Advanced Market Report

Global Liquid Crystal Display/ Flat Panel Display Market Strategies 2002

Including Special Feature: Business Chances in the Small-Screen LCD Market

Infinite Technologies, Inc. (iTec) announces the impending release of a major update to its LCD/FPD Market Strategies 2001 report. The latest English language revision, due for release in April 2002, forecasts that the global flat panel display market will be valued at ¥7.8 trillion ($60 billion) in 2006, of which ¥4 trillion ($31 billion) will be TFT-based displays and ¥230 billion ($1.77 billion) organic EL displays. The active matrix organic EL display market is expected to take off from 2004 onwards.

Special report features:

(1) Wide-ranging forecasts are detailed not only for large-screen FPDs, but also for small and medium screen sizes. Production trends, color screen trends, and size trends are presented on a global basis through to 2006.

(2) An overview of profitability trends and industry restructuring challenges in the LCD industry is included.

(3) We have added forecasts for display applications based on market value. Moreover, we have gone into even more detail in terms of screen size analysis compared with our 2001 report. Special sections also focus on "Strategic Data for the Cellular Telephone and PDA Market" and "Profitability Analysis for Small- and Medium-Size Displays."

REPORT CONTENTS

O. Executive Summary

1. Business Chances in the Small-Screen LCD Market. Focus on Cellular Telephones and PDAs.

<Conclusions>

• The unit price for W-CDMA terminals in 2005 will be of the order of PDC terminals in 2001. Display panel costs will fall to a level of just over half that of 2001.

• The LCD market for PDA and cellular telephone applications in 2006 will grow significantly to ¥960 billion ($7.4 billion) by 2006. However, there are questions regarding industry profitability owing to the sheer number of market players.

• The average return on sales of the five largest small- and medium-size screen LCD manufacturers is likely to reach 8.2%.

2. Global Demand Forecasts for FPD/LCD/CRT (1999-2006)

The following display types are covered in detail:
TN-LCD, STN, Color-STN, aSi-TFT, High Temperature pSi-TFT, Low Temperature pSi-TFT, Reflective LCD, Plastic LCD, PDP, O-ELD, I-ELD, VFD, FED, LED, DMD, CRT, Flat CRT

Each display type is analyzed in terms of: (1) market volume forecast, (2) market value forecast, (3) price forecast, (4) application breakdown, (5) screen size breakdown, (6) color display trend, (7) manufacturer trends, (8) technology trends, (9) miscellaneous information.

<Conclusions>

• The global FPD market registered insignificant growth in 2001 due to adverse market conditions for TFTs. Market value was ¥3.1 trillion ($23.8 billion). By 2006, we estimate the market will grow to ¥7.8 trillion ($60 billion).

• Color STN display demand will expand initially due to use in the fast-growing cellular telephone market, but from 2003, we expect the market to start to contract.

• The overall large aSi-TFT display market posted a lower value in 2001 compared with 2000. Taiwanese players such as Acer, Unipac, and Chimei increased their market presence.

• Shipments of small and medium screen size aSi-TFT displays finally started to pick up as the cellular market developed, but over-competition quickly emerged.

• Companies expanded their capacities for low temperature pSi-TFTs, and the market size jumped to ¥85 billion ($650 million). The overall market should challenge the ¥300 billion ($2.3 billion) level by 2006.

• The delayed roll out of digital television means PDPs are still primarily employed in non-TV applications. Prices will continue on their downward trend.

• Motorola's adoption of organic ELDs has seen their utilization grow. We foresee full color variants and active matrix drivers taking off from 2003 onwards. Initially, market development will begin with self-emitting and fast response types.

• Inorganic ELDs have unique attributes such as earthquake resistance, fast response, and usability under cold temperatures. Numerous challenges, however, remain with regards to cost, brightness, and color display.

• VFDs are a stable, mature market, but through penetration into color display segments, we see a gradual increase in the market.

• Use of FEDs in TVs is expected to commence in 2003.

• CRTs will benefit from the trend towards wide-screen TVs, but we foresee tough times ahead as the price differential with LCD monitors continues to contract. Expect a number of manufacturers to exit the business.

