

BUSINESS OUTLOOK

GLOBAL ELECTRONICS INDUSTRY

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DECEMBER 1999**

TOPICS

GLOBAL ECONOMY

ELECTRONIC EQUIPMENT

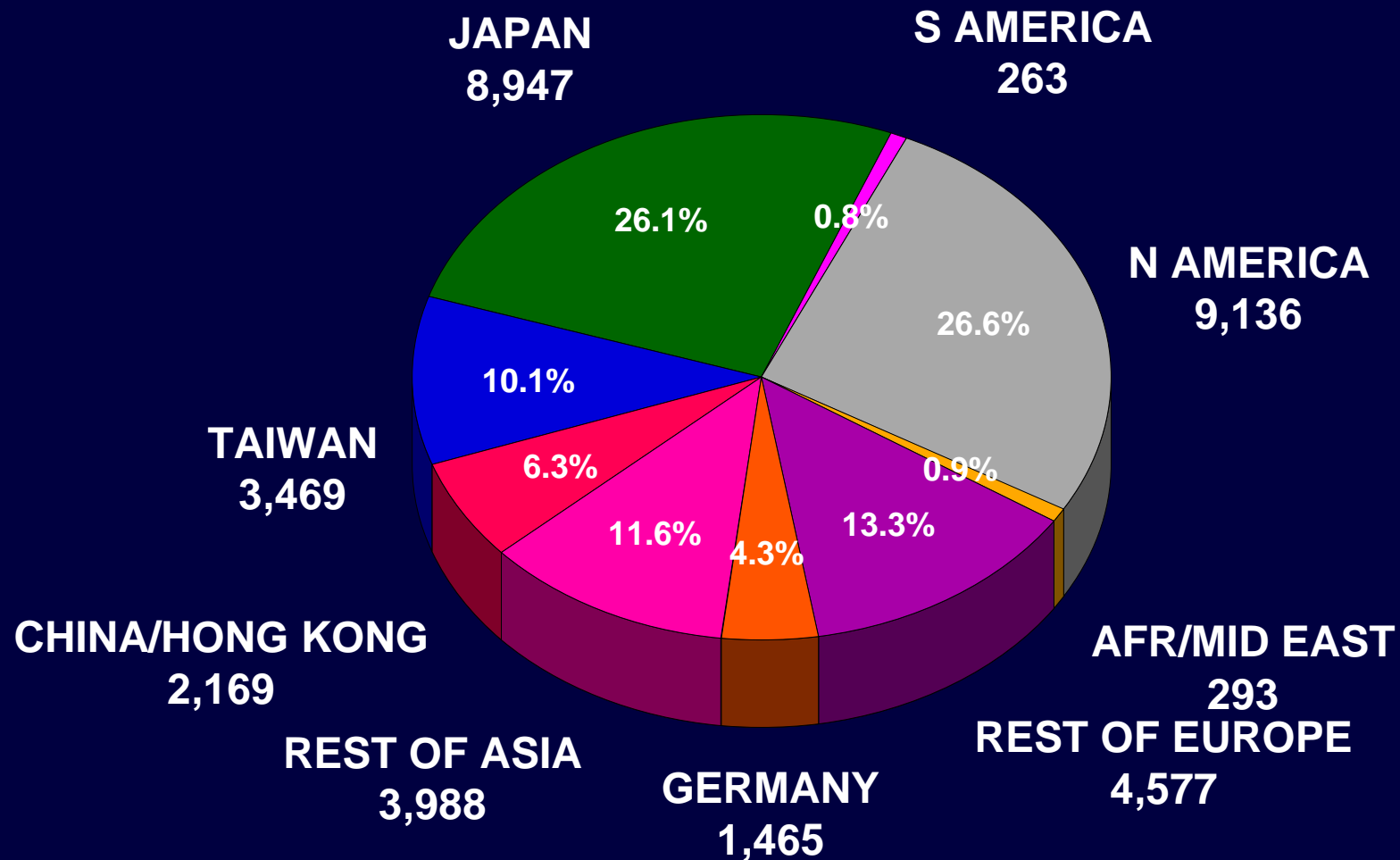
SEMICONDUCTORS

PRINTED CIRCUIT BOARDS

FUTURE OUTLOOK

1998 WORLD RIGID & FLEX PCB PRODUCTION

BY GEOGRAPHICAL AREA (\$M)

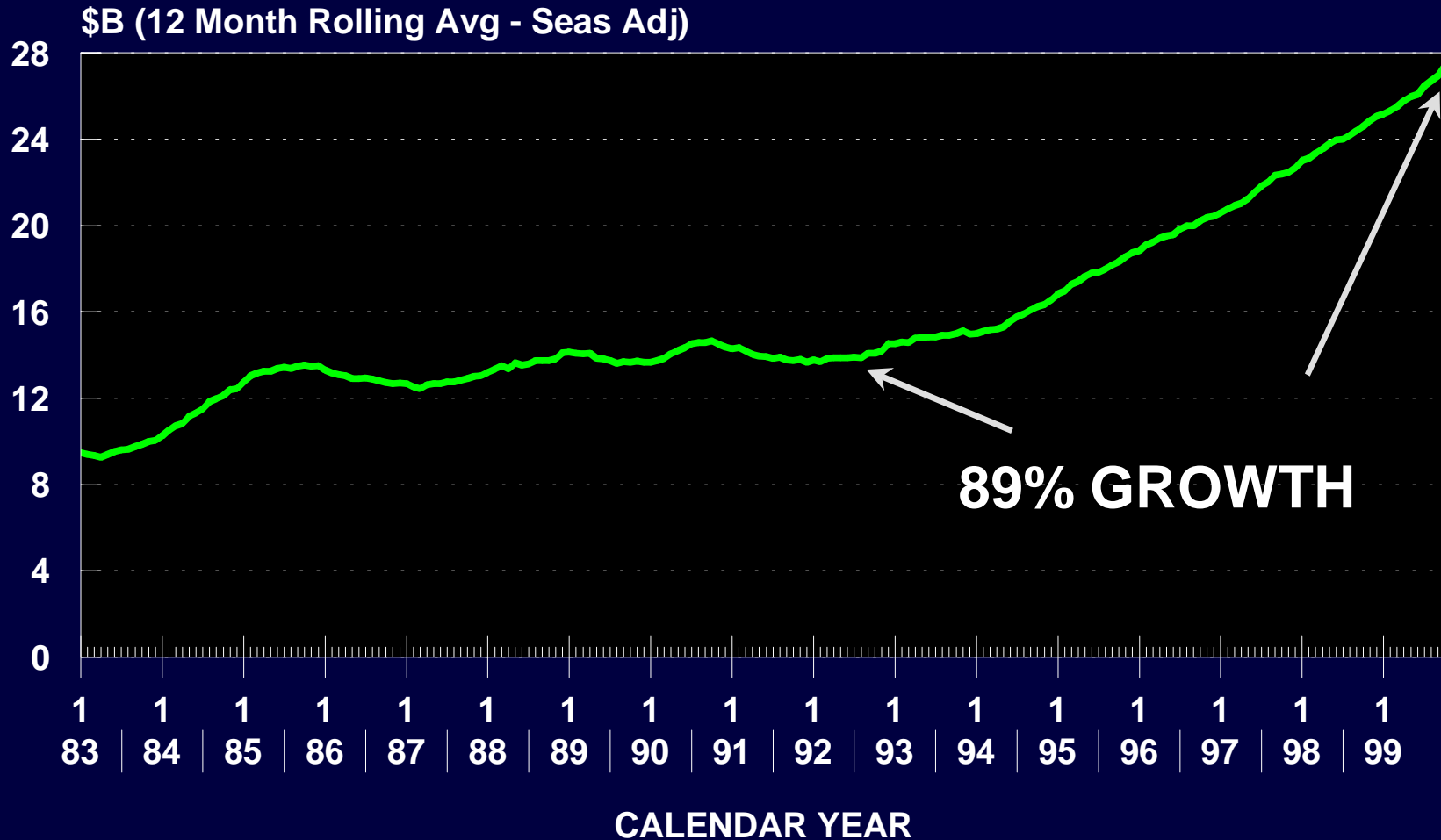


Total: \$34.3 Billion

IPC T/MRC 6/99 (includes Buildup PCBs)

US ELECTRONIC EQUIPMENT ORDERS

COMMUNICATION, COMPUTER & OFFICE,
MILITARY, INSTRUMENTS



US DEPT OF COMMERCE 12/99

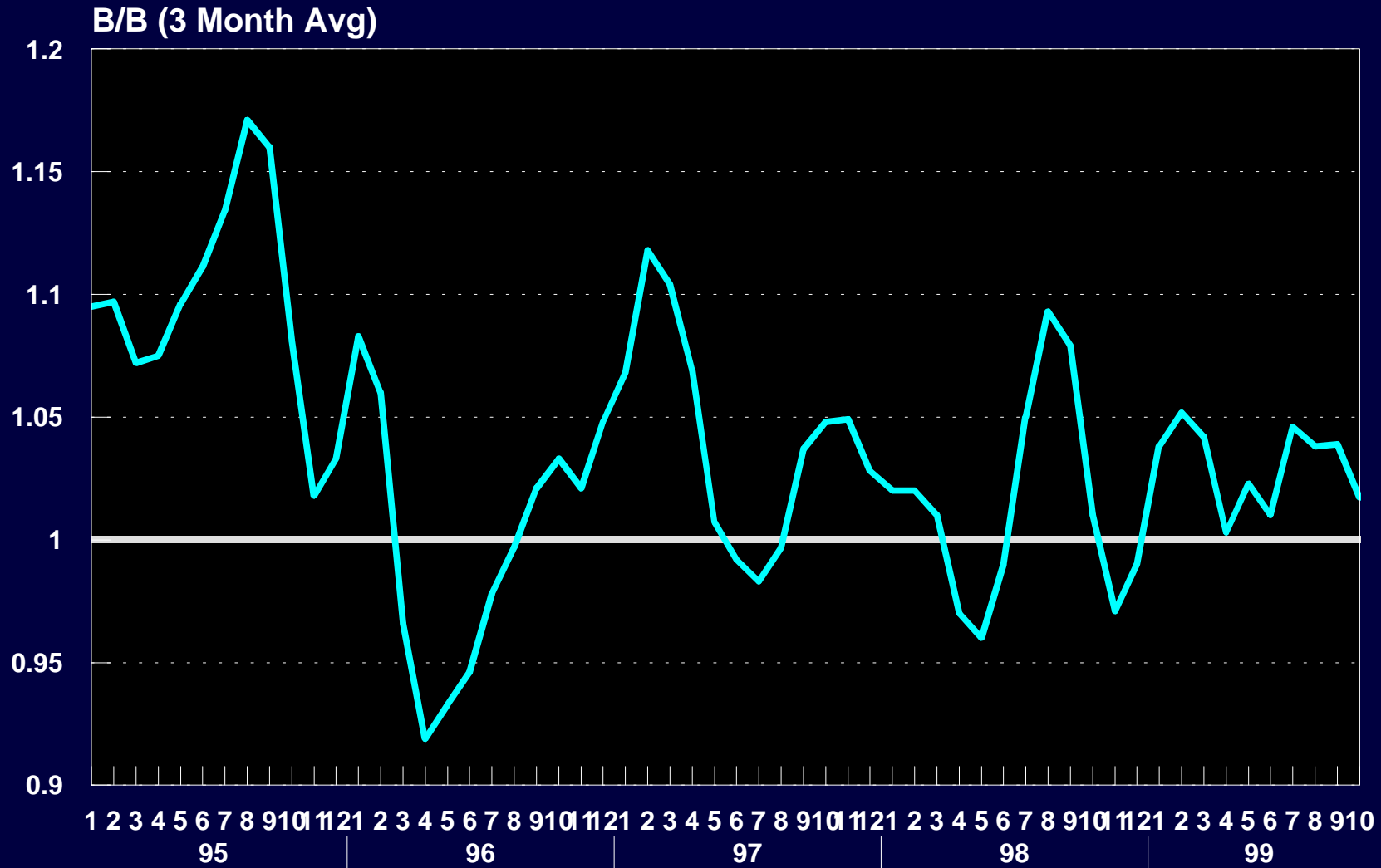
INDUSTRIAL PRODUCTION - WORLD

% CHANGE vs ONE YEAR EARLIER

BRITAIN	+0.9 Sep
FRANCE	+3.1 Sep
GERMANY	-1.1 Sep
ITALY	-0.4 Sep
NETHERLANDS	+2.8 Sep
SPAIN	+3.7 Sep
EURO-11	+0.8 Sep
RUSSIA	+10.3 Oct
CANADA	+6.2 Sep
USA	+3.3 Oct
CHINA	+7.0 Oct
MALAYSIA	+19.3 Sep
SINGAPORE	+22.6 Oct
S KOREA	+30.6 Oct
TAIWAN	+7.5 Oct
THAILAND	+15.4 Sep
JAPAN	+1.7 Oct

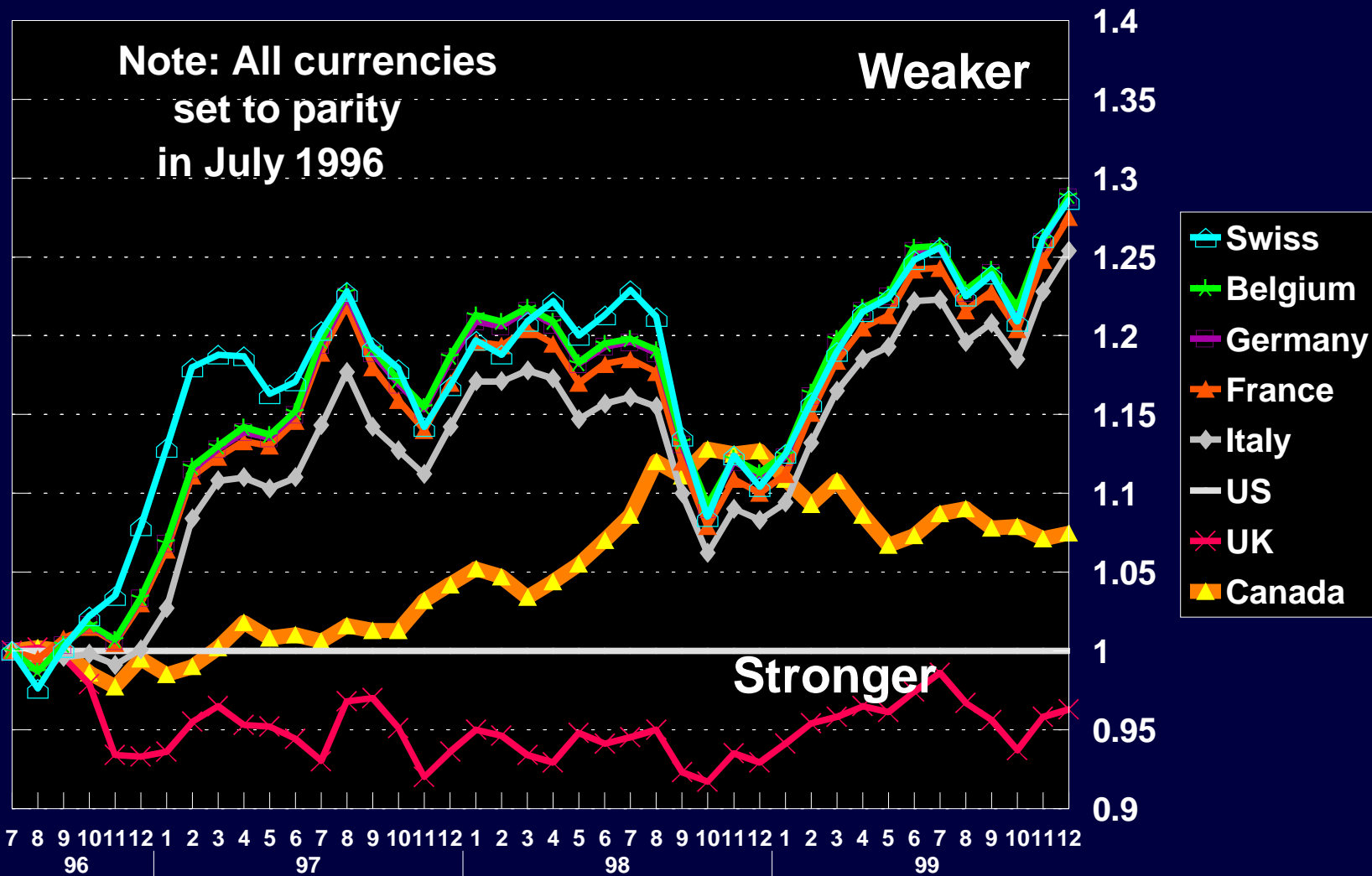
Rigid PCB Book/Bill

N. America



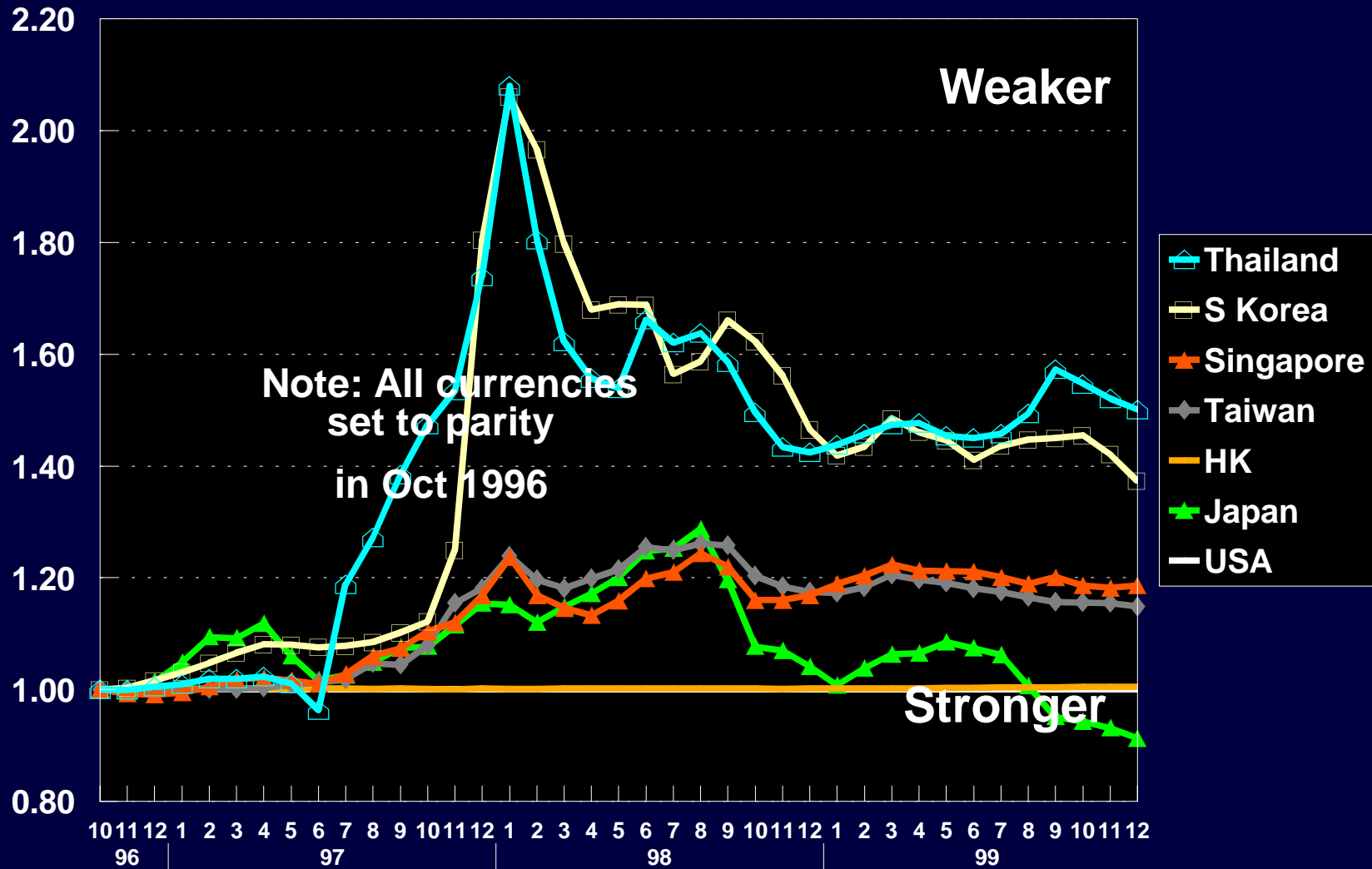
EUROPEAN EXCHANGE RATES vs US \$ & JAPANESE YEN

7/96 = 1.00

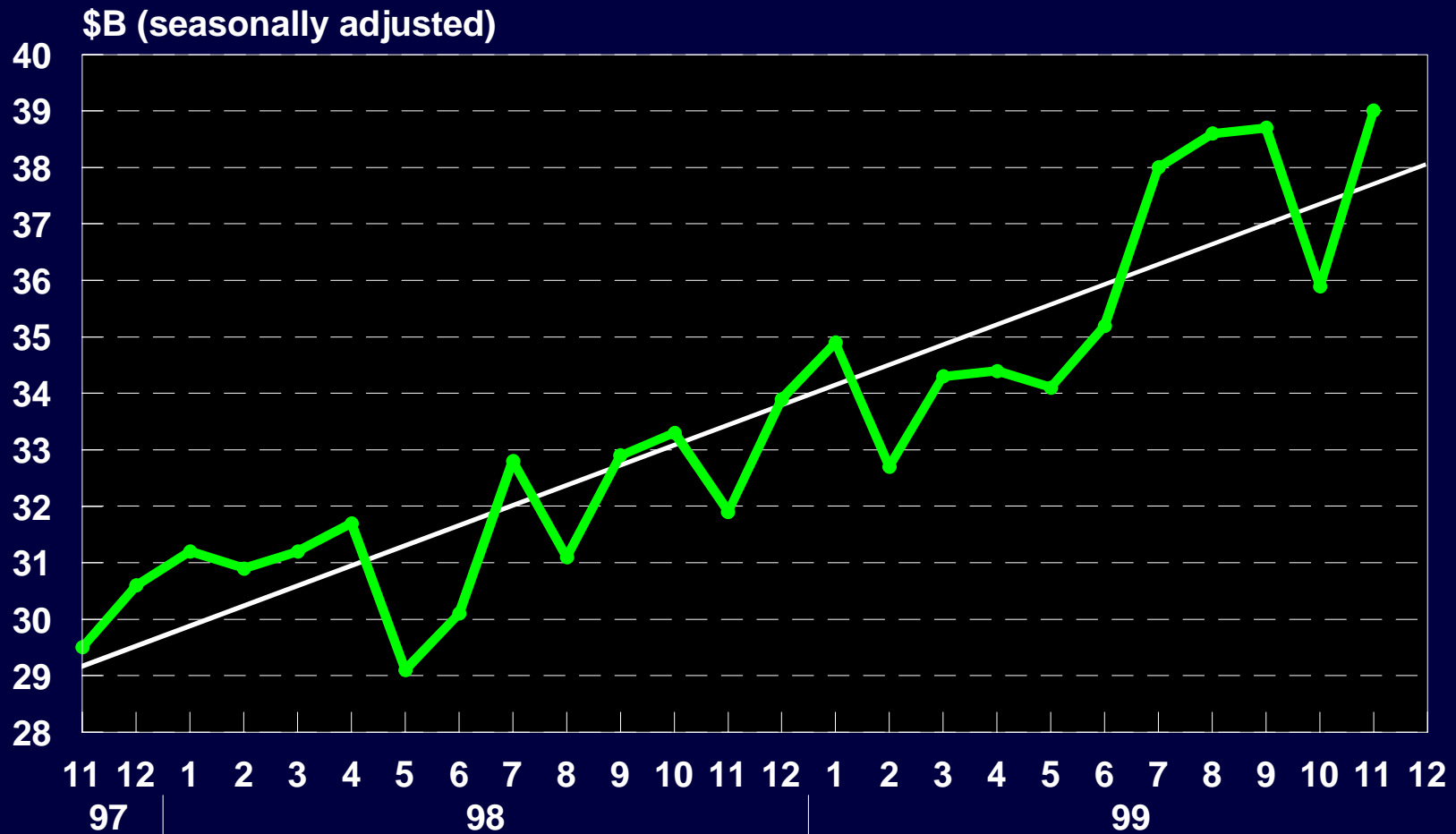


SE ASIA EXCHANGE RATE vs US \$

10/96 = 1.00



U.S. DURABLE GOODS ORDERS ELECTRONIC & OTHER ELECTRICAL EQUIPMENT



U.S Dept of Commerce 12/99

LONG TERM GROWTH DRIVERS

INCREASING ELECTRONIC CONTENT OF CAPITAL GOODS

PRODUCTS THAT DID NOT EXIST A DECADE AGO

EMERGING GLOBAL MARKETS

**GLOBAL PERSONAL COMPUTER CATCH-UP TO USA
LEVELS**

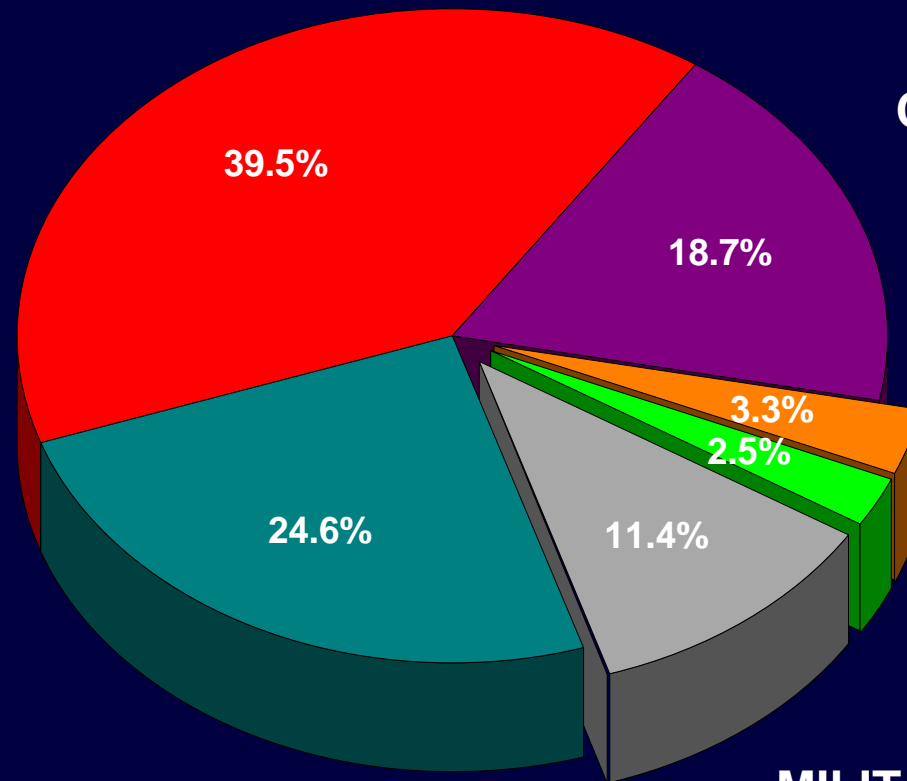
CELLULAR PHONES - DEVELOPING NATIONS

INTERNET EXPLOSION

US PRODUCTION OF ELECTRONIC EQUIPMENT 1999 ESTIMATE (\$B)

COMPUTER & OFFICE
\$171.1

COMMUNICATION
\$80.9



INDUSTR & INSTR
\$106.5

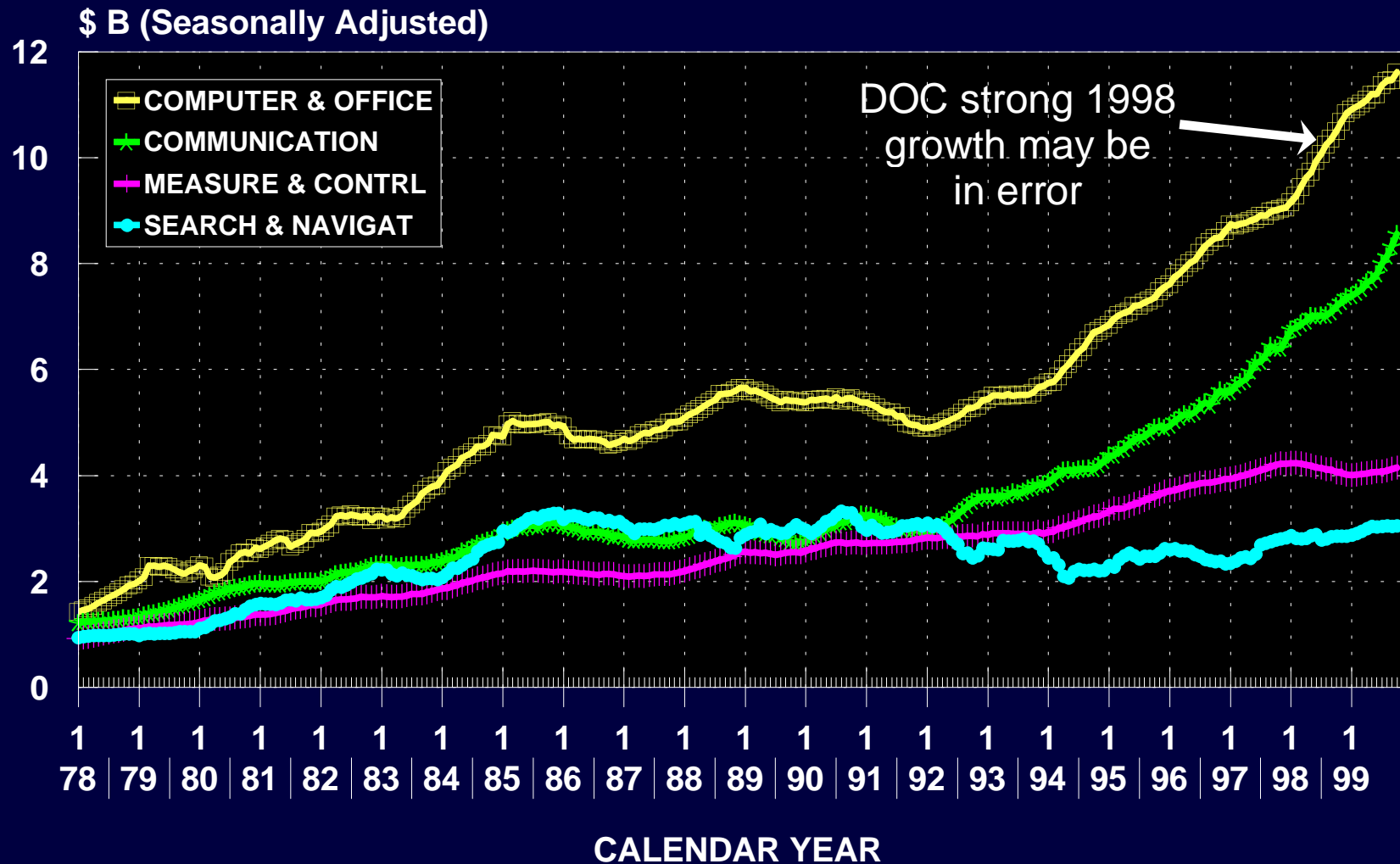
AUTOMOTIVE
\$14.2
CONSUMER
\$10.8

MILITARY
\$49.5

TOTAL = \$433 Billion

US ELECTRONIC EQUIPMENT BOOKINGS

12 MONTH ROLLING AVERAGE



Automotive Electronics

Rank		1998 Global Segment Revenue (\$M)
1	Ford Motor Co.	\$3,610
2	General Motors	\$3,074
3	Motorola	\$2,352
4	TRW	\$1,225
5	Sagem	\$874

HOUSEHOLD AUDIO & VIDEO EQUIPMENT SHIPMENTS



COMMERCE DEPT 12/99

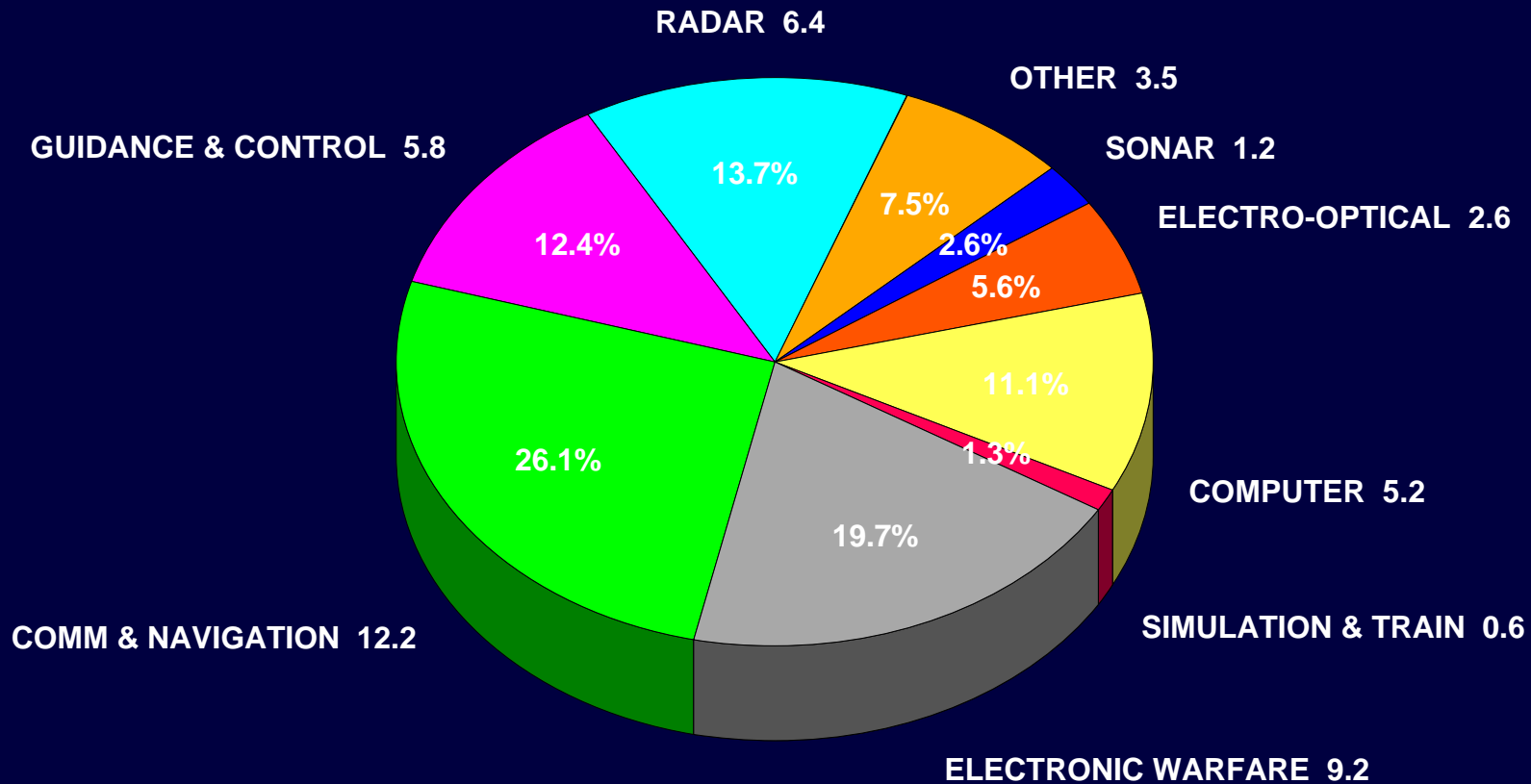
Consumer Electronics

(e.g. TVs, cameras & audio)

Rank		1998 Global Segment Revenue (\$M)
1	Hitachi	\$28,694
2	Pioneer Electronic	\$4,114
3	Nintendo	\$4,015
4	Casio Computer	\$3,773
5	Aiwa	\$2,749
6	Sega Enterprises	\$2,492
7	NEC	\$1,843
8	Kenwood	\$1,806
9	Semi-Tech Global (STG)	\$1,442
10	Fujitsu	\$1,124

MILITARY ELECTRONICS PRODUCTION

U.S. - 1998

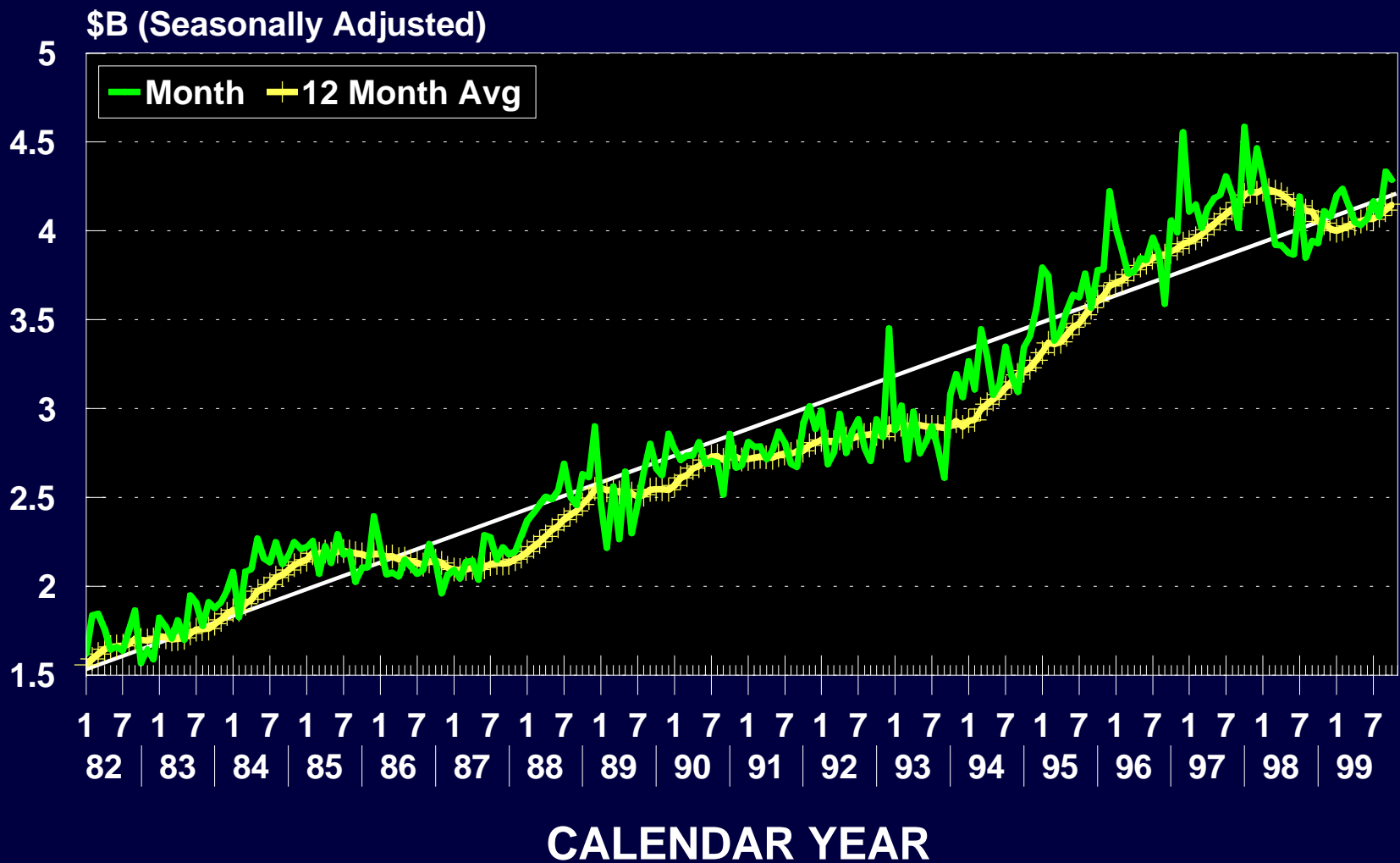


TOTAL: \$46.8 Billion

Government, Military & Aerospace

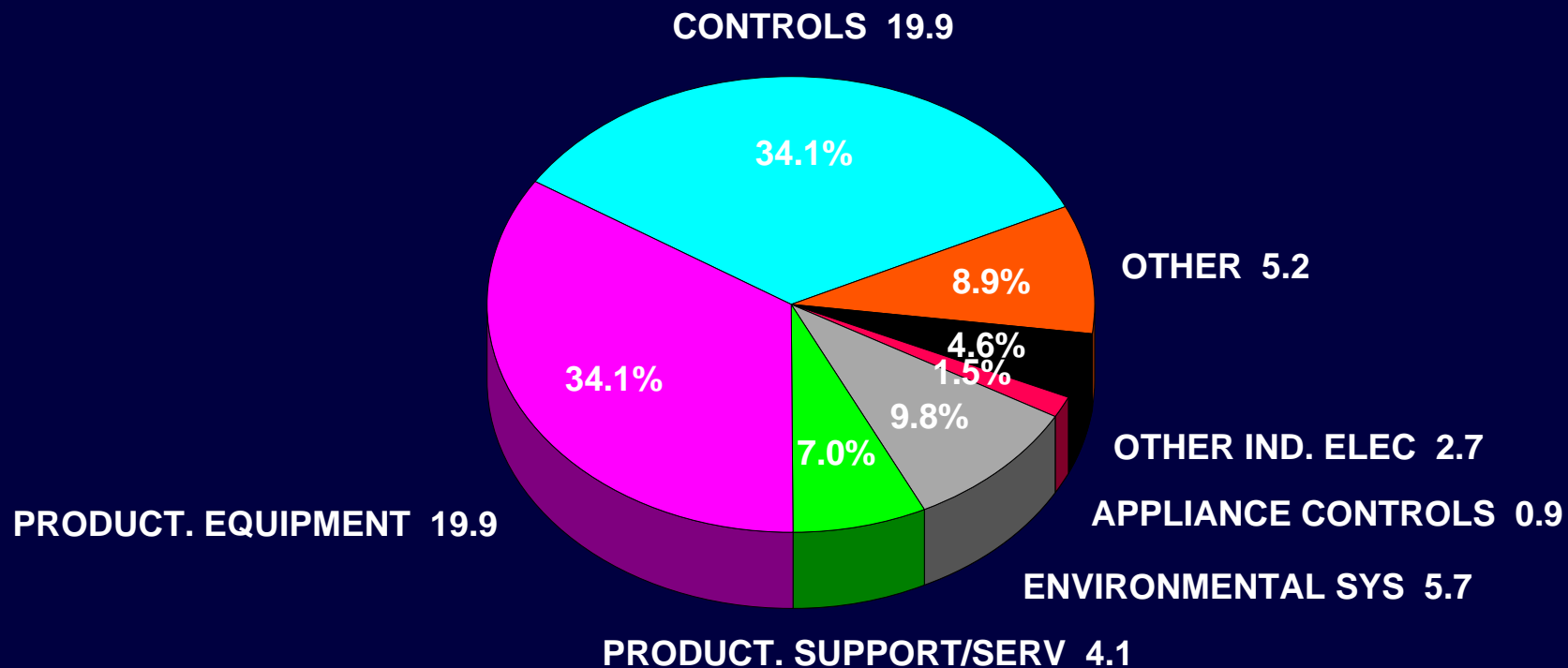
Rank		1998 Global Segment Revenue (\$M)
1	Raytheon	\$14,822
2	Lockheed Martin	\$7,342
3	General Electric Co. (GEC)	\$6,116
4	General Motors	\$5,968
5	TRW	\$4,900
6	Northrop Grumman	\$4,006
7	Litton Industries	\$2,841
8	Honeywell	\$2,528
9	Boeing Company, The	\$2,527
10	Rockwell International	\$2,318
11	Allied Signal	\$2,154
12	ITT Industries	\$1,220
13	Harris	\$937
14	Motorola	\$882
15	Sagem	\$739

MEASUREMENT & CONTROL EQUIPMENT BOOKINGS



INDUSTRIAL ELECTRONICS PRODUCTION

U.S. - 1998



TOTAL: \$58.3 Billion

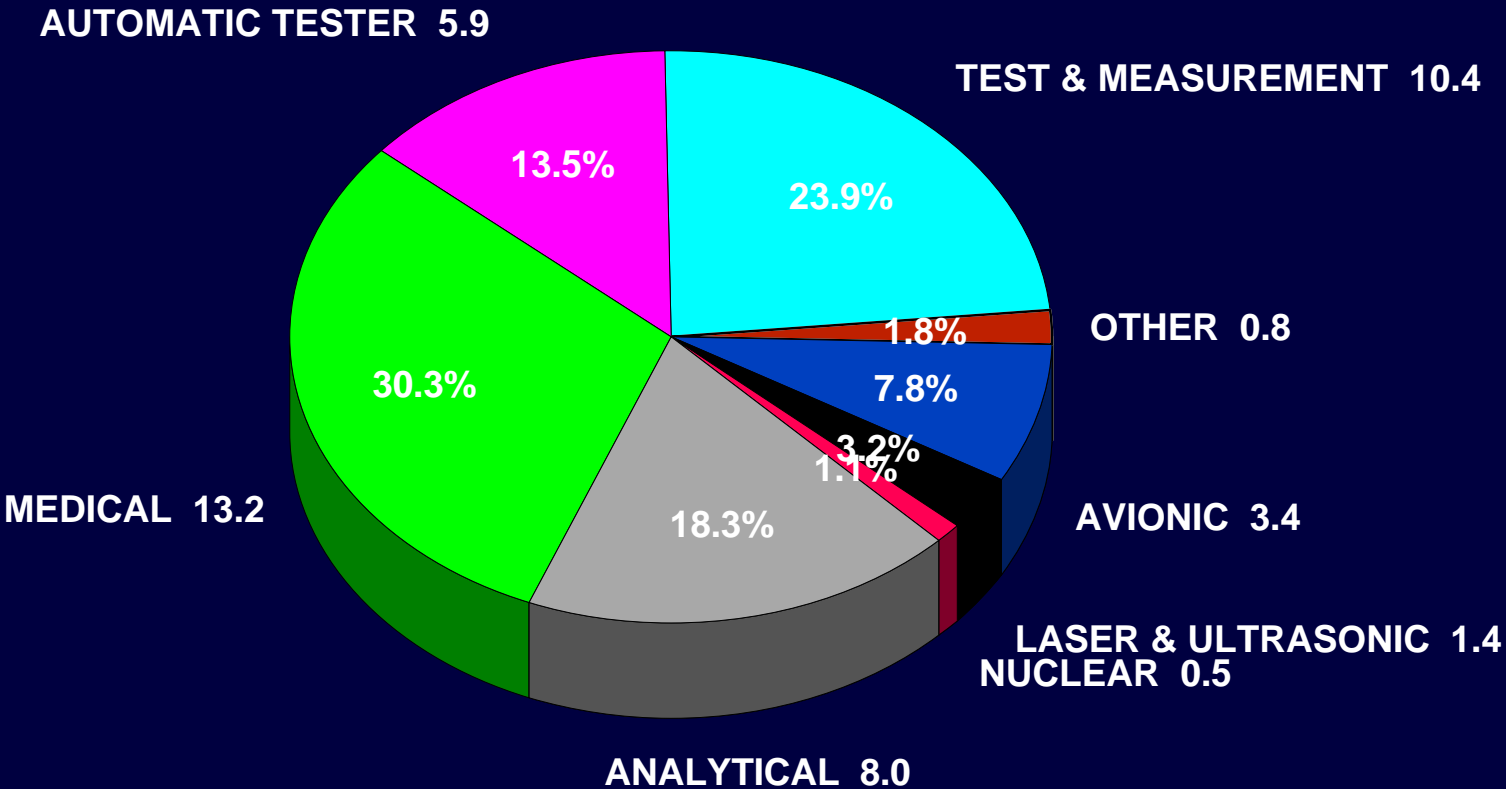
Industrial Systems

(e.g. automation, controls & security)

Rank		1998 Global Segment Revenue (\$M)
1	Fuji Electric	\$7,385
2	Rockwell International	\$4,707
3	BTR Siebe	\$4,665
4	Omron	\$4,598
5	Emerson Electric	\$4,430
6	Honeywell	\$4,213
7	Johnson Controls	\$3,512
8	General Electric Co. (GEC)	\$3,511
9	Eaton	\$3,320
10	General Electric Co	\$2,926
11	Nikon	\$1,818
12	Matsushita Electric Works	\$1,612
13	Pittway	\$1,128
14	NEC	\$1,106
15	Symbol Technologies	\$978
16	Sensormatic Electronics	\$975
17	Dover	\$908
18	Allied Signal	\$816
19	Texas Instruments	\$761
20	Diebold	\$711

ELECTRONIC INSTRUMENT PRODUCTION

U.S. - 1998



TOTAL: \$43.6 Billion

Instruments, Test & Measurement

Rank		1998 Global Segment Revenue (\$M)
1	Hewlett-Packard	\$4,246
2	Thermo Electron	\$1,888
3	Perkin-Elmer	\$1,504
4	Teradyne	\$1,221
5	KLA-Tencor	\$926
6	Tektronix	\$886
7	Danaher	\$485
8	Honeywell	\$421
9	EG&G	\$270
10	Teac	\$135

Medical Equipment

Rank		1998 Global Segment Revenue (\$M)
1	Medtronic	\$2,258
2	Hewlett-Packard	\$1,416
3	Imation	\$318
4	Eastman Kodak	\$280
5	Fuji Photo Film	\$230

Today in the USA

Data exceeds voice volume on phone lines

E-Mail exceeds hand-delivered mail volume

Number of E-mail Messages Sent on an Average Day in the U.S.

