 02 units up 22%; revenue up 32% Y/Y

Q4 02 units up 8%; revenue up 38% Y/Y

Source: DisplaySearch, September 11, 2002





Gen 5/6 TFT LCD fabs (as of July 2002)

Company	Location	Production Start	Substrate Size	Capacity (subs/mo)
Hannstar	Tainan, Taiwan	Q1 04	1150 x 1300	70,000
LG Philips	Kumi, Korea	Q2 02	1000 x 1200	60,000
AU Optronics	Lungtan, Taiwan	Q2 03	1100 x 1250	45,000
CPT	Padah, Taiwan	Q2 04	1100 x 1250	70,000
SVANEC	Shanghai, China	Q2 04	1100 x 1250	45,000
LG Philips	Kumi, Korea	Q3 03	1100 x 1250	60,000
Quanta Display	Taoyun, Taiwan	Q4 02	1100 x 1300	60,000
Samsung	Chonan, Korea	Q4 02	1100 x 1250	80,000 100,000
Chi Mei Optoelectronics	?	Q4 03	1100 x 1300	75,000
Sharp	Kameyama, Japan	Q2 04	1500 x 1800	100,000
Samsung	?	Q3 04	1500 x 1800	90,000

Source: Industry reports and sources August 2002

5. Summary and Conclusions

2001년부터 시작된 반도체산업 불황이 다소 나아지고 있으나, 소자업체의 일부에서만 나타나고있고, 증가 추세가 매우 완만한 상태이다.

2002년도 반도체소자 수량은 약10-15% 증가가 예상되나, 매출액은 2001년과 비슷할 것으로 본다.

반도체 장비업계는 1994년이래 Capital equipment tracks device revenue growth, Fab Capacity and Utilization이 최악의 상태로, 장비사의 어려움이 내년까지 지속될 것으로 예상된다.

모든 면에서 Outsourcing을 지향하는 추세로 나갈 것으로 예측된다.

현재로서는 LCD, 300mm Fab, 중국시장 등이 반도체 장비업체의 중요 사업권으로 생각하고 추진해야 될 것으로 본다.

*편집자주 : 다음 항목은 한국반도체장비학회지 제2호에 게재되어 있습니다.

1. About SEMI
2. Semiconductor Industry Trends