3. FPD/LCD/CRT Demand Forecasts by Product

<Segments covered>

(1) Large (10" plus): PC Monitors, Large Notebook PCs, TVs, Non-PC Monitors, Others (word processors, etc.)
(2) Small and Medium: Small Notebook PCs, PDAs, Handheld PCs, Home Web Terminals, Digital Cellular Telephones, Pagers, Small TVs/Portable DVDs, Video Cameras, Digital Still Cameras, Projectors, AV Front Panels, Remote Controllers, Pocket Games, Pachinko, Car Displays/Navigation Systems, Instrument Panel Displays, Factory Automation/Measurement Equipment, Medical Equipment, POS/ECR, Clocks/Watches, Copy Machines, Calculators, Other

Each segment is analyzed in terms of: (1) display demand, (2) national and regional demand (3) demand by display format, (4) screen size breakdown, (5) color display trend, (6) technology trends, (7) user trends, (8) miscellaneous information.

<Conclusions>

• Falling prices for 15" TFT PC monitor displays will see the market grow significantly. By 2006, we estimate 42% of PC monitors will be FPDs. Expect high growth rates for high resolution monitors and 17-18" monitors.

• The mainstream screen size for notebook PCs will center on 14-15" for A4 types, and 10-12" for B5 types. In 2006, 28% of monitors will be high resolution.

• While digitalization of television is expected to create competition between CRTs plus set-top boxes, PDPs, and LCDs, we foresee that CRTs will dominate as stand alone types, while LCDs will feature prominently as 10-20" wall-mounted units, and PDPs will occupy the wall mounted segment with larger screen sizes.

• Reflective LCDs are coming to dominate in mobile devices, but we see market segmentation depending on the end-use application in the medium term.

• While demand growth for cellular applications was unimpressive in 2001, we expect that the impending shift to the CDMA format will reignite market growth in 2002. By 2006, we forecast that 48% of cellular telephones will employ aSi-TFT displays and 8% OELD displays. We expect the 2" panel market in this market segment to collapse.

• High temperature pSi-TFT displays will be employed in viewfinder-type cameras and data projectors in the audio-visual segment, while we also foresee significant growth in low temperature pSi-TFT demand. We expect OELDs to make considerable gains in audio visual front panels and projectors.

• Car displays are undergoing a transformation from dedicated instrument panel indicators, navigation, and VICS and ETC displays, to versions that integrate car PCs and TVs. Amidst a plateau in automobile production volume, we see a high probability of between two and six displays being mounted per one vehicle, making this segment one with considerable potential.

4. LCD Cost and Profitability Trends/Simulation of How to Achieve Profitability

(1) Analysis of profitability and competitiveness of LCD manufacturers, (2) Trends in unit cost composition of TFT modules, (3) Simulation of how to achieve profitability

<Conclusions>

• The moment that large TFT display makers finally achieved profitability across-the-board in fiscal 1999 (ending March), they were confronted with a slowdown in fiscal 2000. We foresee a high probability that fiscal 2001 (ending March) will see many manufacturers bleed red ink.

• Sales and administration costs as Taiwanese manufacturers are only 5-7% of total costs, so therefore they should turn profits on a operating basis in 2001. On a net profit basis, the Taiwanese will overpower their Japanese and Taiwanese competitors due to the taxation incentives they enjoy.

• Without significant industry restructuring, we foresee tough times for market players.

The **English language version** of **Global Liquid Crystal Display/Flat Panel Display Market Strategies 2002** is available as of April through Infinite Technologies' global marketing agent, Asia Info Tsushinsha, in either hard copy or .pdf document format. The report is priced at **US$2500–**. A **Japanese language version** is also available for the same price.

ABOUT INFINITE TECHNOLOGIES

Infinite Technologies, Inc. (iTec) was established in April 1999 by George Ohgaki, previously a consultant at Yano Research Institute. The company's staff of six specialize in analysis of three key areas: information technology; electronics; and new materials.

Major projects to date include consultation on marketing and R&D strategies at major Korean electronic component manufacturers, a study on merger & acquisition targets for European companies in the Japanese automotive component manufacturer sector, a survey on computer peripherals technology, an analysis of management at major U.S. semiconductor manufacturers, and a report on B-to-B and B-to-C E-commerce in Japan.