1995 **0.3 Billion**

1999 **3.5 Billion**

2002 **8.0 Billion**

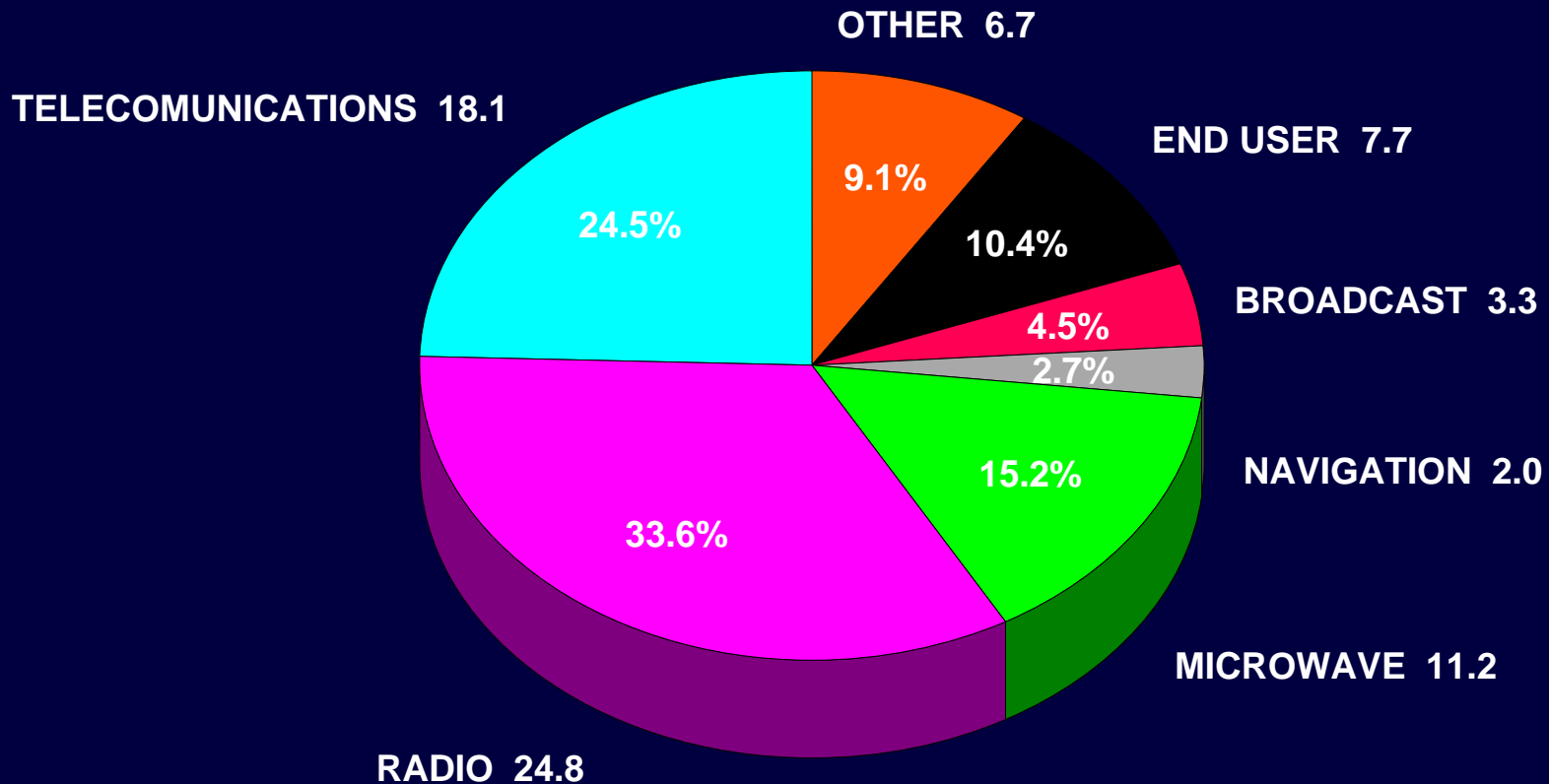
Communications

(e.g. systems, modems, switches, software & telephones)

Rank		1998 Global Segment Revenue (\$M)
1	Lucent Technologies	\$27,564
2	Telefon AB LM Ericsson	\$22,691
3	Alcatel	\$21,254
4	Motorola	\$19,403
5	Northern Telecom	\$17,575
6	Siemens	\$16,876
7	Nokia	\$15,553
8	NEC	\$12,898
9	Cisco Systems	\$9,989
10	Fujitsu	\$6,369
11	3Com	\$5,572
12	GTE	\$4,977
13	Qualcom	\$3,503
14	Corning	\$2,440
15	General Instrument	\$1,988
16	Sagem	\$1,747
17	General Electric Co. (GEC)	\$1,699
18	Tellabs	\$1,660
19	Oki Electric Industry Co.	\$1,551
20	Ascend Communications	\$1,479

COMMUNICATION EQUIPMENT PRODUCTION

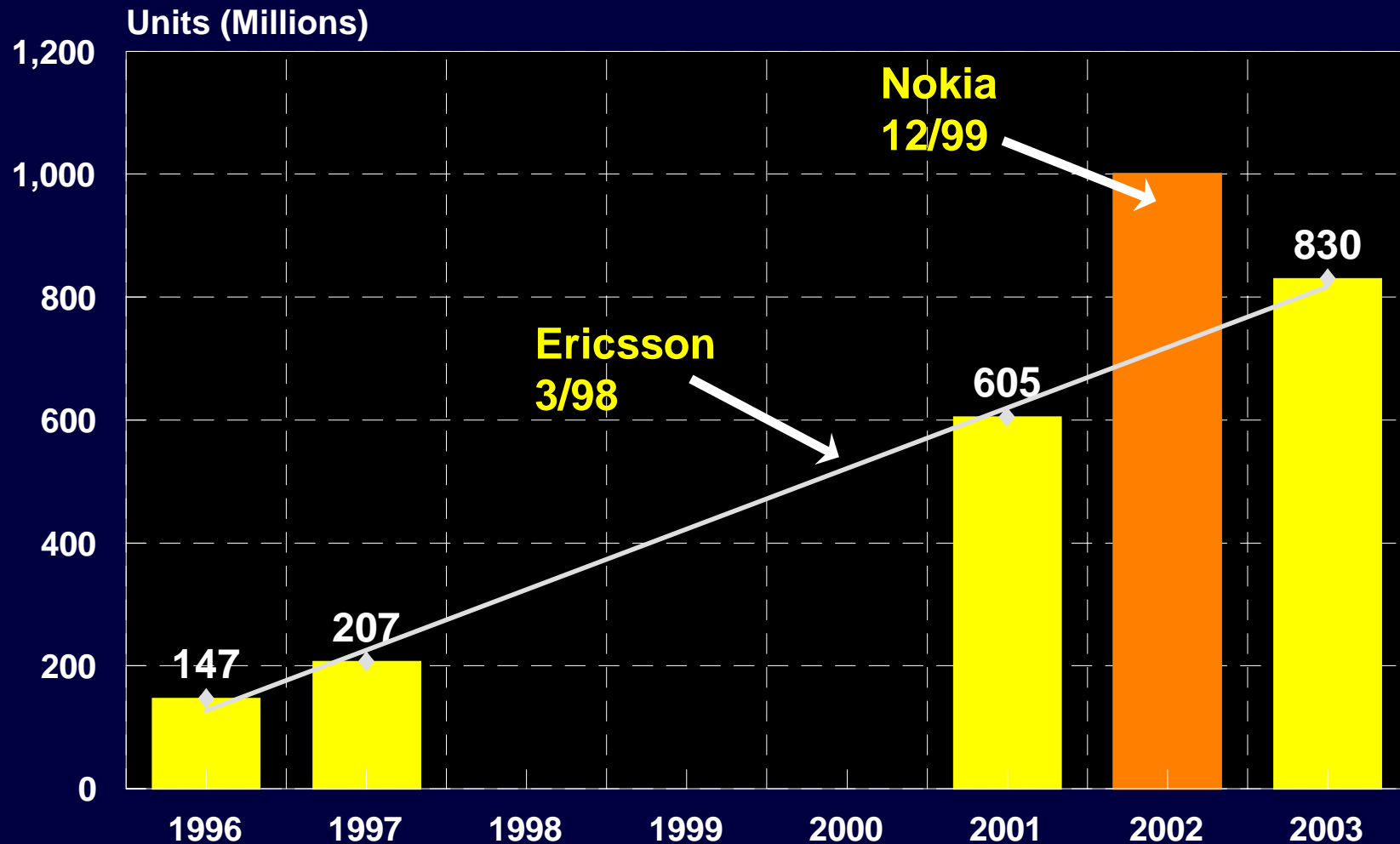
U.S. - 1998



TOTAL: \$73.7 Billion

WORLD CELLULAR PHONE GROWTH

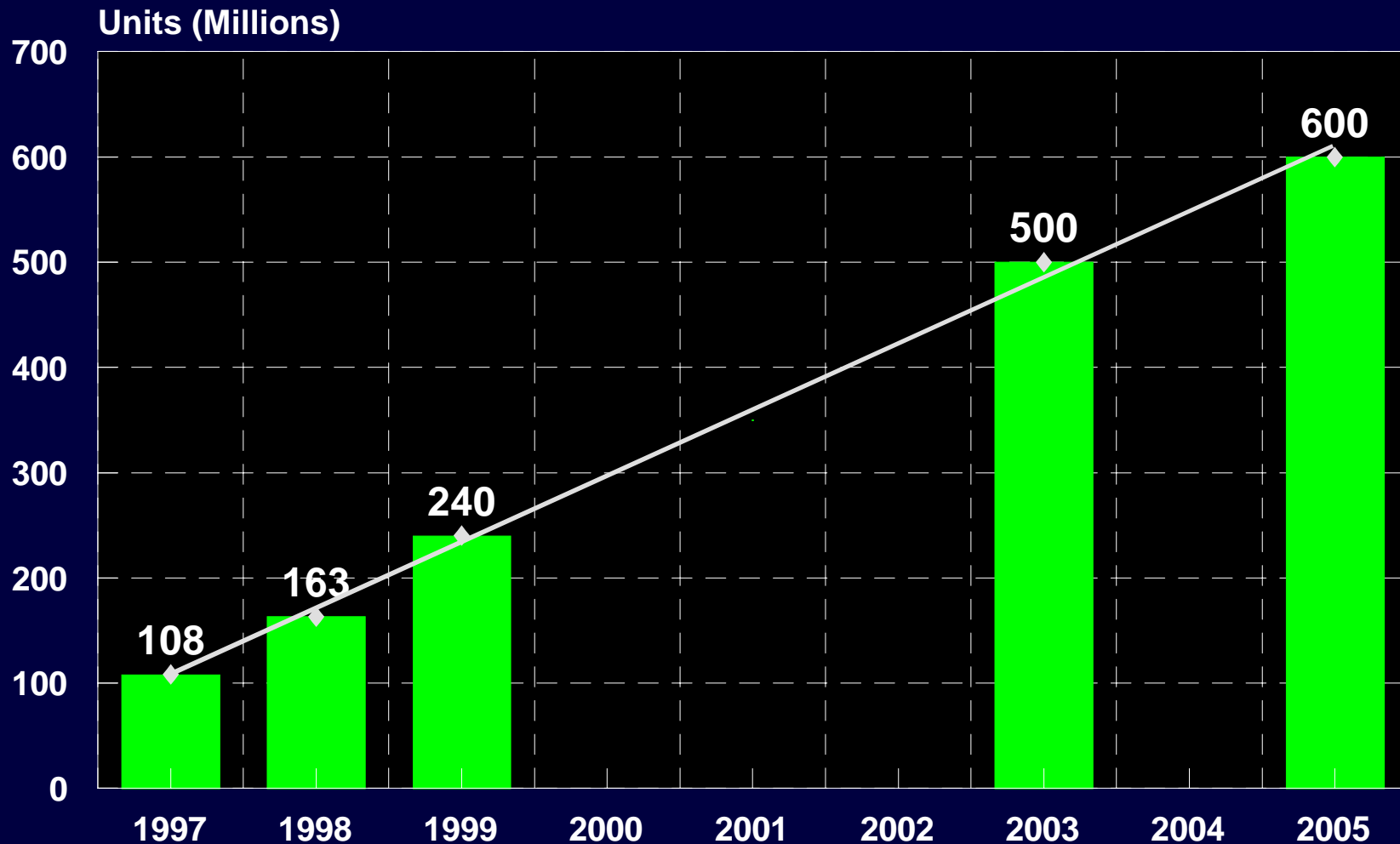
TOTAL SUBSCRIBERS - ANALOG & DIGITAL



Ericsson 3/98, Nokia 12/99

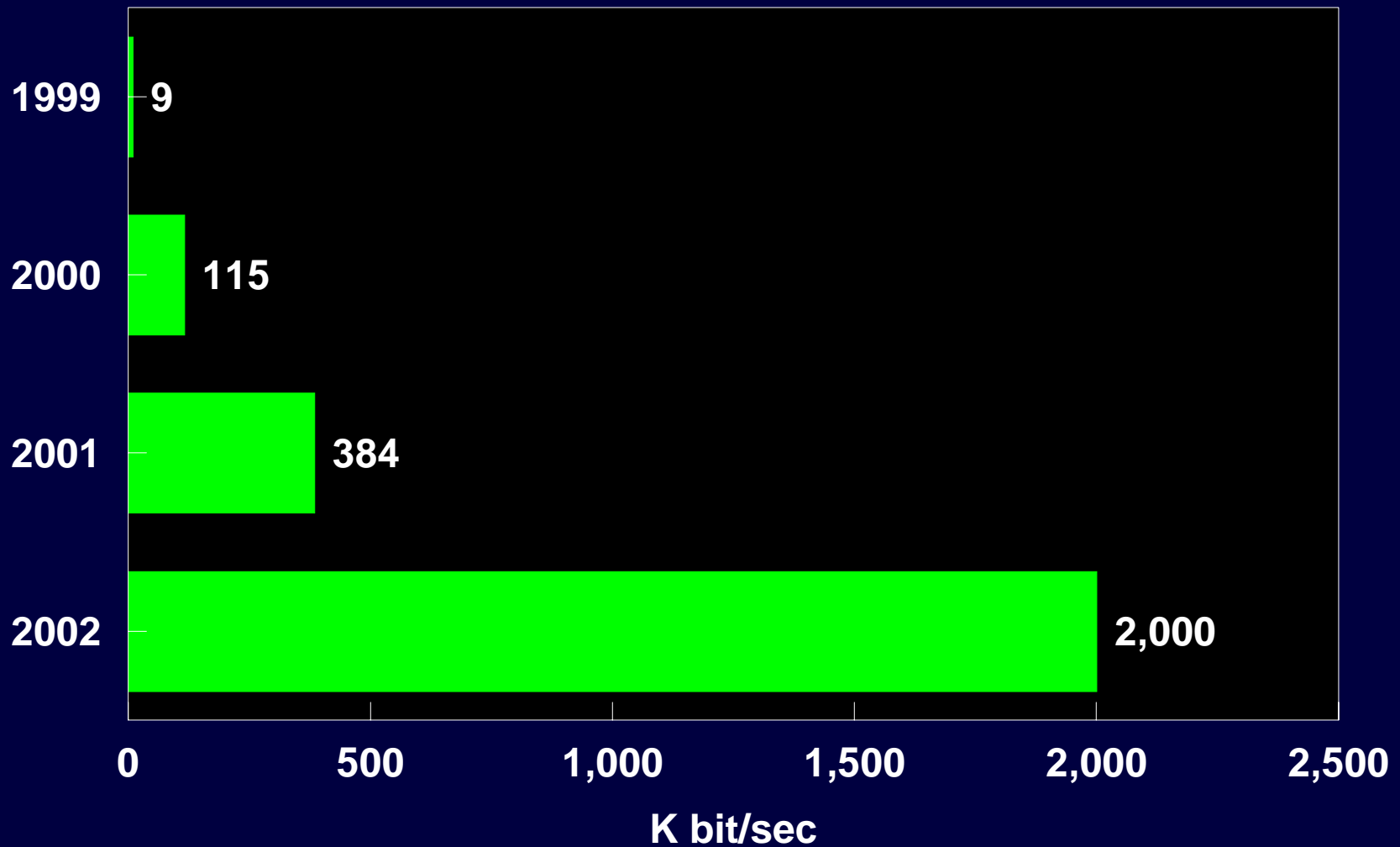
WORLD CELLULAR PHONE GROWTH

TOTAL SALES - ANALOG & DIGITAL



Ericsson 5/99, Dataquest 5/99

WIRELESS DATA RATE PROJECTIONS



Computerworld: The Yankee Group 6/99

Outposts on the Internet

**Projected number of regular Internet users by
yearend 2000**

	<u>Millions of People</u>	<u>% of People</u>
North America	148.7	47.9
Western Europe	86.6	21.8
Asia-Pacific	57.6	1.7
South/Central America	10.8	2.1
Eastern Europe	9.5	3.3
Middle East/Africa	7.5	0.7

The Internet is the most significant factor driving the computer industry because its reshaping the computer companies, their sources of revenues, and their customer and vendor relationships.

EBN: Andrew Neff - Bear, Stearns & Co 10/99

- The Internet Economy grew from \$64 billion in the first three months of 1998 to \$108 billion in the first three months of 1999, an increase of 68%.**
- The Internet Economy, up from \$301 billion in calendar year 1998 to an estimated \$507 billion for 1999, today generates more annual revenue than such entrenched American industries as telecommunications (\$300 billion) and airlines (\$355 billion).**
- E-commerce, the amount of business conducted directly on the Internet, increased 127% from the first quarter of 1998 to the first quarter of 1999.**
- Of 3,400 businesses surveyed to measure the size of the Internet Economy, more than one third did not exist before 1996. Those new businesses now employ 305,000 people.**

Disruptive Technologies

Railroads

Telephone

Internal Combustion Engine

Electric Power

Radio, Television & Movies

Plastics

Jet Travel

Microelectronics

Internet

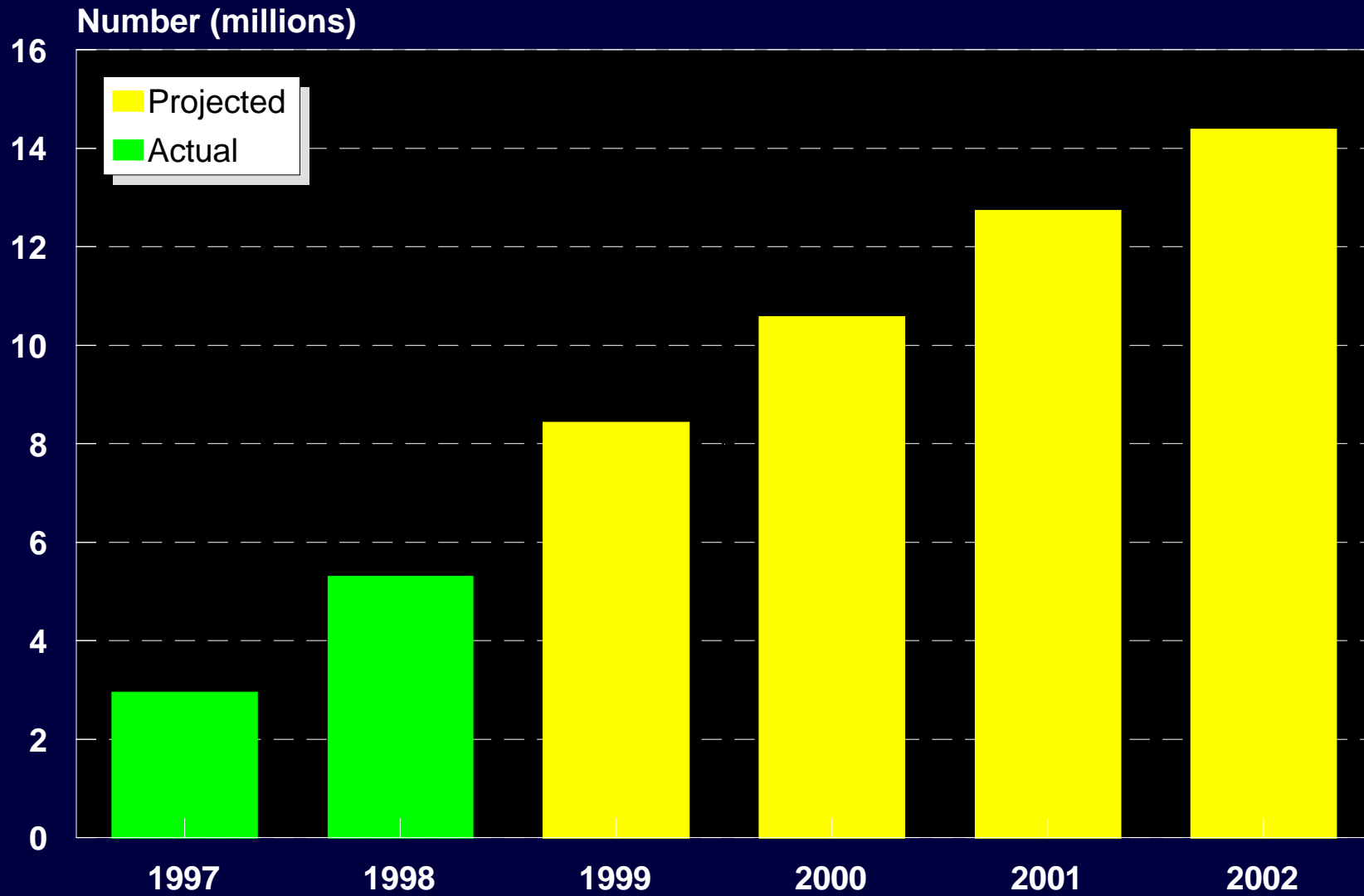
Internet Driven Changes

- **Post office -> E-Mail**
- **Libraries & magazines -> On-line information**
- **Retail stores -> E-Commerce**
- **Financial services -> Internet based**
- **and many more**

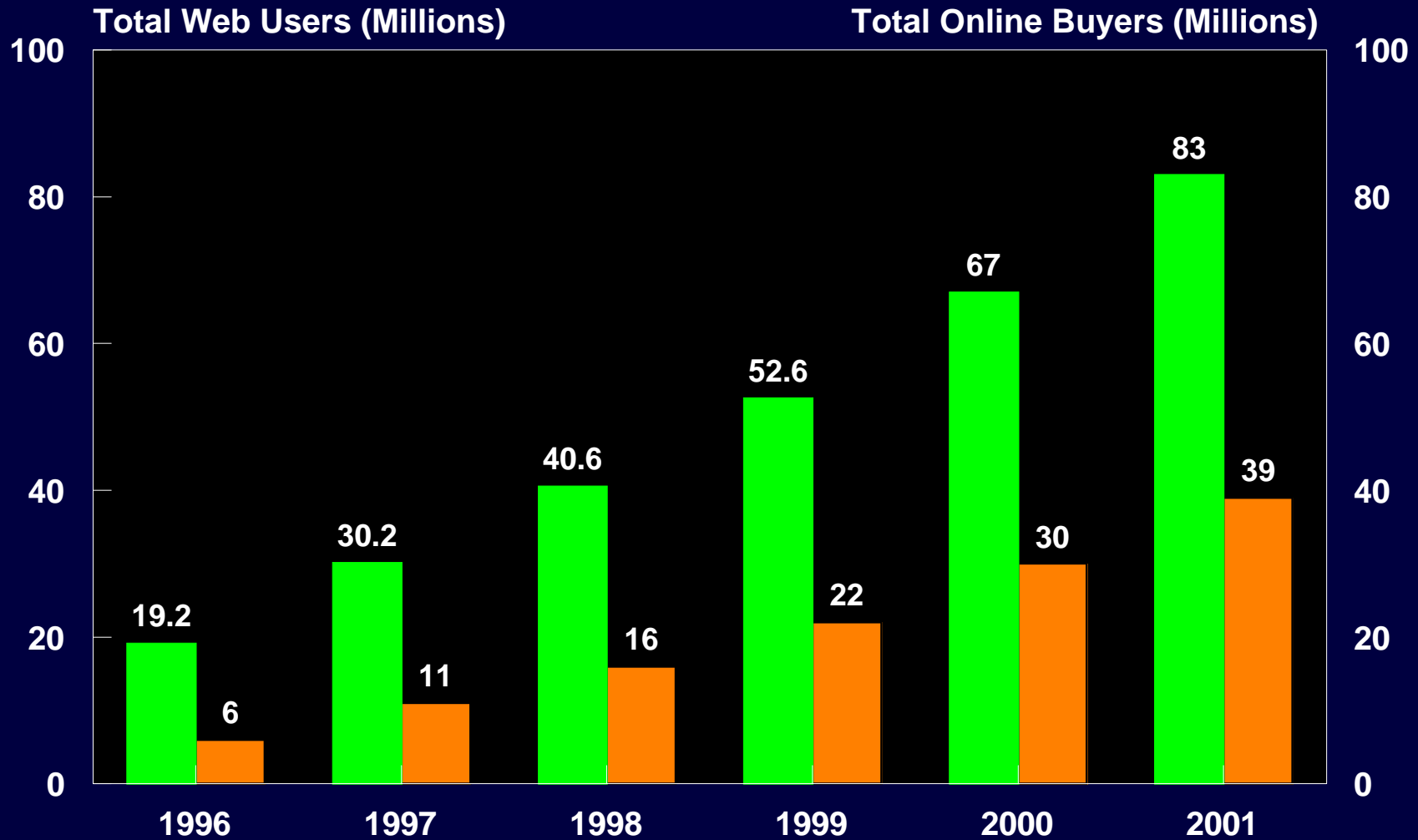
Drivers

- **Speed**
- **Cost**
- **Ease of use**
- **Availability**

ONLINE TRADING ACCOUNTS



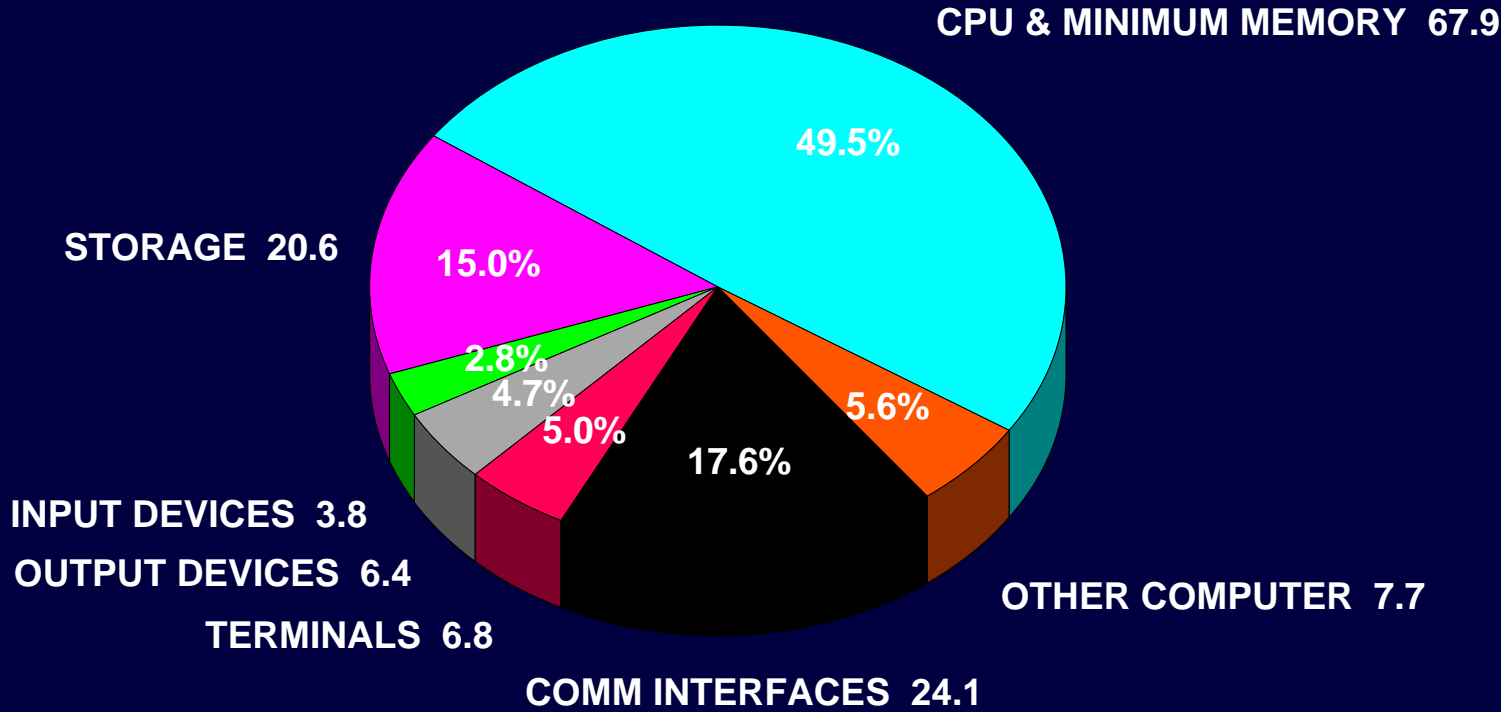
Growing Market - US Online Consumers



Infoworld: IDC 1/99

COMPUTER EQUIPMENT PRODUCTION

U.S. - 1998



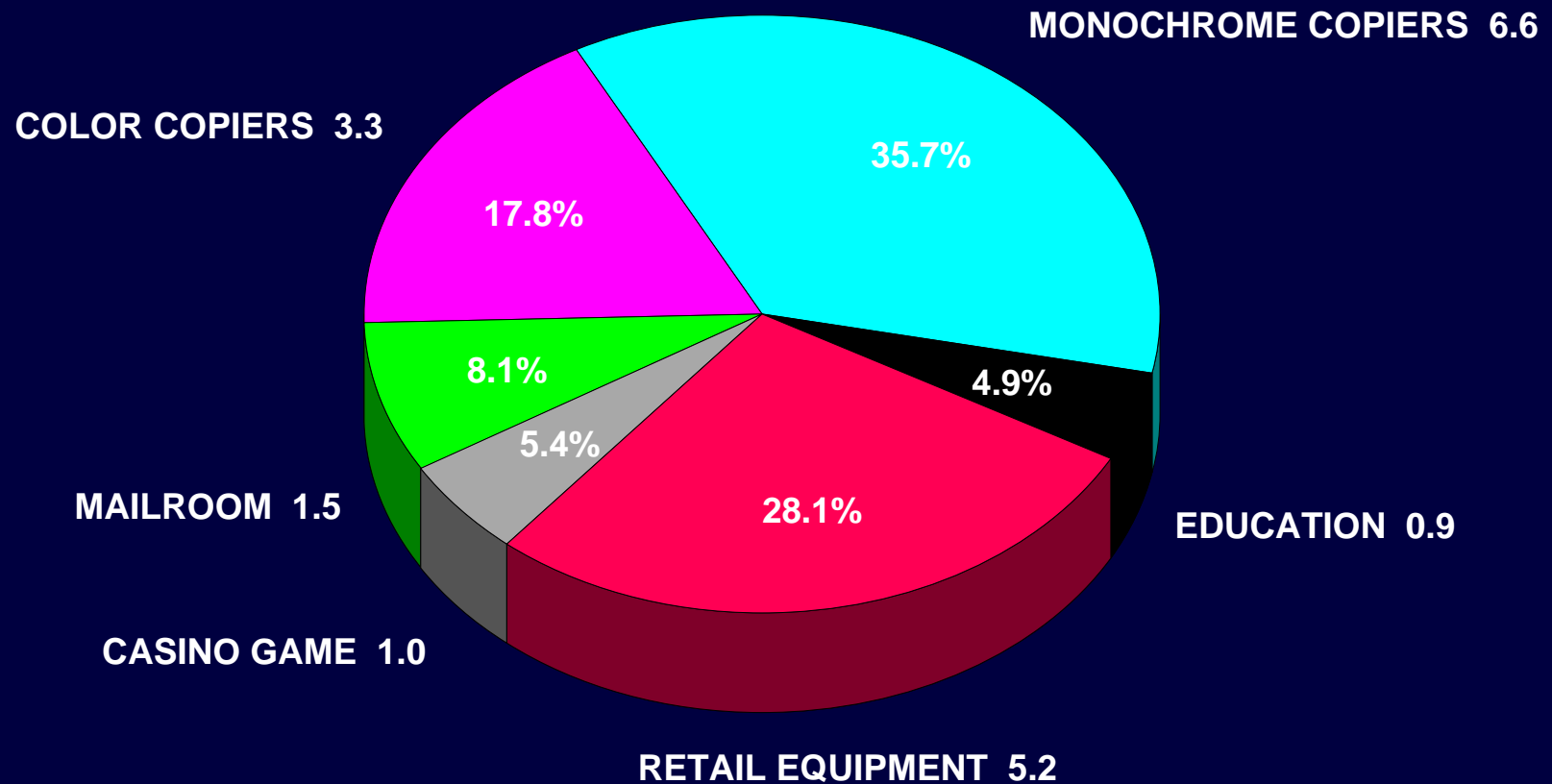
TOTAL: \$137.2 Billion

Computer Hardware

Rank		1998 Global Segment Revenue (\$M)
1	IBM	\$35,117
2	Compaq Computer	\$27,429
3	Fujitsu	\$25,850
4	Hewlett-Packard	\$18,873
5	Dell Computer	\$16,966
6	NEC	\$12,161
7	Siemens	\$9,087
8	Sun Microsystems	\$7,888
9	Gateway	\$7,169
10	Acer	\$6,700
11	Apple Computer	\$4,555
12	OKI Electric Ind. Co.	\$2,873
13	Unisys	\$2,523
14	Silicon Graphics	\$2,227
15	Bull	\$1,964
16	Micron Technology	\$1,368
17	Legend Holdings	\$758
18	Data General	\$629
19	Molden	\$544
20	Intergraph	\$516

BUSINESS & RETAIL EQUIPMENT PRODUCTION

U.S. - 1998



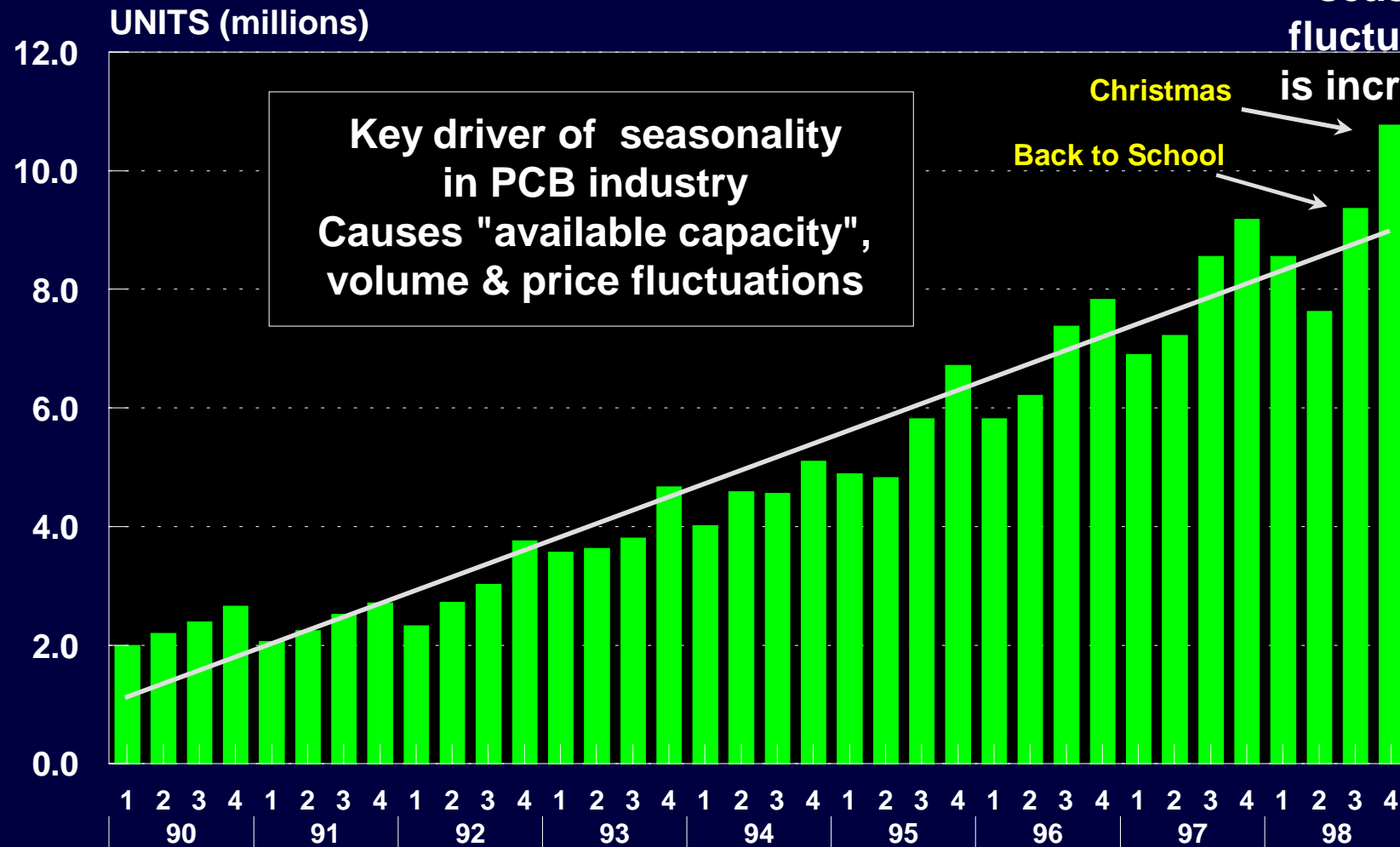
Office Equipment

(e.g. copiers, scanners & calculators)

Rank		1998 Global Segment Revenue (\$M)
1	Xerox	\$14,565
2	Canon	\$12,132
3	Ricoh	\$9,070
4	Pitney Bowes	\$3,158
5	OCE	\$3,075

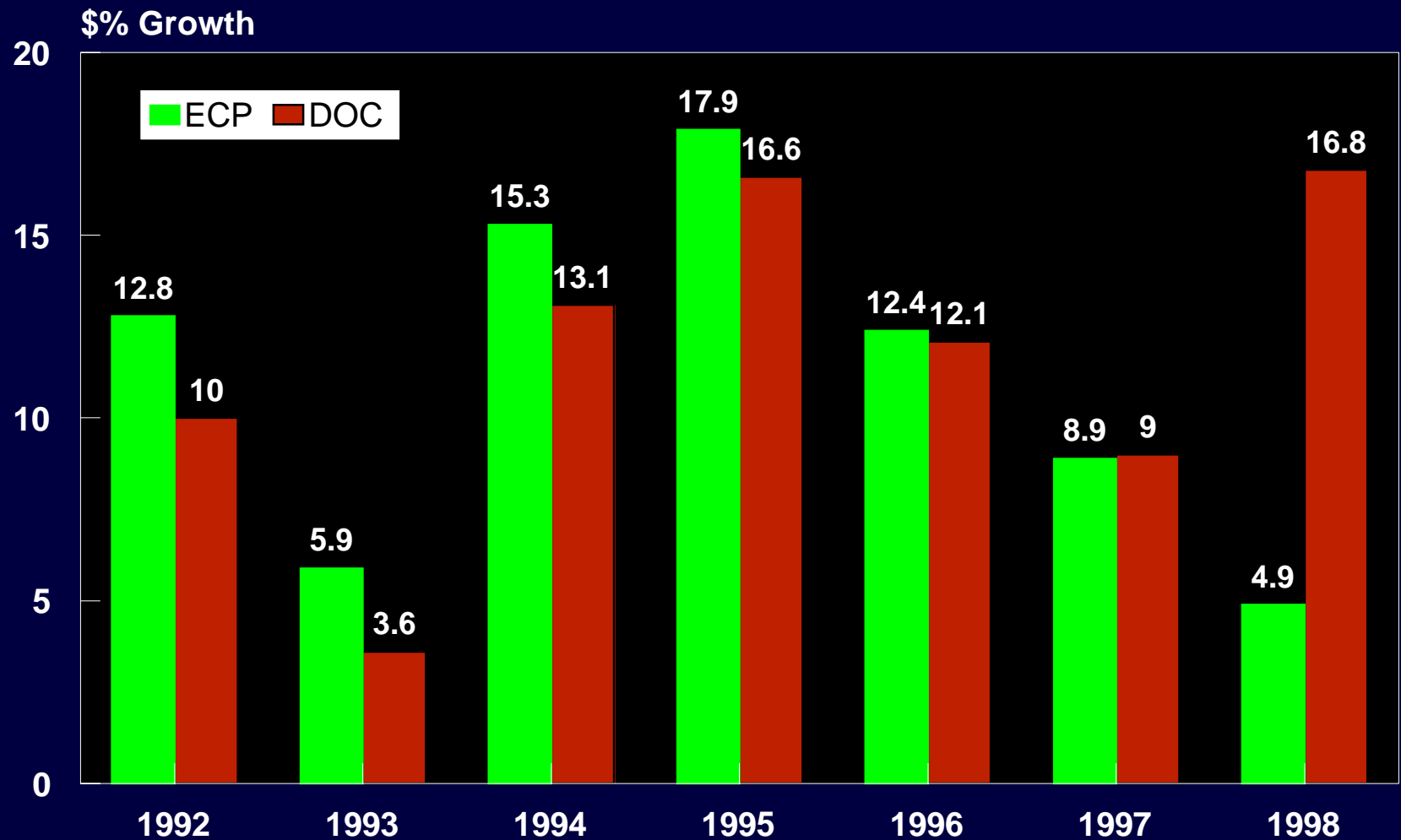
MICROCOMPUTER SHIPMENTS TO THE U.S.

Magnitude of seasonal fluctuations is increasing



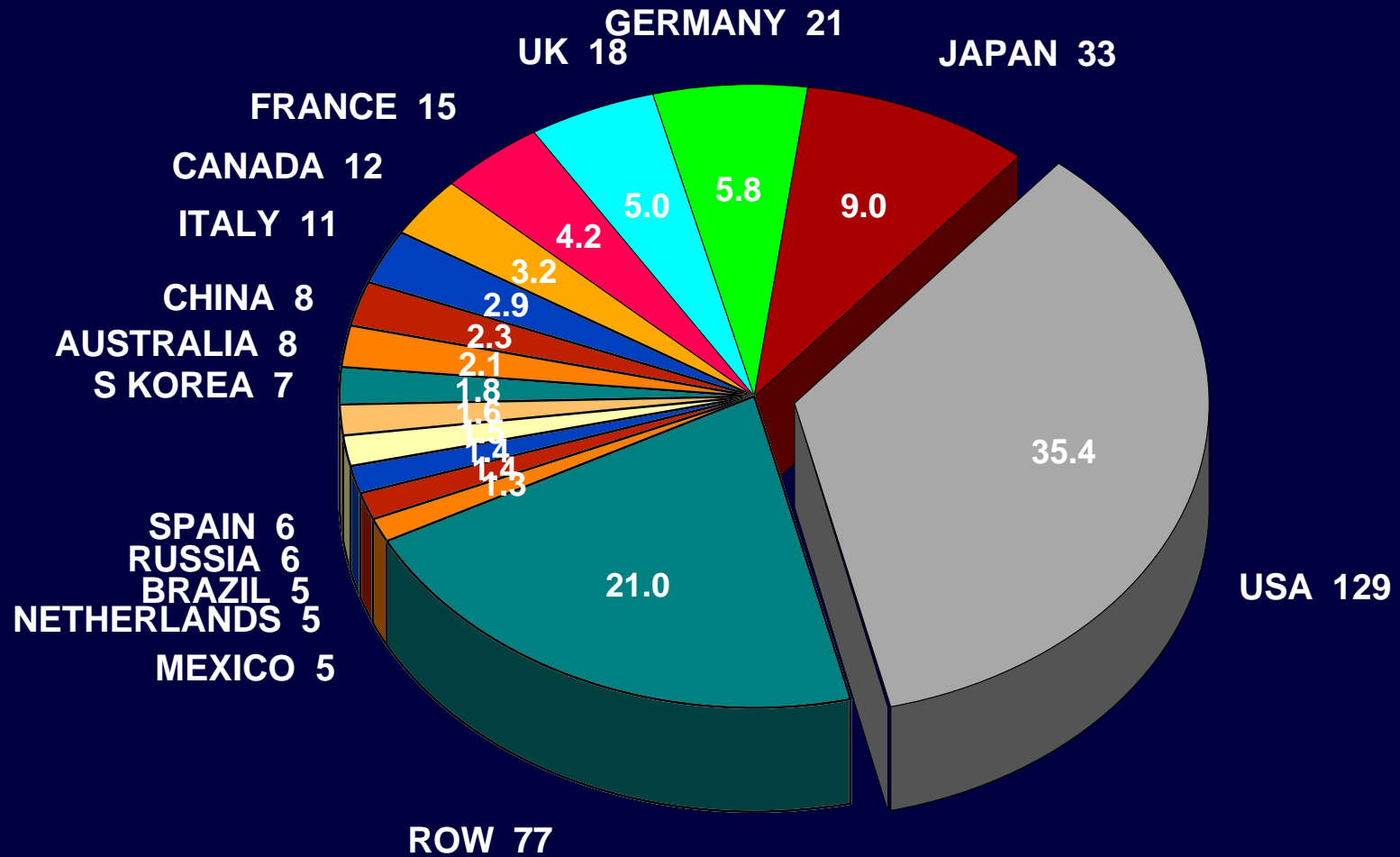
ECP vs DOC COMPUTER EQUIPMENT SHIPMENTS

Current Dollar Growth Rates



COMPUTER OWNERSHIP

1998



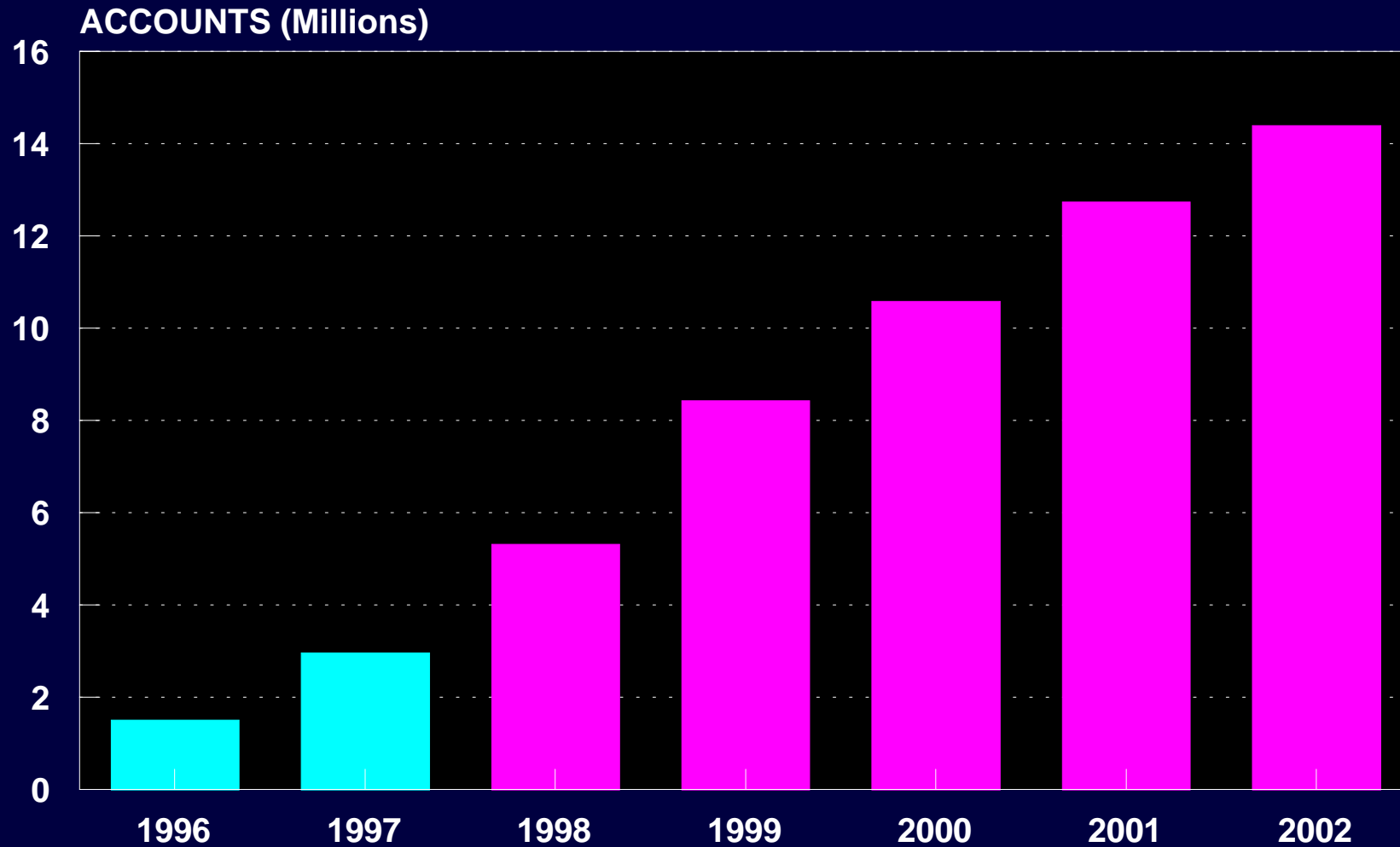
TECHNOLOGY INTRODUCTION

NUMBER OF YEARS TO REACH 10 MILLION USERS

PAGER	41 YEARS
FAX MACHINE	22 YEARS
CELLULAR PHONE	9 YEARS
VIDEO RECORDER	9 YEARS
COMPACT DISC	6 YEARS
PERSONAL COMPUTER	6 YEARS
NETSCAPE BROWSER	10 MONTHS

