

Top 15 Leading USA PCB Companies at Year-End 2004 “Global Footprint”

See the attached table modified as of March 5, 2005

In the table the “Top 15” U.S.- based printed circuit board companies are tracked in the tumultuous decade that began so auspiciously in 1995 and ended so modestly in 2004. In that tumultuous decade 1995 to year-end 2004, the leading US-based companies' production share of the Global PCB Marketplace declined from 16.6% to 9.3%.

The first table column shows the ranking, just within this group, based on global sales. By period's end, it no longer made sense to speak of national investments. Global output, outside of North America, accounted for twice those in North America, for this group: \$3.7B, compared to \$1.8B, in 2004.

An important point is that the **total** sales for this important group declined only from \$4.5B to \$3.7B, while the total sales for all PCBs made in N.A. declined more than 50% from over \$11B to less than \$5B. The bottom line is that the U.S.-based leaders control a good base going forward, to serve the Global PCB market. All of these companies have U.S. HQs where design or other front-end activities are performed and where strategies, including major investments are formulated. It is a major expression of the globalization of the industry, impacting every level of the North American industry.

Another feature displayed in the table is the extraordinary churning that took place in the period. Columns 3, 4, and 5 show the previously owned compared to operations still owned at the end of 2004. Only 51.5 sites are now operated by the companies; 113 passed through their collective hands between 1995 and 2004. (The 0.5 site refers to the shared equity by Sanmina in a German site.) Viasystems accounted for 26 of that number.

Dr. Hayao Nakahara estimates the vanished value in the churn at \$4.8B!

2005 Developments

Our Fabfile Online 2005 updates show a continuation of the above offshoring trends to Asia. In early 2005, DDI's offloaded its UK operations. Photocircuits will downsize its Atlanta operations. Value-added re-selling from China will be a larger part of its mix. Viasystems has announced that Canada and Netherlands plants will close in favor of concentration in China. A counterpoint – Tyco is opening a new plant in Oregon and Merix is investing in a new plant in the same state. Time will tell which geographic investment will prove wiser.

Global Rank 2004	Company	Acquisition, Expansion, and Divestiture Impacts on Number of Operations 1995 to 2004 Surviving Operations as of March 2005 Underlined for example, 5 Total/ 1 surviving	Max Fab Sites 1995 to 2003	March 2005	Total PCB Sales -- \$M GLOBAL		2004	2004	Product
					1995*	2004 est.			
1	Flextronics Multek	CA-1, MN-2/1, TX-1, MN-1, Sweden-1, <u>Brazil-1</u> , <u>China-3</u> , <u>Germany-1</u>	9	6	550	480	65		Rigid
2	Sanmina SCI	CA-8/2, MA-2, NH-4, TX-1, NY-1, AZ-1, <u>Malaysia-1</u> , <u>China1</u> , <u>Germany-1/2</u>	18	6.5	890	440	310		Rigid
3	Viasystems	VA-1, PR-1, UK-13, Italy-1, Sweden-1, Mexico-1, Holland-1, <u>China-2</u> , <u>Canada-3/1</u>	26	2	1,055	430	70		
4	3M	<u>MO-1</u> , Singapore-1, Japan-1	3	3	75	400	75		Flex
5	Tyco Printed Circuit Group	CA-4/2, <u>UT-1</u> , CT-2/1, WA-1, OR-2/2, TX-1, FL-1, Spain-2	14	9	510	370	310		Rigid
6	DDi Corp/ Dynamic Details	CA-2, VA-1, <u>CANADA-1</u> , UK-4, TX-1, CO-1	10	4	195	270	195		Rigid
7	M-Flex	<u>CA-1</u> , <u>China-1</u>	2	2	26	270	35		Flex
8	TTM	WA-2/1, <u>CA-1</u> , <u>WI-1</u>	4	3	110	248	248		Rigid
9	Photocircuits	NY-1, <u>GA-1</u> , service facilities in Costa Rica and Philippines	2	2	280	220			Rigid
10	Innovex	MN-2/1, AZ-1 (moved to MN), <u>Thailand-1</u>	4	2	90	140	20		Flex
11	Merix	CO-1, <u>OR-2</u> , CA-1 (Data Circuit Sys)	2	4	130	120	120		Rigid
12	Endicott Interconnect	NY-1, Ref Flextronics Multek for former IBM plant in TX	1	1	200	110	110		Rigid
13	Parlex	<u>MA-1</u> , RI-1, CA-1, <u>China-2</u>	5	5	53	130	60		Flex
14	Teradyne	<u>NH-1</u> , CA-1	2	1	120	80	80		Rigid
15	Northrop Grumman	<u>MO-1</u>	1	1		60	60		Rigid
	(Advance/JM/Honeywell)	MN-5	5	0	150	0			
	(Viktron)	IL-2, CA-1, UT-1, FL-1	5	0	100	0			
	TOTALS		113	51.5	4,534	3,588	1,768		