INVESTING GOES ONLINE

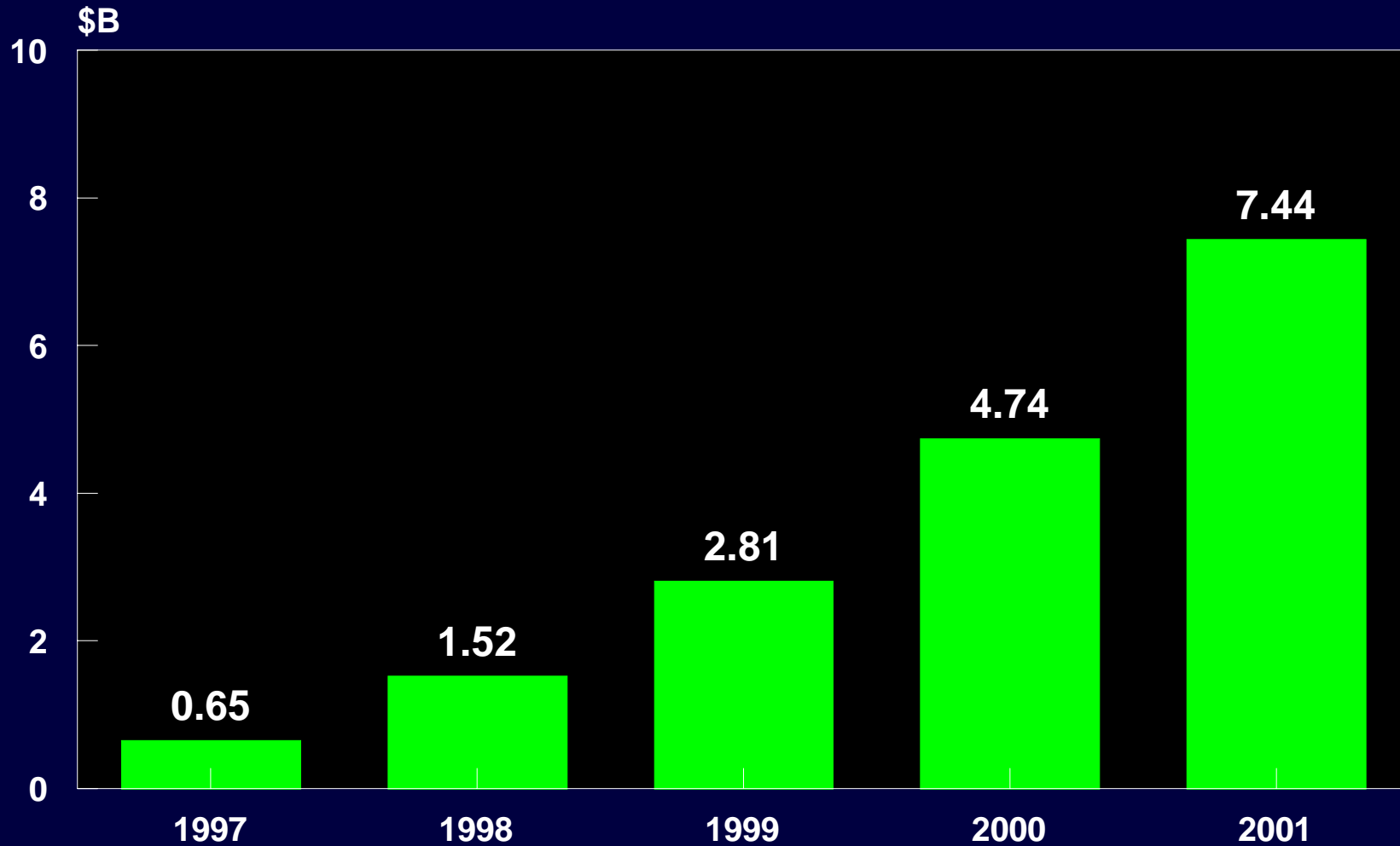
US ONLINE BROKERAGE ACCOUNTS



Computerworld: Forrester Research 10/98

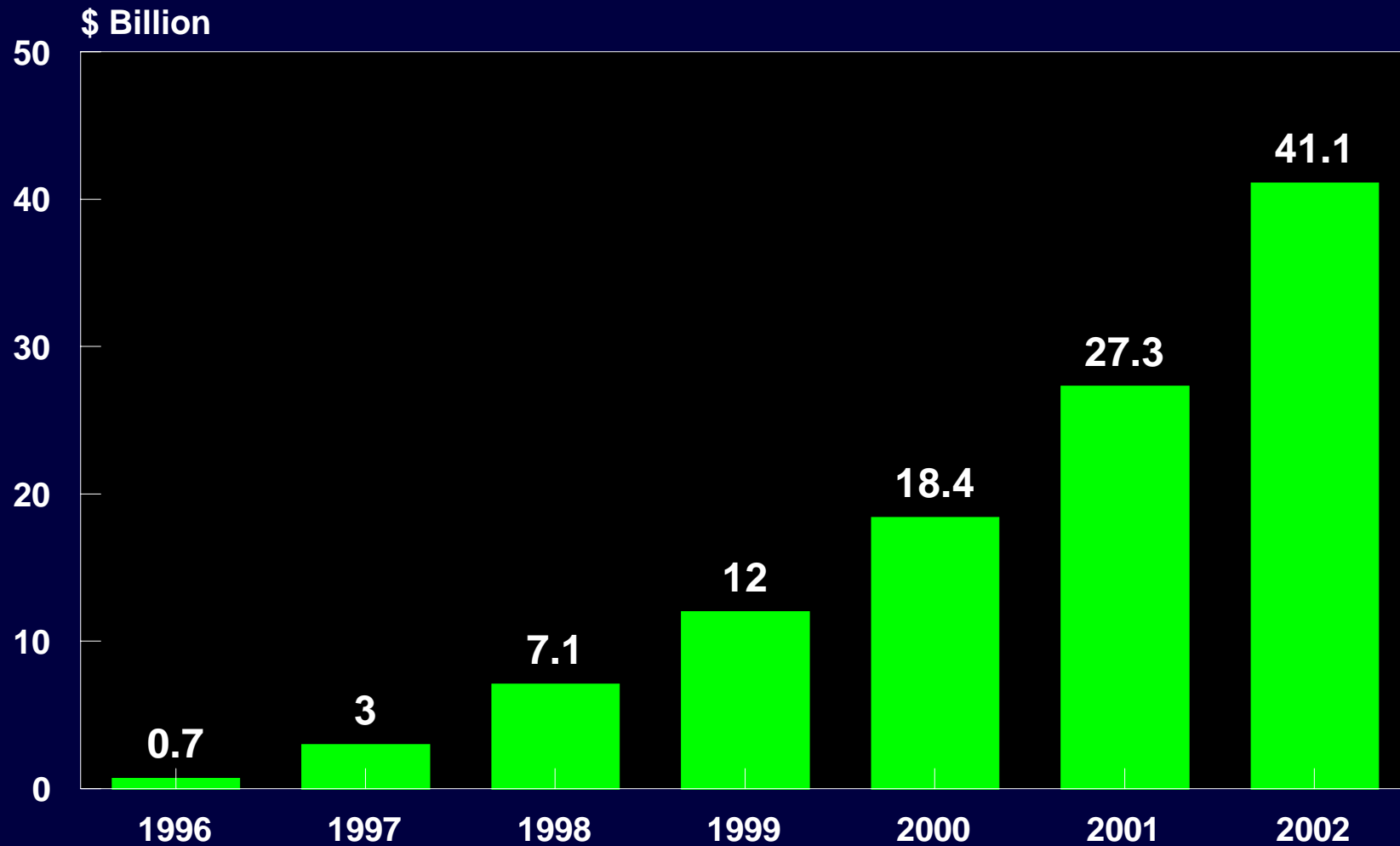
TICKET SALES ON THE WEB TAKE OFF

TOTAL \$ SPENT ON WEB FOR TRAVEL RESERVATIONS



INTERACTIVE WEEK:FORRESTER RESEARCH 2/98

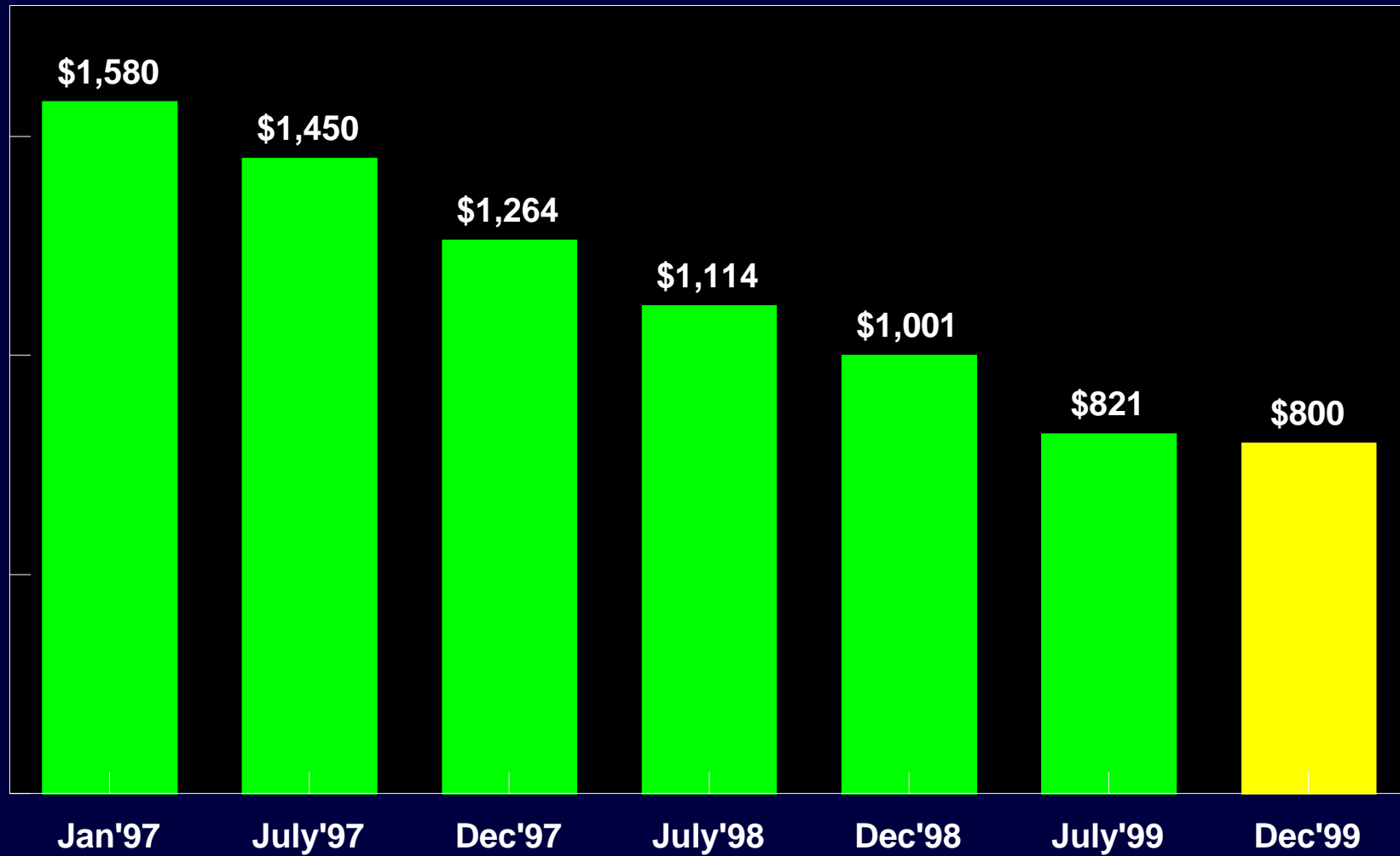
ONLINE SHOPPING REVENUE FORECAST



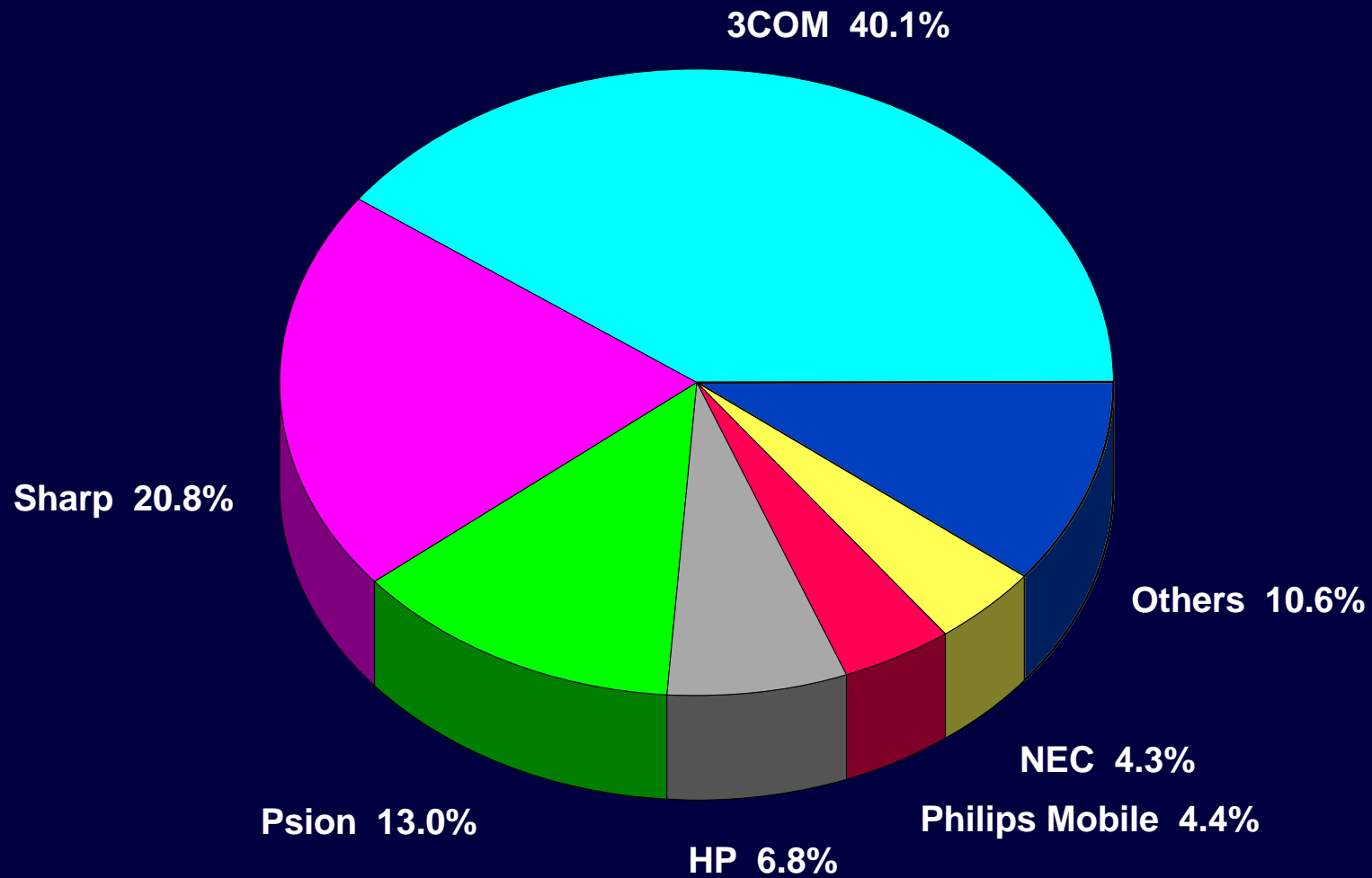
CRN: Jupiter Communications 12/98

FALLING PRICES

Average price of a PC with Windows & Intel microprocessor (no monitor)



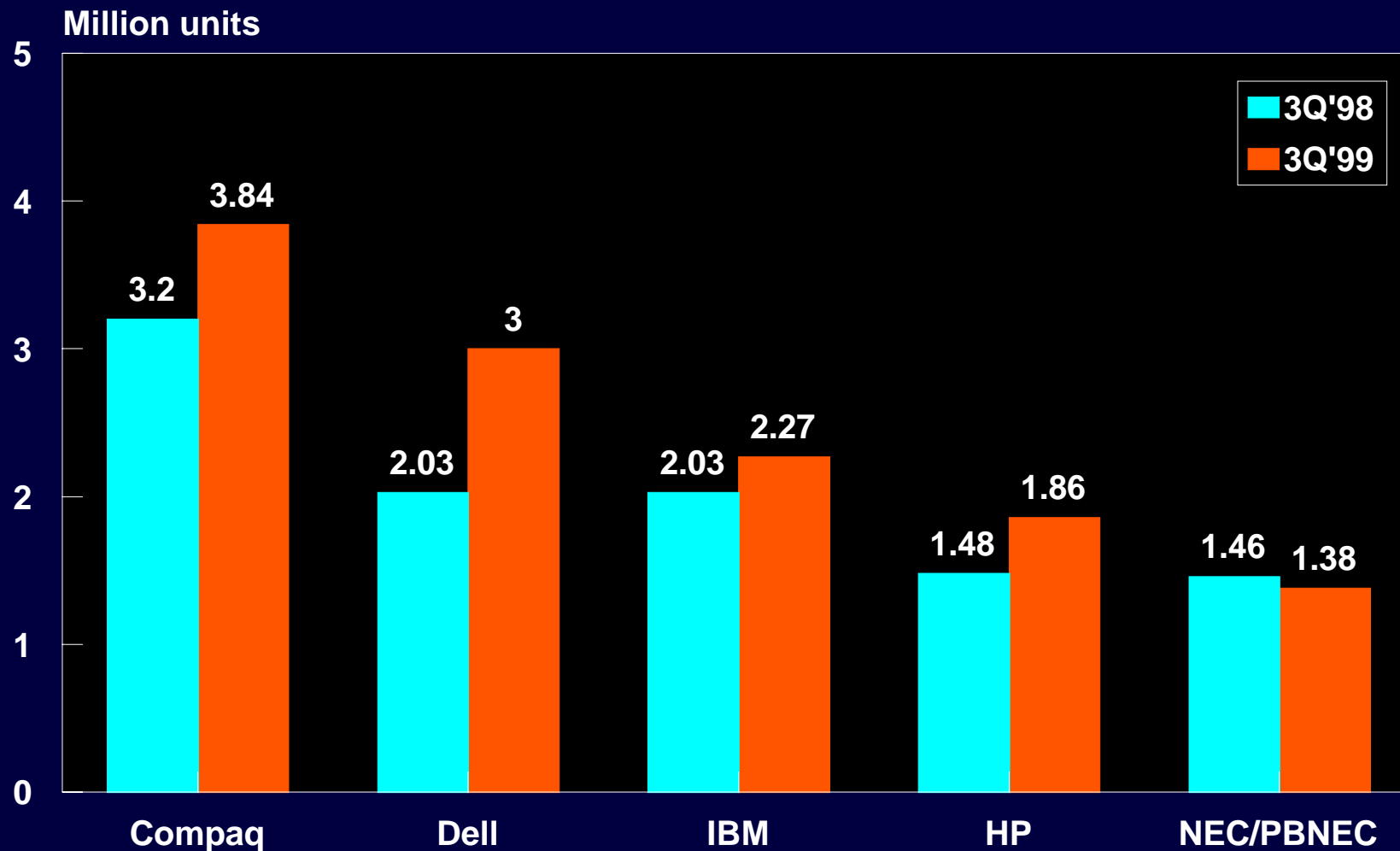
WORLD HANDHELD COMPUTER MARKET 1998



Total: 3.9 Million Units

WORLD PC UNIT SHIPMENTS

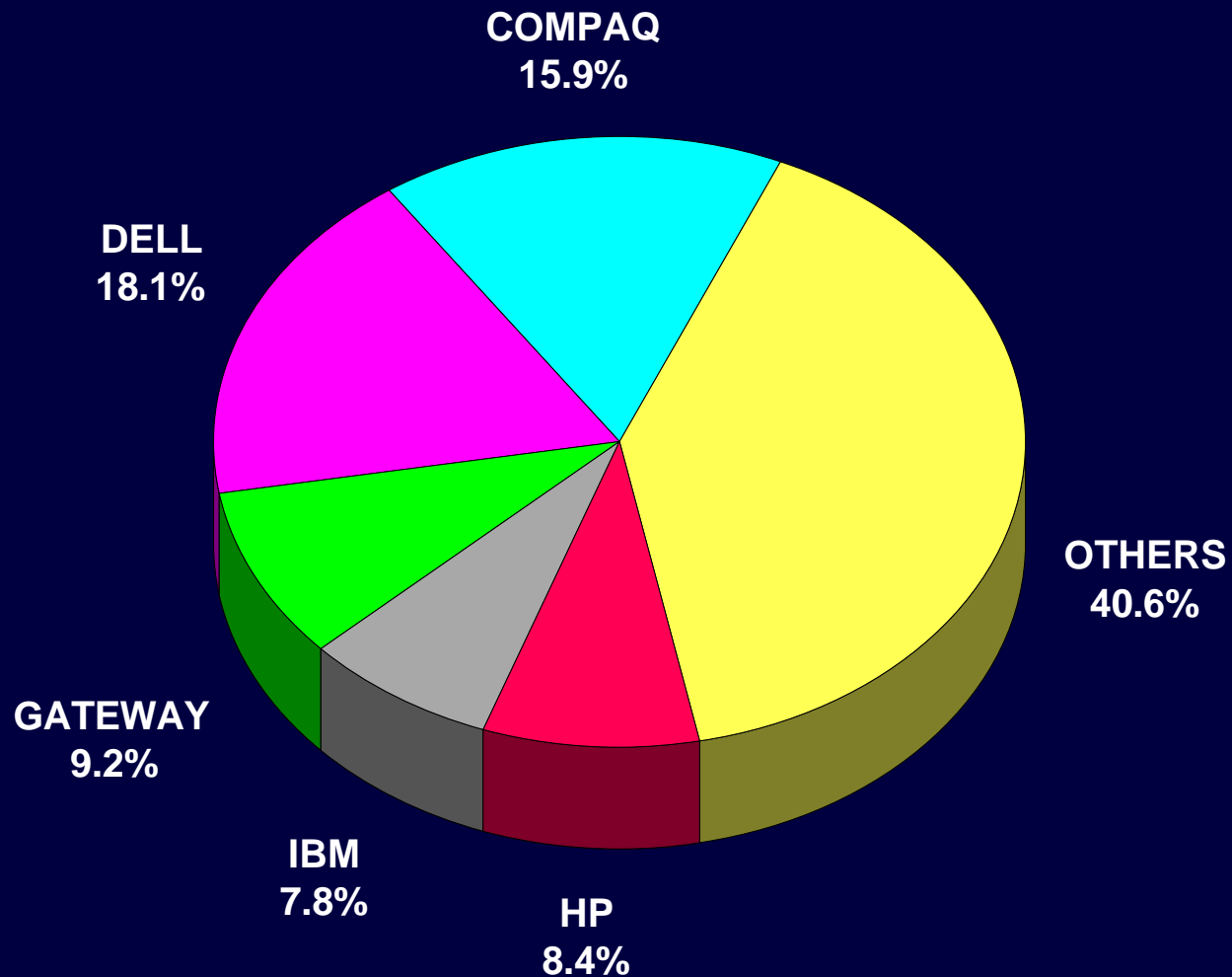
3Q'98 vs 3Q'99



IDC 10/99 - Desktops, Notebooks & Servers

US PERSONAL COMPUTER MARKET

3Q'99



IDC 10/99

Desktops & Notebooks & Servers

TOTAL: 11.7 Million Units

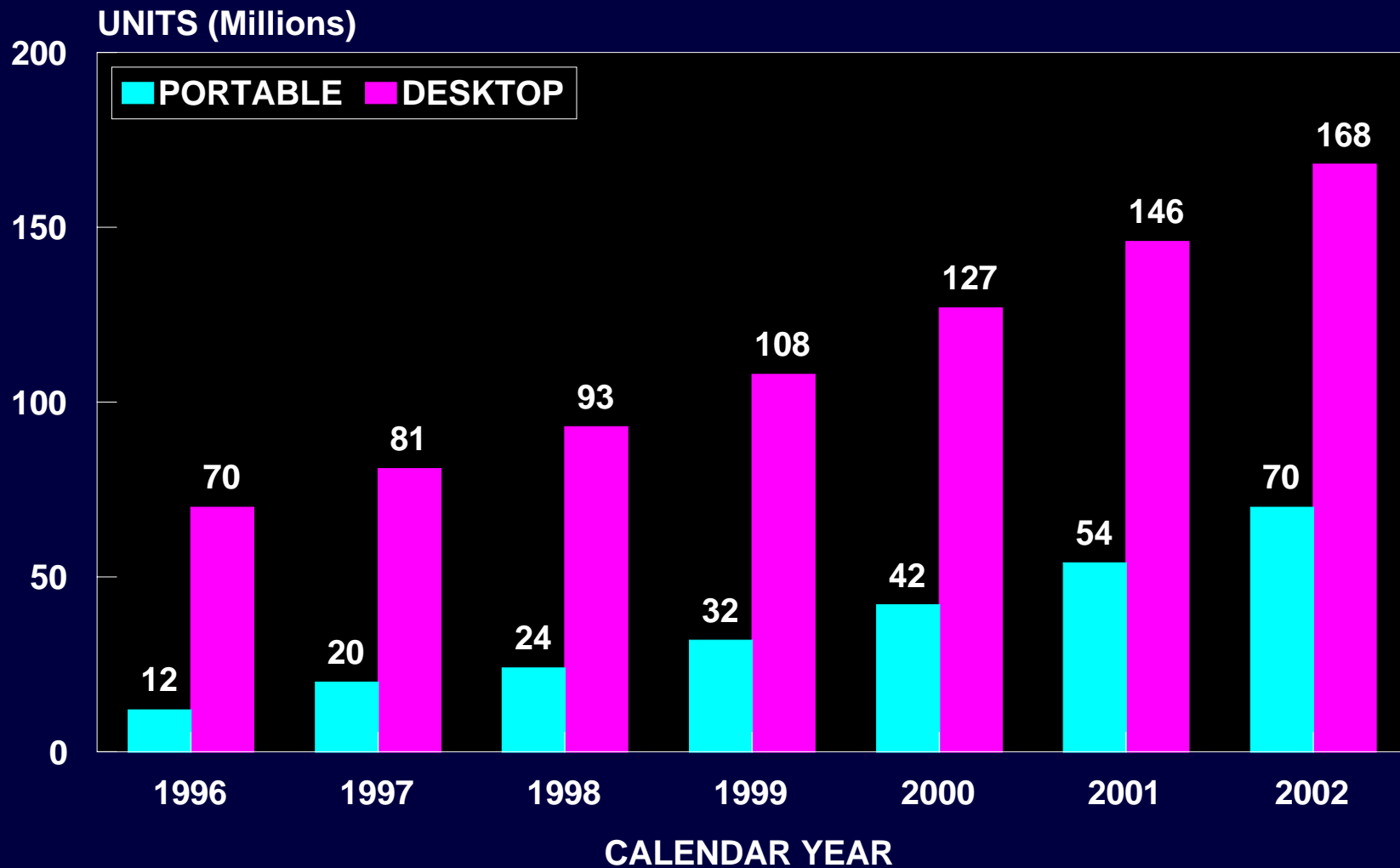
Peripherals

(e.g. printers, disk drives & surge protectors)

Rank		1998 Global Segment Revenue (\$M)
1	Hewlett-Packard	\$16,514
2	Canon	\$9,926
3	Seagate Technology	\$6,406
4	IBM	\$5,717
5	Quantum	\$4,879
6	EMC	\$3,974
7	Western Digital	\$2,871
8	Intel	\$2,627
9	Lexmark Intl. Group	\$2,447
10	Storage Technology	\$2,258
11	lomega	\$1,694
12	Creative Technology	\$1,259
13	Apple Computer	\$1,215
14	American Power Conversion	\$1,126
15	Ricoh	\$1,055
16	Eastman Kodak	\$839
17	Read-Rite	\$777
18	Sun Microsystems	\$736
19	Dell Computer	\$730
20	Adaptec	\$712

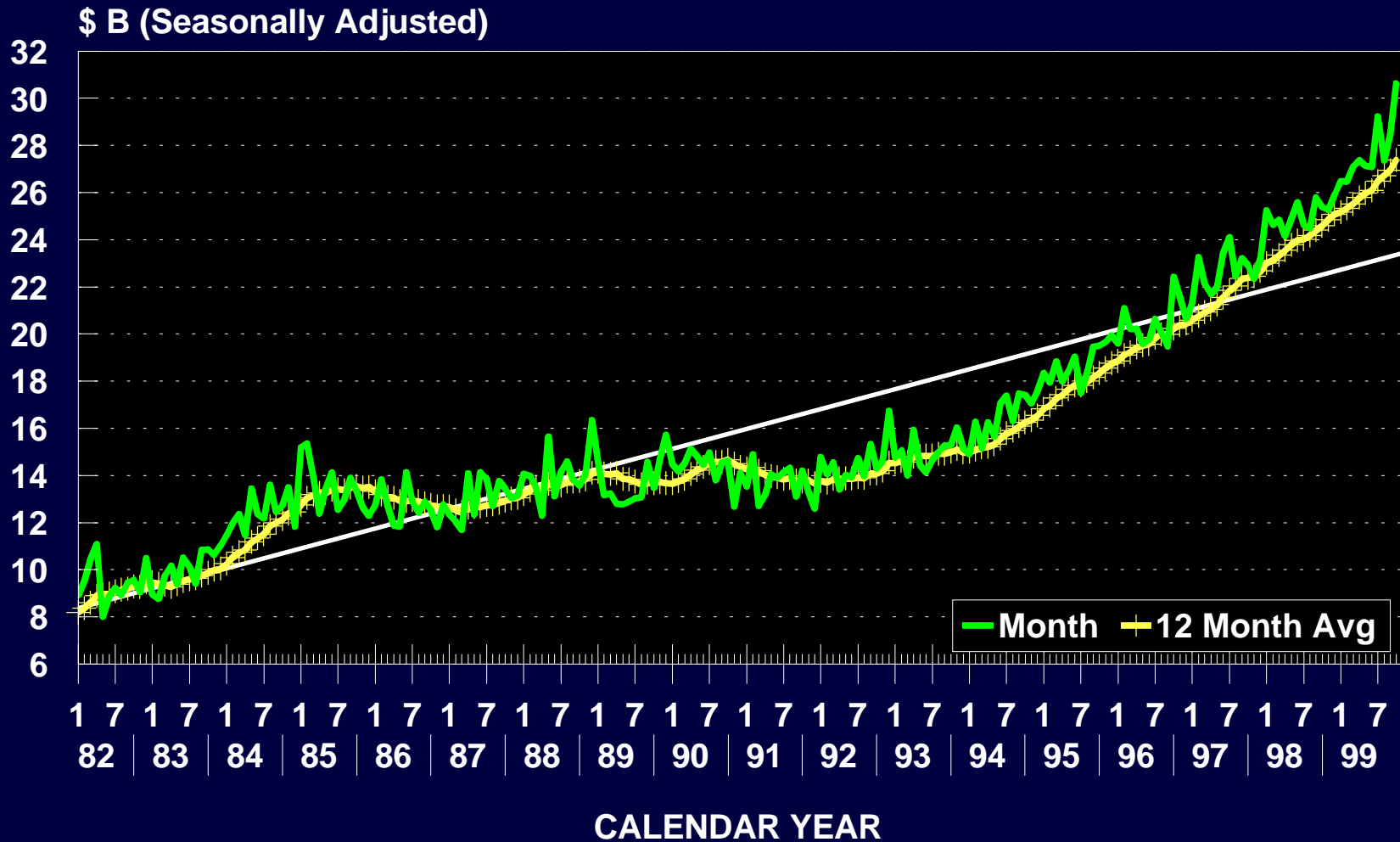
PORTABLE & DESKTOP COMPUTER GROWTH

GLOBAL SALES

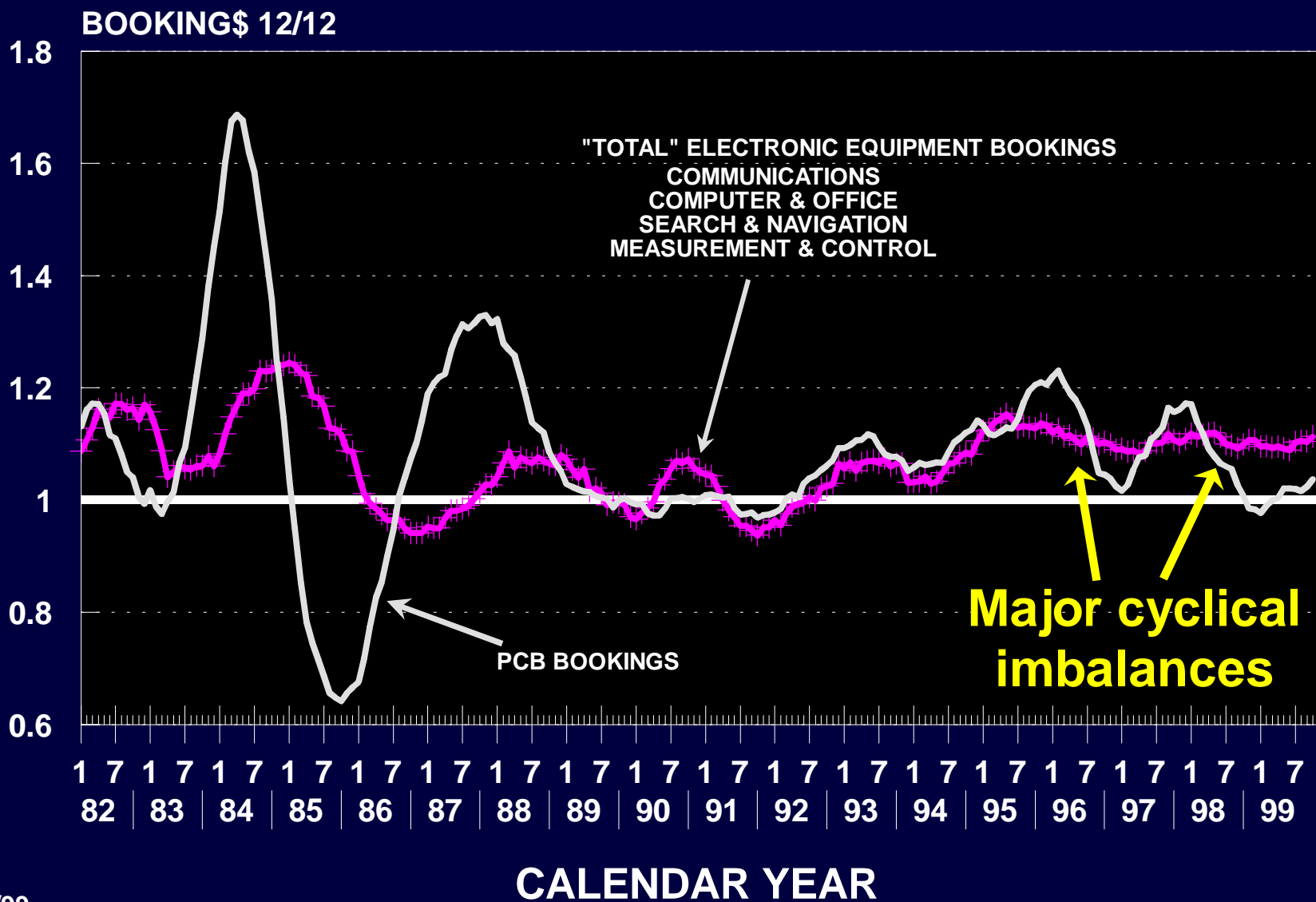


EBN:John Peedie Assoc 8/97, Dataquest 1/99, Custer 1/99

TOTAL ELECTRONIC EQUIPMENT BOOKINGS



U.S. PCBs vs Total Electronic Equipment



ELECTRONIC COMPONENTS BOOKINGS

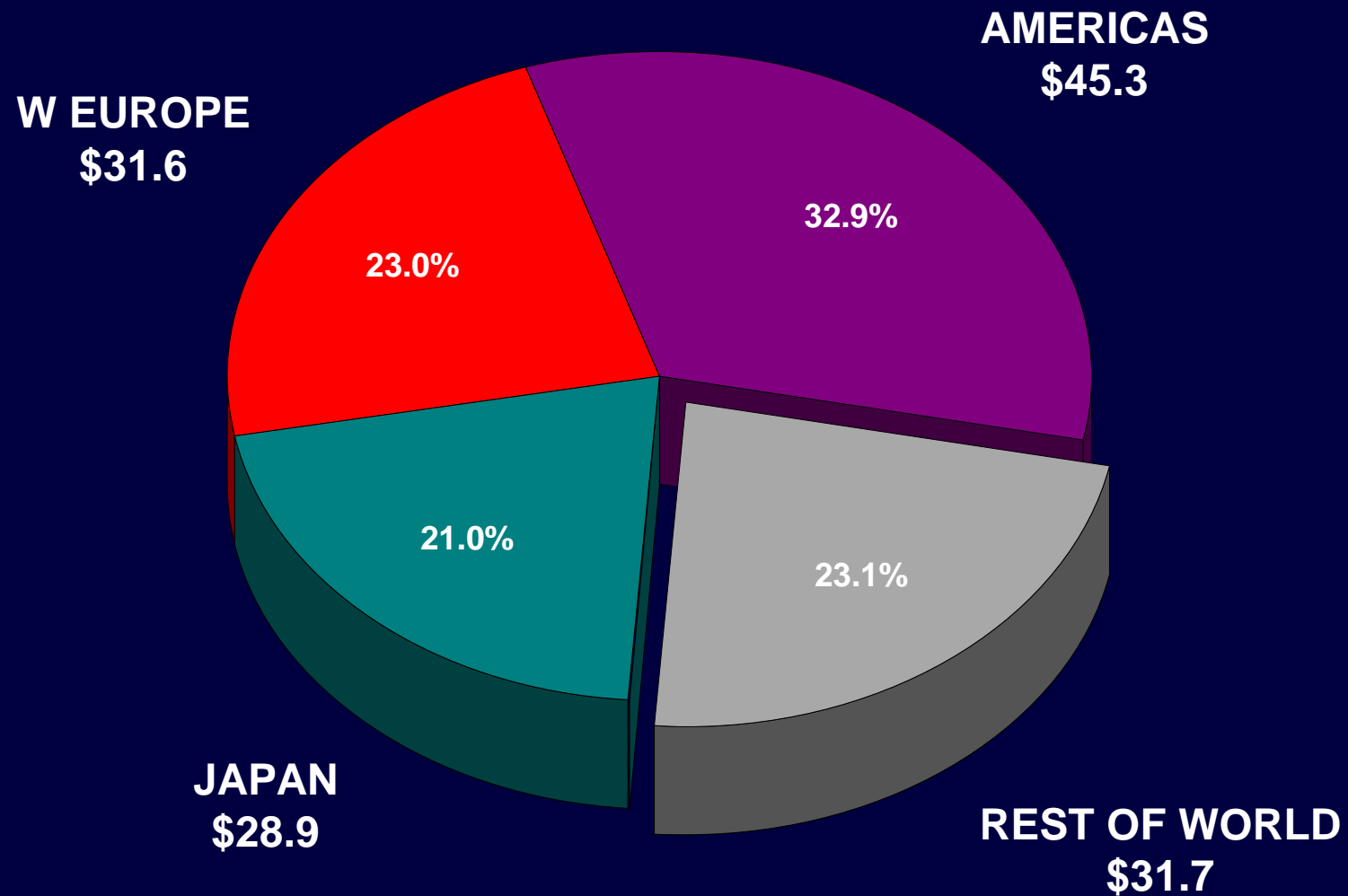
\$ B (Seasonally Adjusted)



COMMERCE DEPT 12/99

CALENDAR YEAR

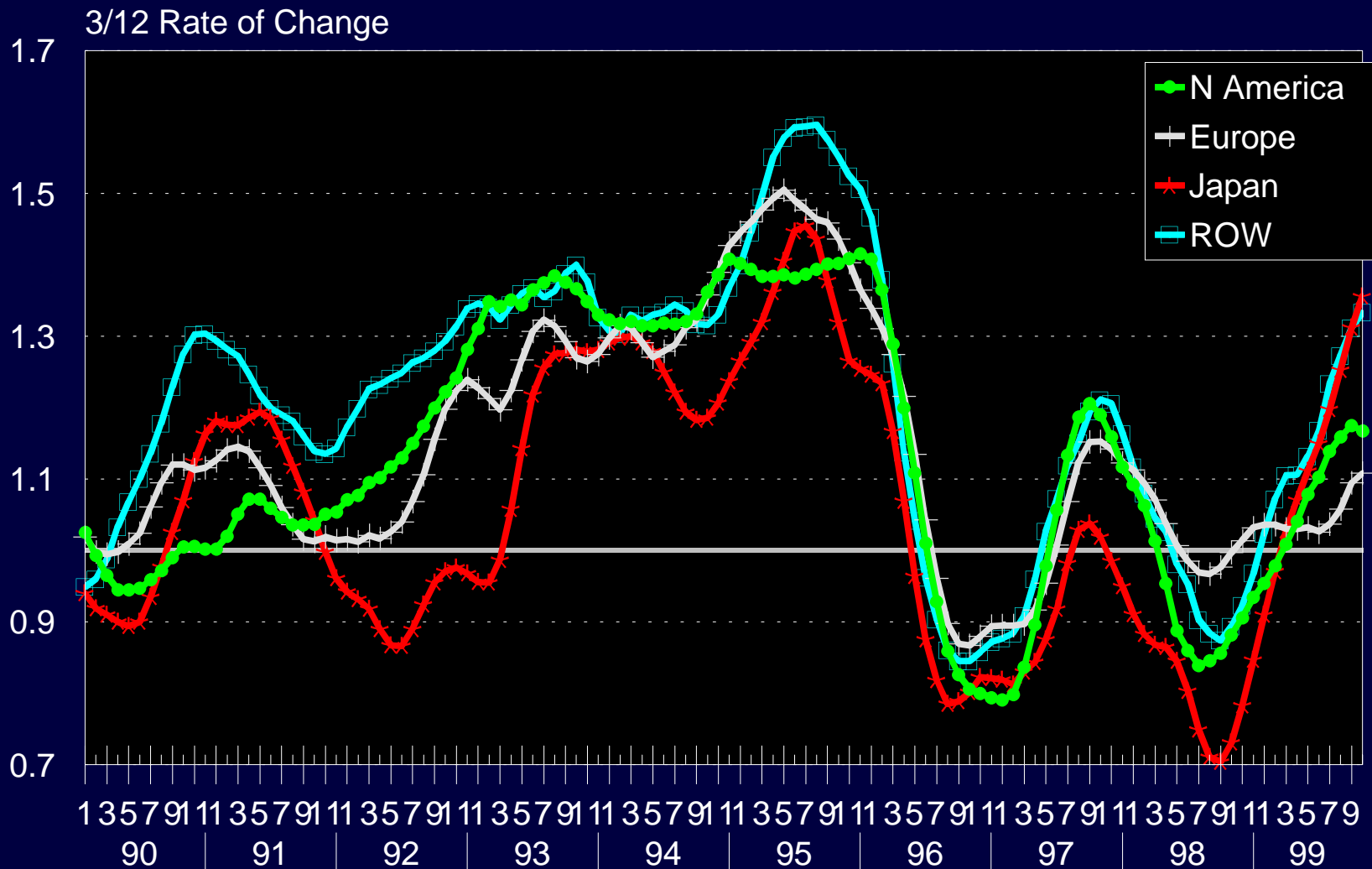
MERCHANT SEMICONDUCTOR MARKET 1999 ESTIMATE (\$B)



TOTAL = \$138 Billion

SEMICONDUCTOR GROWTH RATES

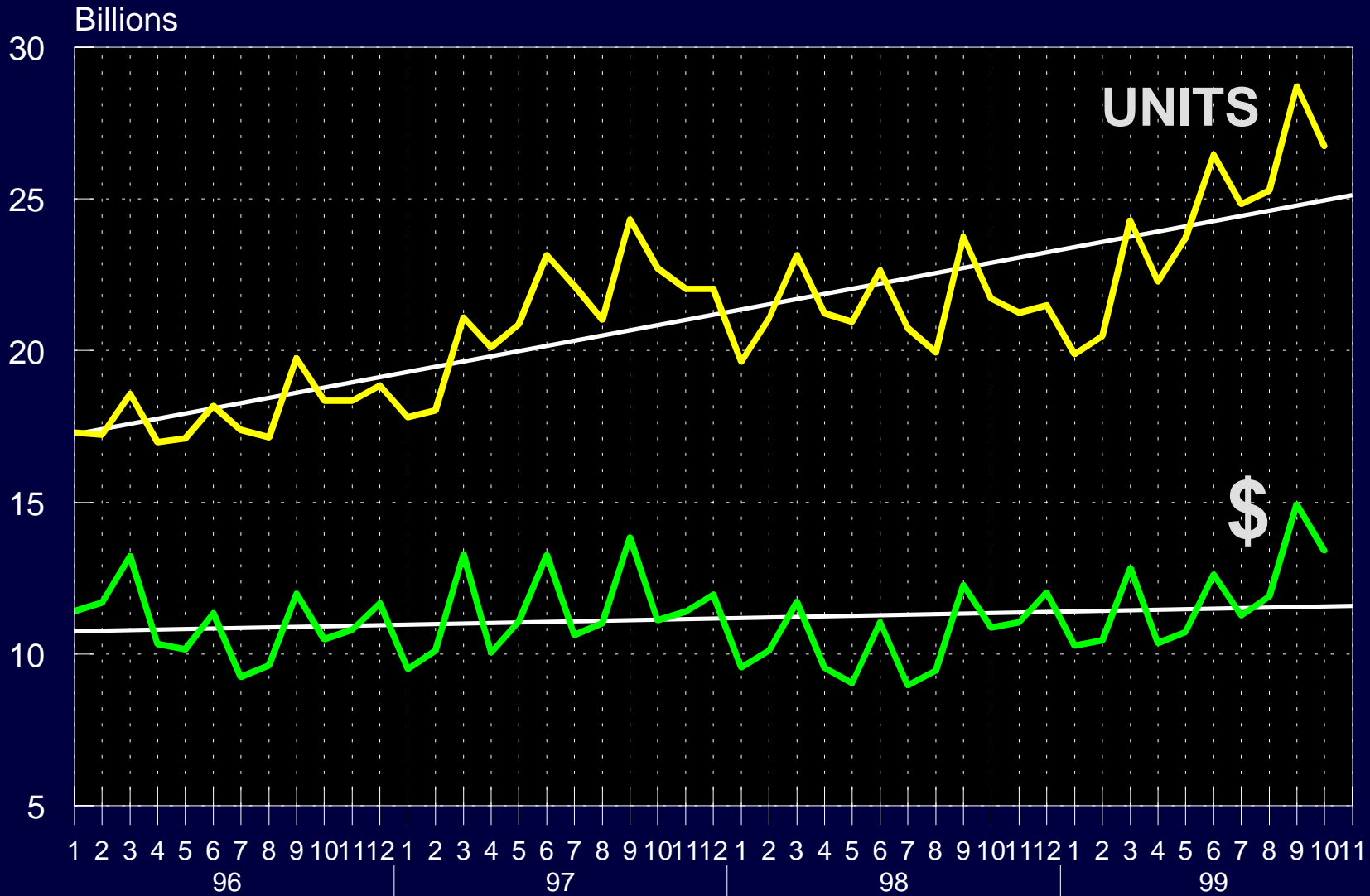
TOTAL \$ SHIPMENTS TO AN AREA



Total \$ Shipments From All Countries To
An Area, Date Source:SIA via E Henderson

WORLD SEMICONDUCTOR SHIPMENTS

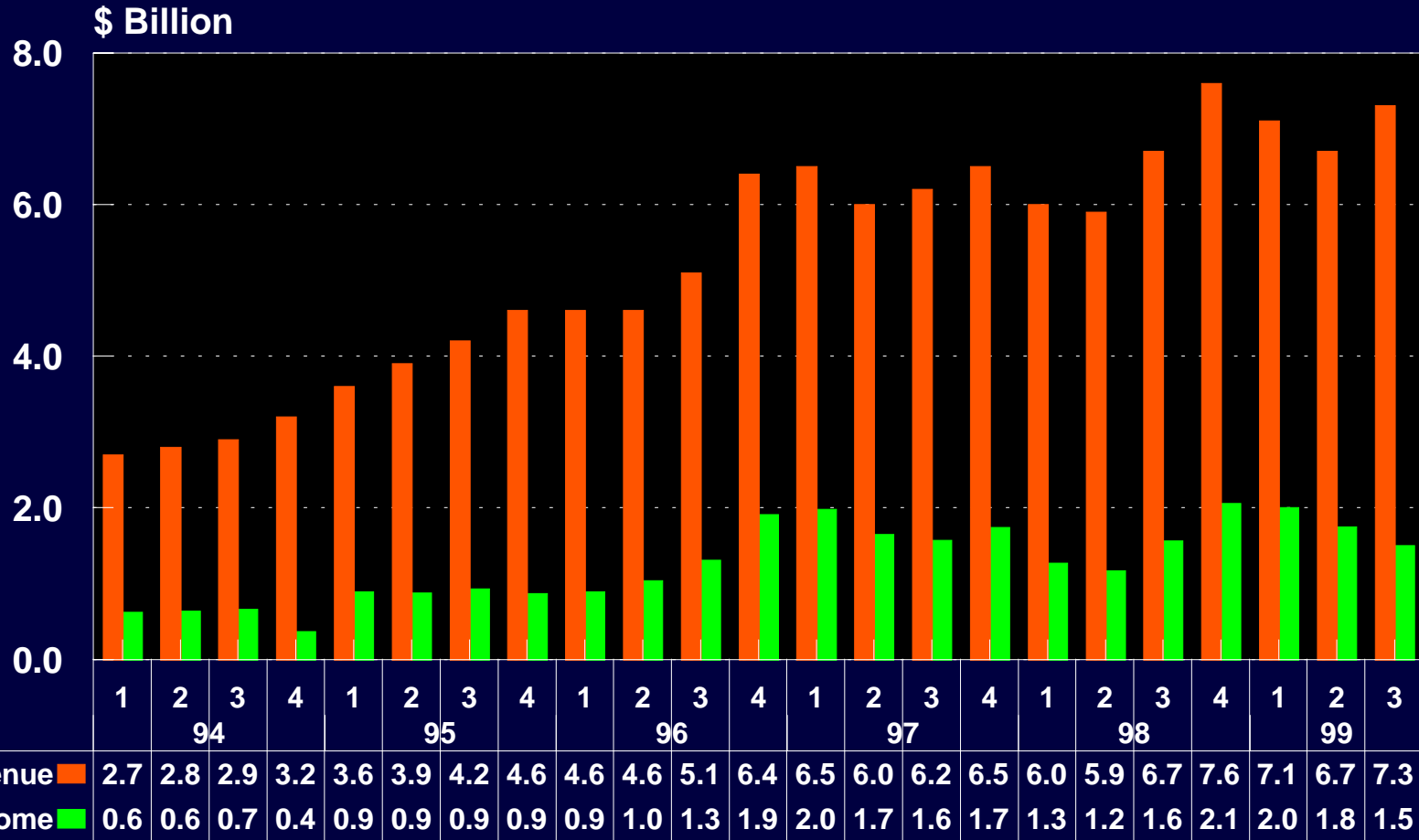
MONTHLY \$ and UNITS



SIA via E Henderson (Not Seasonally Adjusted)

Intel

Revenue & Net Income



CY

INTC

FY=CY

64 BITS IN 2000

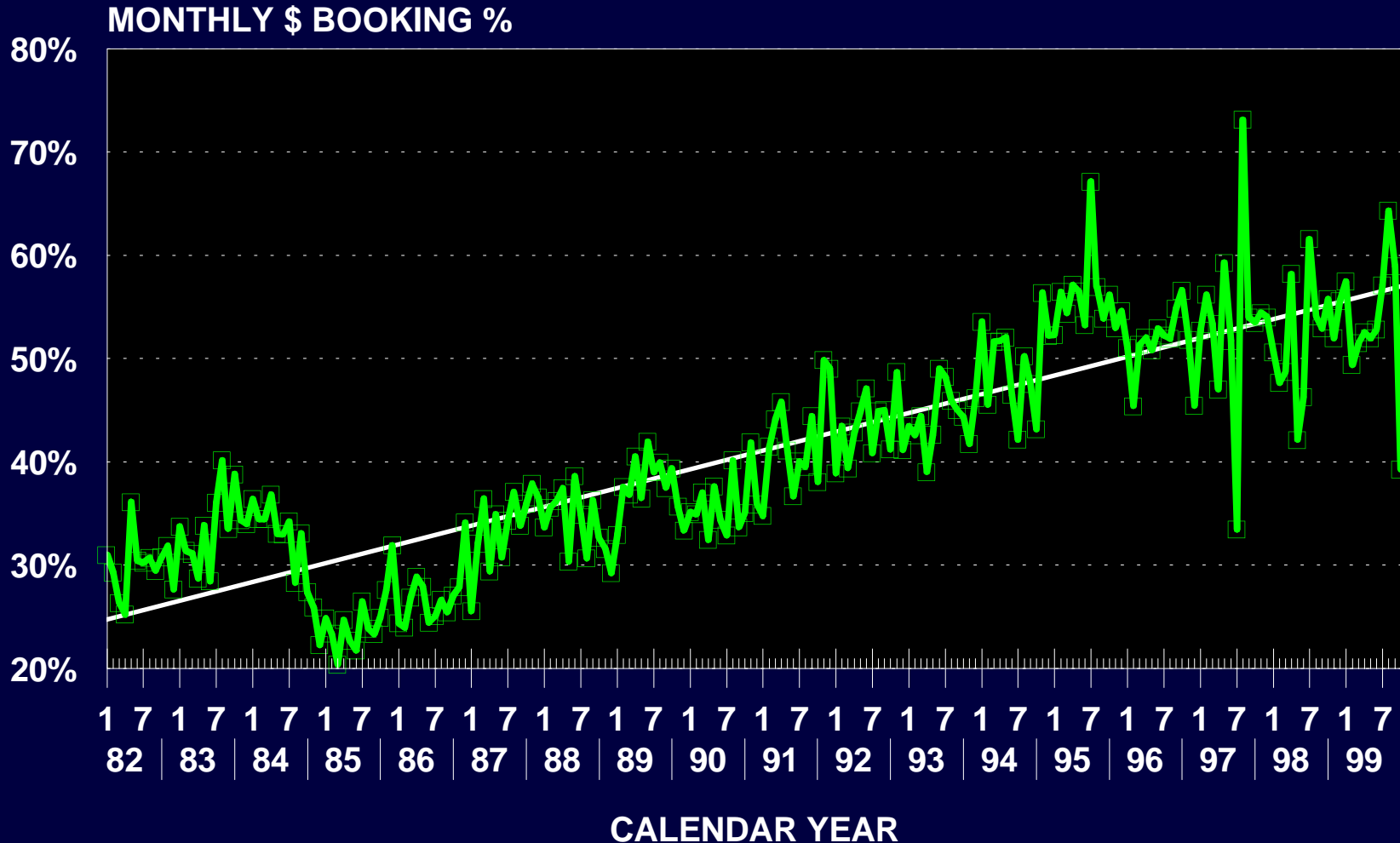
AMD Sledgehammer - 2000

IBM Power4 - middle of 2000

Intel Itanium - middle of 2000

Sun Sparc64 V - middle of 2001

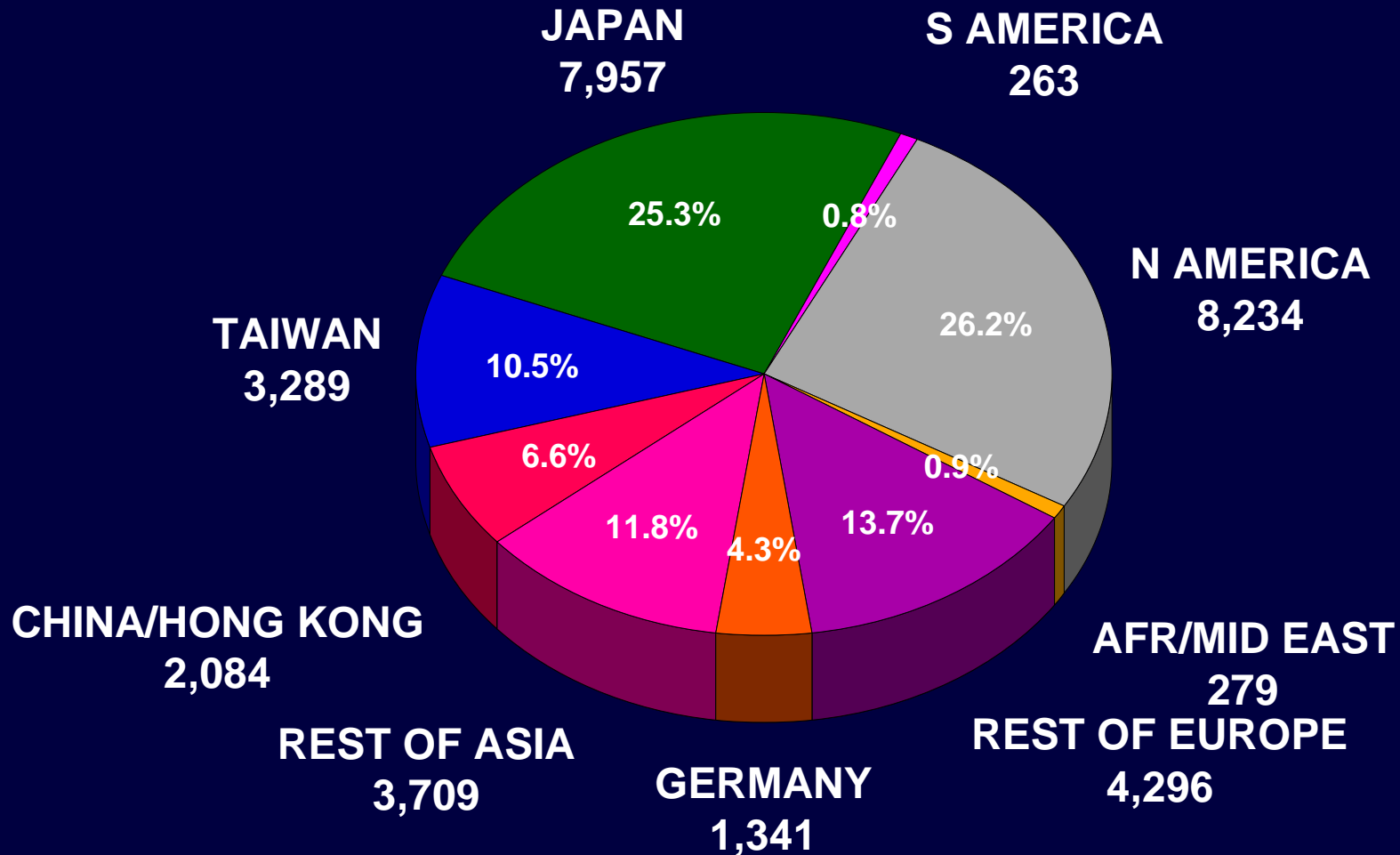
ELECTRONIC COMPONENT "PERCENTAGE" OF ELECTRONIC EQUIPMENT



COMMERCE DEPT 12/99

1998 WORLD RIGID PCB PRODUCTION

BY GEOGRAPHICAL AREA (\$M)



Total: \$31.5 Billion

IPC T/MRC 6/99 (includes Buildup PCBs)

European PCB Manufacturers

1998 Sales (million DM)

Viasystems (estimated)	890
Ruwel-group	394
AT&S group	334
Philips group	288
Aspocomp (estimated)	270
Vogt-Fuba	248
Alcatel group	231
STP	190
SEAG	173
DII (HP)	132

Source: M. Gasch, SEAG (Schweizer) 8/99

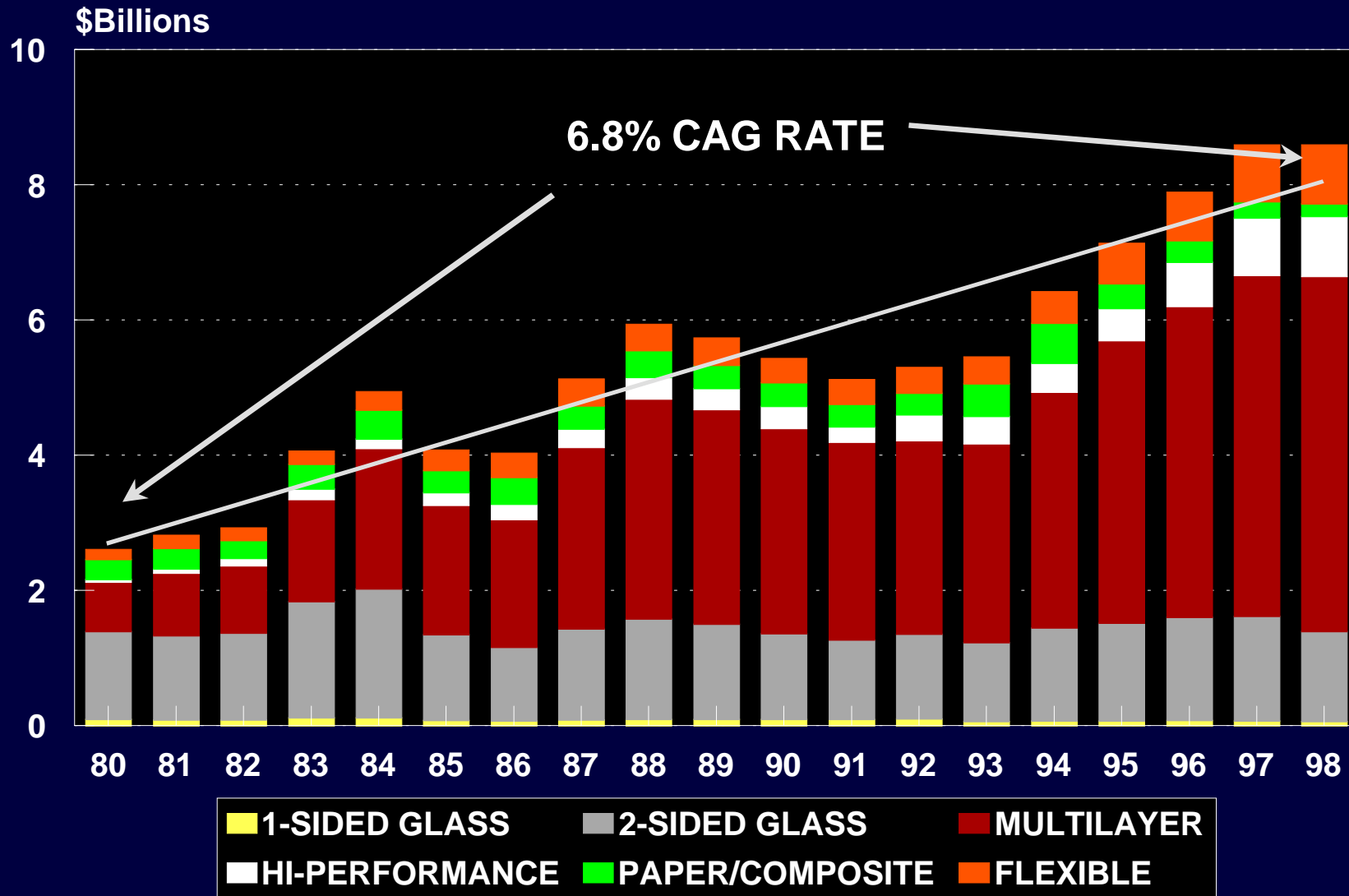
Taiwan PCB Manufacturers

1999 Sales - \$M

Compeq Manufacturing Co, Ltd	455
Na Ya Printed Circuit Board Corp	360
Gold Circuit Electronics Ltd	175
WUS Printed Circuit Co, Ltd	171
Unicap Electronics Ind Corp	148
Unitech Printed Circuit Board Corp	145
Tai Hong Circuit Ind. Co Ltd	135
World Wiser Electronics Inc	125
Mectec	106
Chin-Poon Industrial Co Ltd	102
Ya Hsin Industrial Co Ltd	66
Vertex Precision Electronics Inc	60
TPWC	57
Bestmult Industry Co Ltd	49
Yeti Electronics Co Ltd	49
Boardtek Electronics Corp	48
Unic	44
Hitachi Chemical Co (Taiwan) Ltd	40
Chant World	40
Yang An	40
Top 20	2,415
Others	605
Total	3,020

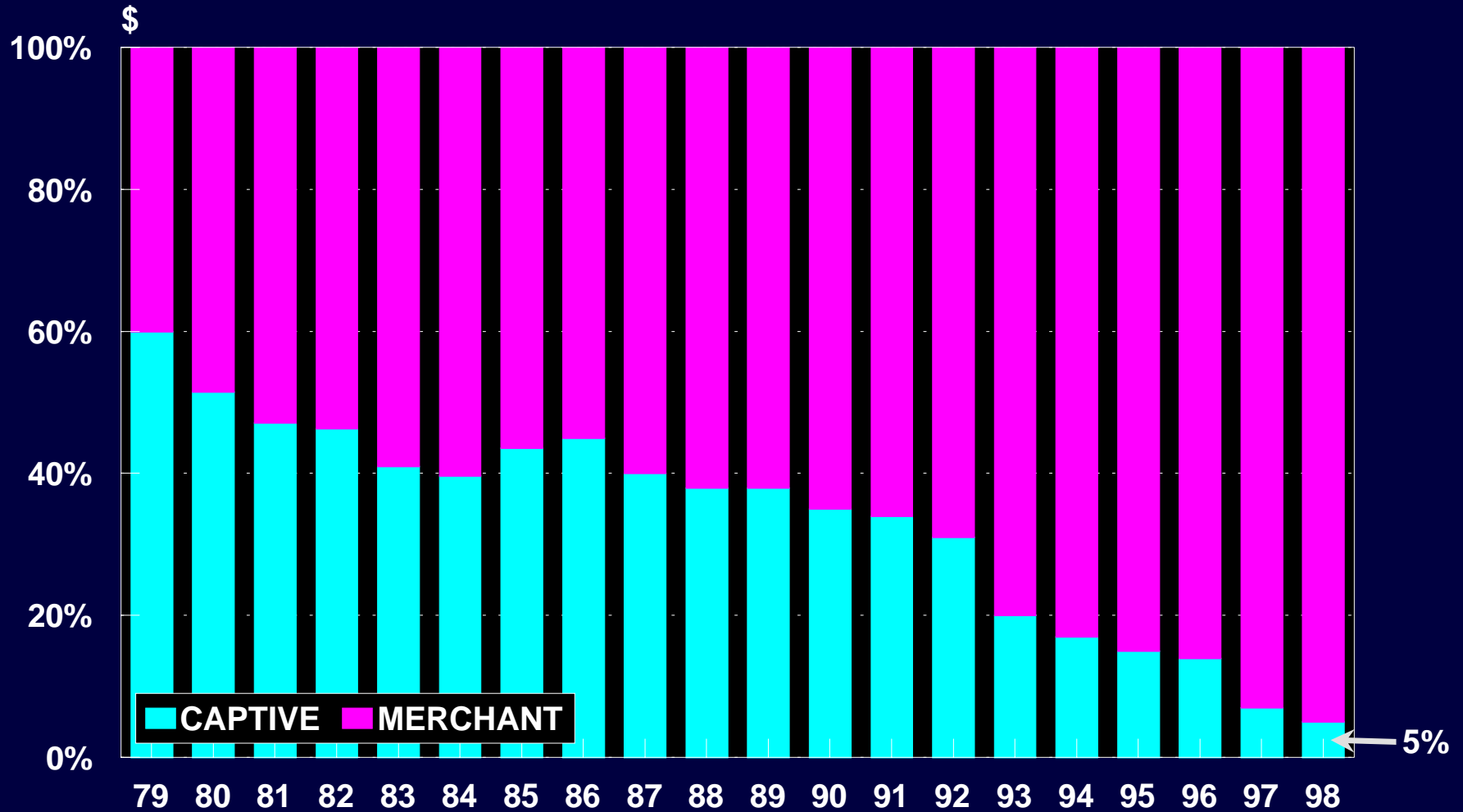
H Nakahara 8/99 (32.5 NTD = 1 US\$)

N. AMERICAN PCB SHIPMENTS



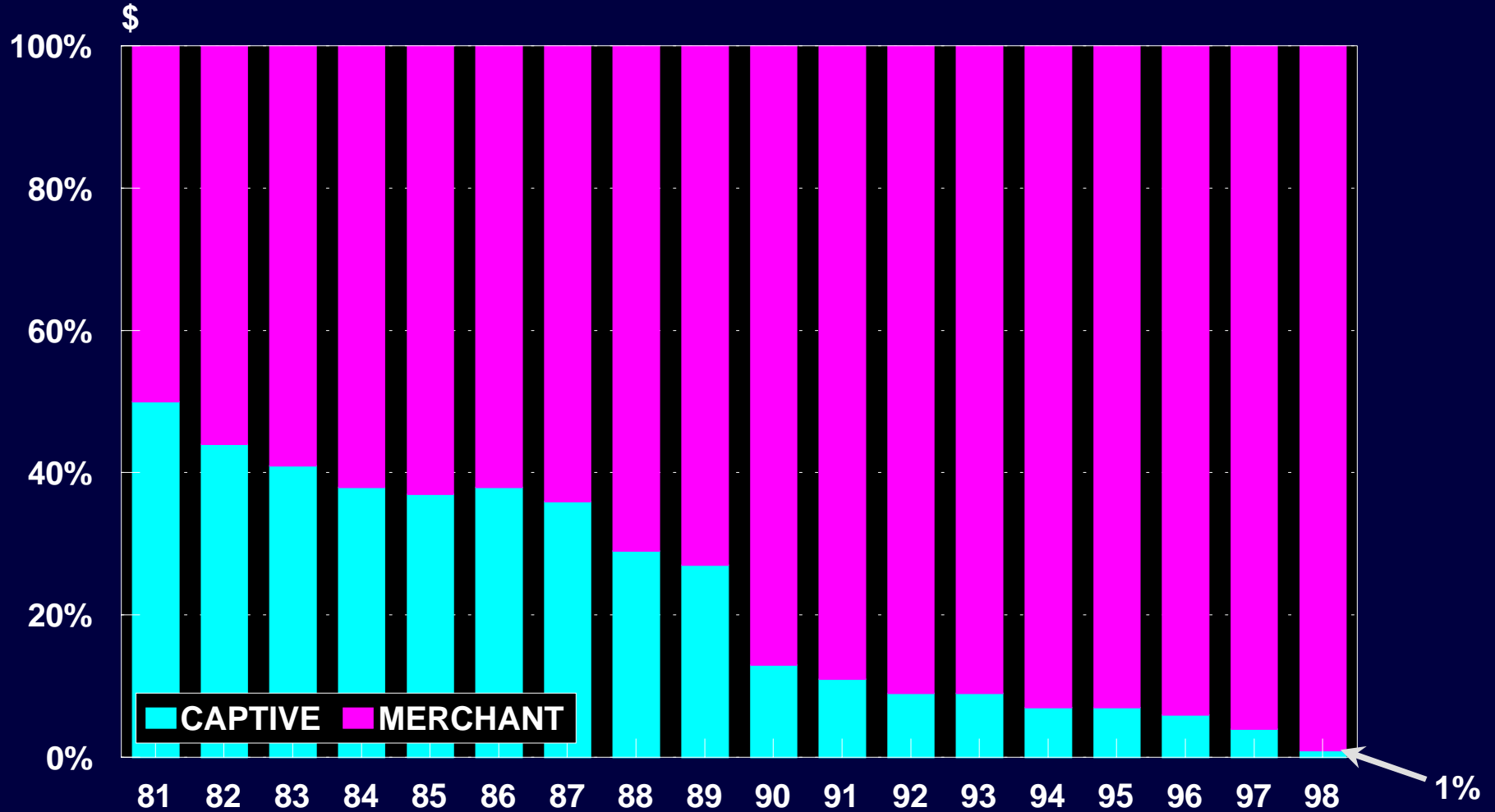
RIGID PCBs - MAKE OR BUY

U.S. CAPTIVE vs MERCHANT PRODUCTION



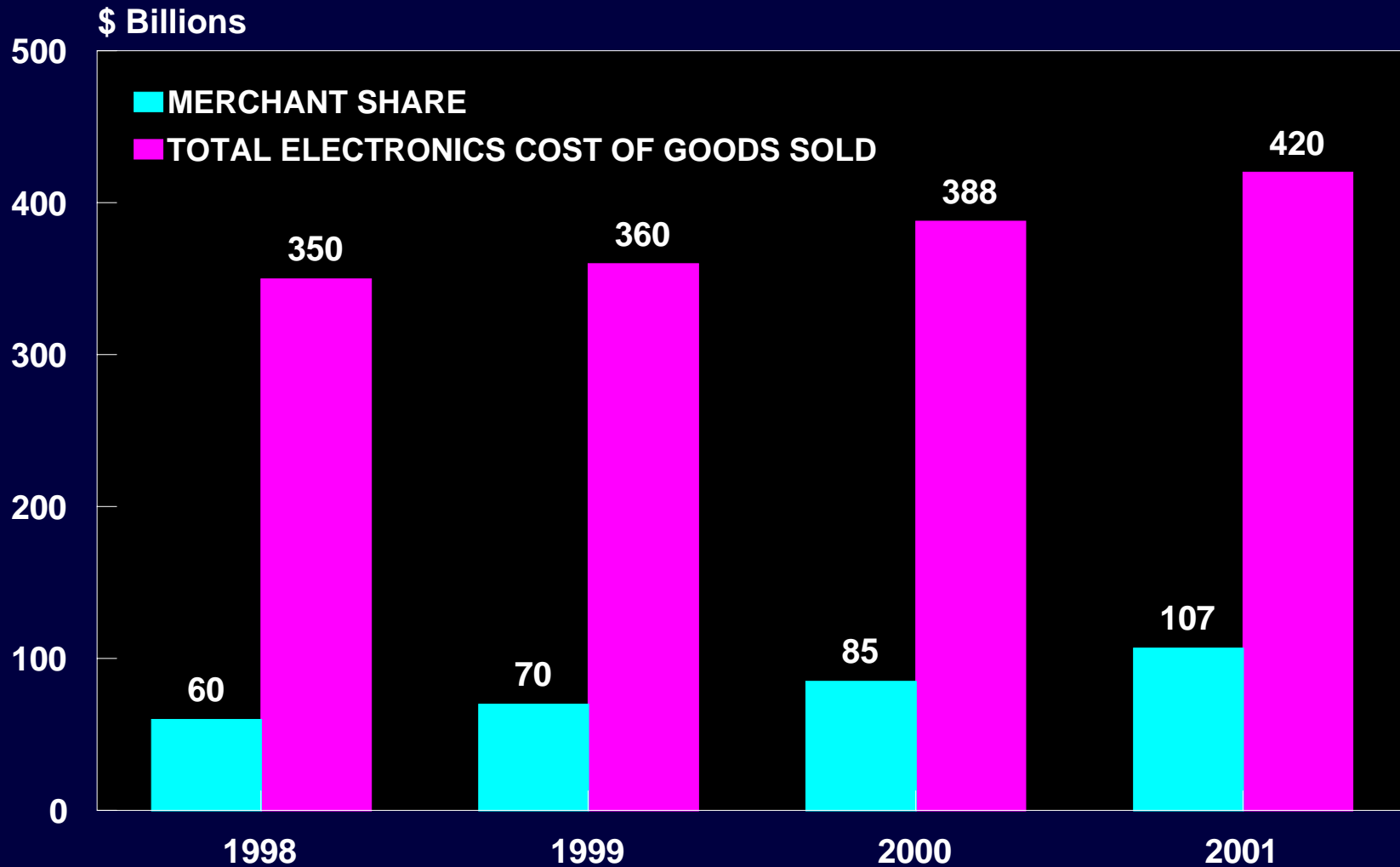
FLEXIBLE PCBs - MAKE OR BUY

U.S. CAPTIVE vs MERCHANT PRODUCTION



CONTRACT ELECTRONIC MANUFACTURERS PICKING UP A LARGER SHARE

MERCHANT MARKET SHARE OF WORLD ELECTRONICS MARKET



EBN: Technology Forecasters 10/99, Custer estimates

TOP CONTRACT MANUFACTURERS

1998

	<u>\$ Sales</u>	<u>98/97 Growth %</u>
SCI Systems	6,583	3
Solectron	6,097	52
Celestica	3,249	62
Flextronics Intl	1,630	71
NatSteel Electronics	1,472	76
Jabil Circuit	1,449	27
AVEX Electronics	850	23
Manufacturers' Services	838	49
Sanmina	691	44
Universal Scientific	600	62
Dovatron Intl	589	15
Benchmark Electronics	524	61
Bull Electronics	466	1
Venture Manufacturing	437	-7

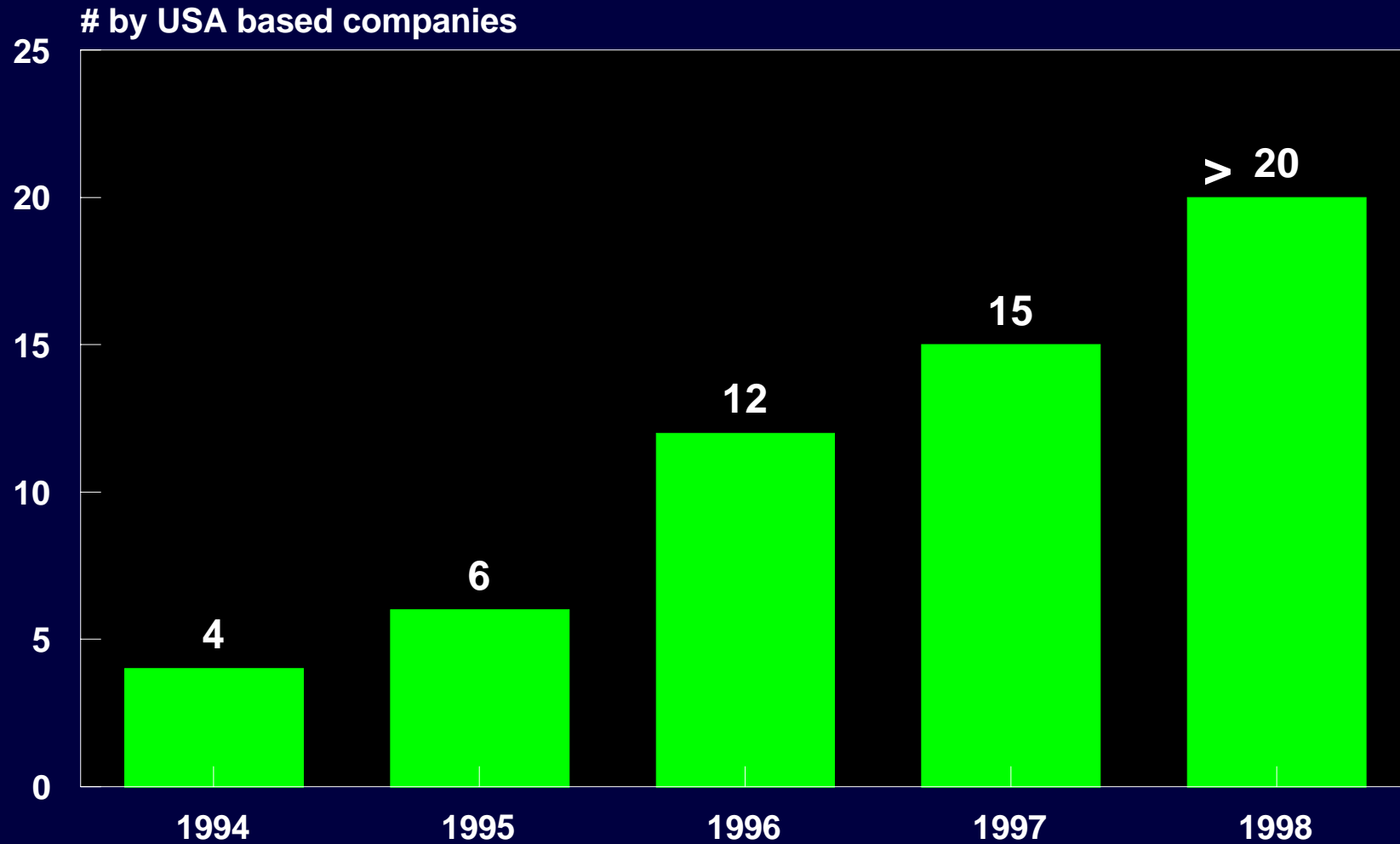
TOP N AMERICAN PCB MANUFACTURERS

PCB FAB & TOTAL - 1999 ESTIMATE (\$M)

	<u>PCB</u>	<u>TOTAL</u>
VIASYSTEMS	1,130	1,230
HADCO	925	1,000
TYCO	515	590
ALLIEDSIGNAL	405	Large
PHOTOCIRCUITS	385	385
SANMINA	330	1,375
DII GROUP	315	1,100
DYNAMIC/DETAILS	280	280
IBM	220	430
3M	150	Large
MERIX	138	138
TTM TECHNOLOGIES	125	125
AUTOMATA INTERNATIONAL	110	110
SHELDAHL	105	127
VIKTRON	93	133
CIRCUIT SYSTEMS	89	89
TOPPAN WEST	80	80
CIRCUIT-WISE	75	75
BUREAU ELECTRONICS	74	74

ACCELERATING PACE OF ACQUISITIONS

NUMBER OF ACQUISITIONS IN PCB INDUSTRY



INDUSTRY CONSOLIDATIONS

VIASYSTEMS GROUP (HICKS, MUSE, TATE & FURST)

LUCENT TECHNOLOGIES (ex AT&T, RICHMOND)

CIRCO CRAFT

FORWARD GROUP

ISL

ERICSSON

MOMMERS PRINT SERVICE

ZINCOCELERE

PAGG CORP

TERMBRAY

HADCO

ZYCON

ACT

CONTINENTAL

DYNAFLEX

RADIAN

PCA DESIGN

INDUSTRY CONSOLIDATIONS

SANMINA

COMPTRONIX

ASSEMBLY SOLUTIONS

GOLDEN EAGLE SYSTEMS

LUCENT CUSTOM MANUFACTURING

ELEXSYS

PRAGMATEC

ALTRON

PRAEGITZER - sold to TYCO 10/99

TREND CIRCUITS

3 DESIGN FACILITIES

INTERGRAPH PCB FACILITY - closed 7/99

LIKOM PCB, MALAYSIA (51%) - for sale

INTRACOM DESIGN, EDINBURGH, SCOTLAND

JOHNSON MATTHEY - sold to AlliedSignal 7/99

ACI

CRAY

UNIVERSAL CIRCUITS, BUFFALO, MN

INDUSTRY CONSOLIDATIONS

DII GROUP (sold to Flextronics 11/99)

MULTEK

UNISYS, ROSEVILLE

IBM, AUSTIN

HP, BOEBLINGEN

GREATSINO ELECTRONIC TECHNOLOGY, CHINA

ERICSSON ASSEMBLY, KINDBERG, AUSTRIA

MICRO ELECTRONICA, BRAZIL

CORNERSTONE CAPITAL

AUTOMATA

KODE (KAM CIRCUITS)

PAM CIRCUITS

MICRON TECHNOLOGY ASSEMBLY FACILITIES

TYCO

ELECTROSTAR

SIGMA CIRCUITS

AMP (QLP) - SOLD TO NELCO

SOLADYNE (from MERIX)

ADVANCED QUICK CIRCUITS

PRAEGITZER

INDUSTRY CONSOLIDATIONS

MERIX

HEWLETT-PACKARD, LOVELAND - closed

SOLADYNE/ROGERS - sold to TYCO 2/99

AMKOR CHIP CARRIER FACILITY

PENTEX-SCHWEITZER

DEGUSSA ELECTRONICS

BAIN CAPITAL

DYNAMIC CIRCUITS

DETAILS INC

CUPLEX

NTI

C-MAC INDUSTRIES

CAROLINA CIRCUITS (former DEC)

ADFLEX - sold to INNOVEX 8/99

XYRATEX FLEX OPERATIONS

THAILAND JV

INDUSTRY CONSOLIDATIONS

CIRCUIT SYSTEMS

PHILIPS (ex MAGNAVOX)

SILICON VALLEY PRINTED CIRCUITS

WU's

MOTOROLA, SINGAPORE (2)

THAYER

COSMOTRONICS

PACIFIC CIRCUITS

POWER CIRCUITS

← TTM Technologies
←

M&I CAPITAL

ELECTROTEQ

EL MAN

ERICSSON, ITALY PCB FACILITY

INDUSTRY CONSOLIDATIONS

PARLEX

DYNAFLEX (from HADCO)

PROTOTRON CIRCUITS

SOUTHWEST CIRCUITS

ALLIEDSIGNAL

LITRONICS CHIP CARRIER FACILITY

JOHNSON MATTHEY ELECTRONICS

GUL TECHNOLOGIES, SINGAPORE

ACCUDYNE

ELLIOT TECHNOLOGIES

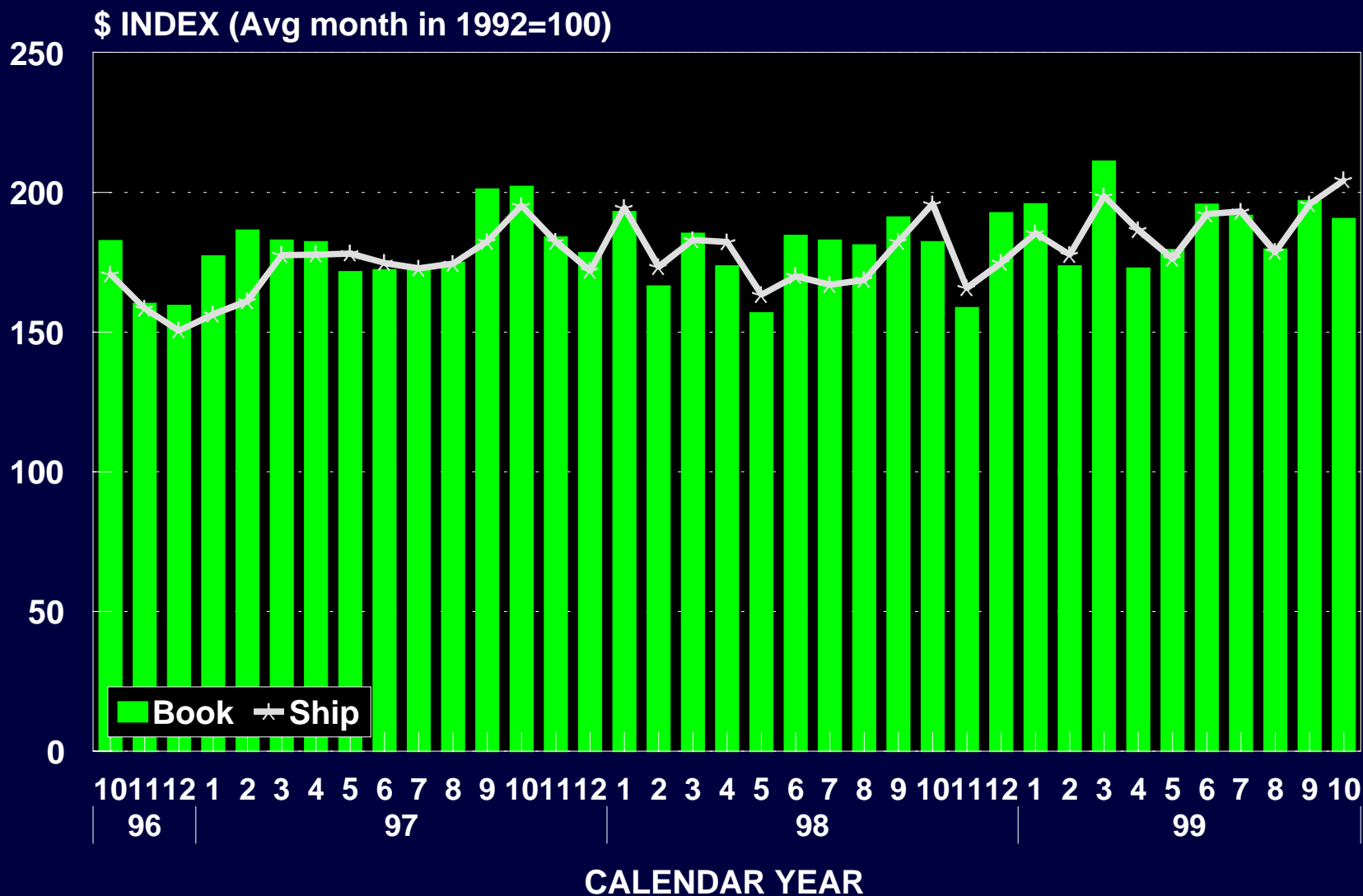
N. AMERICAN PCB MANUFACTURERS - PUBLIC DATA

QUARTERLY SALES & NET INCOME (\$M)

		LAST YEAR		THIS YEAR		QUARTER
		SALES	INC	SALES	INC	ENDING
CIRCUIT SYS	CSYI	22.8	-0.5	20.6	1.9	7/99
CIRCUIT WORLD	TSE:CWW	3.5	0.1	3.6	-0.6	9/99
HADCO	HDCO	201.4	-6.9	252.4	6.6	7/99
INNOVEX	INVX	20.3	2.4	20.6	1.5	6/99
MERIX	MERX	41.1	1.0	32.9	0.7	8/99
M-WAV	MWAV	3.6	0.1	2.2	-0.9	9/99
PARLEX	PRLX	15.5	0.2	20.4	1.3	9/99
PRAEGITZER	PGTZ	55.4	0.6	47.3	-0.8	9/99
SHELDAHL	SHEL	28.4	-3.8	33.0	-12.0	8/99
VIASYSTEMS		263.0	-15.7	270.1	-48.2	9/99
TOTAL		634.2	-47.9	707.1	-53.3	
INCOME %			-7.6%		-7.5%	

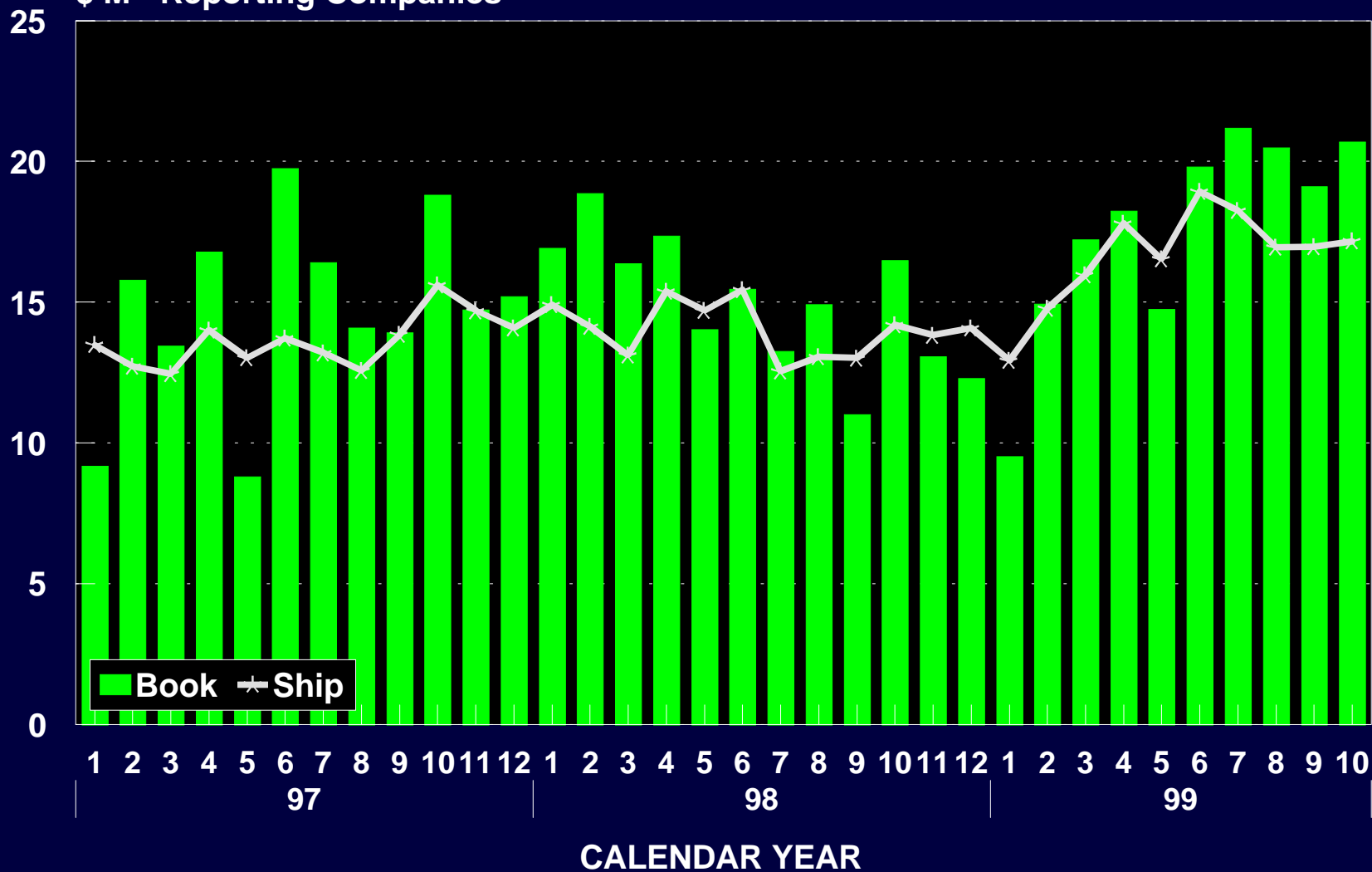
Includes foreign sales

U.S. RIGID PCB BOOKINGS & SHIPMENTS



U.S. FLEX CIRCUITS BOOKINGS & SHIPMENTS

\$ M - Reporting Companies



OCTOBER U.S. PCB GROWTH INDICATORS

% GROWTH - Oct 99 vs Oct 98

RIGID PCB \$ SHIPMENTS

UP 4.4%

RIGID PCB \$ BOOKINGS

UP 4.5%

RIGID PCB BOOK/BILL RATIO

3-MONTH AVG 1.02

1-MONTH 0.98

RIGID LAMINATE SQ FT SHIPMENTS

UP 3.2%

RIGID LAMINATE SQ FT BOOKINGS

UP 14.1%

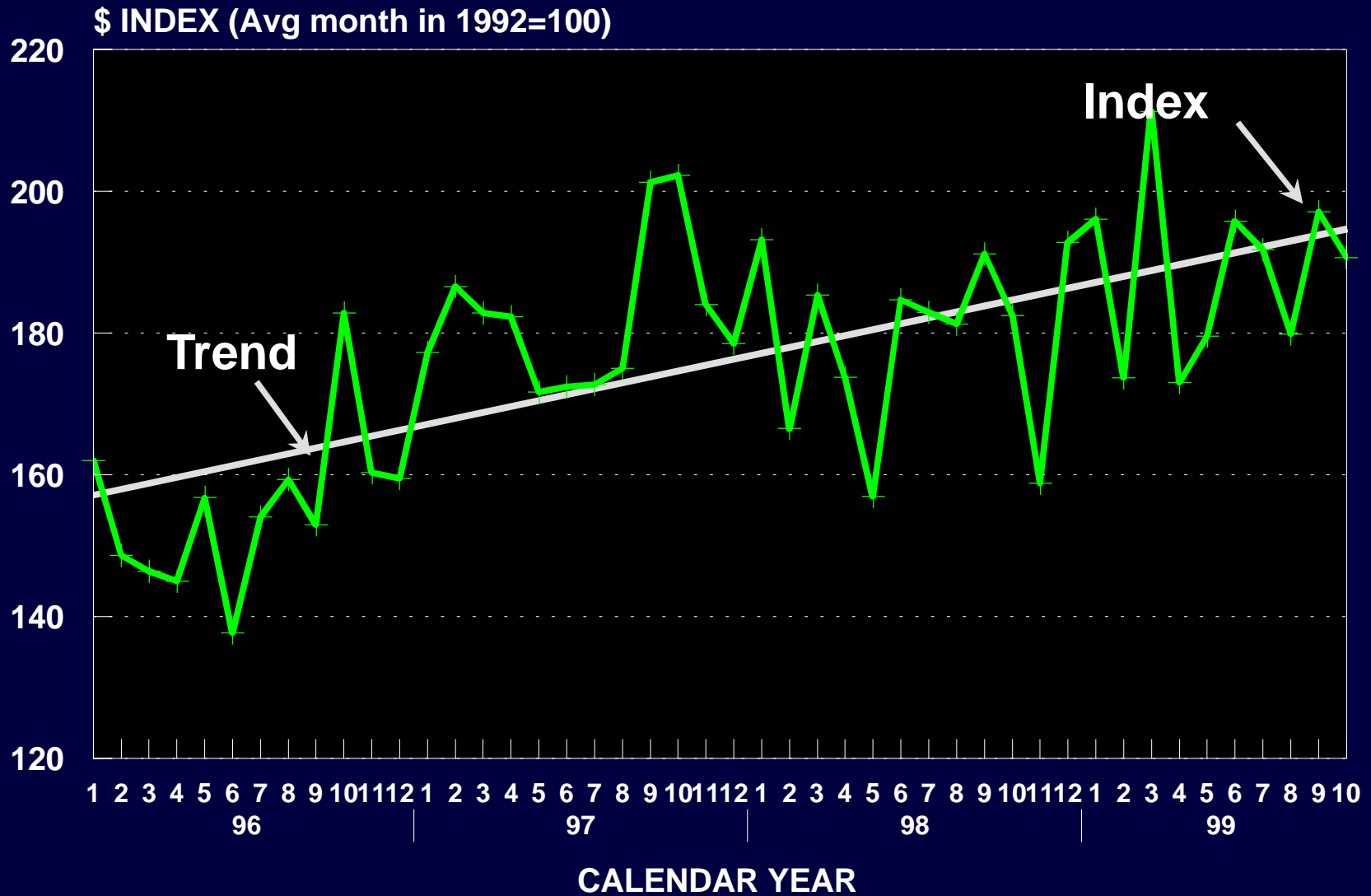
FLEX CIRCUIT \$ SHIPMENTS

UP 16.6%

FLEX CIRCUIT \$ BOOKINGS

UP 15.8%

U.S. RIGID PCB BOOKINGS



PCB vs Equipment Bookings

N. America

RATIO - PCB \$/EQUIPMENT \$



CALENDAR YEAR

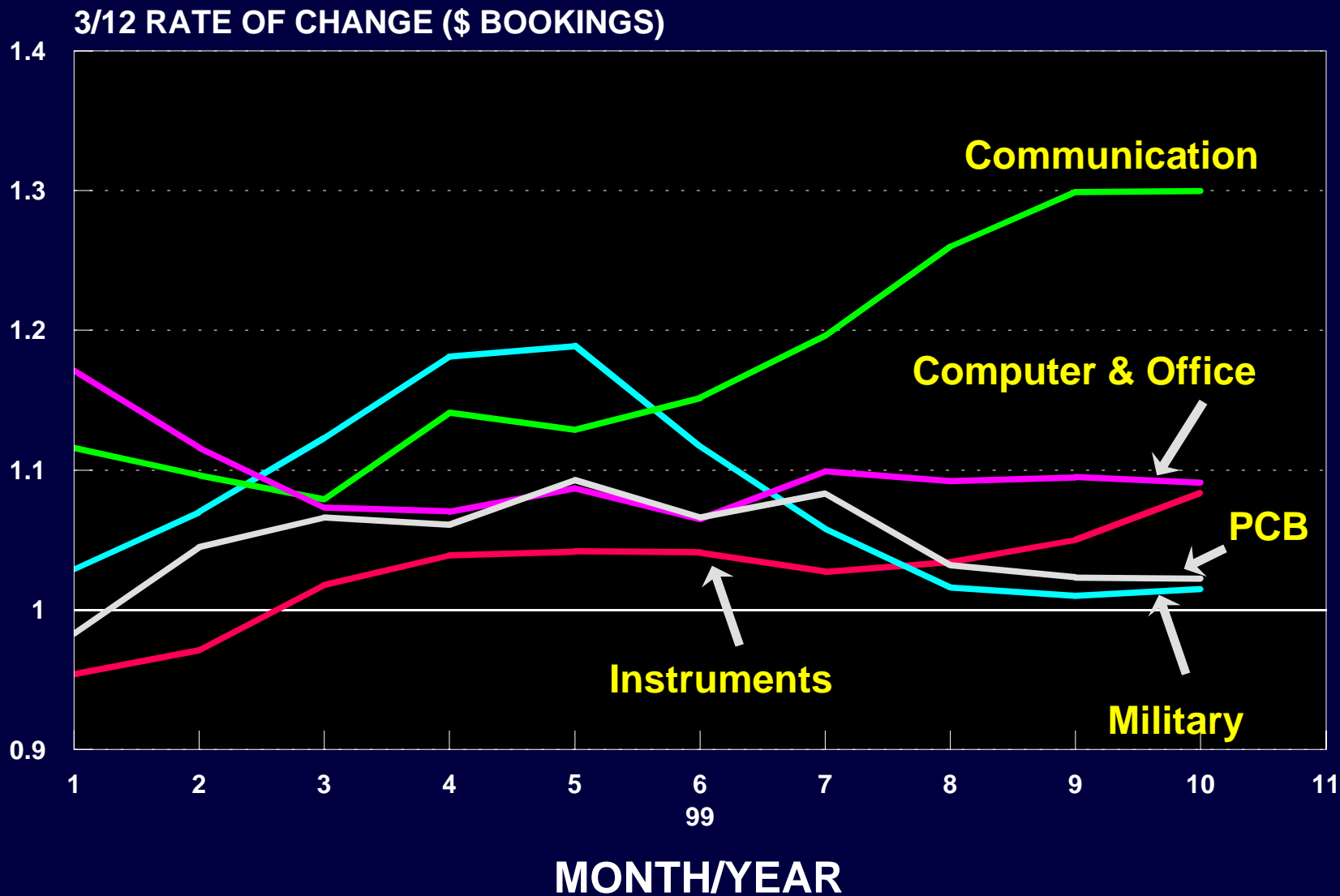
U.S. ELECTRONIC EQUIPMENT vs PCBs

\$ BOOKINGS GROWTH

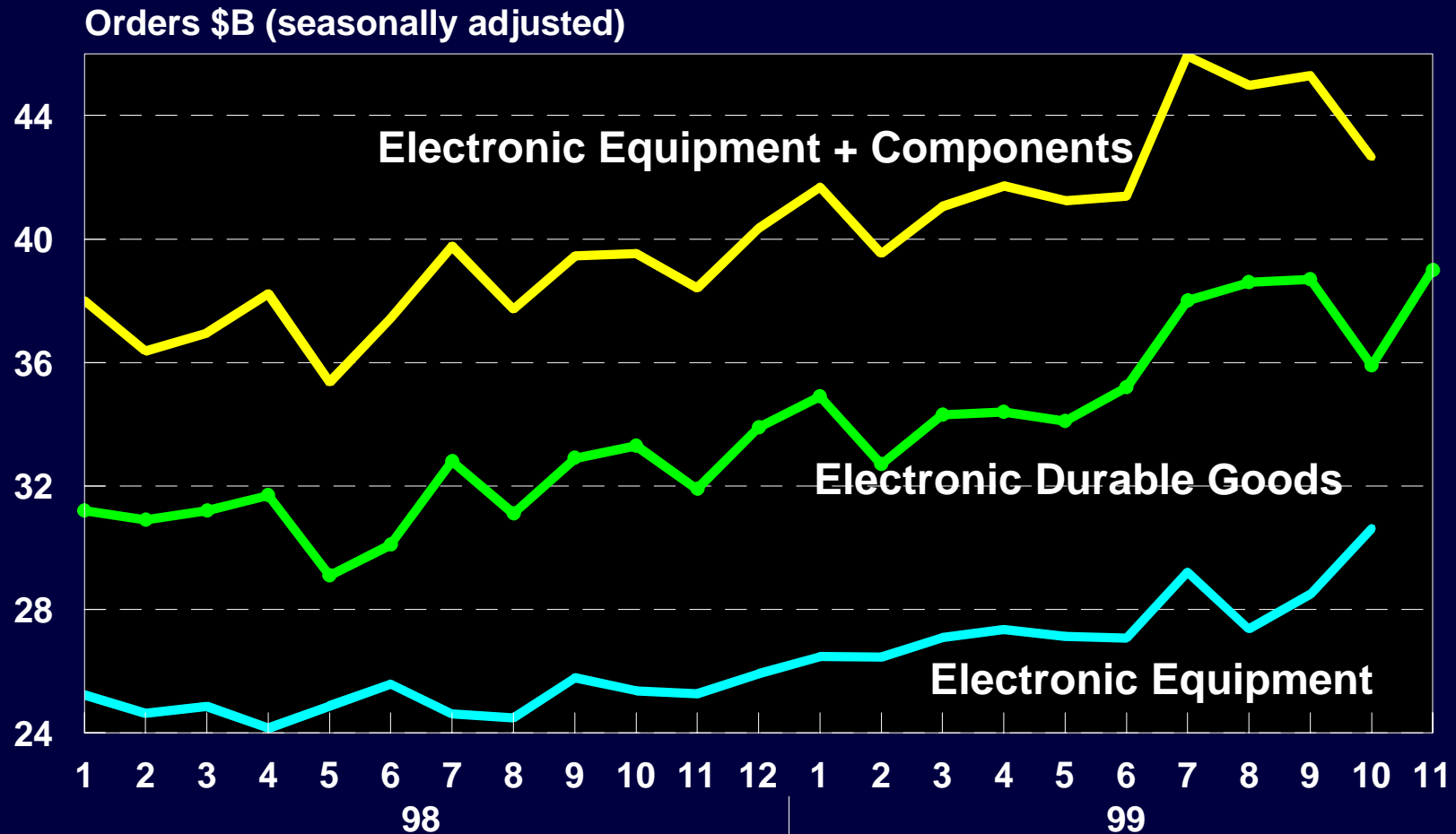
3/12 RATE OF CHANGE



US RIGID PCB vs ELECTRONIC EQUIPMENT BOOKINGS



ELECTRONIC DURABLE GOODS vs ELECTRONIC EQUIPMENT & "ELECTRONIC EQUIPMENT + COMPONENTS"



U.S Dept of Commerce 12/99

"Electronic Equipment" = Search & Navigation, Communications, Computer & Office and Measurement & Control

PRESENT GROWTH RATES (%)

U.S. ECONOMY & ELECTRONICS INDUSTRY

	LATEST MONTH	ANNUAL GROWTH RATE	3-MONTH GROWTH RATE
RIGID PCB BOOKING \$	10/99	103.7	102.2
RIGID PCB SHIPMENT \$	10/99	104.4	105.8
RIGID LAMINATE SHIPMENTS SF	10/99	104.1	110.0
ELECTRONIC COMPONENTS BOOK \$	10/99	114.2	113.1
ELECTRONIC EQUIPMENT BOOKINGS \$			
COMPUTER & OFFICE	10/99	110.6	109.1
COMMUNICATIONS	10/99	119.0	130.0
MEASURE/CONTROL INSTRUMENTS	10/99	102.4	108.4
MILITARY (SEARCH & NAVIG)	10/99	107.0	101.5
TOTAL ELECTRONIC EQUIPMENT	10/99	111.3	114.3
INDUSTRIAL PRODUCTION	10/99	102.2	102.5

NOTE: 3 month growth rates compare most recent 3 months to same 3 months one year earlier

Summary

- **Inventory corrections, reduced equipment exports, global PCB overcapacity and unfavorable exchange rates were all key causes for the flat 1998 US market.**
- **A modest 1999 recovery continues. The ongoing imbalance between equipment & PCB orders suggests US PCB market share loss or disproportionate price erosion.**
- **The massive Electronic Durable Goods order drop in October appears to be a "semiconductor blip."**
- **Asia is recovering well, Europe has slowed modestly.**
- **Personal computer induced seasonality continues. Y2K will negatively impact "big iron" but may spur home sales.**
- **Modest (4-6%) domestic PCB growth is likely for 1999. Longer term, growth should improve with "double digit" cyclical peaks.**

INTERNET WEBSITES

CircuiTree "Market Outlook" Articles

AUTOMATA

http://www.automata.com/newsroom_new/circtree/circtree.htm

IPC

<http://www.ipc.org>

Look under Marketing Articles in Market Information

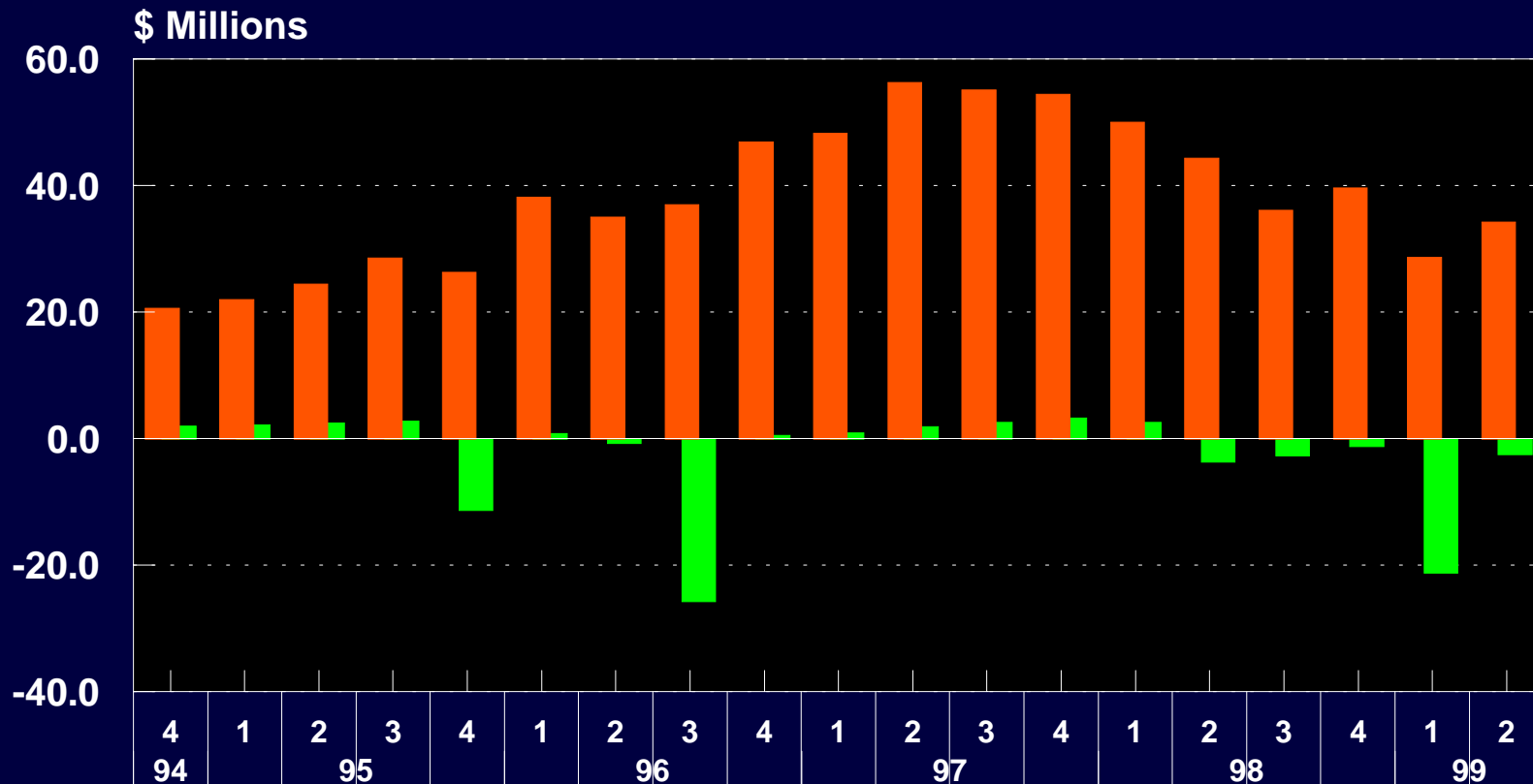
SALES & EARNINGS of PUBLICLY TRADED

**PCB, CONTRACT ASSEMBLY,
SEMICONDUCTOR
& EQUIPMENT COMPANIES**

**WALT CUSTER
SHIPLEY RONAL**

ADFLEX

Revenue & Net Income



Revenue	20.6	22.0	24.4	28.5	26.3	38.1	35.0	36.9	46.8	48.2	56.2	55.1	54.4	50.0	44.3	36.1	39.6	28.6	34.2
Income	2.0	2.2	2.5	2.8	-11.3	0.8	-0.7	-25.7	0.5	0.9	1.9	2.6	3.2	2.6	-3.6	-2.6	-1.2	-21.2	-2.4

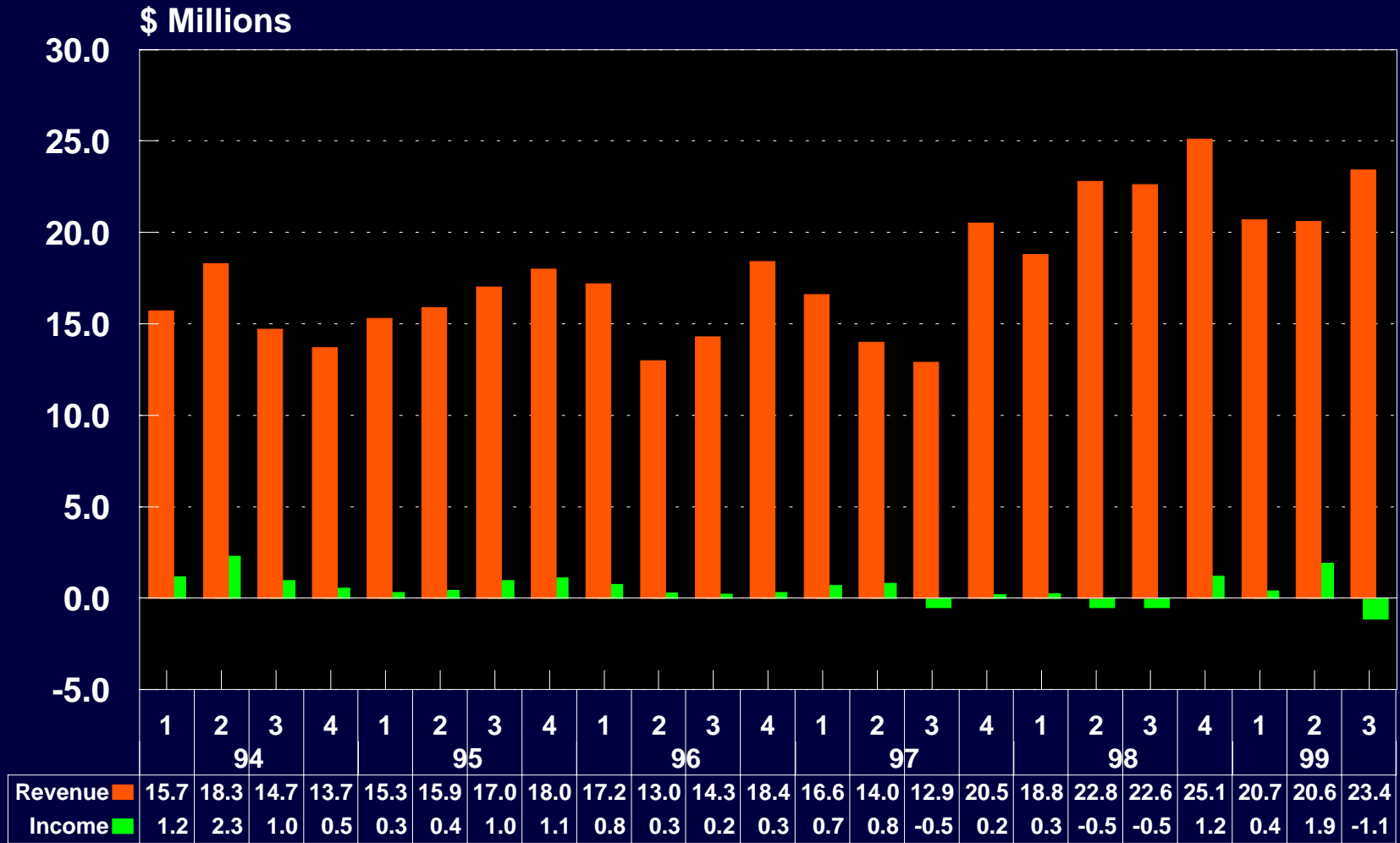
CY

FY = CY

ADFLEX

CIRCUIT SYSTEMS

Revenue & Net Income



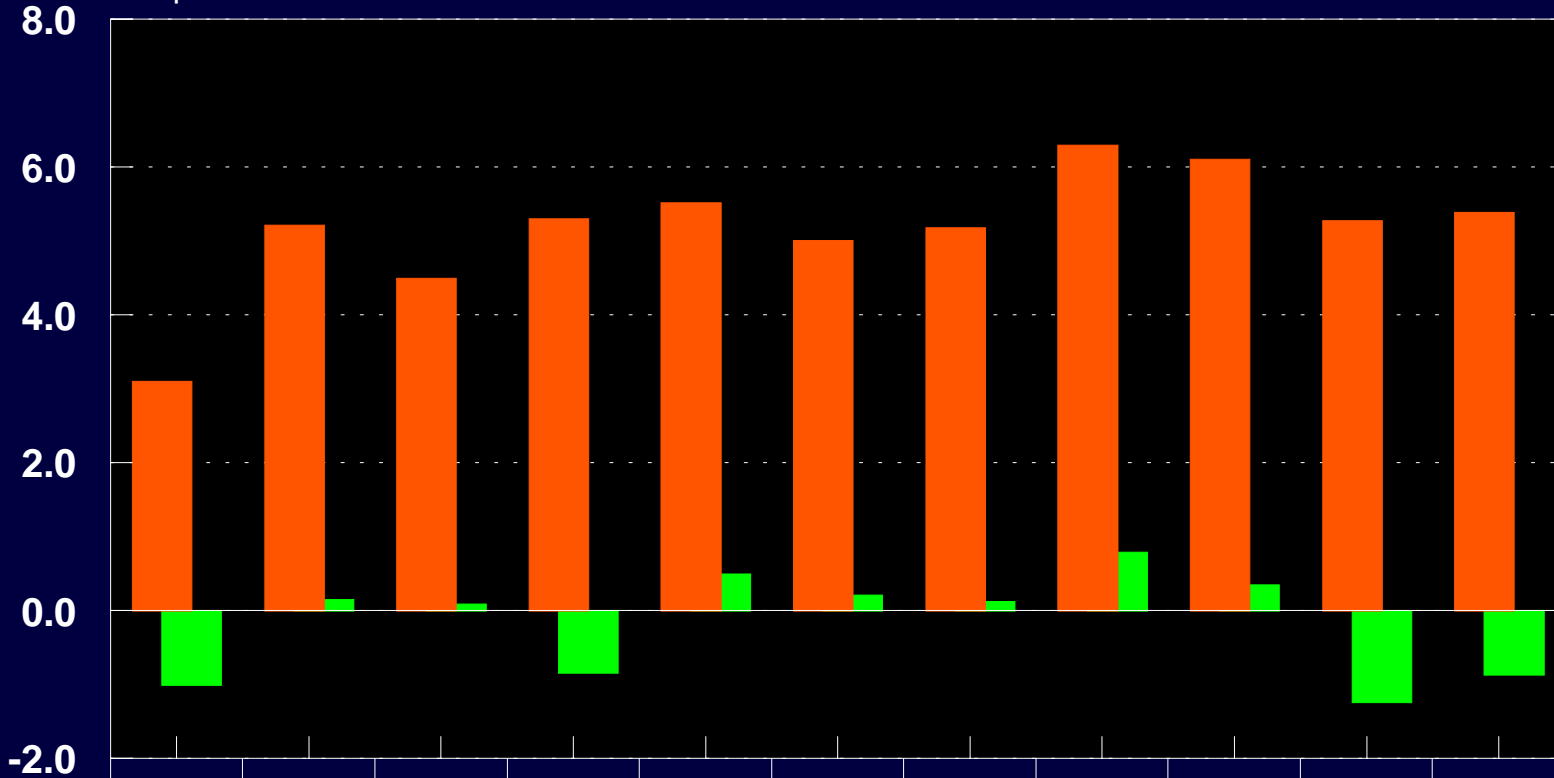
FY ends Apr 30

CSYI

Circuit World

Revenue & Net Income

CY\$ Millions



Revenue	3.1	5.2	4.5	5.3	5.5	5.0	5.2	6.3	6.1	5.3	5.4
Income	-1.0	0.2	0.1	-0.8	0.5	0.2	0.1	0.8	0.3	-1.2	-0.9

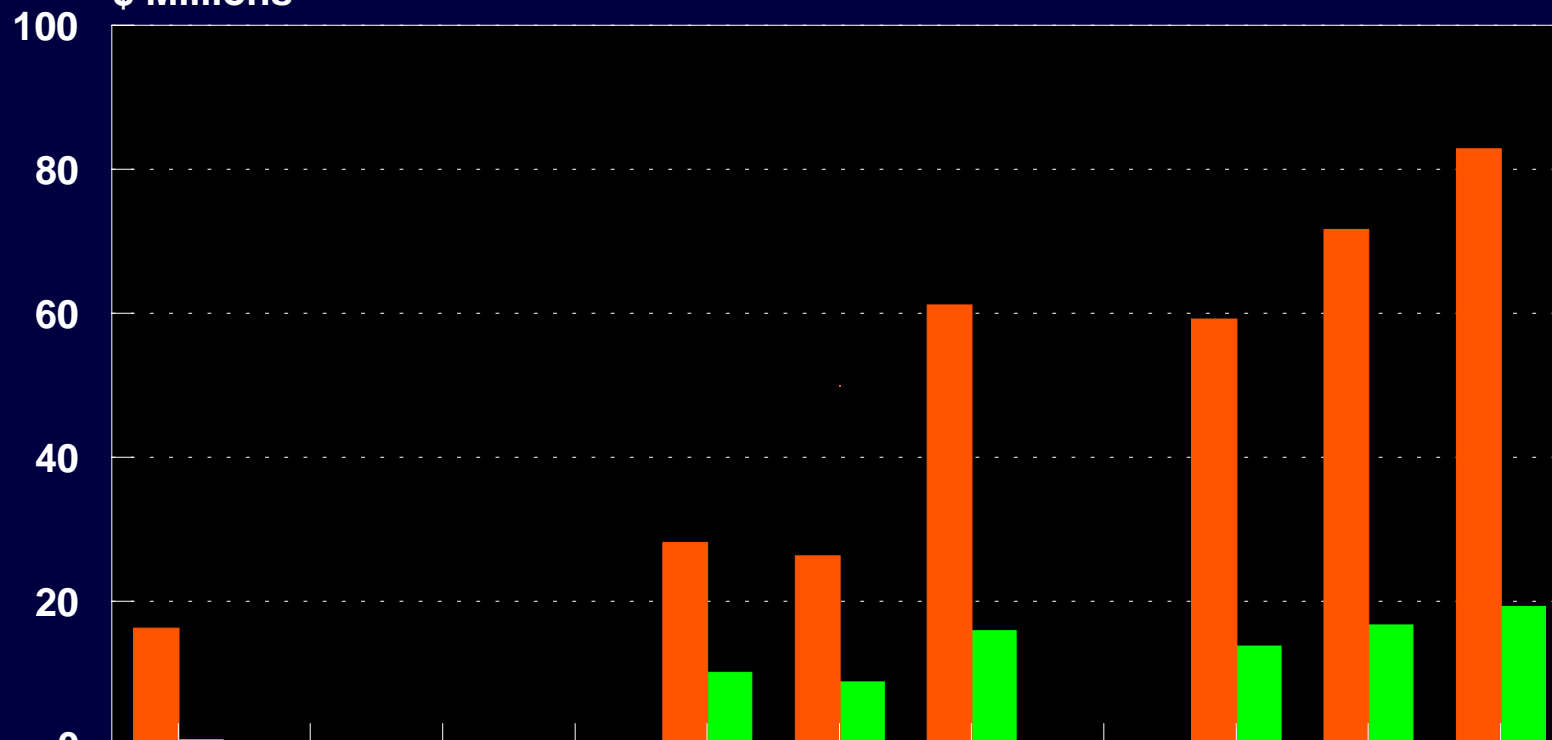
FY=CY

T:CCW

DYNAMIC DETAILS, INC

Revenue & EBITDA

\$ Millions



Revenue ■
EBITDA ■

16.3
0.8

28.2
10.1

26.3
8.8

61.2
15.9

59.2
13.8

71.7
16.7

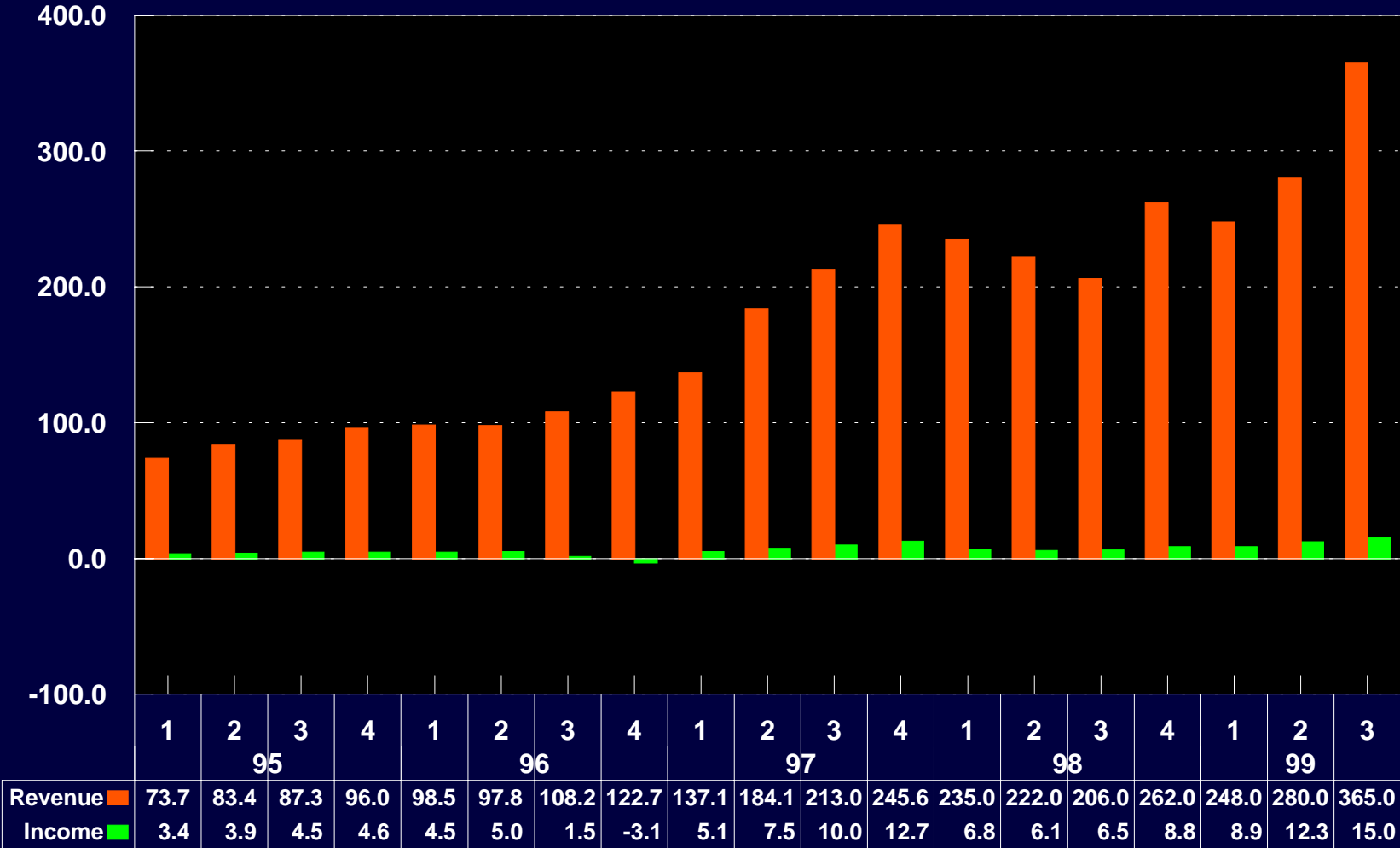
82.9
19.3

CY

FY=CY

DII Group (DOVatron)

Revenue & Net Income



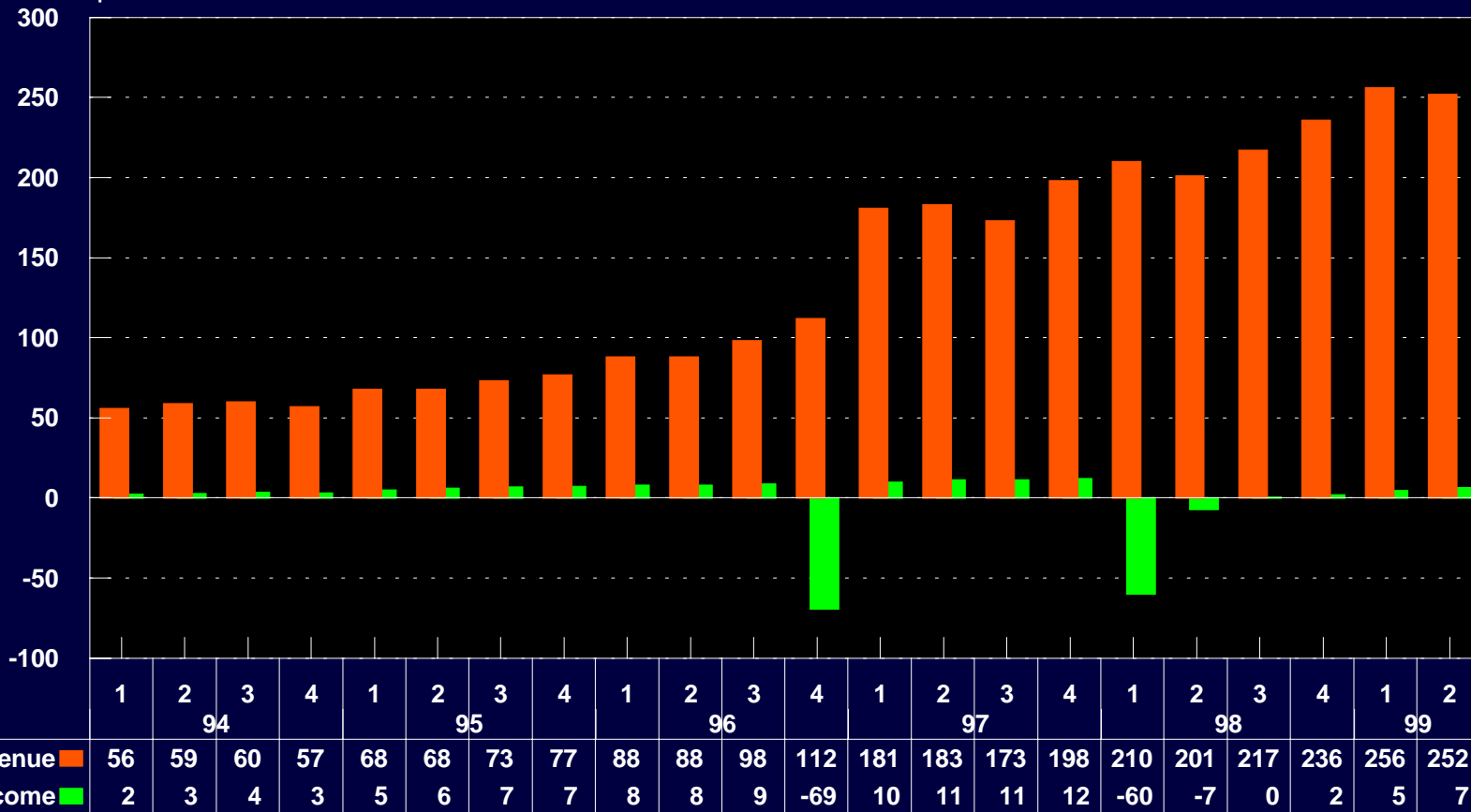
DIIG: FY=CY

DIIG

HADCO

Revenue & Net Income

\$ Millions



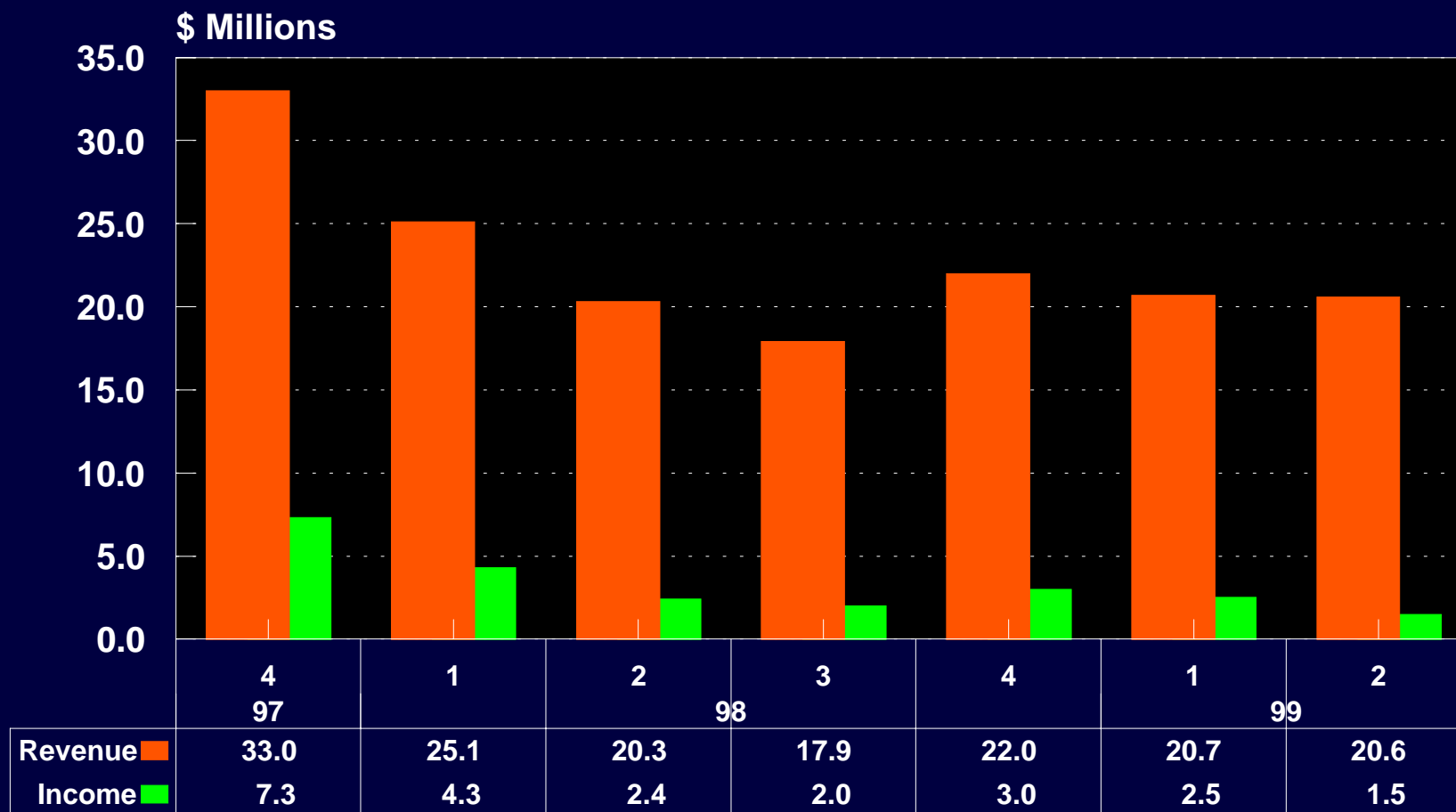
CY

HDCO

FY ends October 31

INNOVEX

Revenue & Net Income



CY

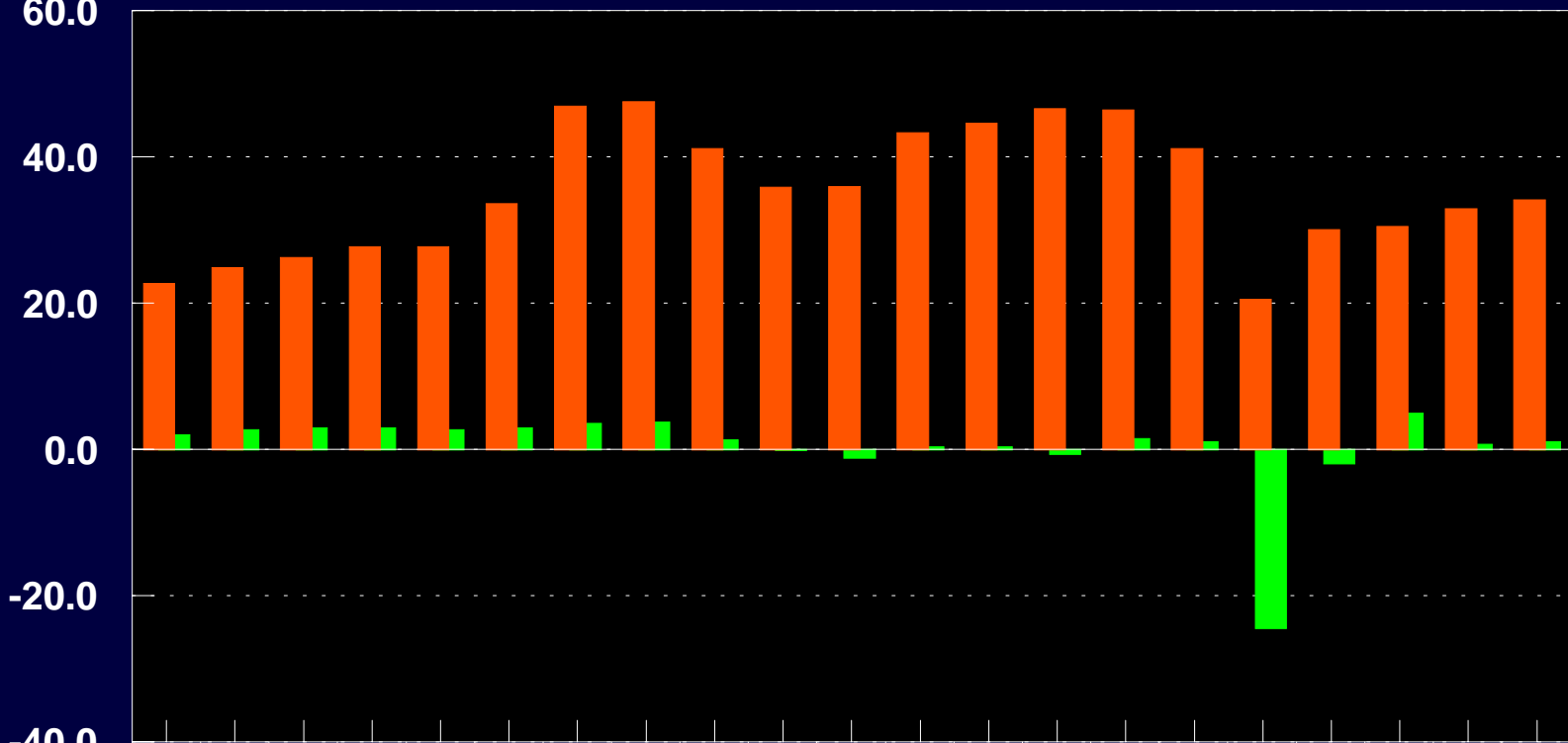
FY ends September

INVX

MERIX

Revenue & Net Income

\$ Millions



	b	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
		94		95			96				97			98					99		
Revenue	22.7	24.8	26.2	27.7	27.7	33.6	46.9	47.5	41.1	35.8	35.9	43.3	44.6	46.6	46.4	41.1	20.5	30.0	30.5	32.9	34.1
Income	2.0	2.7	3.0	3.0	2.7	2.9	3.5	3.7	1.3	-0.1	-1.1	0.3	0.3	-0.6	1.5	1.0	-24.4	-1.9	4.9	0.7	1.0

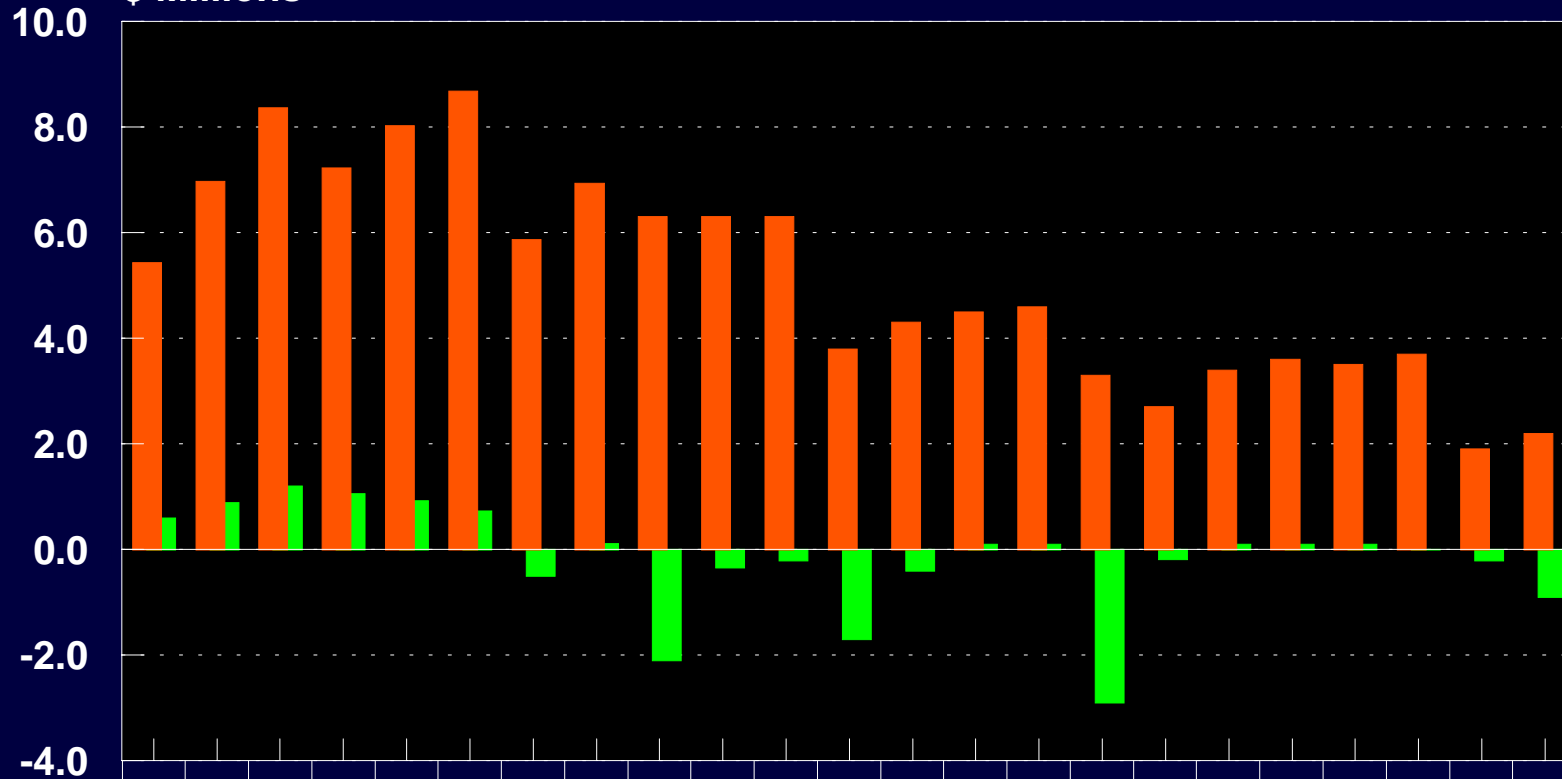
MERIX

FY ends May

M-WAV

Revenue & Net Income

\$ Millions



Revenue	5.4	7.0	8.4	7.2	8.0	8.7	5.9	6.9	6.3	6.3	6.3	3.8	4.3	4.5	4.6	3.3	2.7	3.4	3.6	3.5	3.7	1.9	2.2
Income	0.6	0.9	1.2	1.1	0.9	0.7	-0.5	0.1	-2.1	-0.3	-0.2	-1.7	-0.4	0.1	0.1	-2.9	-0.2	0.1	0.1	0.1	0.0	-0.2	-0.9

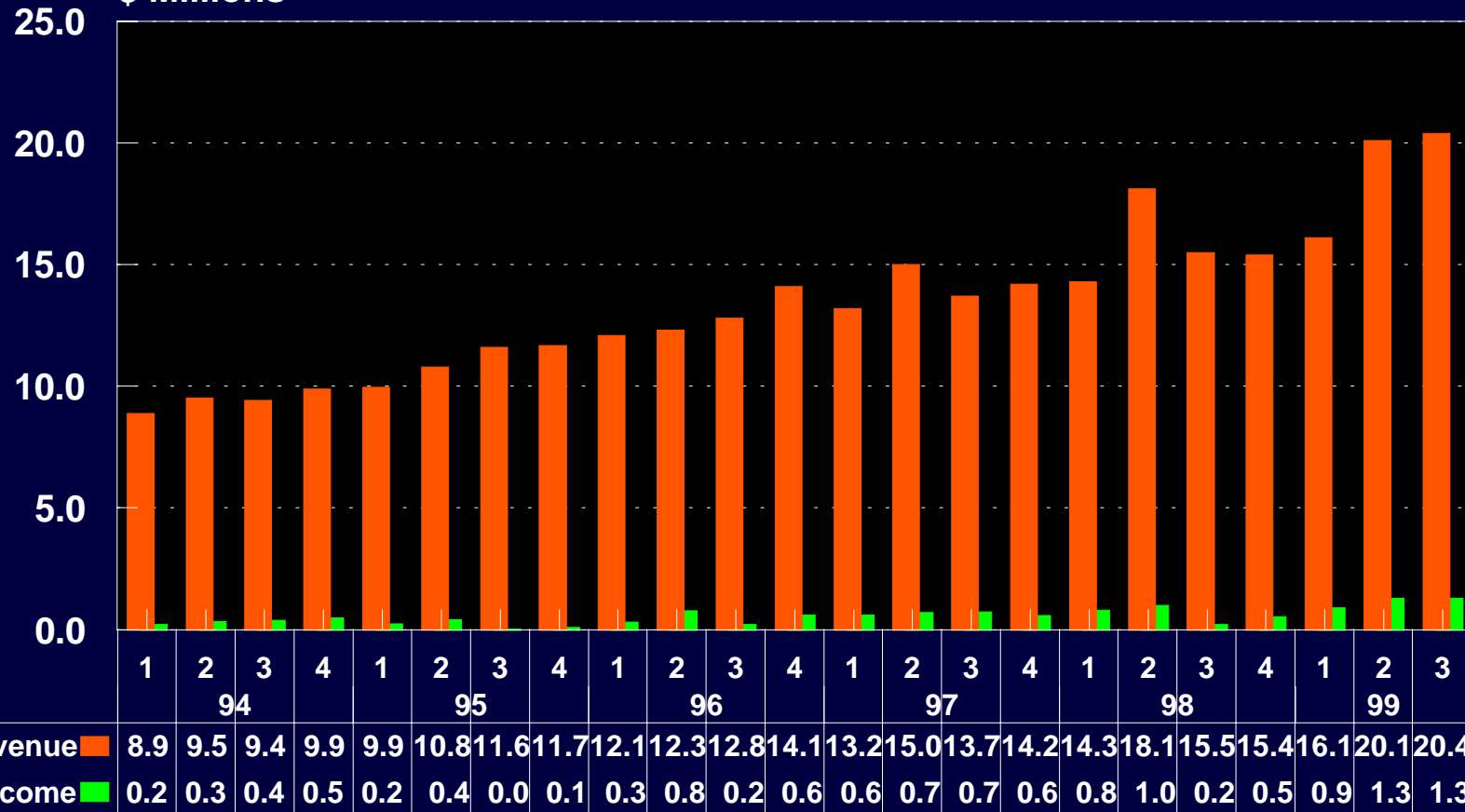
FY = CY

MWAV

PARLEX

Revenue & Net Income

\$ Millions



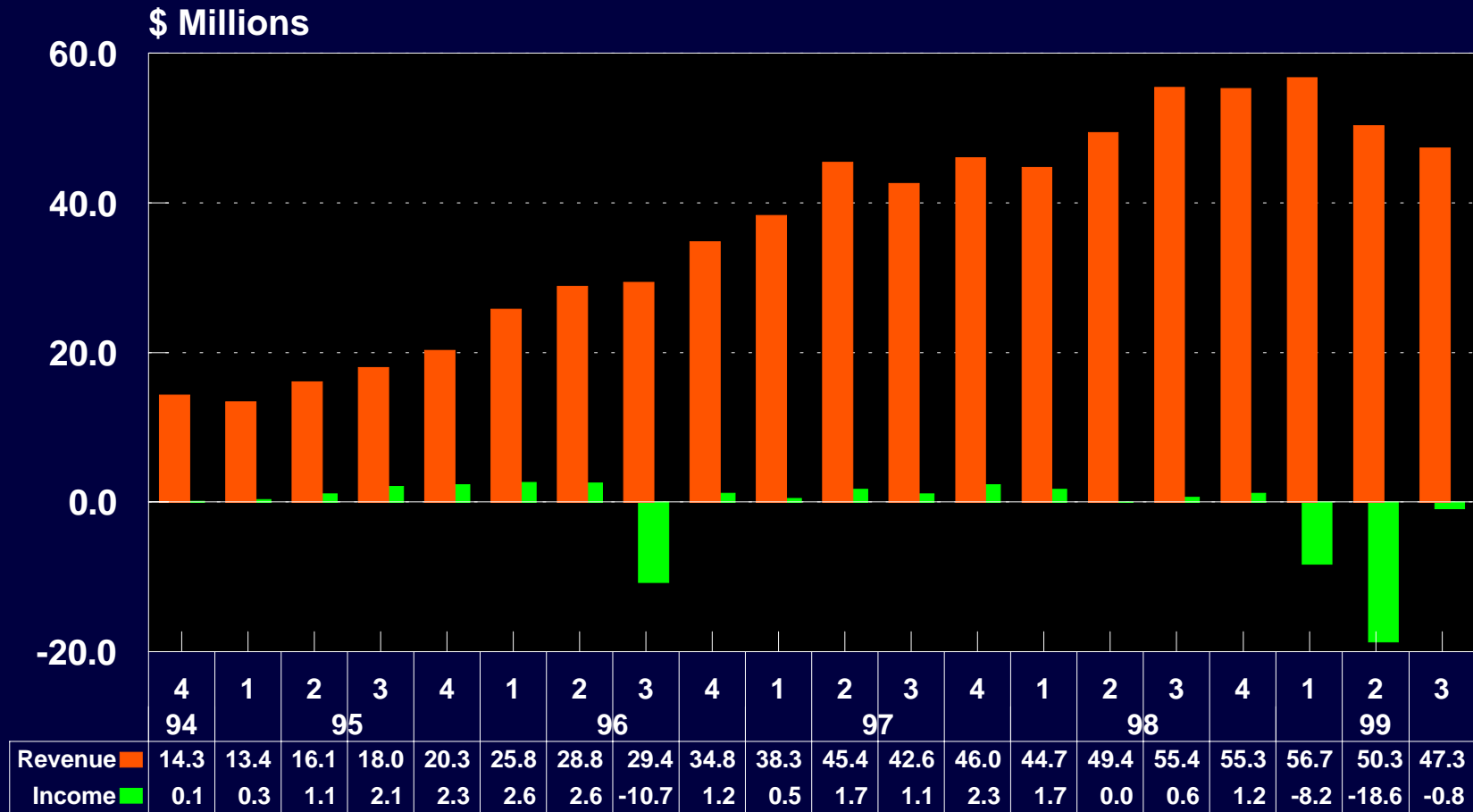
CY

FY ends June 30

PRLX

PRAEGITZER

Revenue & Net Income



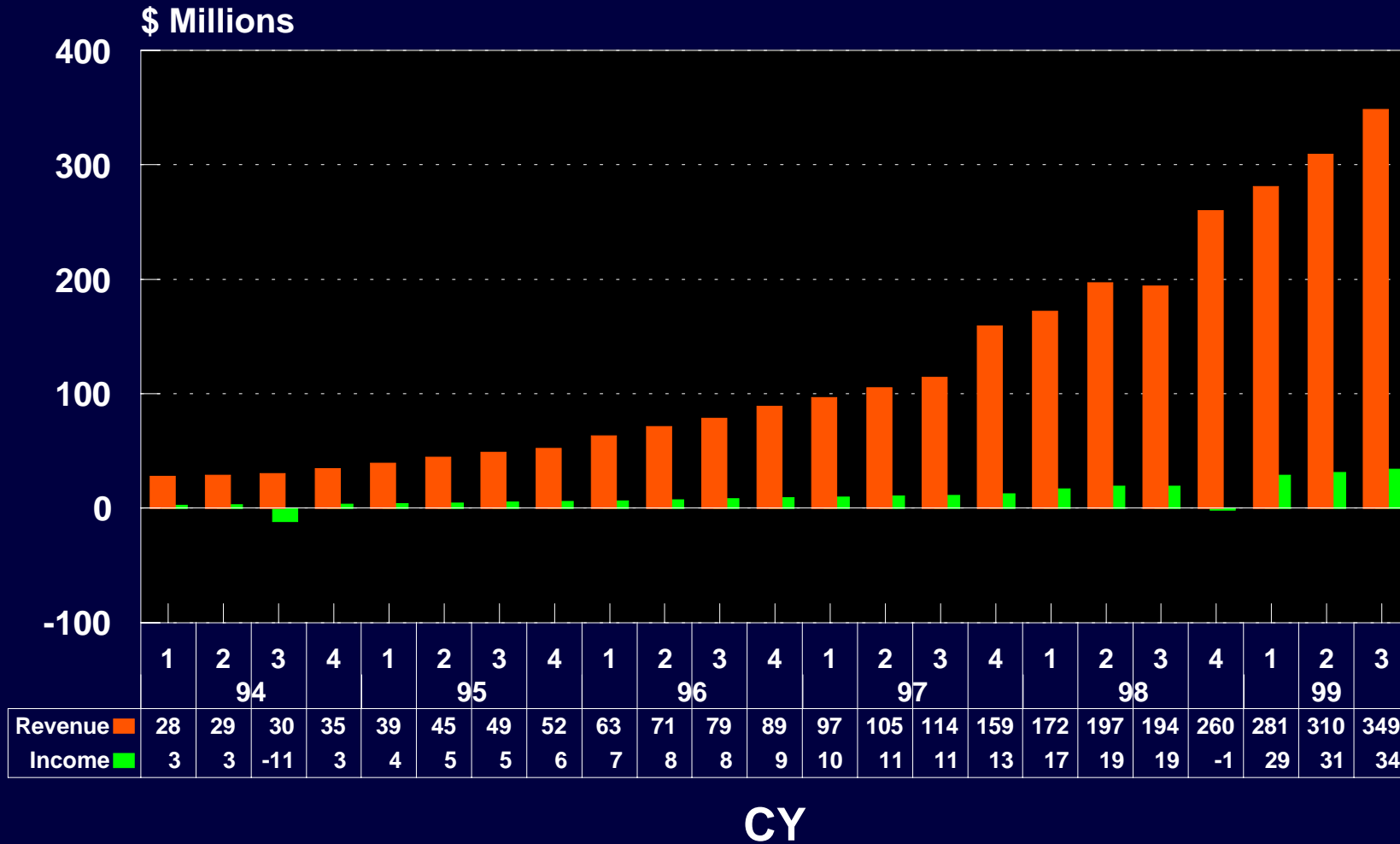
CY

FY ends June 30

PGTZ

SANMINA

Revenue & Net Income

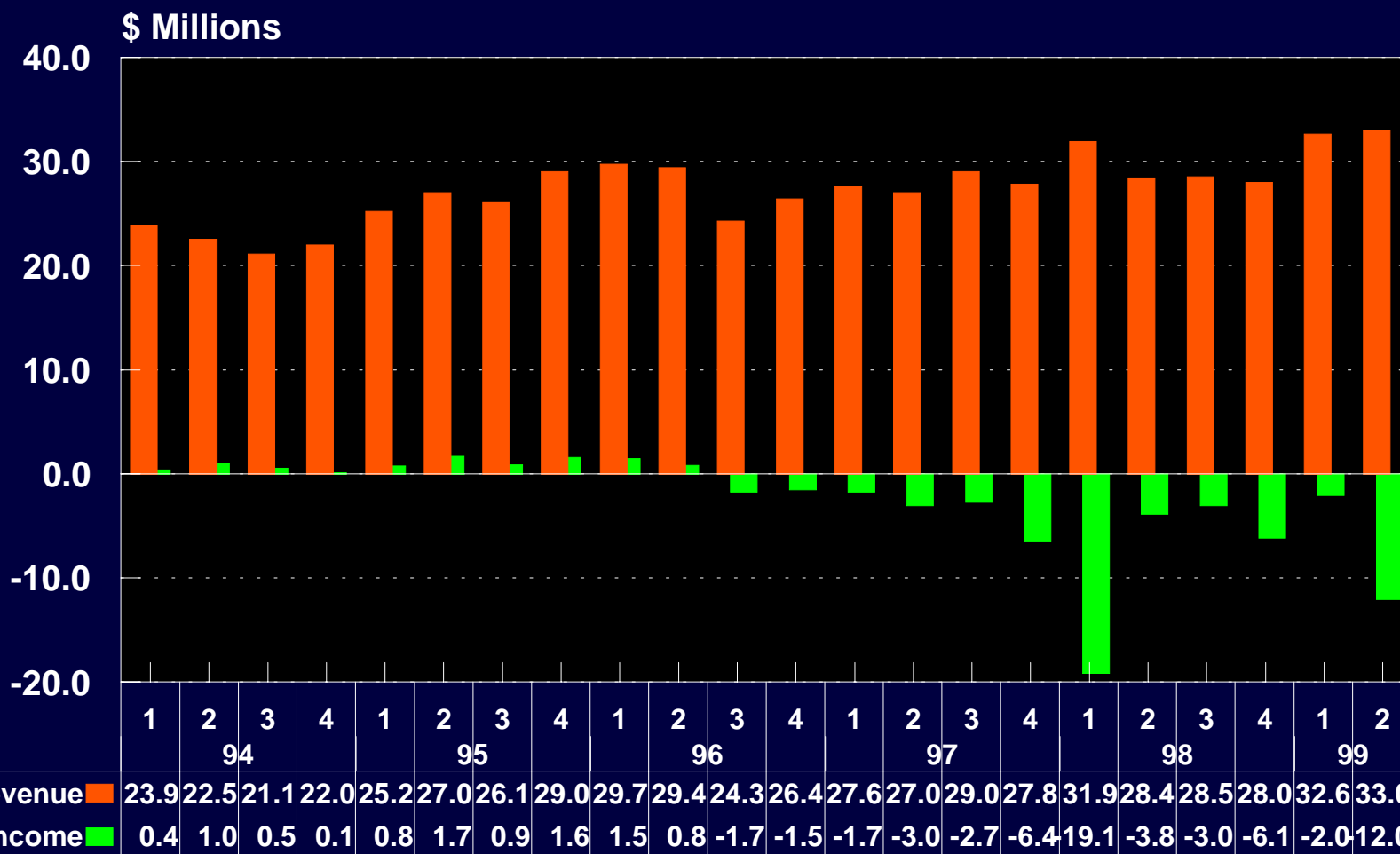


FY ends September 30

SANMINA

SHELD AHL

Revenue & Net Income

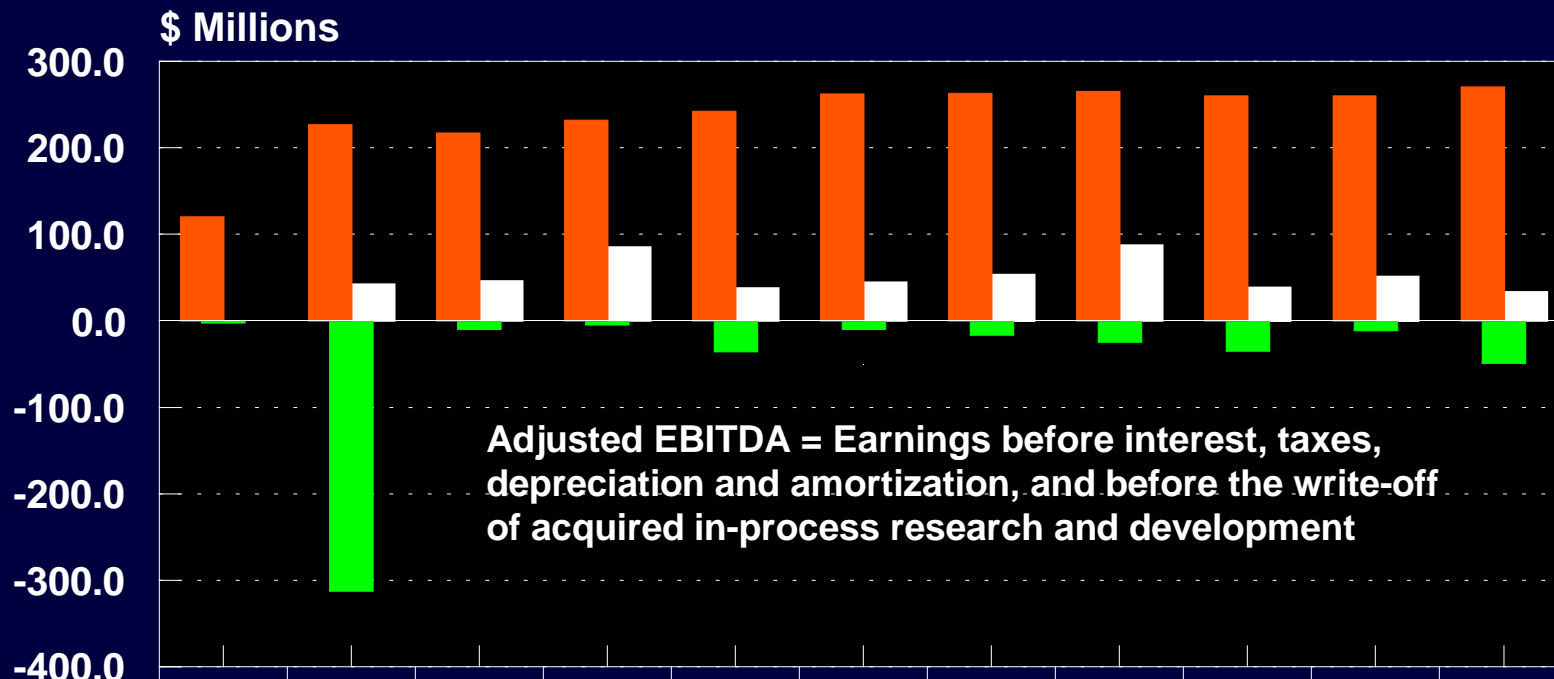


CY

SHEL

VIASYSTEMS

Revenue & Income



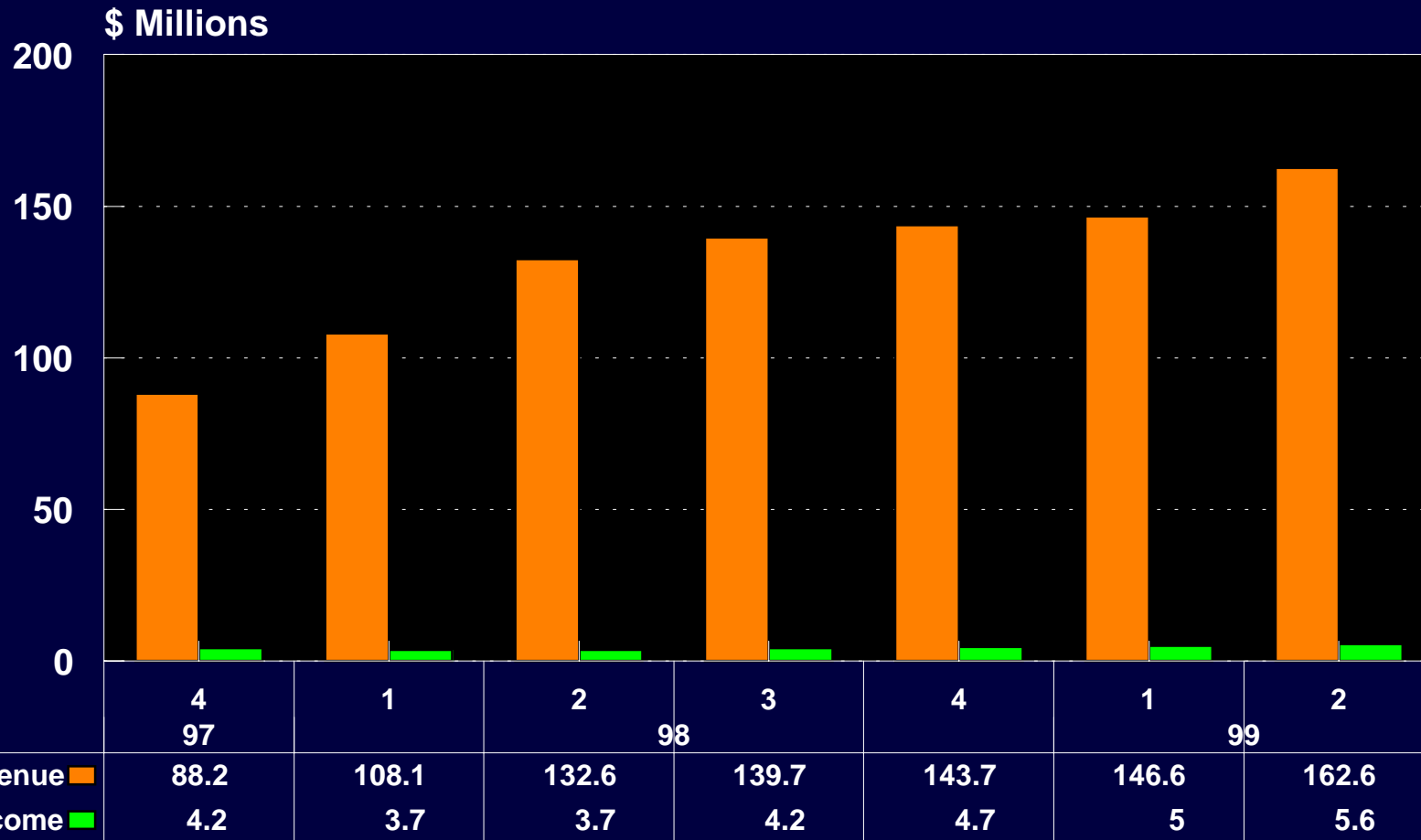
	1	2	3	4	1	2	3	4	1	2	3	
		97				98				99		
Revenue	119.9	226.8	216.8	232.0	242.4	261.9	263.0	265.0	260.0	260.0	270.0	
Net Income	-2.3	-311.9	-9.4	-3.9	-35.6	-9.3	-15.7	-24.1	-34.2	-10.9	-48.2	
Adj EBITDA		41.5	45.2	84.6	37.1	43.5	52.7	86.8	38.2	50.8	32.7	

CY

Sources: 10Q & 10K reports and company press releases

Benchmark Electronics

Revenue & Net Income



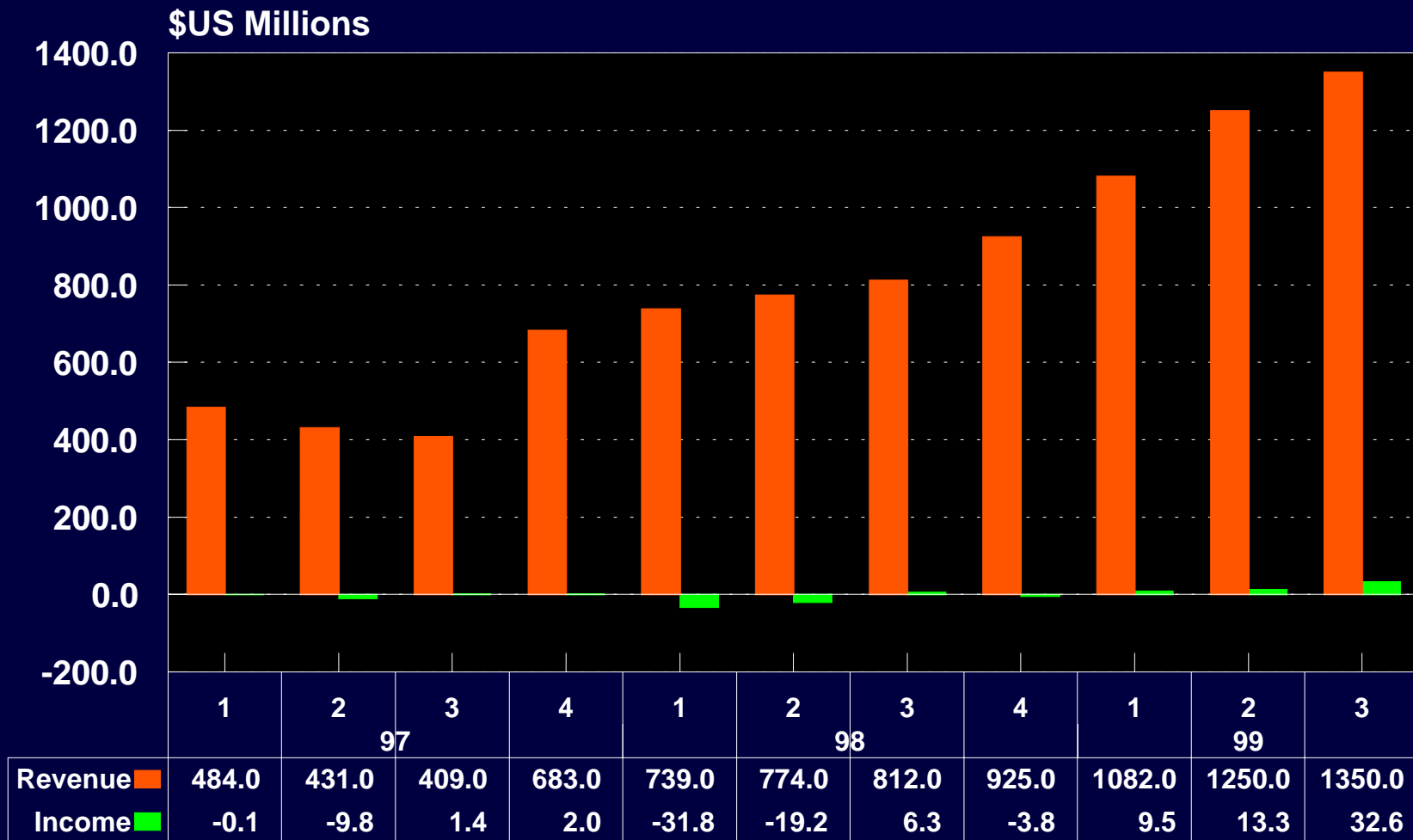
FY=CY

CY

BHE

Celestica

Revenue & Net Income



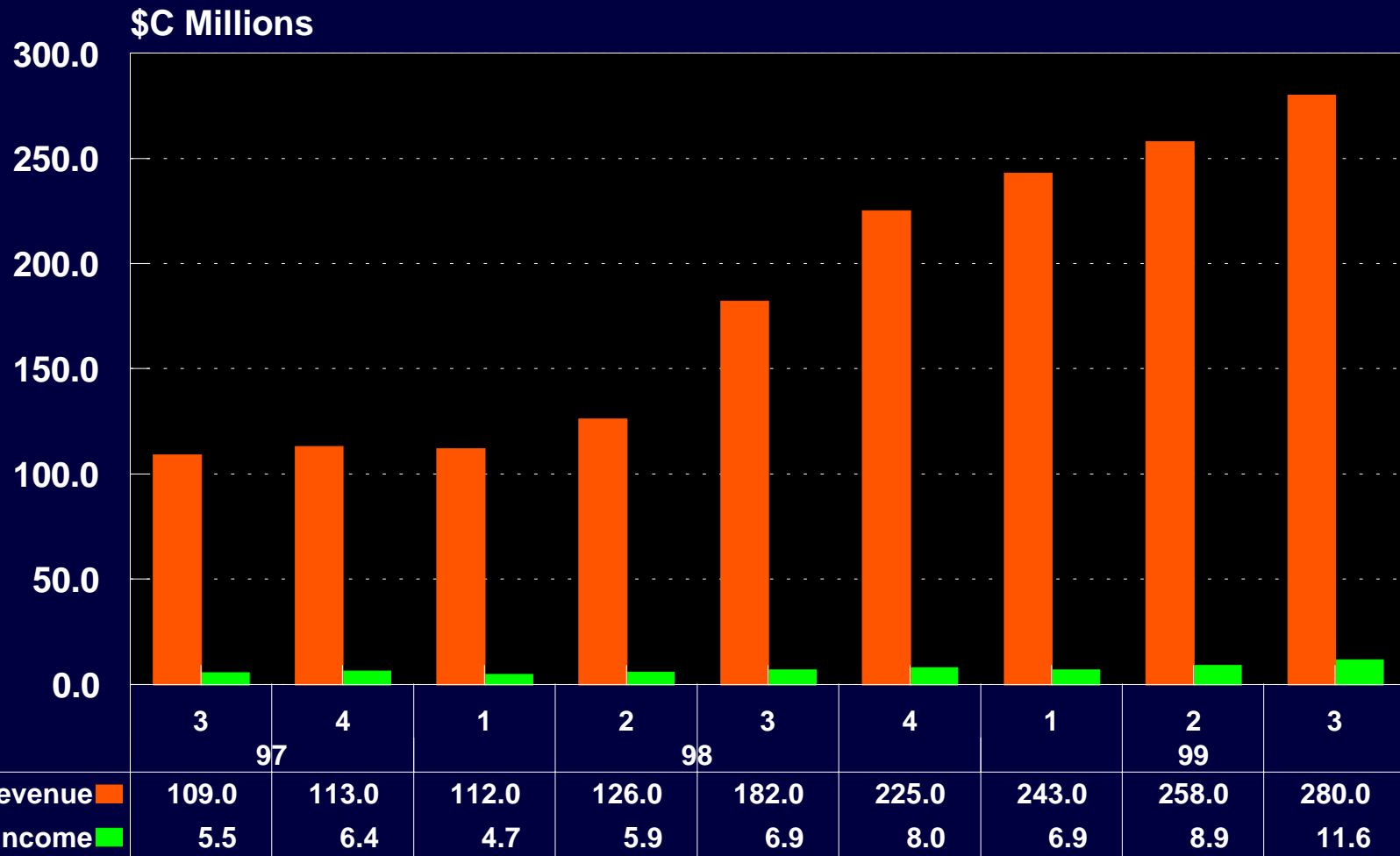
FY=CY

CY

CLS

C-MAC INDUSTRIES

Revenue & Net Income



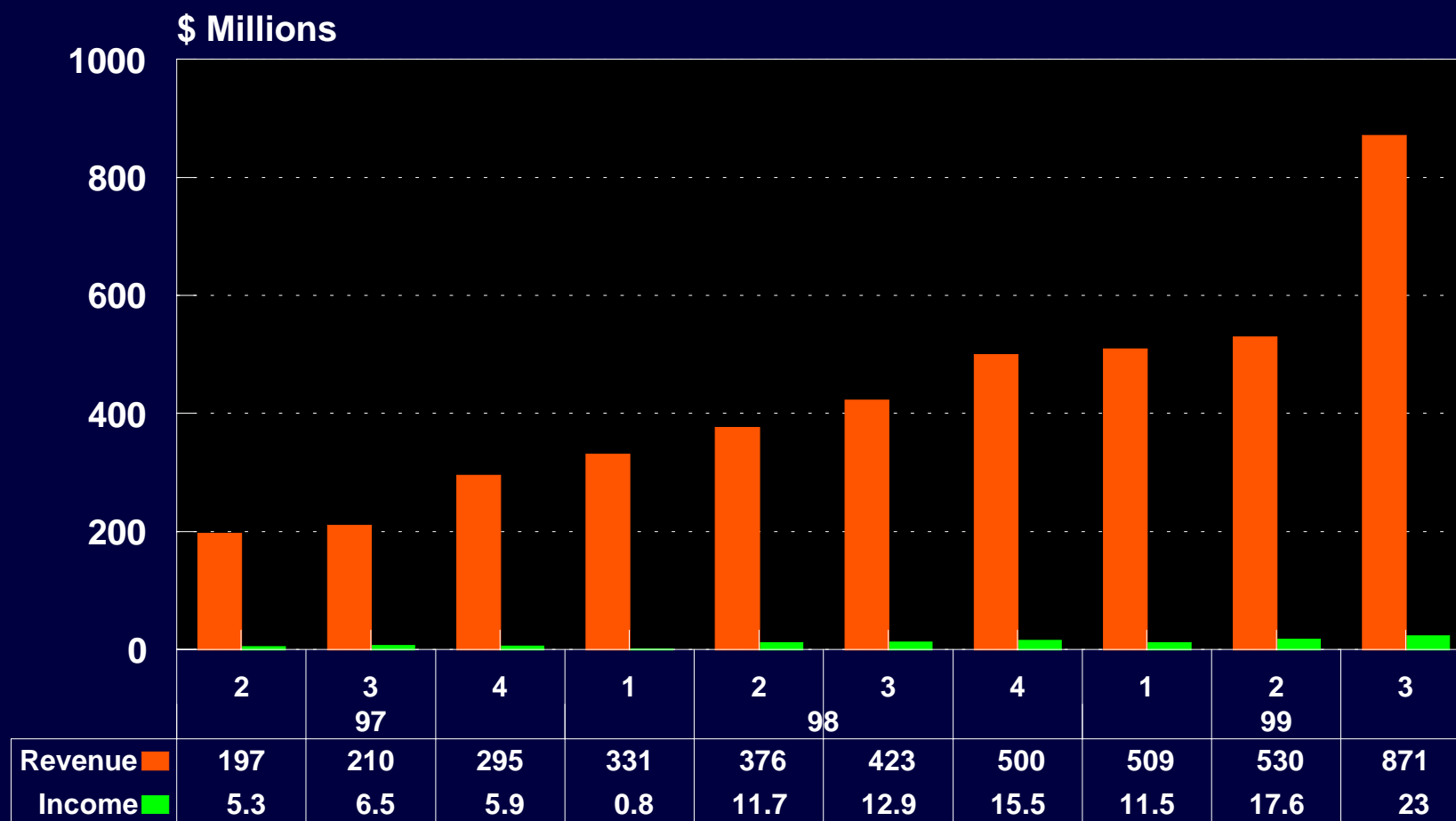
FY=CY

CY

T:CMS

Flextronics

Revenue & Net Income



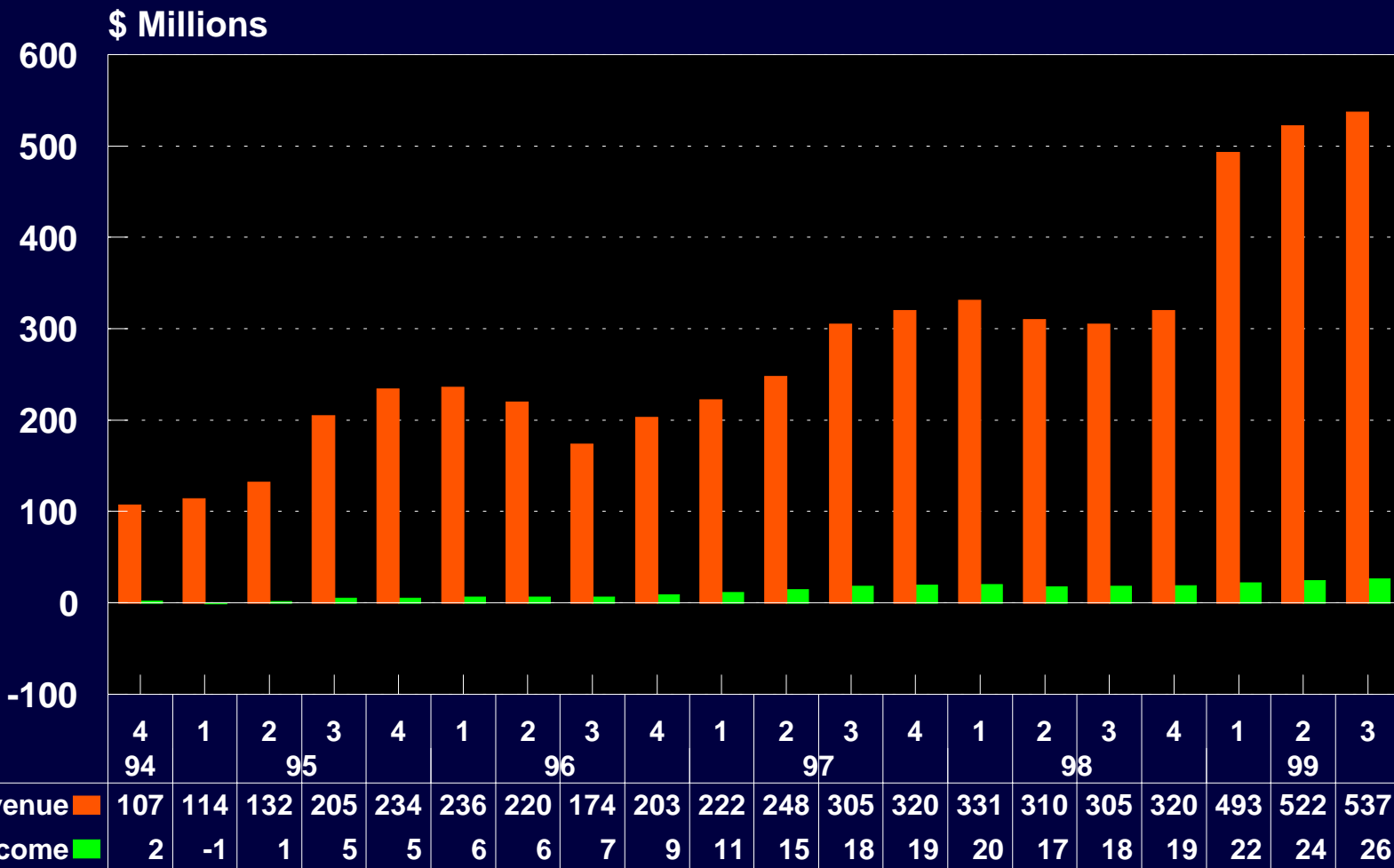
FY ends 3/31

CY

FLEX

JABIL CIRCUIT INC

Revenue & Net Income



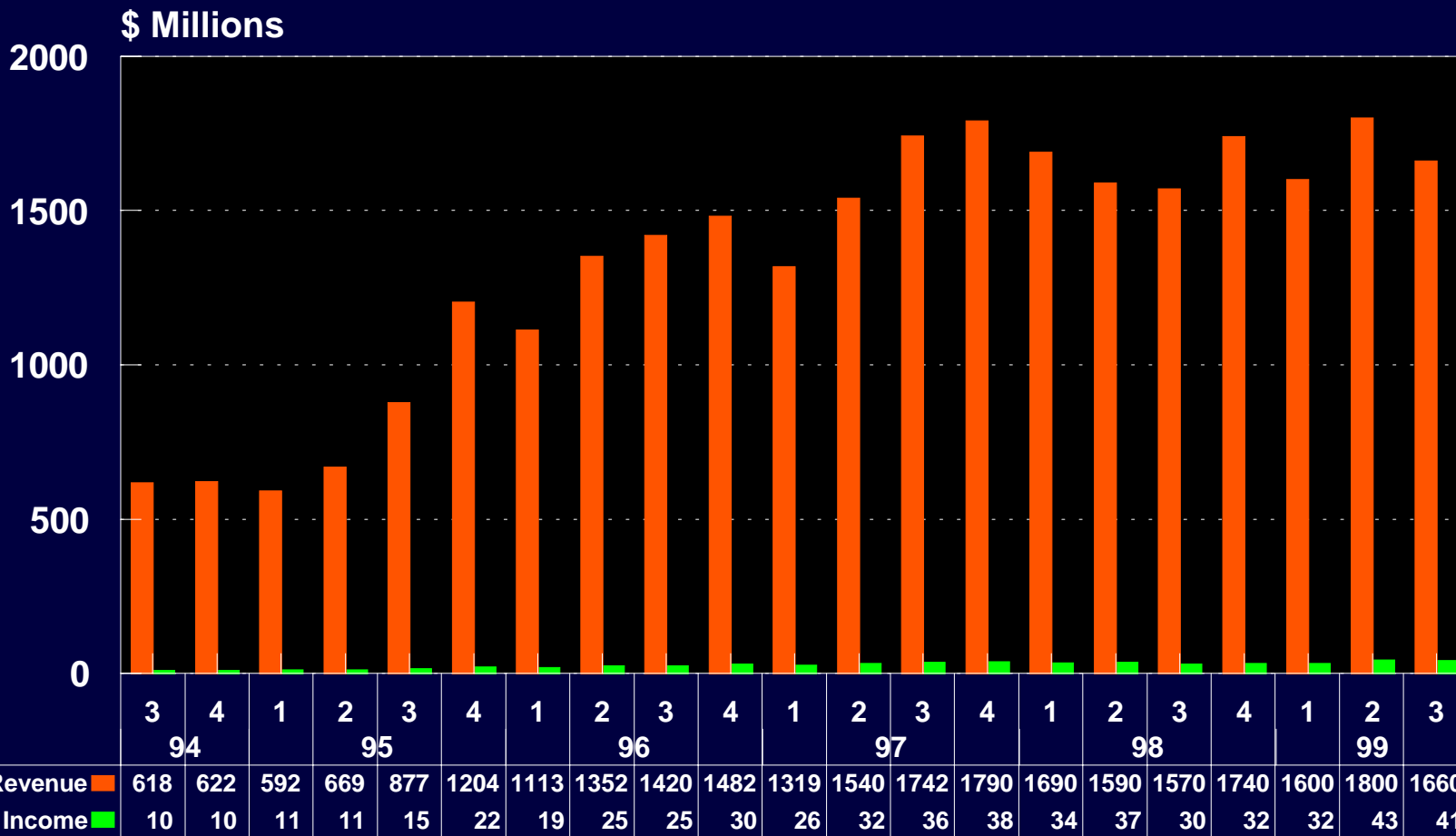
CY

FY ends August

JBIL

SCI Systems

Revenue & Net Income



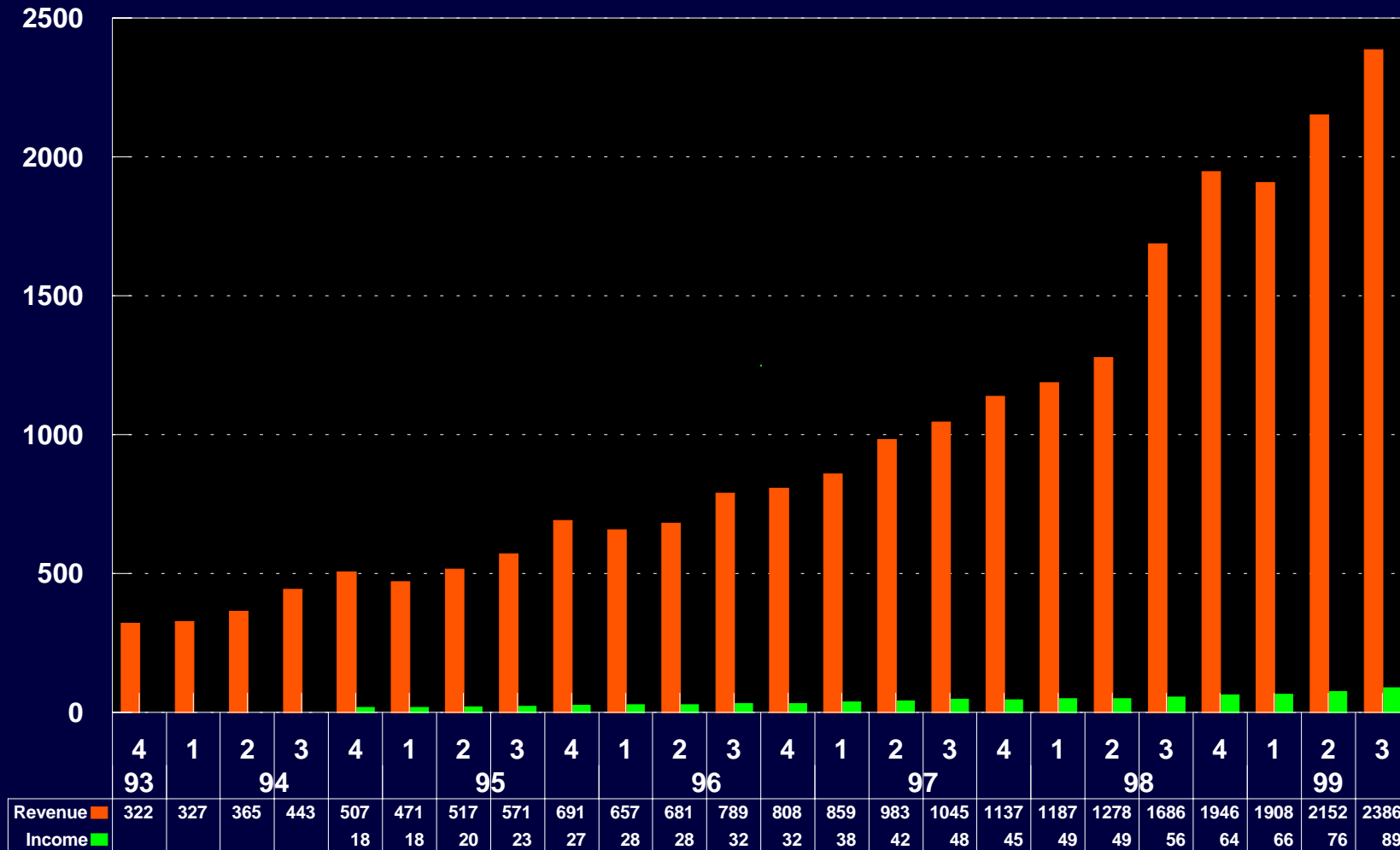
FY ends 6/30

CY

SCI

SOLECTRON

Revenue & Net Income

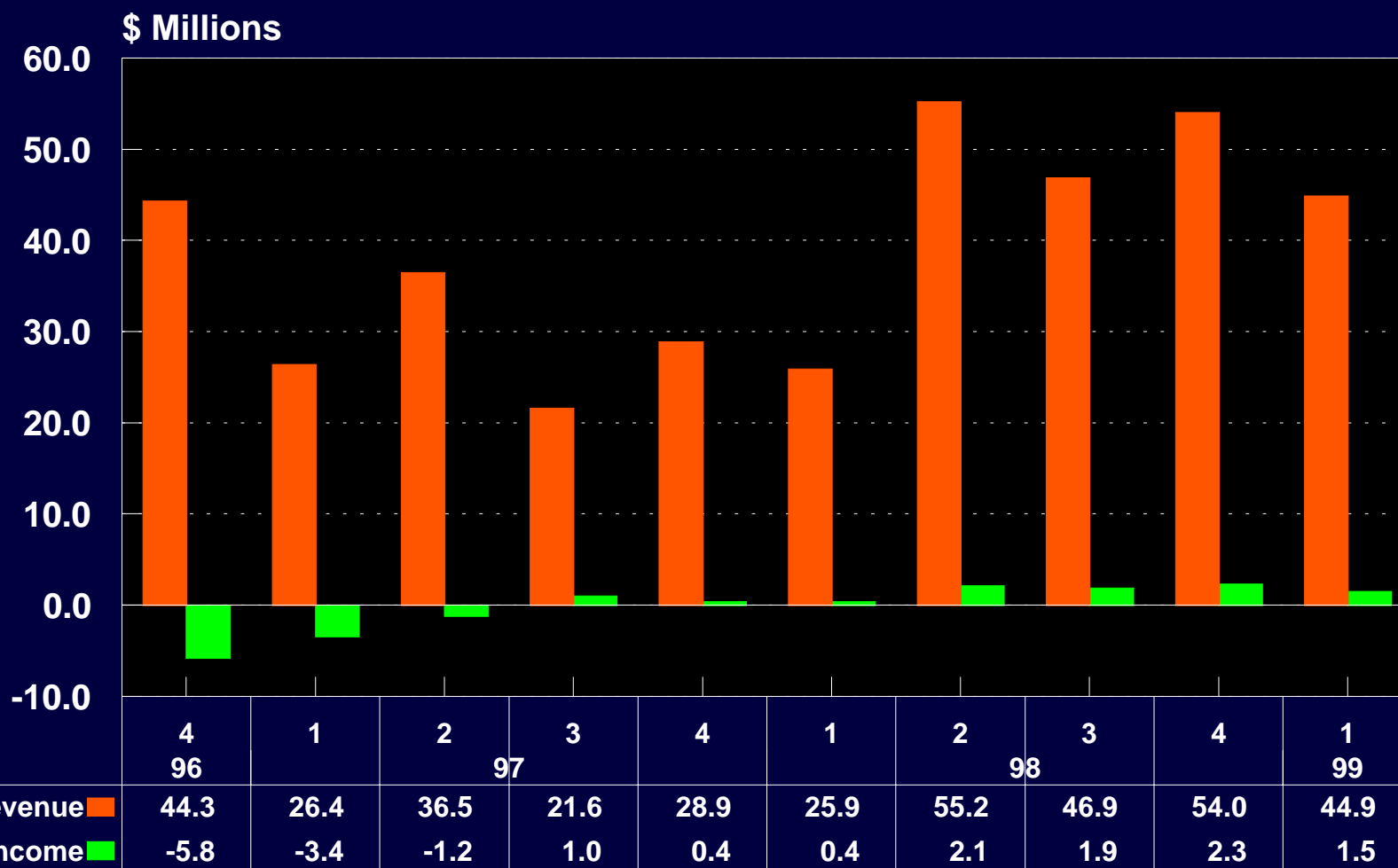


FY ends in August

SLR

Sypris Solutions (formerly Group Technologies)

Revenue & Net Income

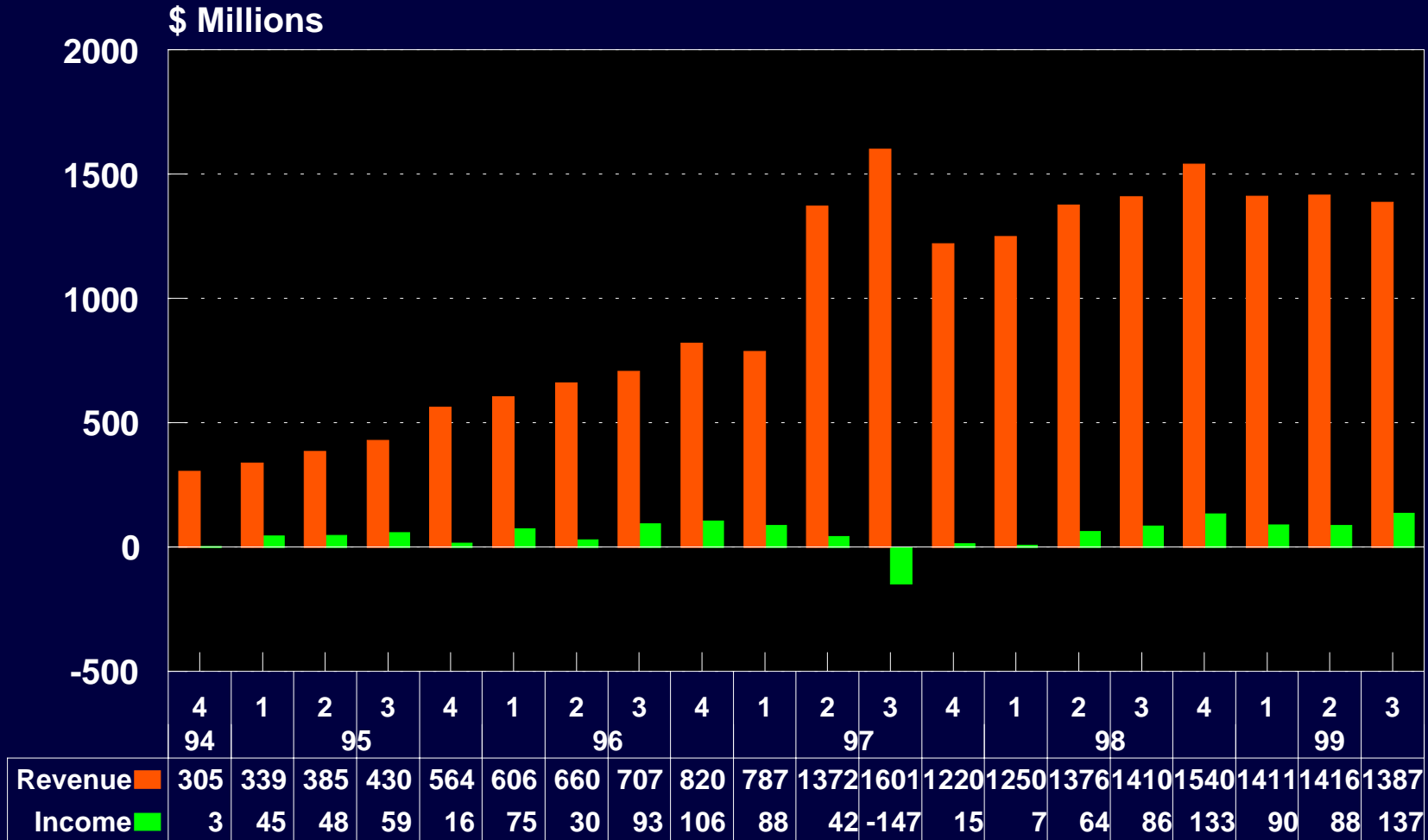


CY

SYPR

3COM CORP.

Revenue & Net Income



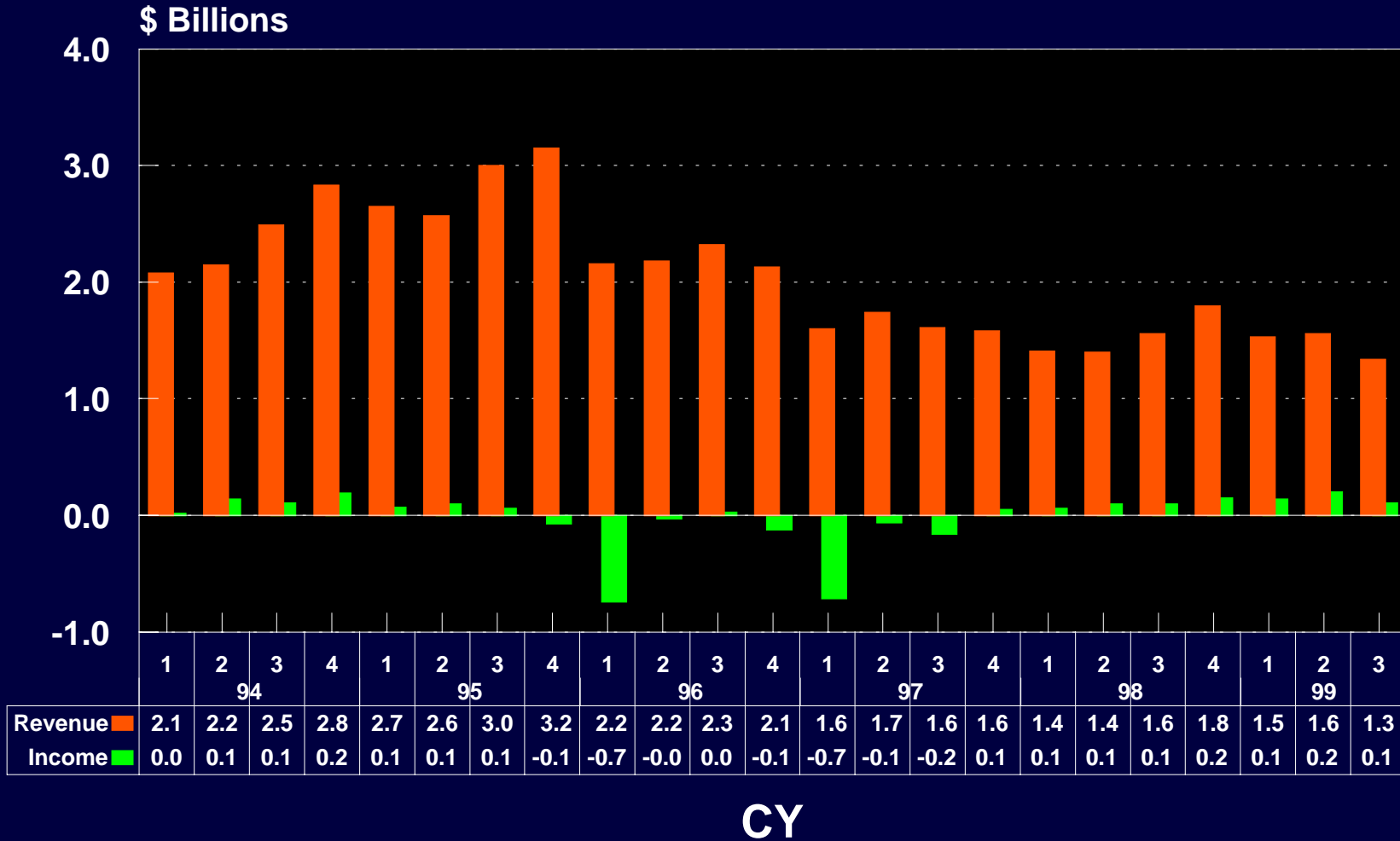
FY ends May

CY

COMS

Apple Computer

Revenue & Net Income

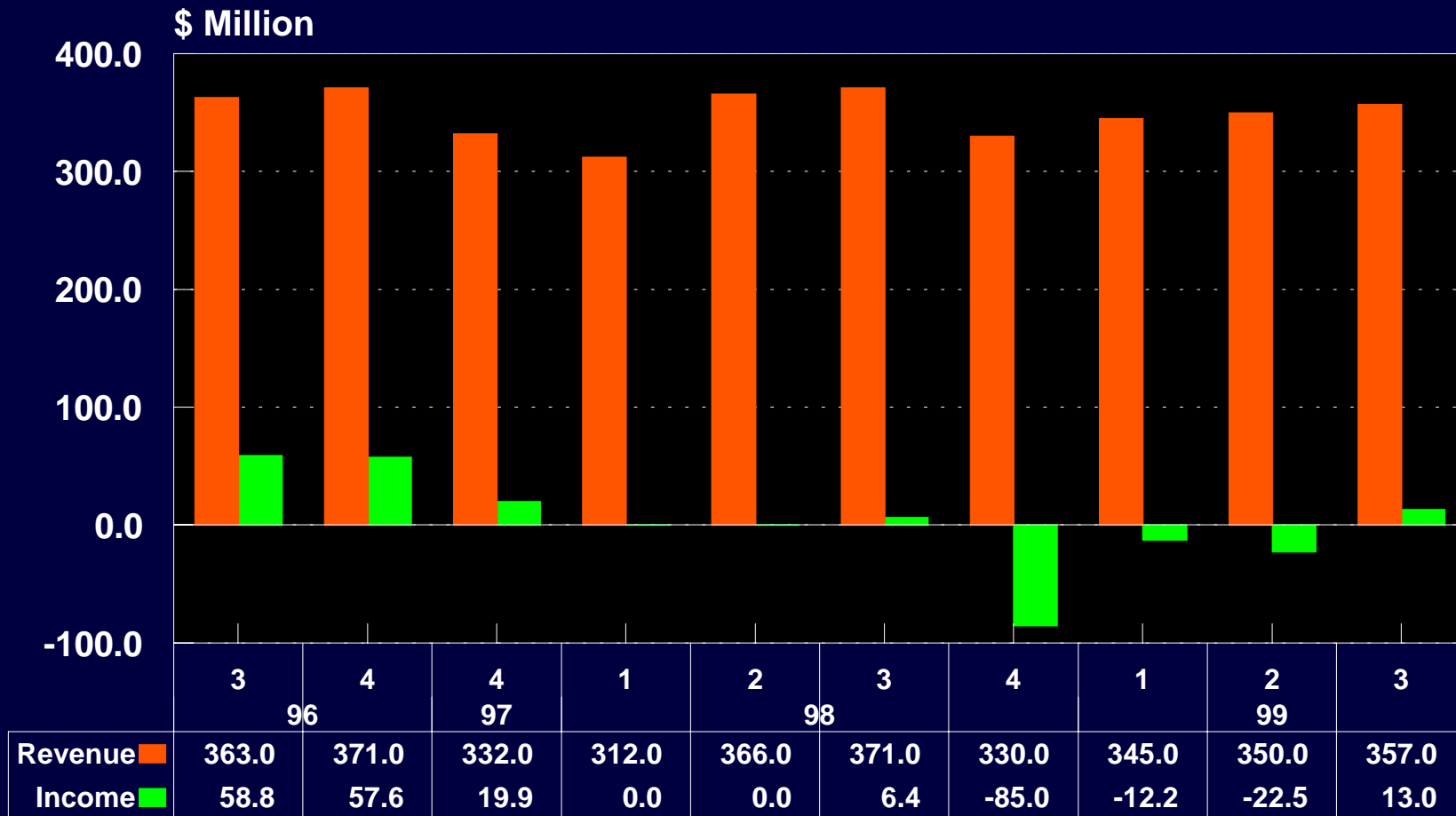


FY ends September

AAPL

Cabletron

Revenue & Net Income



CY

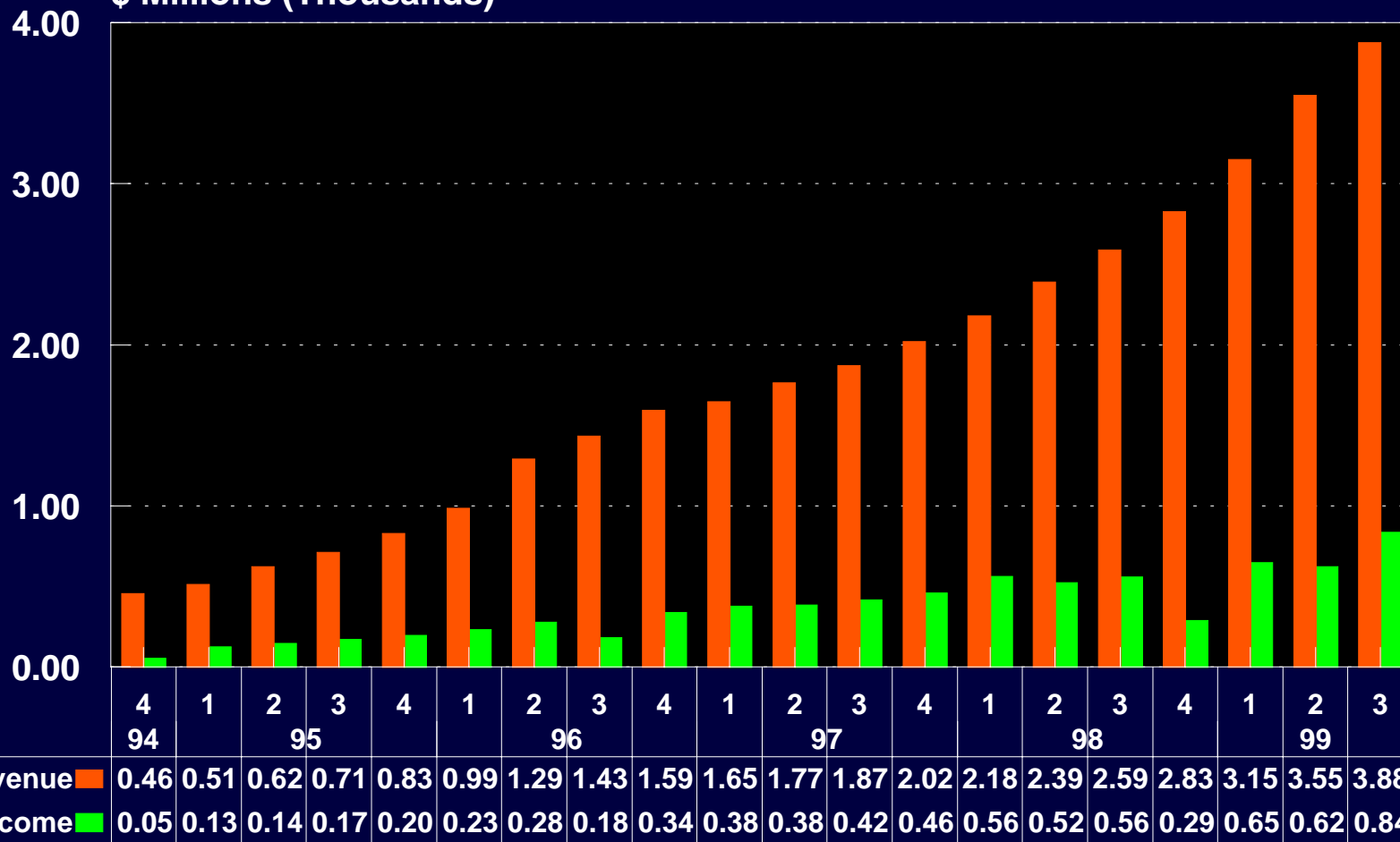
CS

FY ends Feb 28

CISCO SYSTEMS

Revenue & Net Income

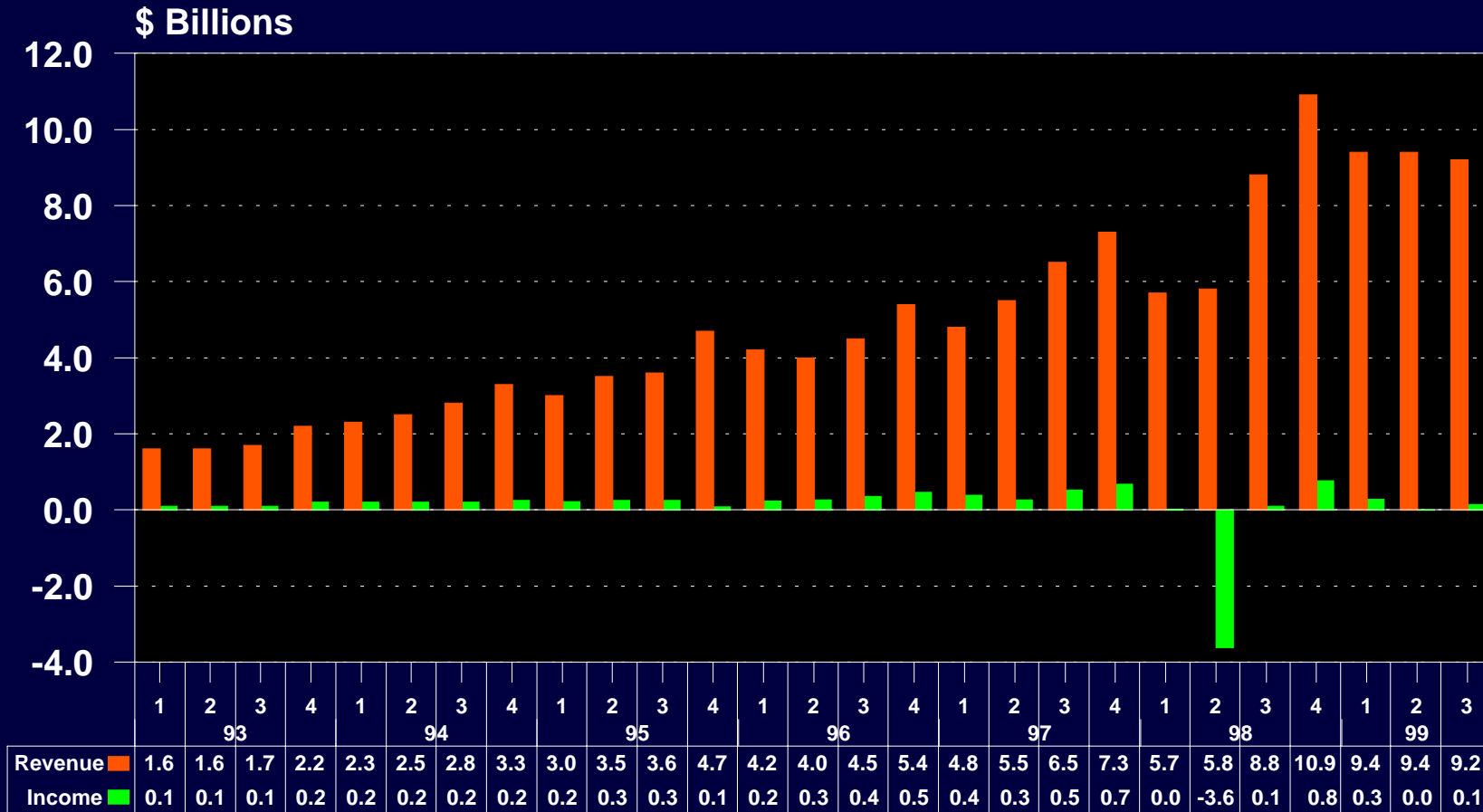
\$ Millions (Thousands)



CY

CSCO

Compaq Computer Revenue & Net Income



CY

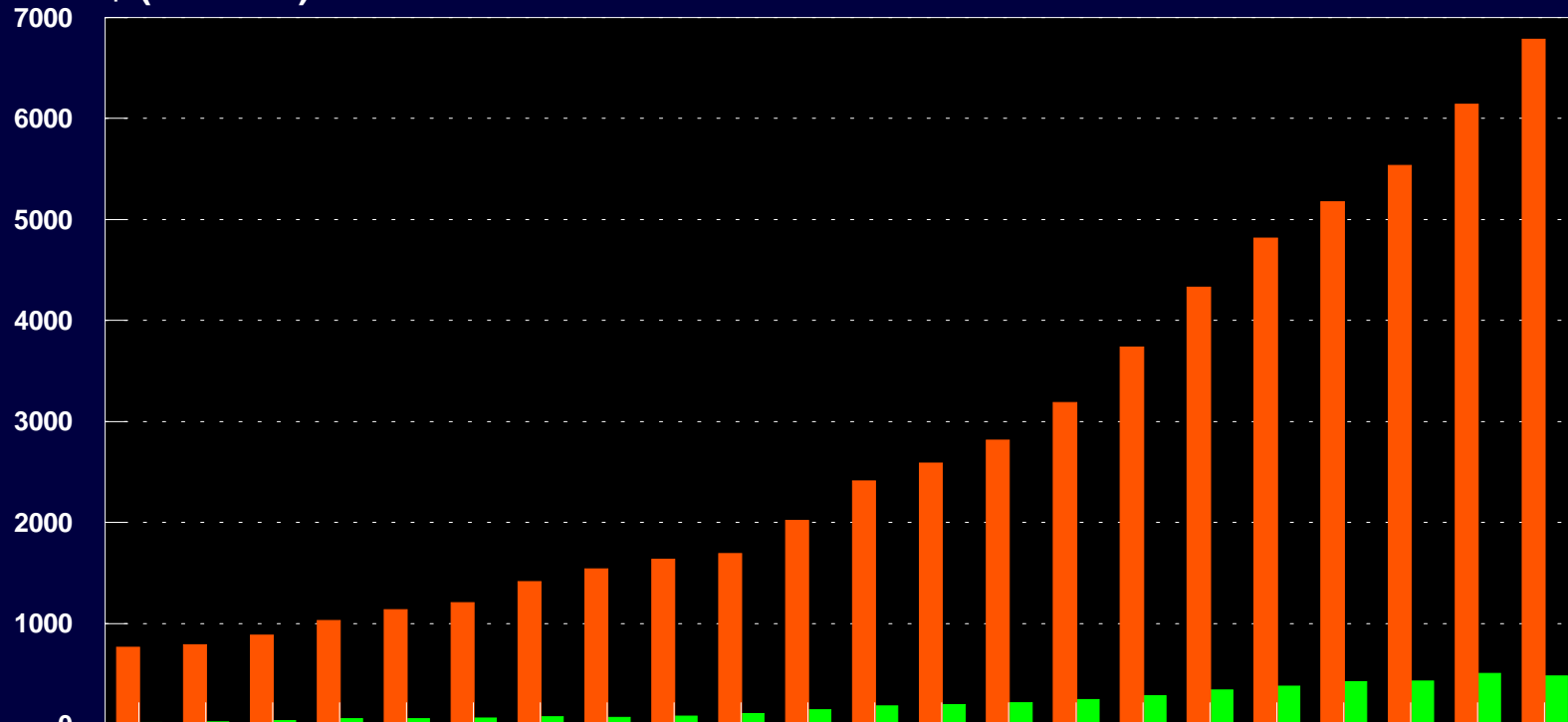
FY=CY

CPQ

DELL COMPUTER

Revenue & Net Income

\$ (Millions)



	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	
	94			95			96			97			98			99							
SALES	767	792	885	1033	1136	1206	1416	1539	1638	1690	2019	2412	2588	2814	3188	3737	4331	4818	5173	5537	6142	6784	
PROFITS	19	29	41	58	62	65	75	70	82	112	149	188	198	214	248	285	346	384	425	434	507	483	

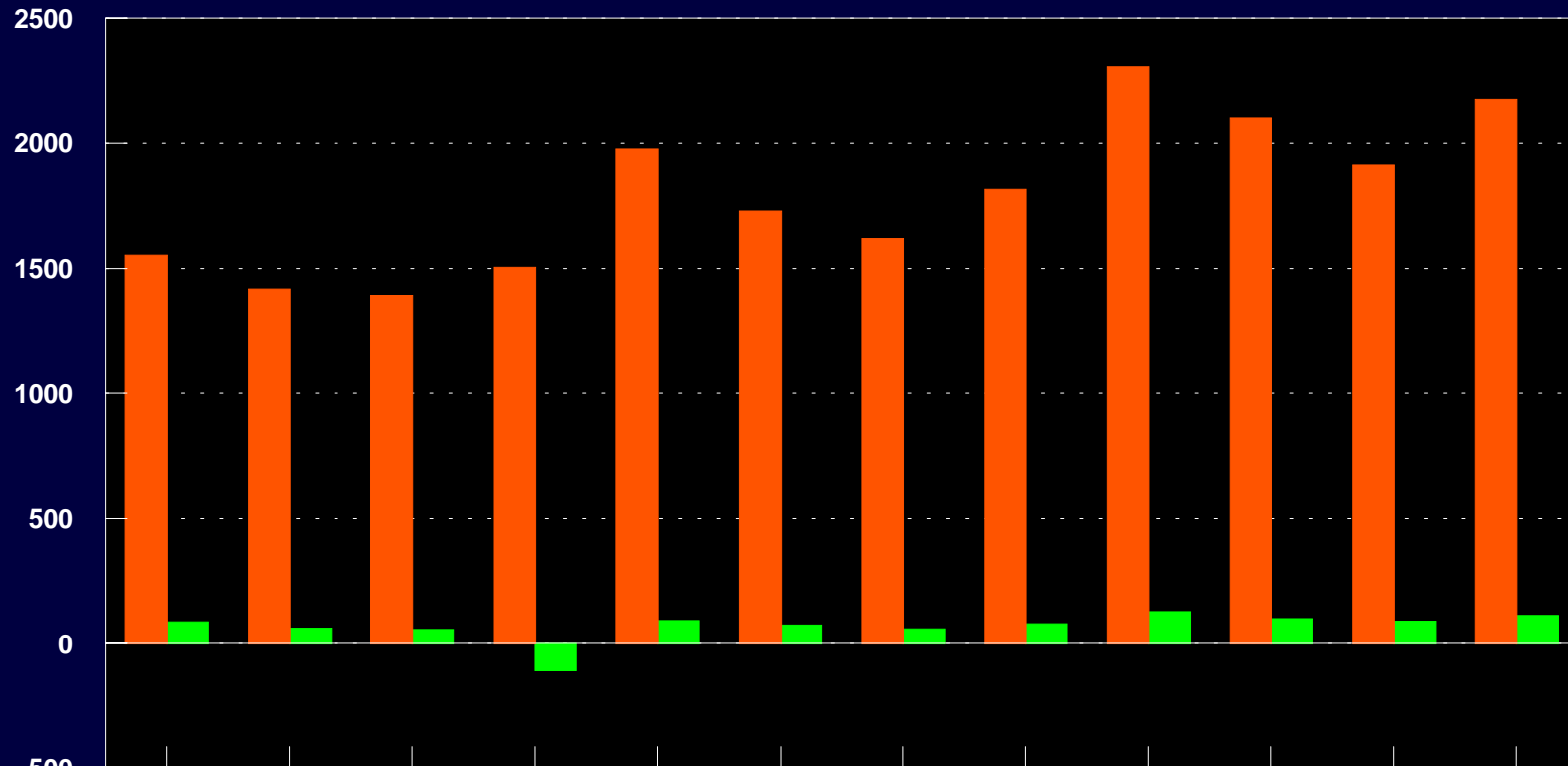
CY

DELL

FY ends October

Gateway 2000

Revenue & Net Income



	4 96	1	2 97	3	4	1 98	2 96	3 98	4	1	2 99	3
SALES	1553	1419	1393	1505	1977	1728	1619	1816	2306	2103	1912	2178
PROFITS	88.1	62.5	56.5	-107.1	92.9	75.9	60.7	80.6	129	99.6	89.2	113.2

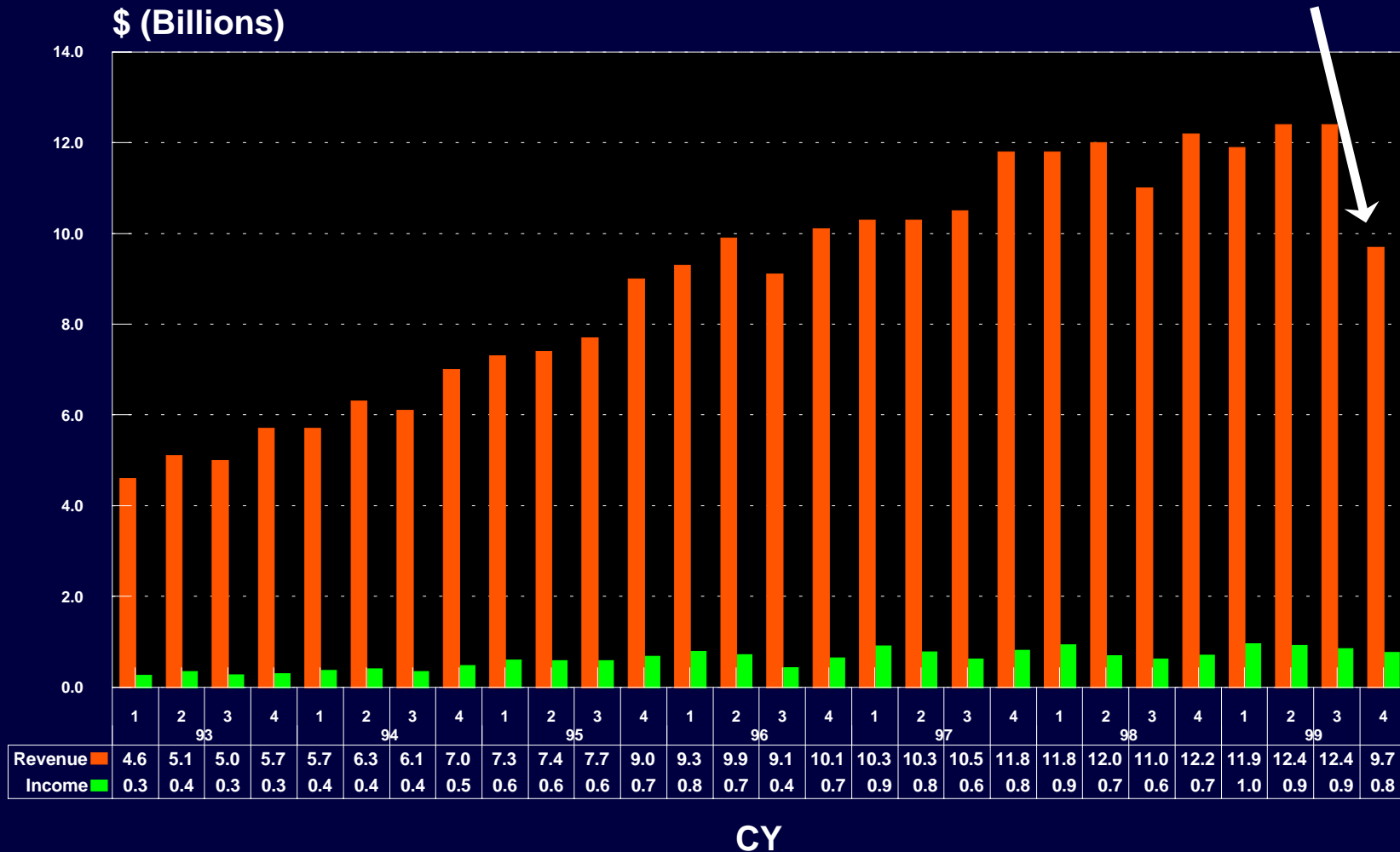
CY

GTW

Hewlett-Packard

Revenue & Net Income

De-merger

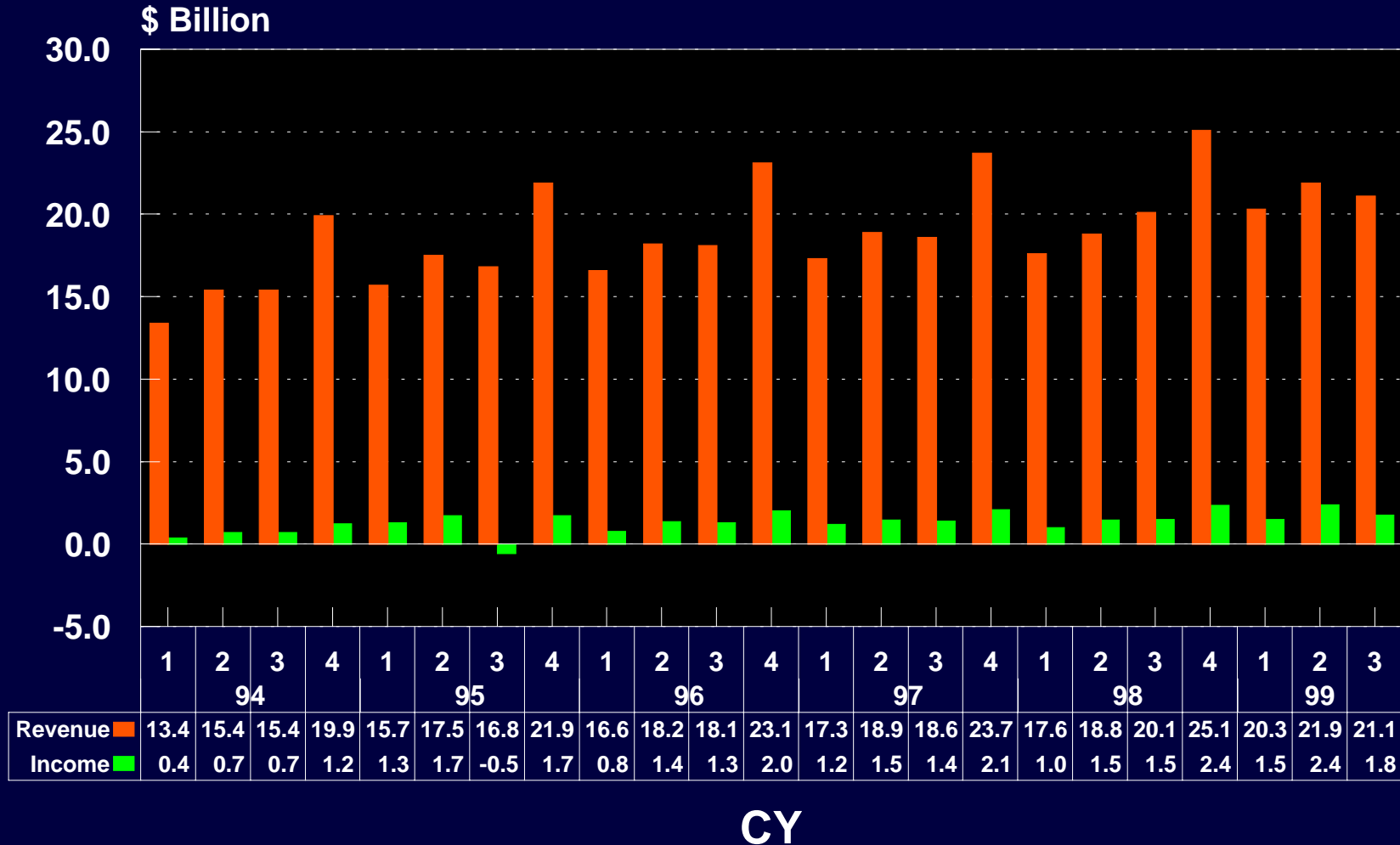


FY ends October

HWP

IBM

Revenue & Net Income

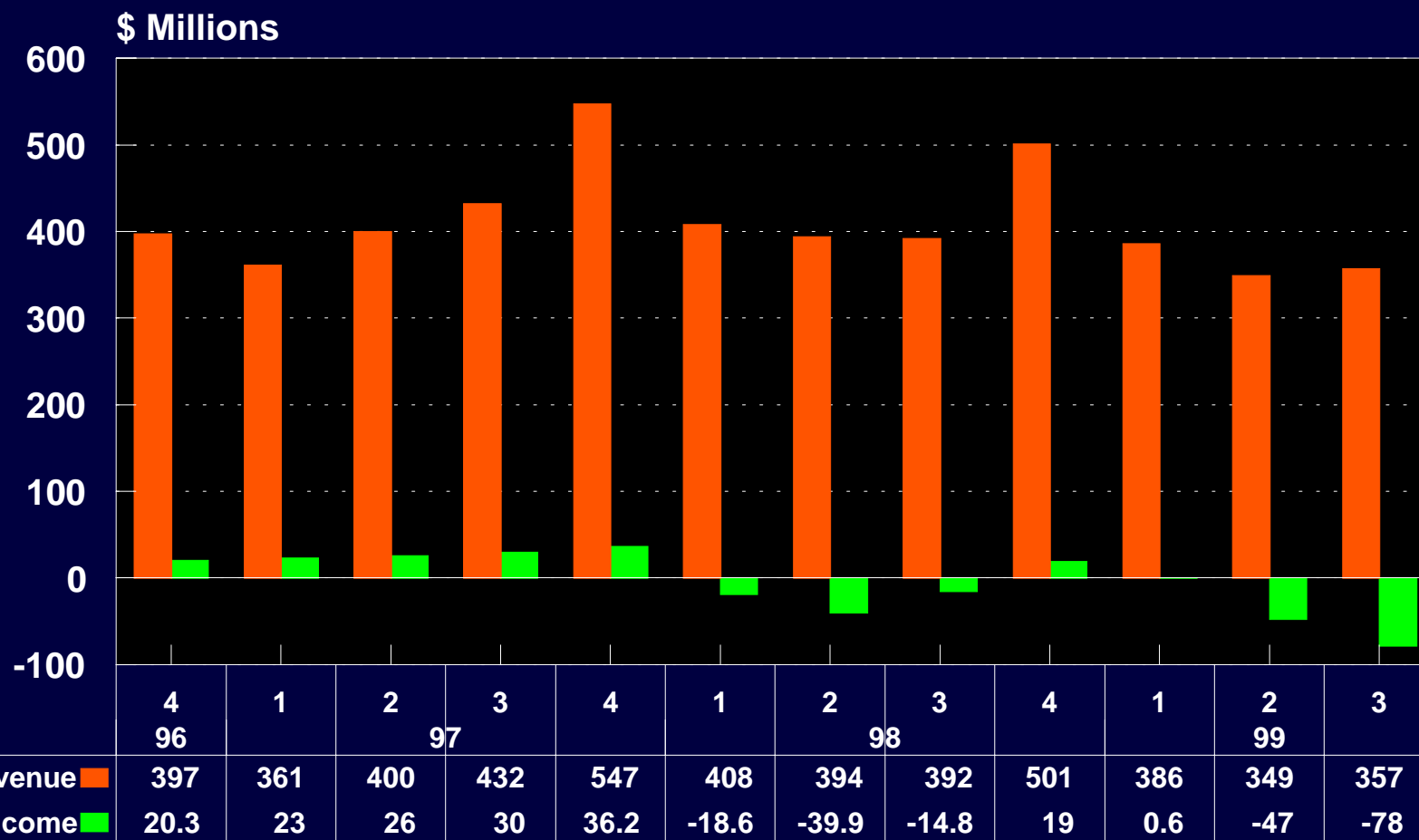


FY=CY

IBM

Iomega

Revenue & Net Income



CY

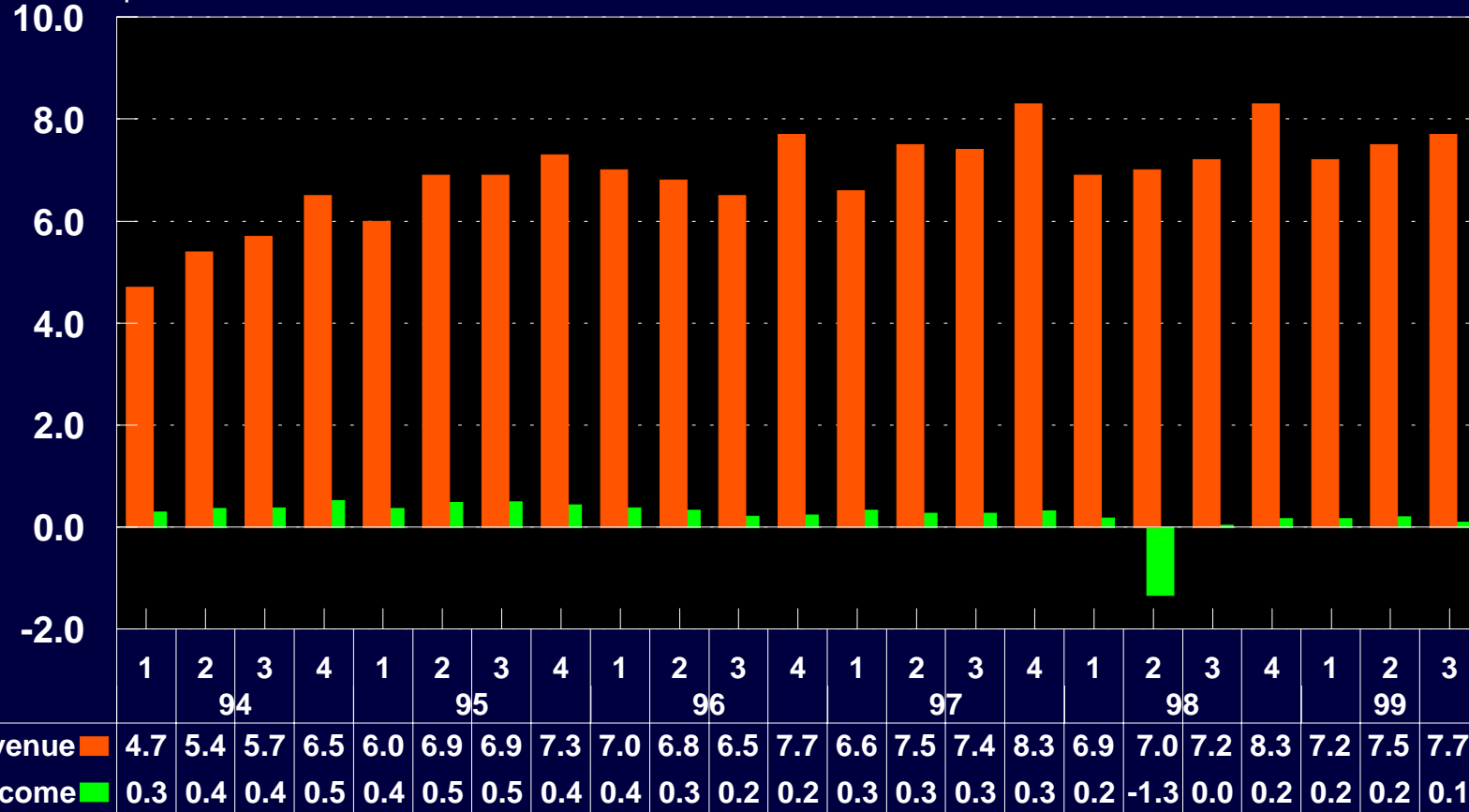
FY = CY

IOM

Motorola

Revenue & Net Income

\$ Billions



CY

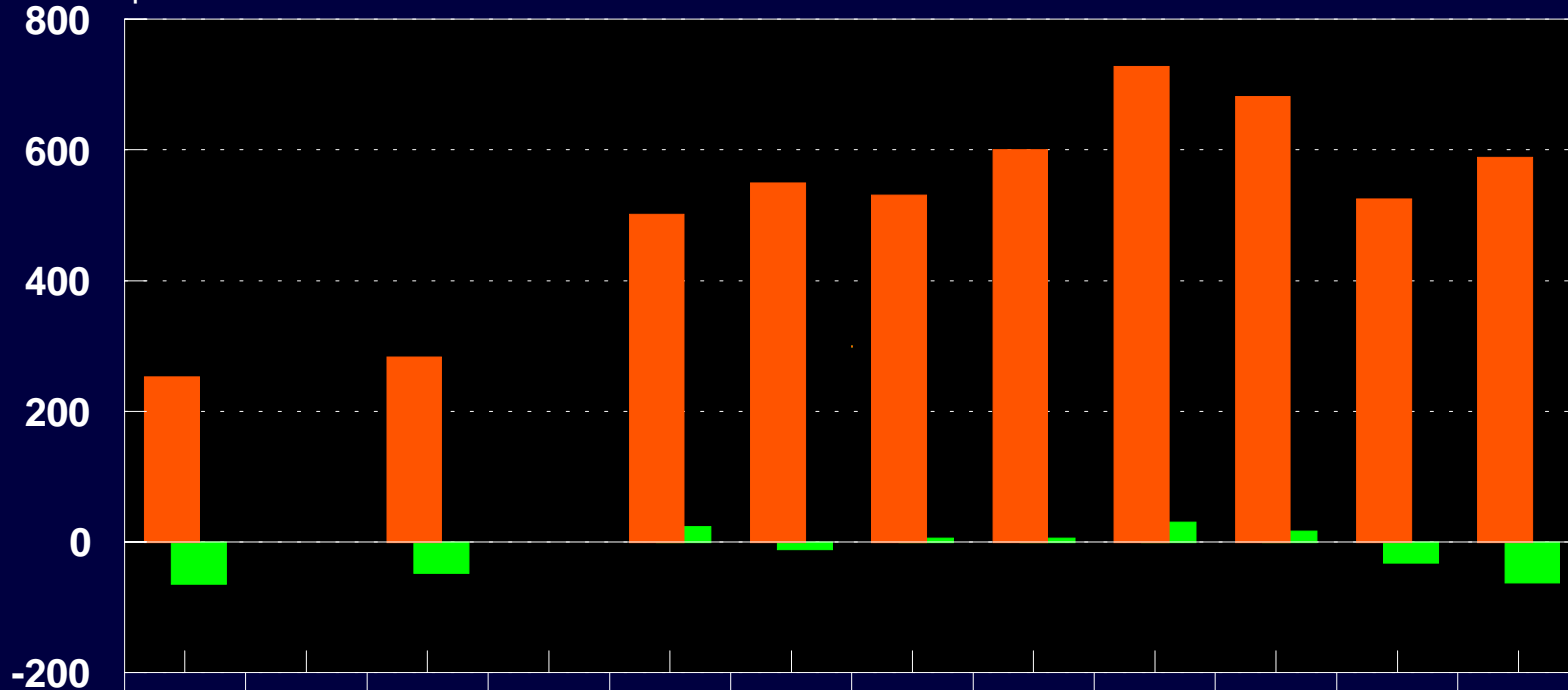
FY=CY

MOT

Maxtor

Revenue & Net Income

\$ Millions



	4 96	1 97	2 97	3 97	4 97	1 98	2 98	3 98	4 98	1 99	2 99	3 99
Revenue	253		283		502	550	531	600	728	682	525	589
Income	-64		-47		23	-10	5	6	30	17	-31	-62

CY

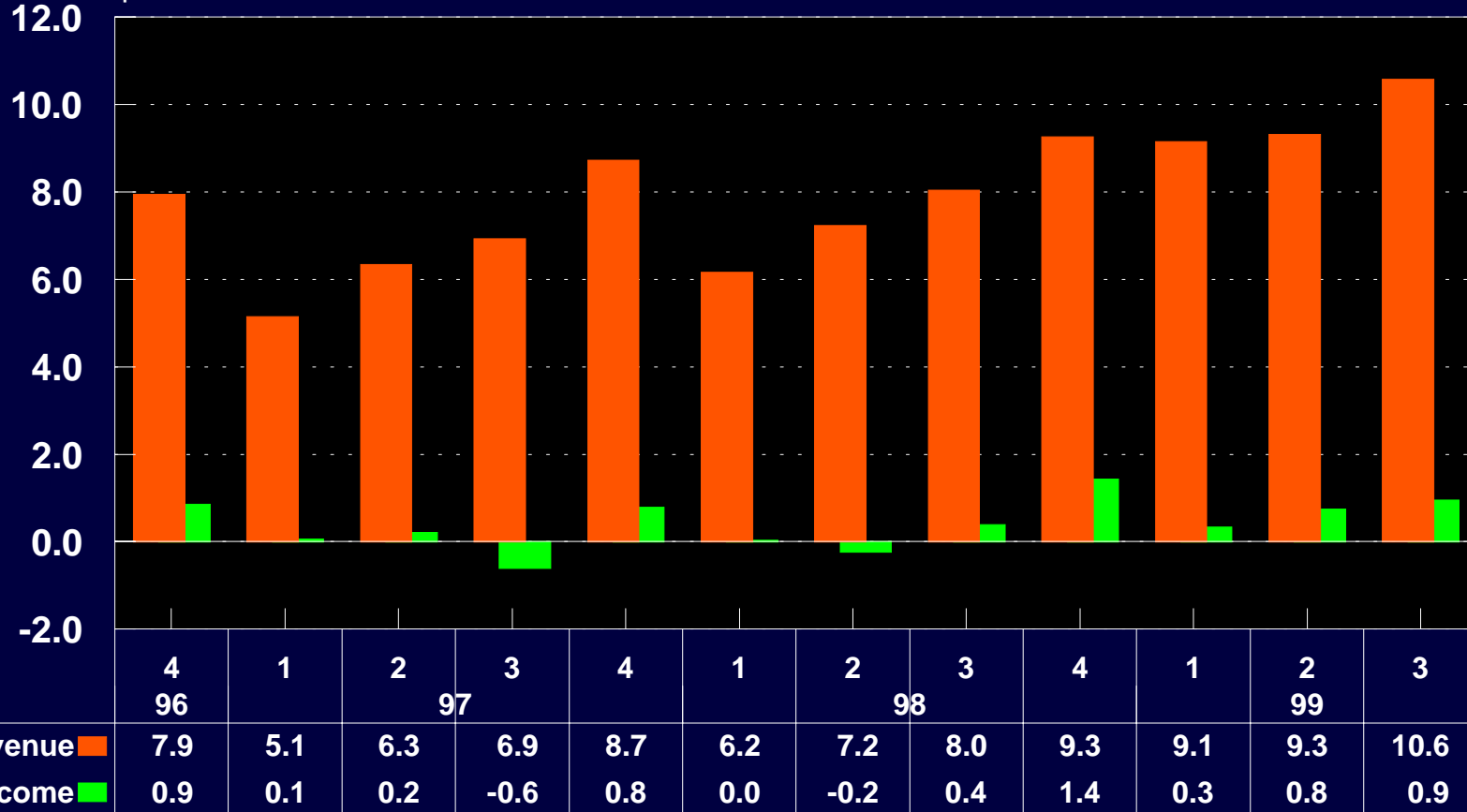
FY ends June

MXTR

Lucent Technologies

Revenue & Net Income

\$ Billions



CY

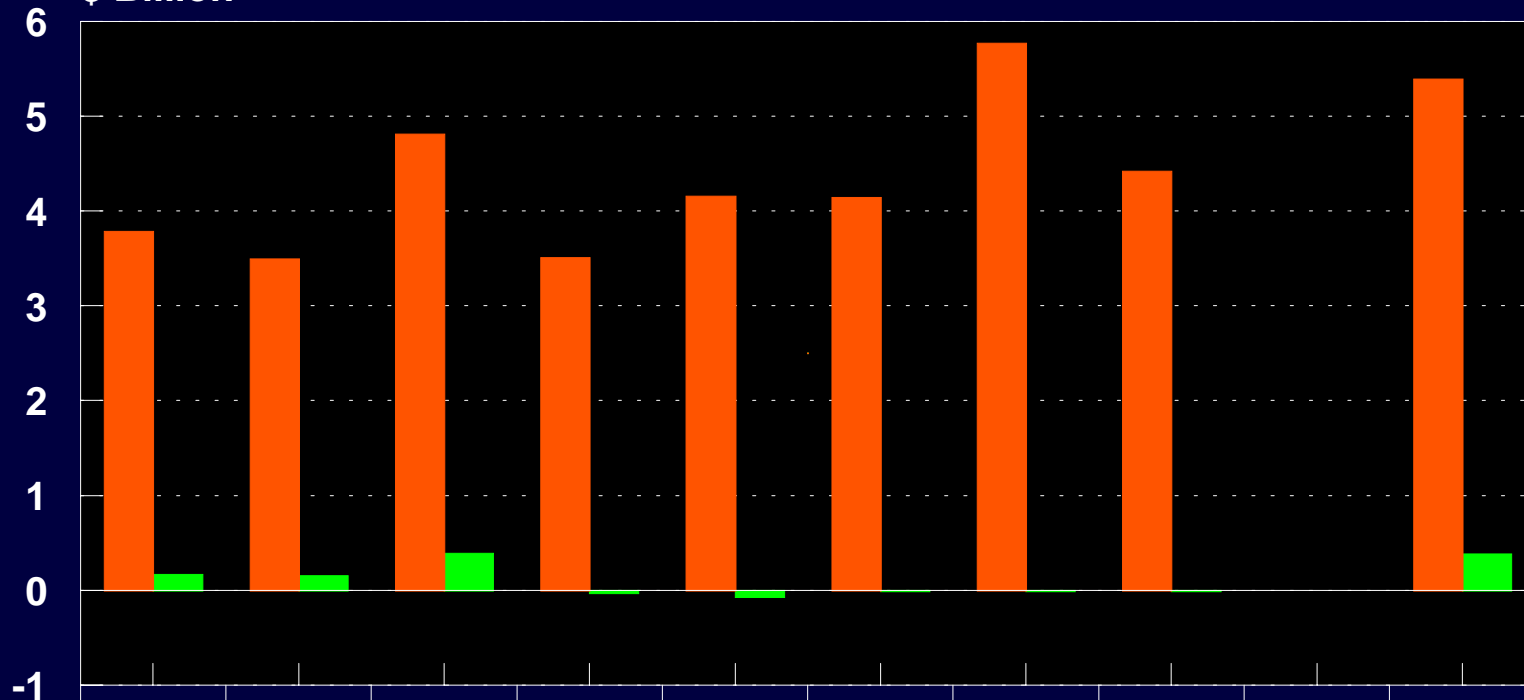
FY ends September

LU

Nortel Networks

Revenue & Net Income

\$ Billion



Revenue	3.787	3.498	4.811	3.51	4.156	4.141	5.768	4.418		5.39
Income	0.169	0.153	0.386	-0.032	-0.069	-0.008	-0.009	-0.007		0.38

CY

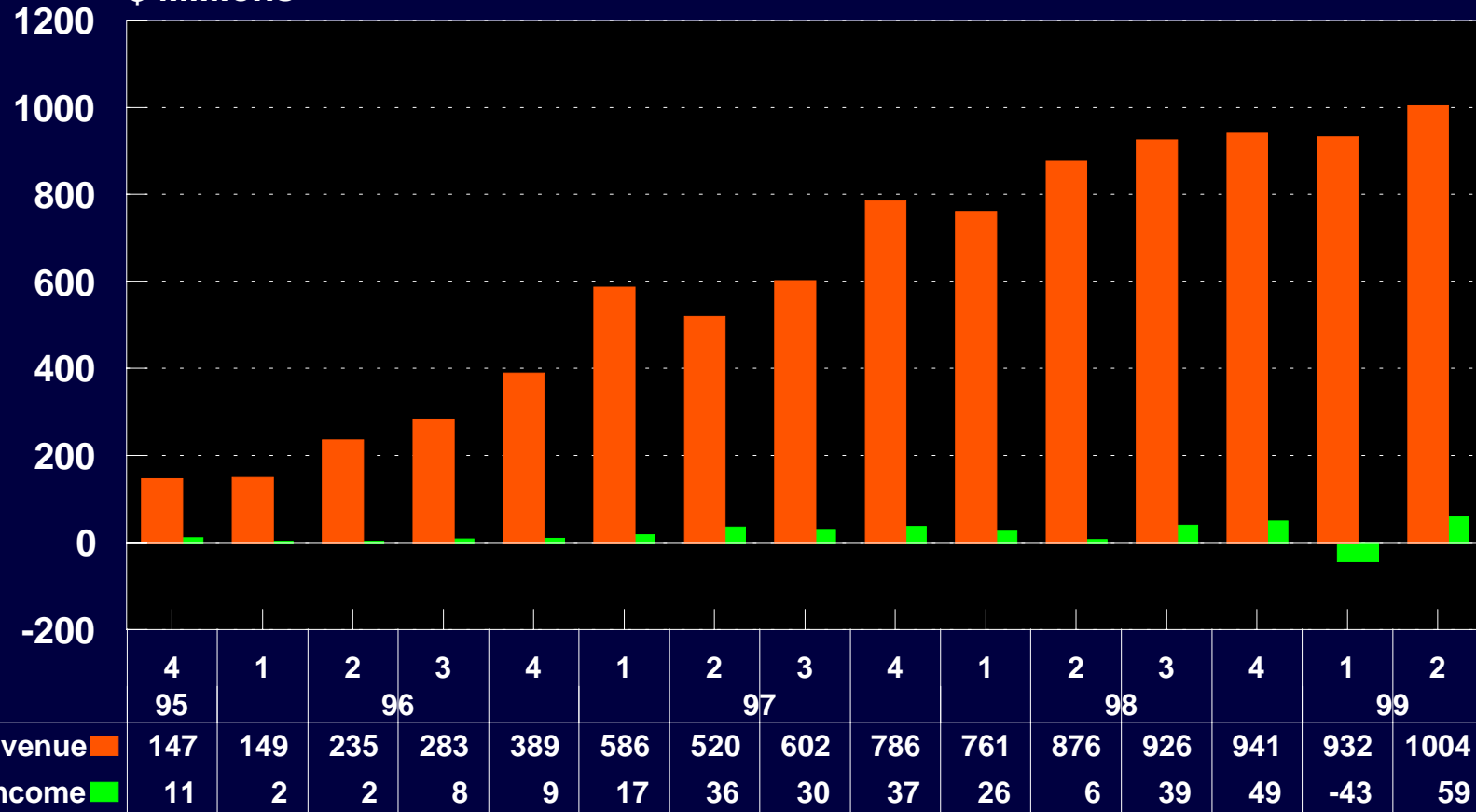
NT

FY=CY

QUALCOMM

Revenue & Net Income

\$ Millions



CY

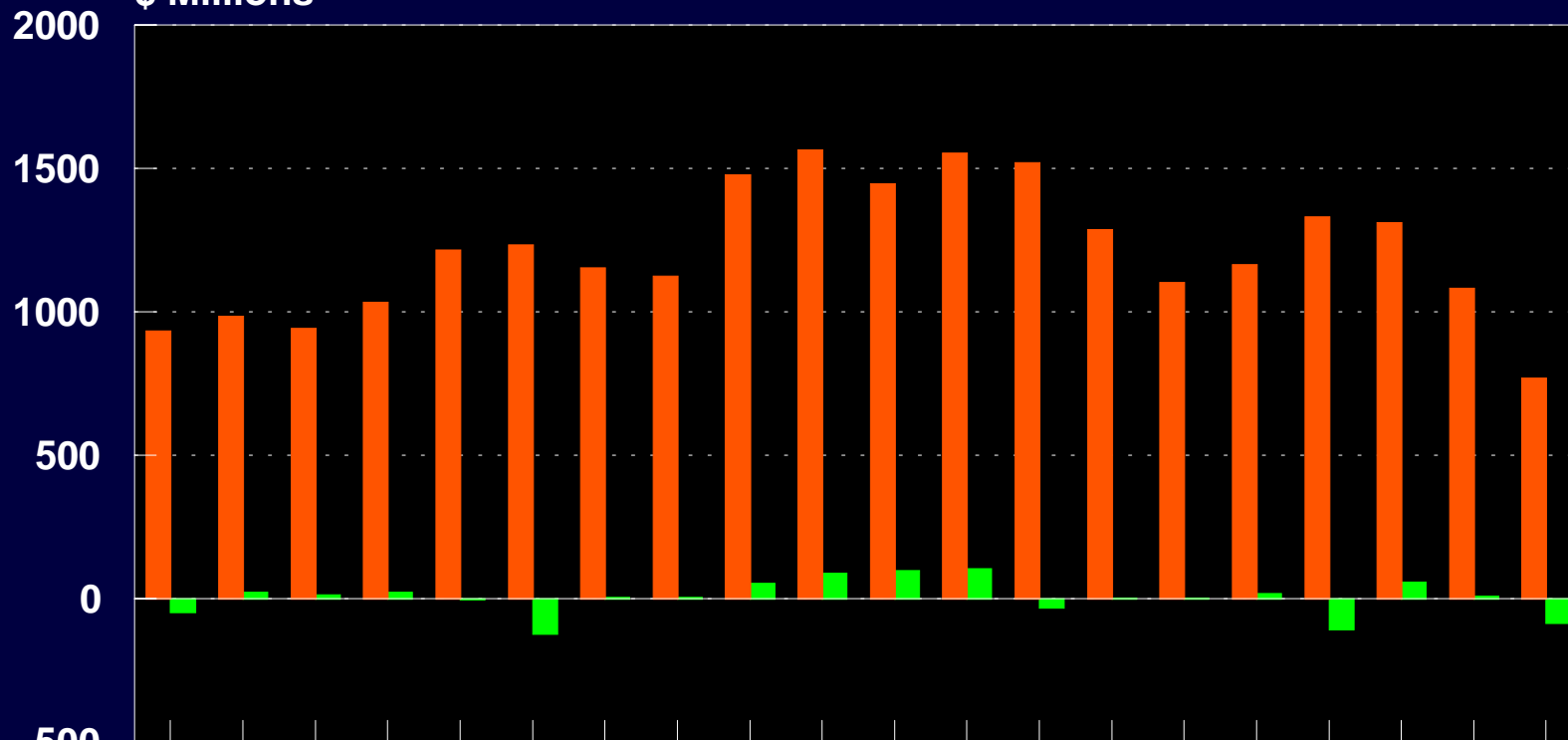
FY ends Sept 30

QCOM

Quantum Corp

Revenue & Net Income

\$ Millions



	4 94	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
Revenue	933	984	941	1033	1216	1233	1154	1124	1478	1564	1446	1554	1520	1286	1103	1165	1330	1310	1083	768
Income	-48	23	13	22	-3	-123	4	5	52	88	97	104	-32	3	3	17	-107	57	8	-84

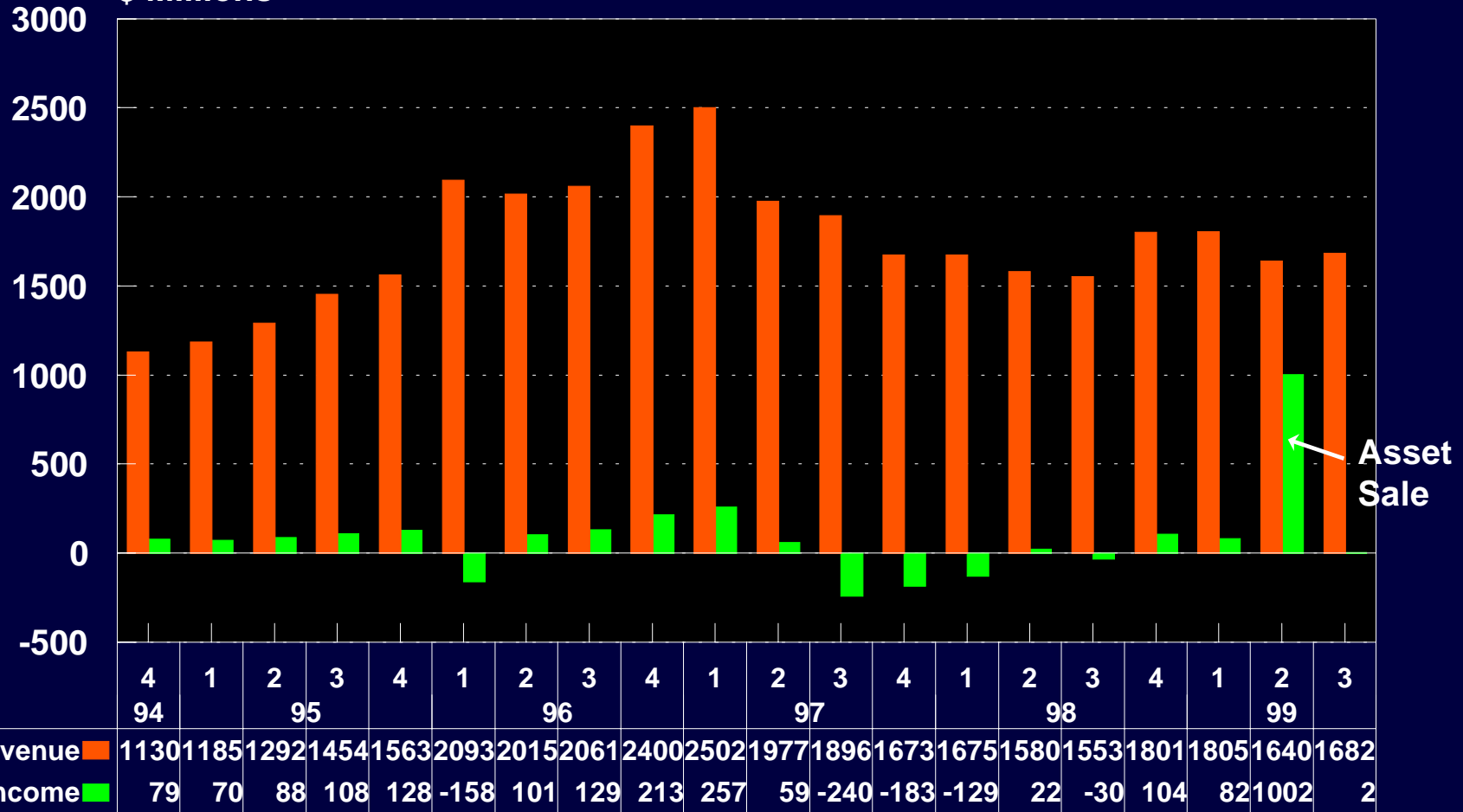
CY

QNTM

Seagate

Revenue & Net Income

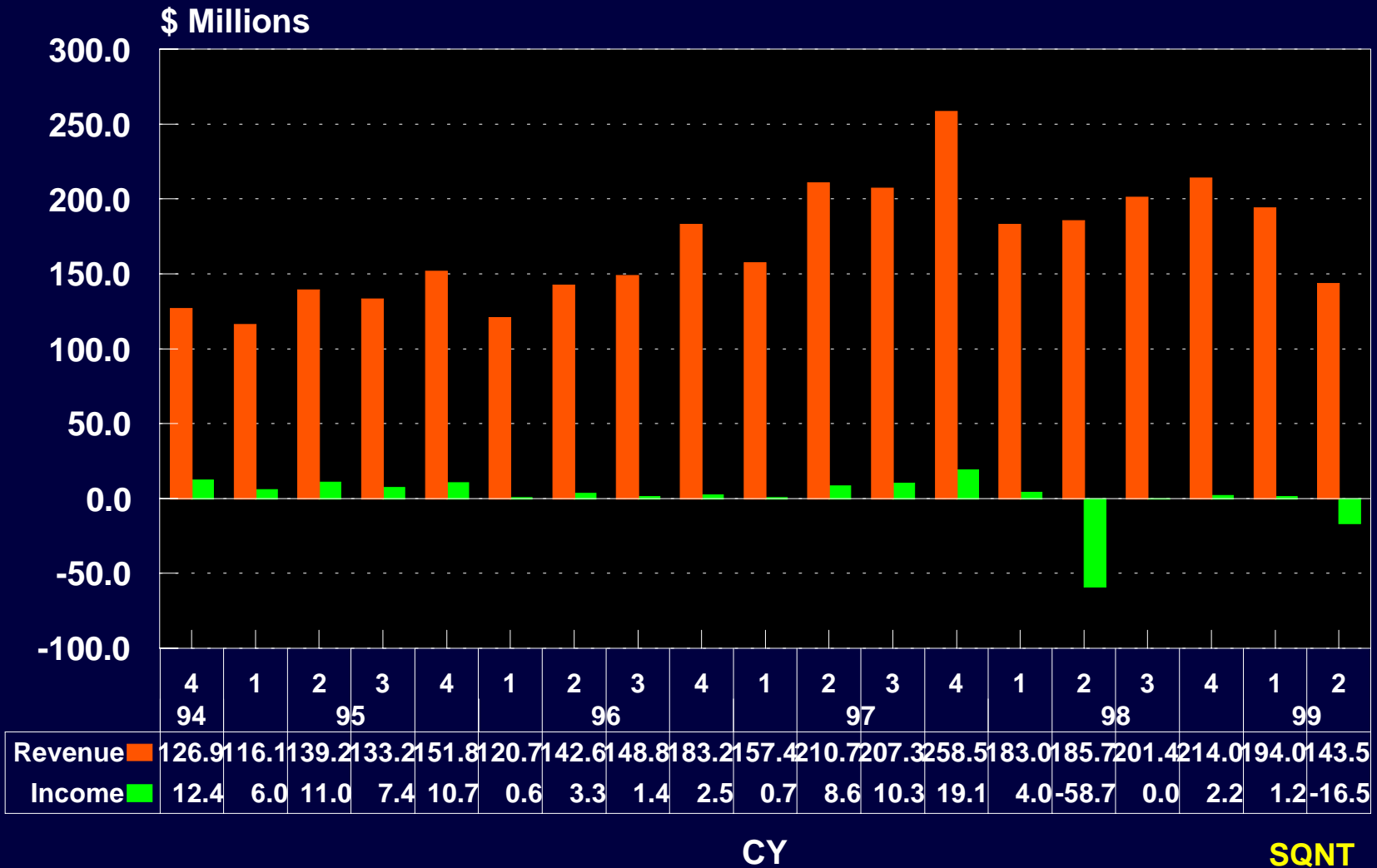
\$ Millions



CY

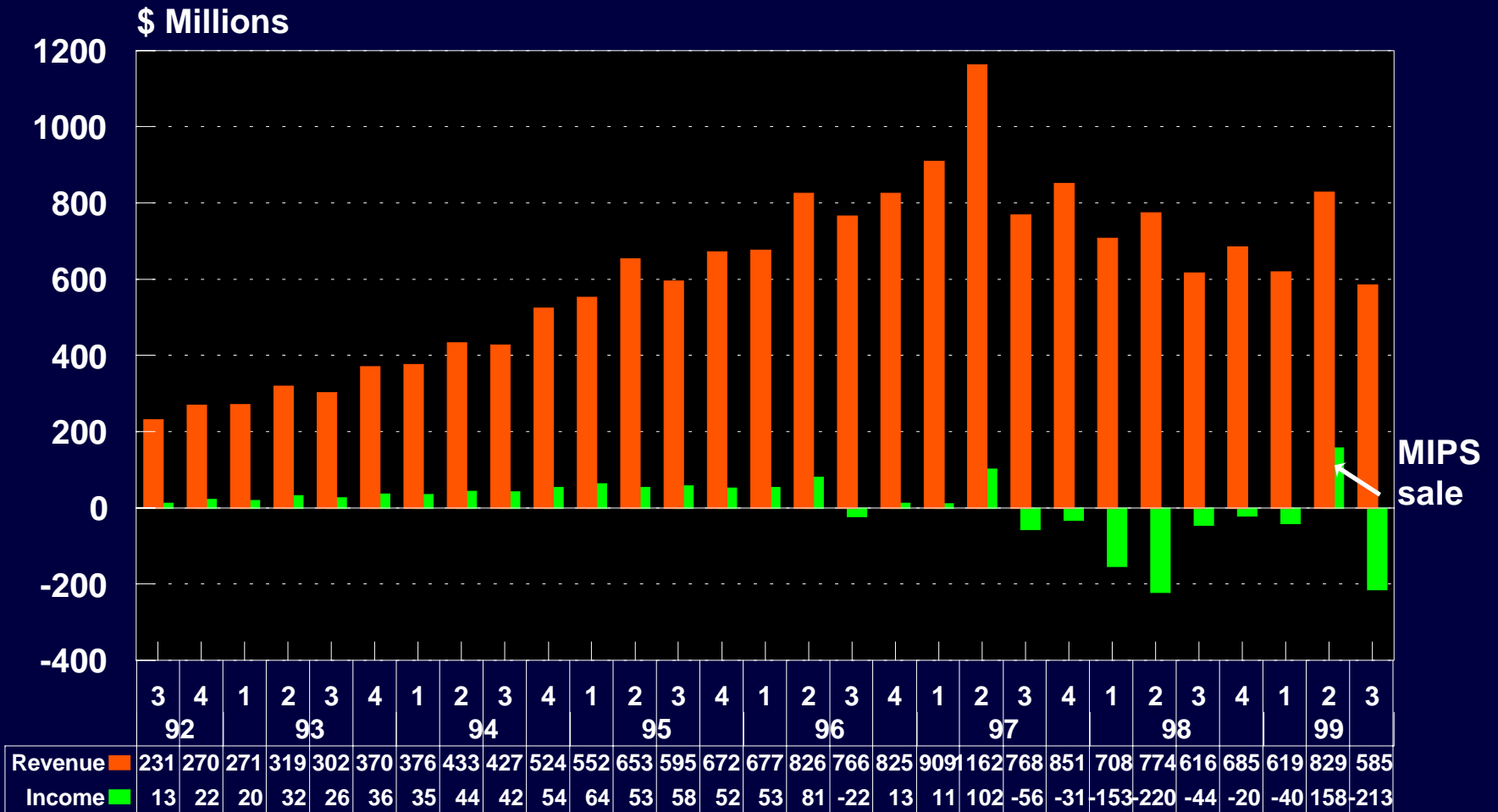
Sequent Computer Systems

Revenue & Net Income



Silicon Graphics

Revenue & Net Income



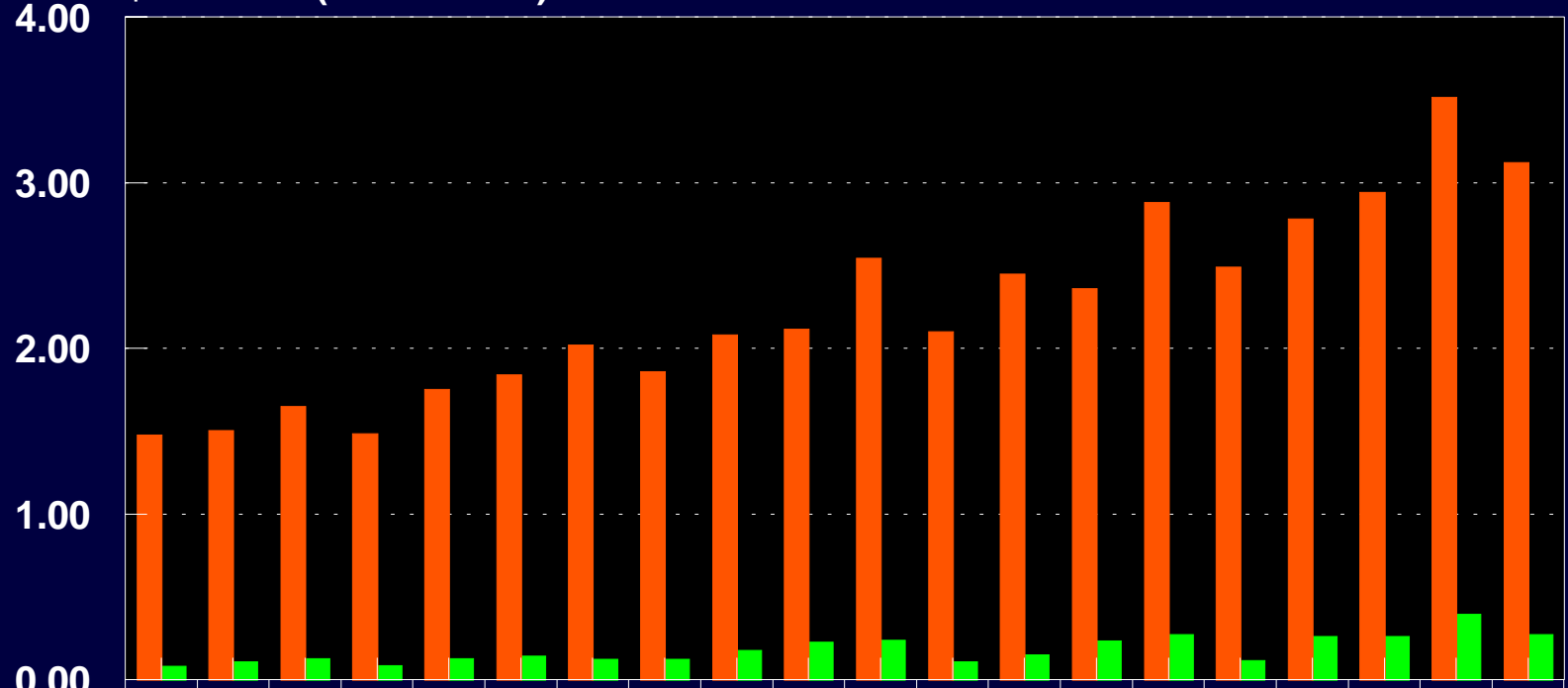
CY

SGI

Sun Microsystems

Revenue & Net Income

\$ Millions (Thousands)



Revenue	1.48	1.51	1.65	1.49	1.75	1.84	2.02	1.86	2.08	2.12	2.54	2.10	2.45	2.36	2.88	2.49	2.78	2.94	3.52	3.12
Income	0.08	0.11	0.13	0.09	0.13	0.14	0.12	0.12	0.18	0.22	0.24	0.11	0.15	0.23	0.27	0.11	0.26	0.26	0.40	0.27

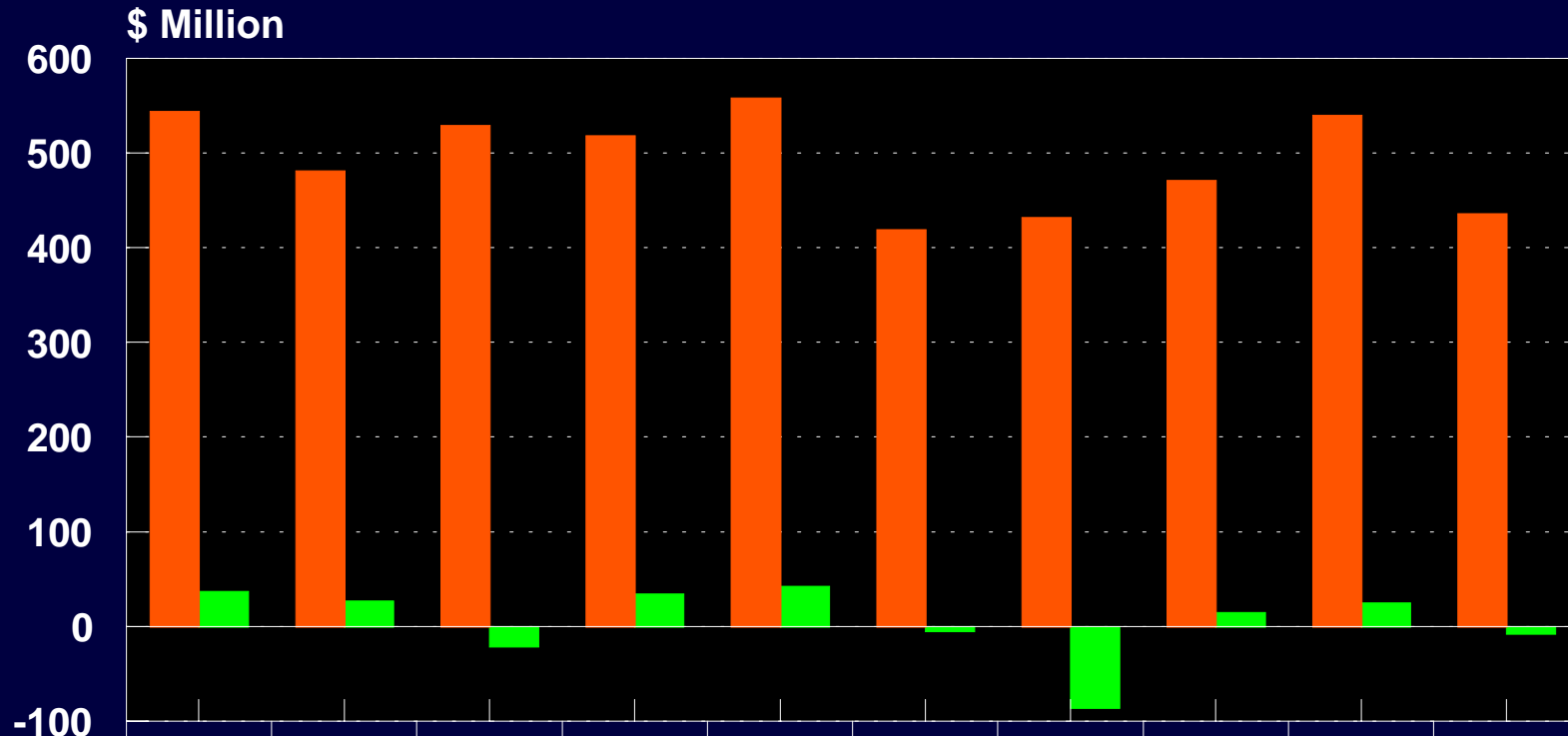
CY

FY ENDS 6/30

SUNW

Tektronix

Revenue & Net Income



Revenue	544	481	529	518	558	419	432	471	540	436
Income	36.9	26.7	-21.2	34.2	42.6	-4.7	-85.9	14.5	25	-8

CY

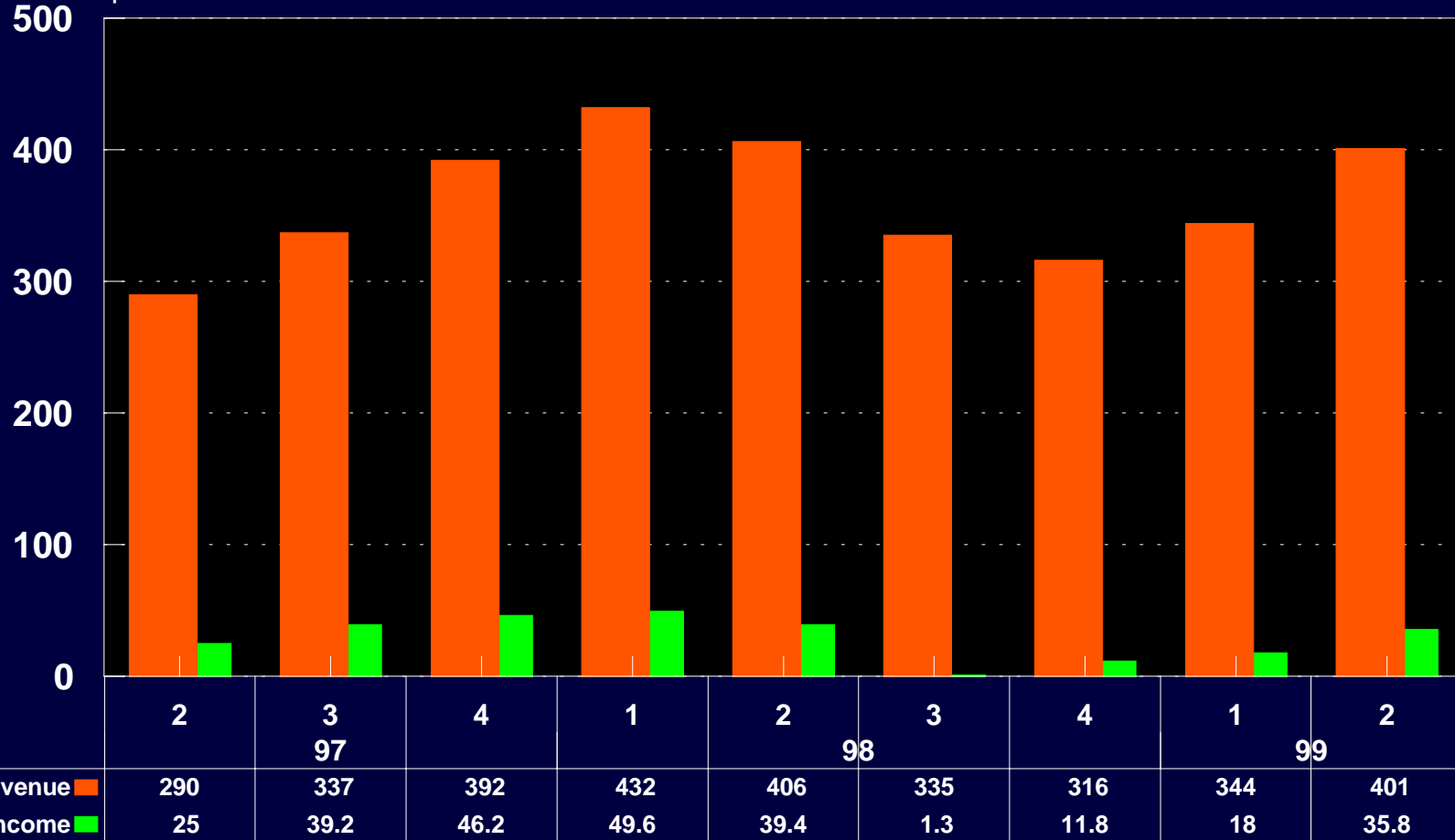
FY ends May 31

TEK

Teradyne

Revenue & Net Income

\$ Millions

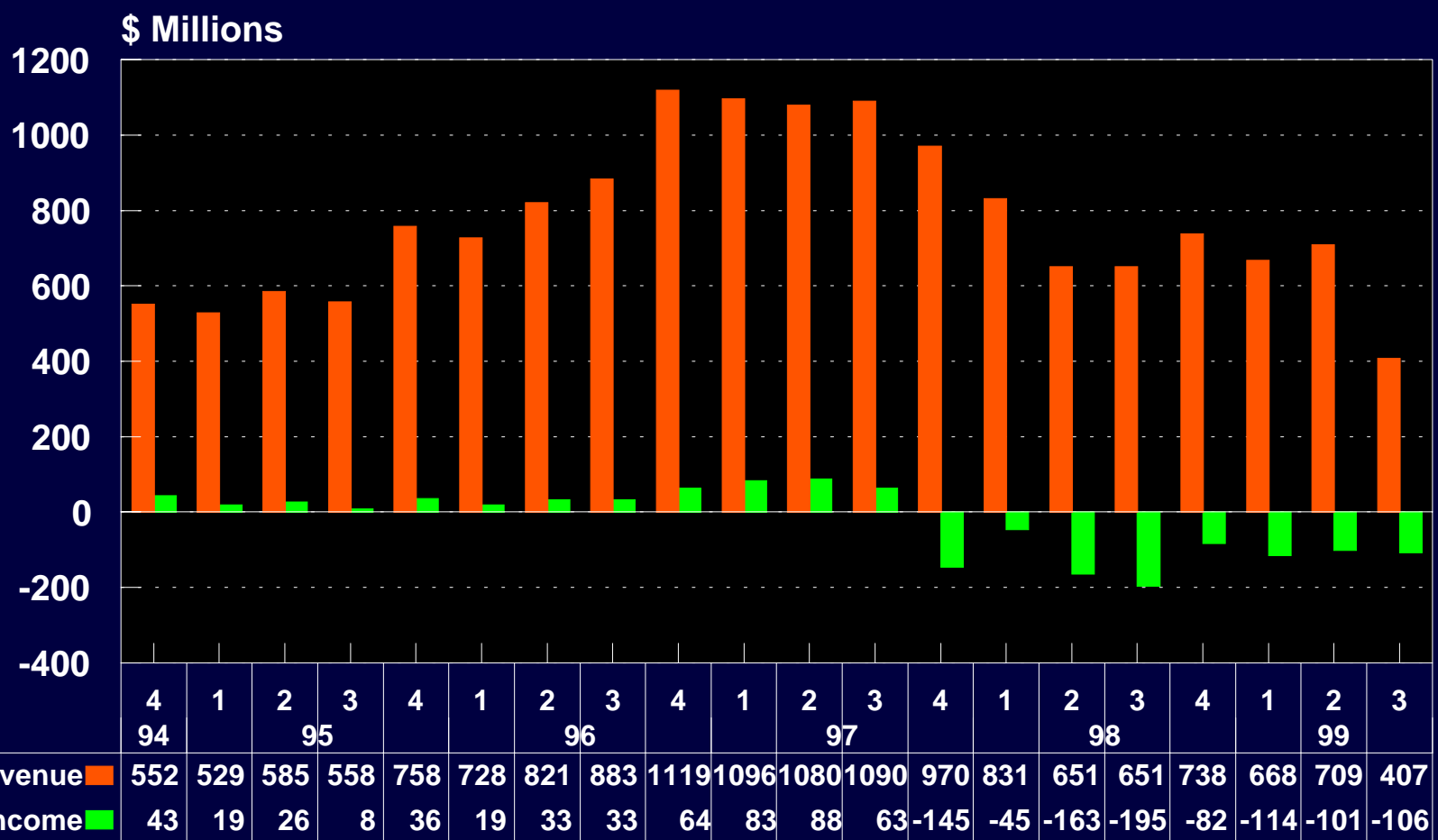


CY

TER

Western Digital

Revenue & Net Income



CY

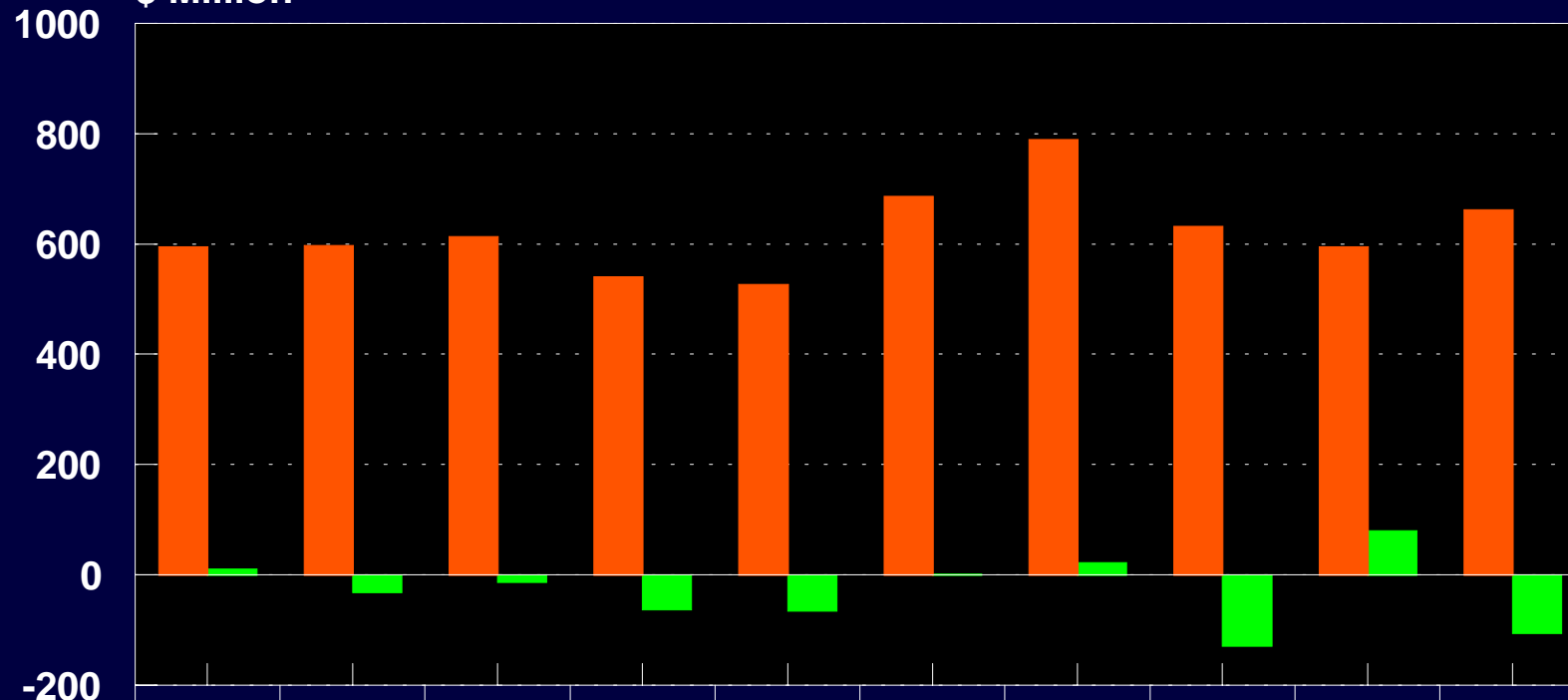
FY ends June

WDC

Advanced Micro Devices

Revenue & Net Income

\$ Million



	96		97		98		99			
	3	4	4	1	2	3	4	1	2	3
Revenue	595	597	613	541	527	686	789	632	595	662
Income	10	-31.7	-12.3	-62.7	-64.6	1	22.3	-128	80	-105

CY

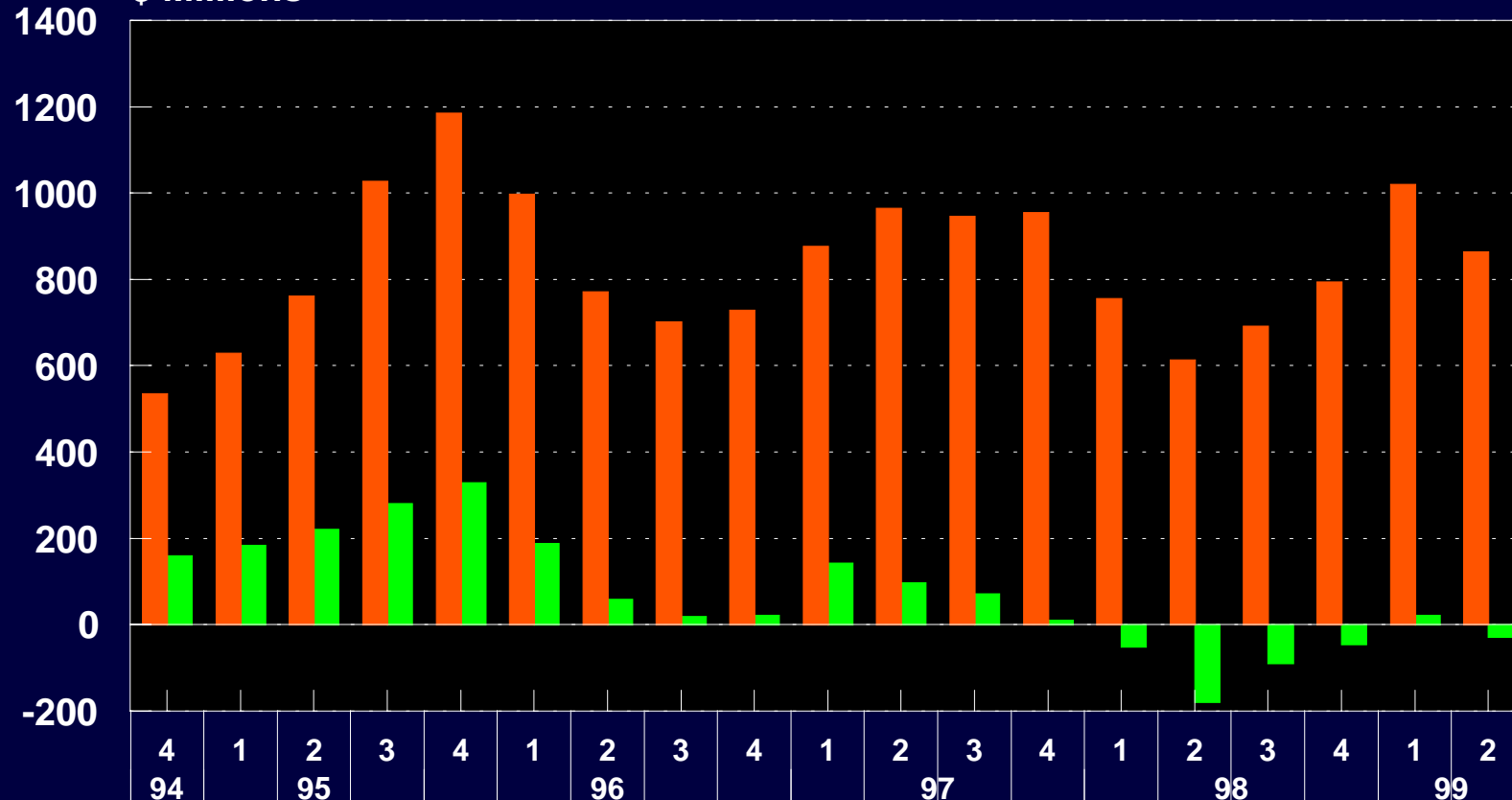
AMD

FY=CY

MICRON TECHNOLOGY

Revenue & Net Income

\$ Millions

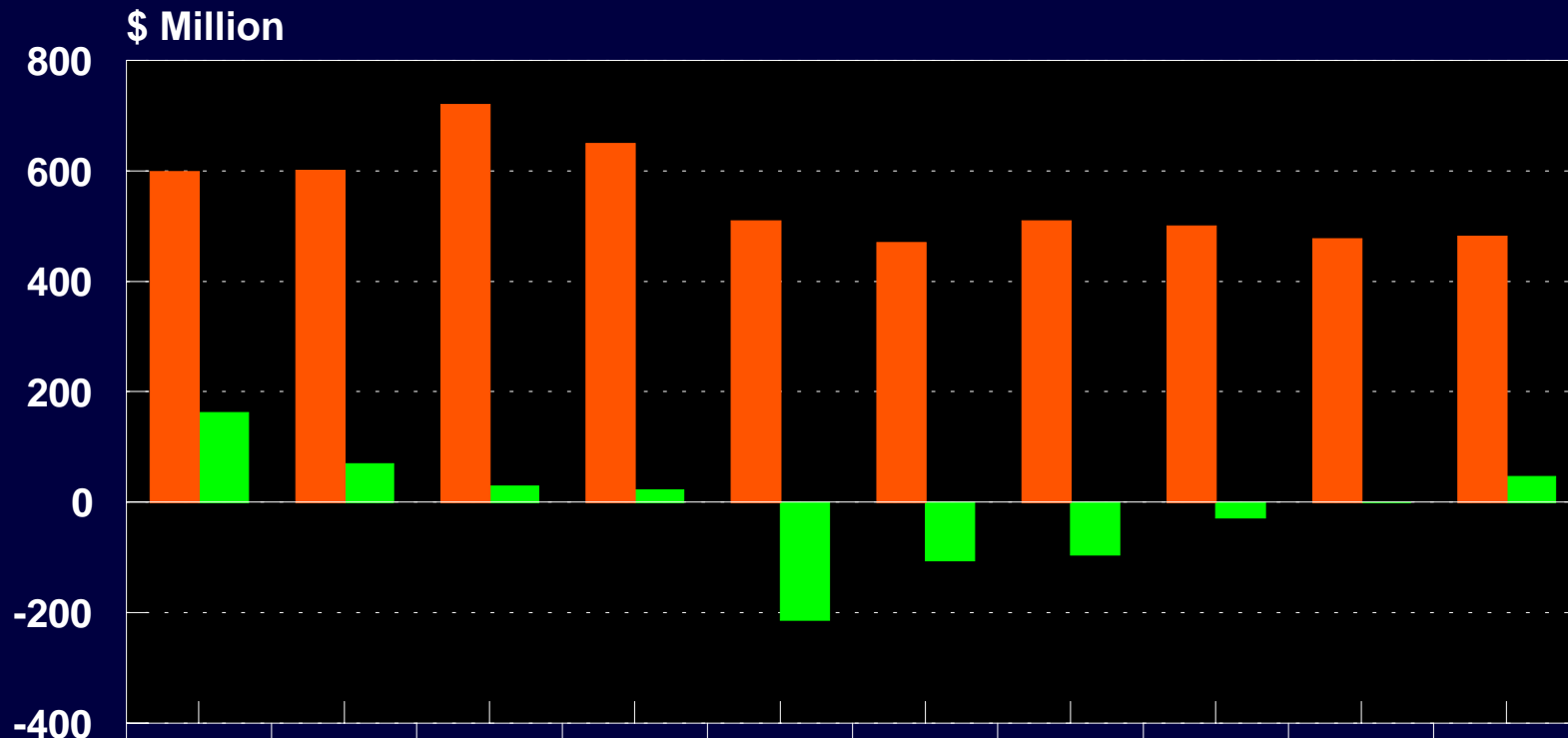


Revenue	535	629	761	1028	1186	997	771	701	728	876	965	946	955	755	613	692	794	1020	864
Income	159	184	220	281	329	188	58	19	21	143	97	72	10	-51	-179	-89	-46	22	-28

CY

MU

National Semiconductor Revenue & Net Income



Revenue	599	601	720	650	510	470	510	500	477	482
Income	162.8	70.1	28.9	22.3	-212.4	-104.8	-94.4	-27.2	0	47

CY

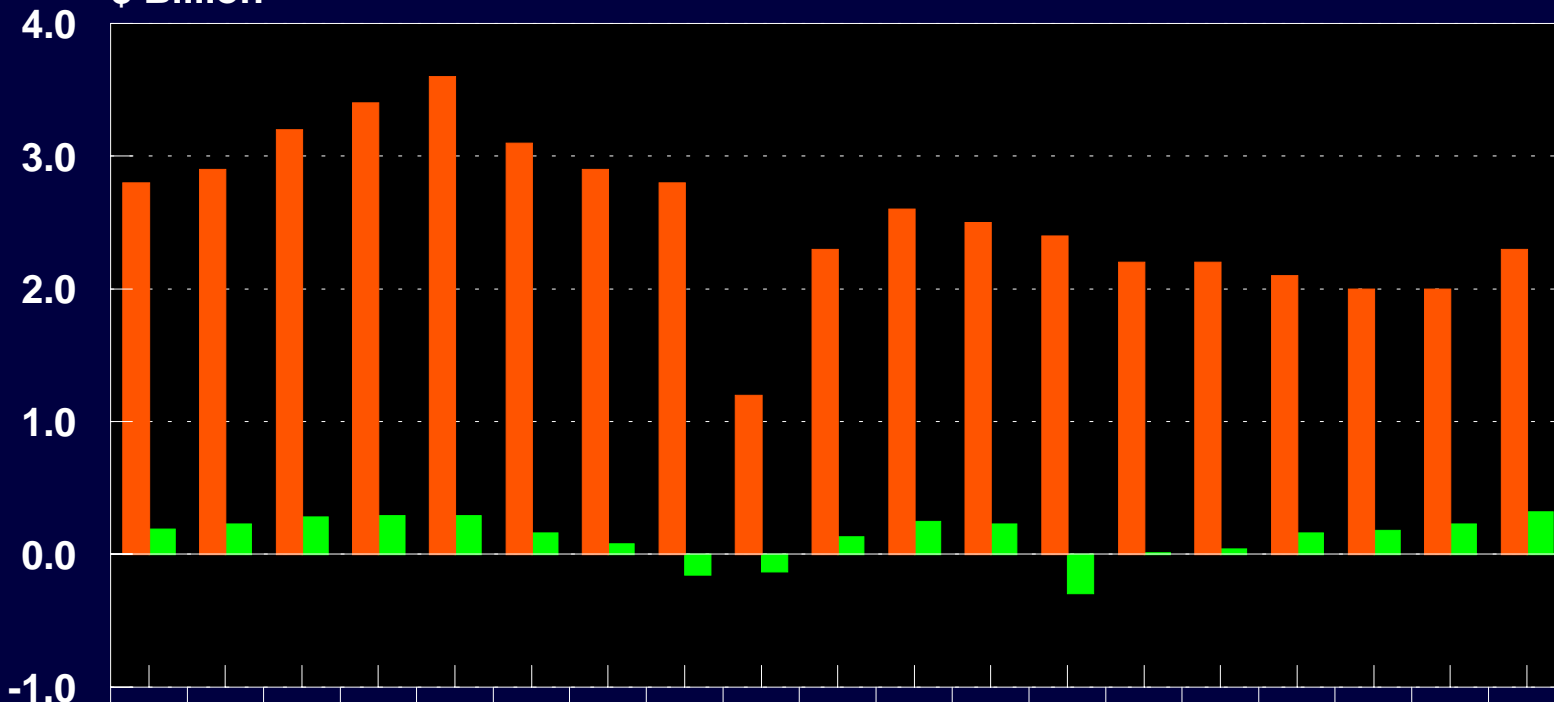
NSM

FY ends May 31

TEXAS INSTRUMENTS

Revenue & Net Income

\$ Billion



Revenue	2.8	2.9	3.2	3.4	3.6	3.1	2.9	2.8	1.2	2.3	2.6	2.5	2.4	2.2	2.2	2.1	2.0	2.0	2.3
Income	0.2	0.2	0.3	0.3	0.3	0.2	0.1	-0.2	-0.1	0.1	0.3	0.2	-0.3	0.0	0.0	0.2	0.2	0.2	0.3

CY

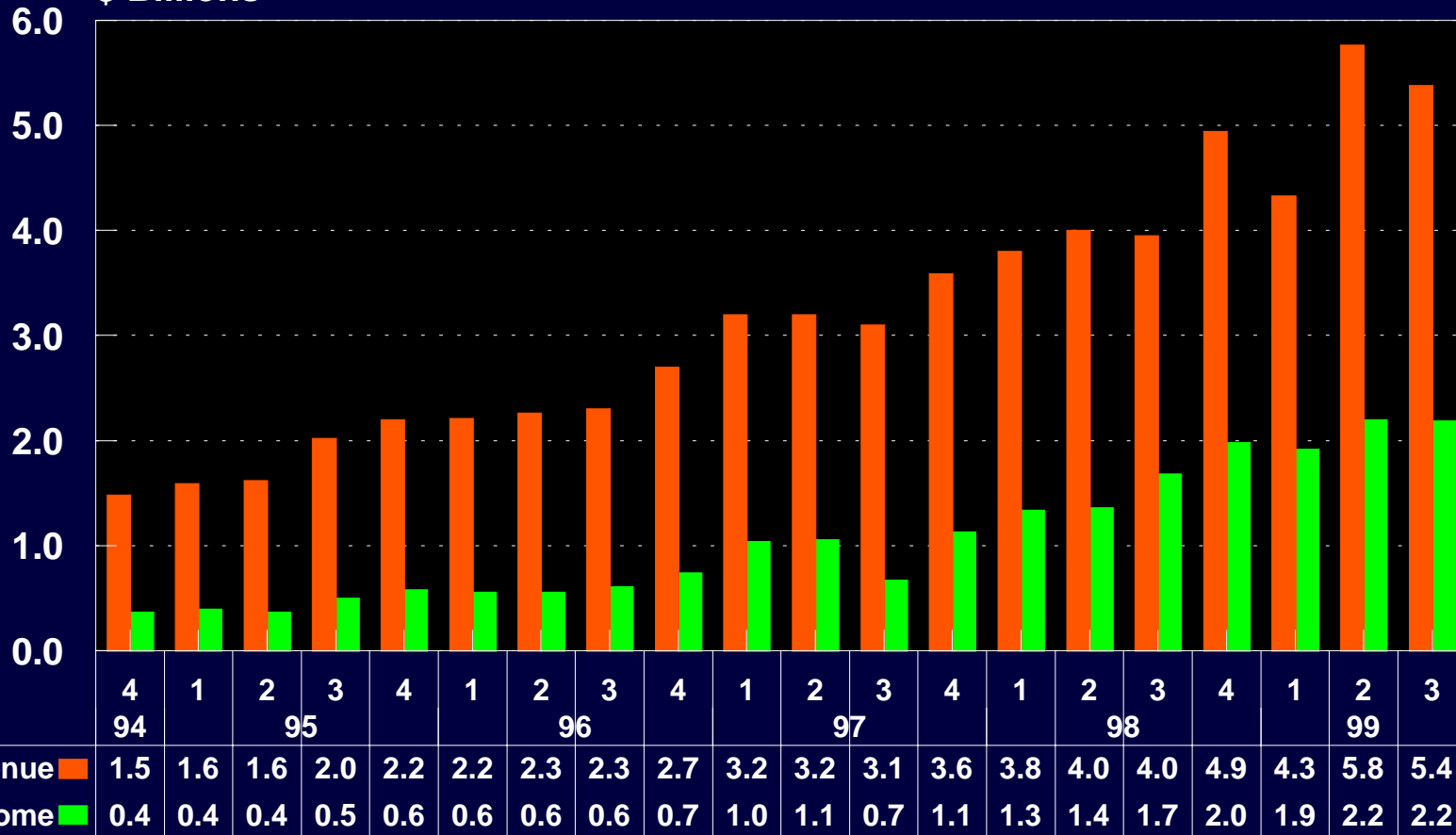
TXN

FY=CY

Microsoft

Revenue & Net Income

\$ Billions



CY

MSFT

FY ends June