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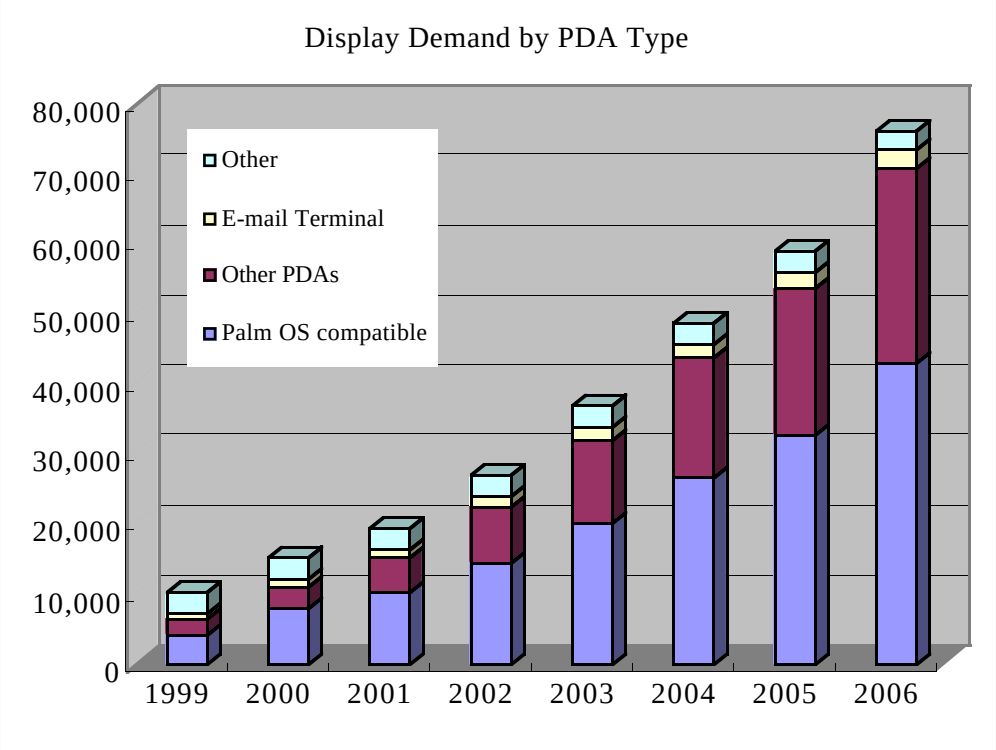
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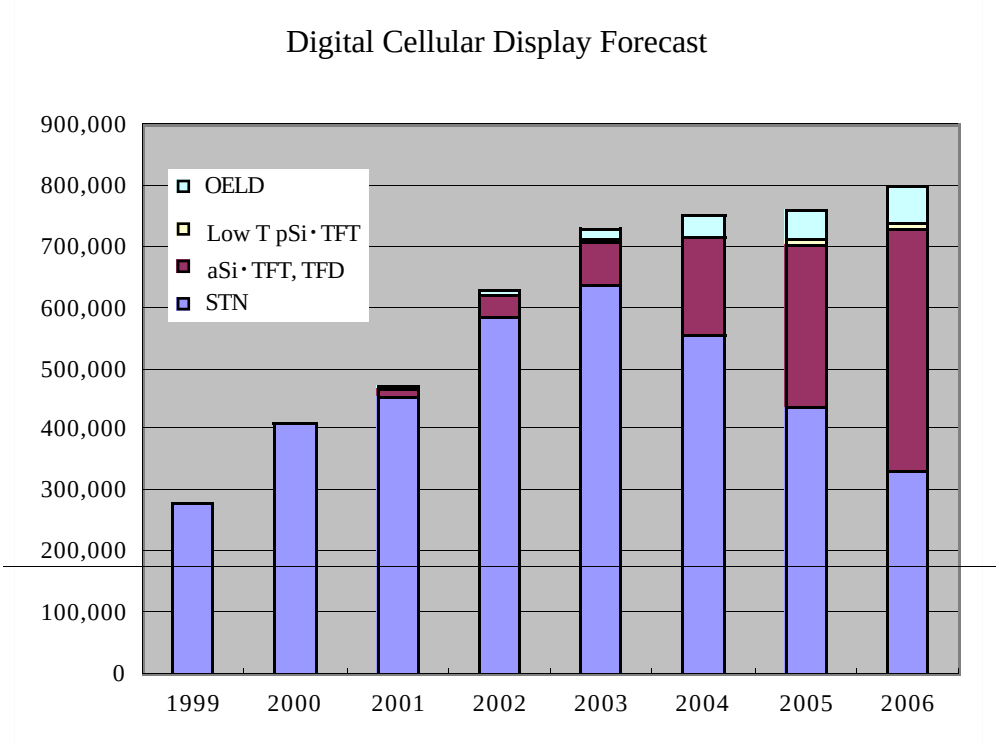
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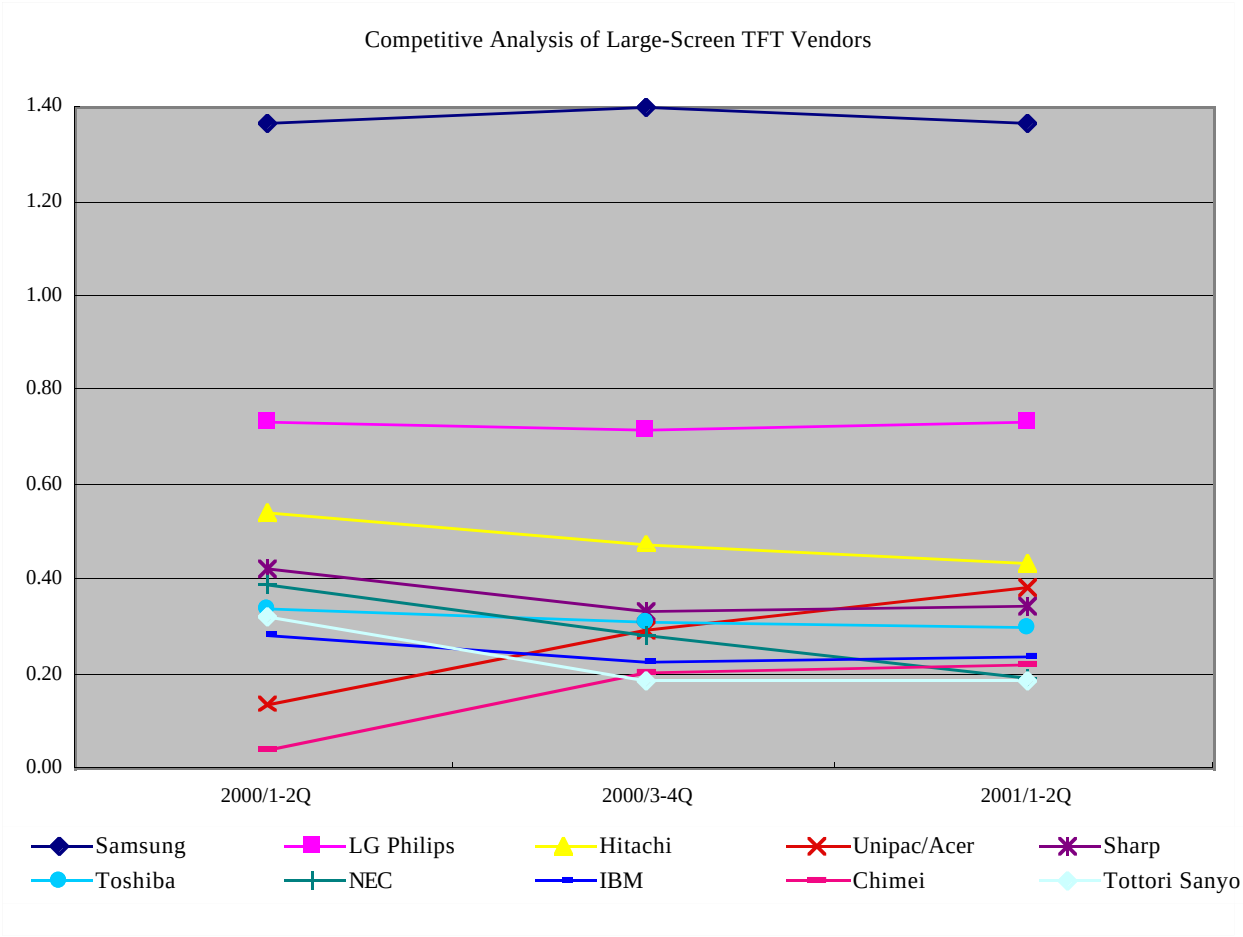
Sample data (Source: Infinite Technologies, 2002)

-Desktop monitor demand forecast by screen size (1000 units)

	1999	2000	2001	2002	2003	2004	2005	2006	CAGR
<CRT>									
14"	10,500	6,500	1,000	500	0	0	0	0	-100.0%
15"	31,490	26,500	24,500	18,000	16,000	14,000	12,000	9,000	-16.4%
17"	45,600	58,500	67,500	72,500	75,000	75,000	75,000	75,000	7.4%
19"	5,500	6,800	7,700	11,500	14,000	17,500	17,800	18,200	18.6%
21"-	3,300	2,980	3,580	3,770	4,100	6,200	6,500	6,800	10.9%
Total	96,390	101,280	104,280	106,270	109,100	112,700	111,300	109,000	1.8%
<STN>									
10-12"	20	0	0	0	0	0	0	0	-100.0%
<aSi-TFT>									
10-12" (12.1")	10	0	0	0	0	0	0	0	-100.0%
13"	130	50	20	0	0	0	0	0	-100.0%
14"	1,650	600	400	100	0	0	0	0	-100.0%
15"	2,280	6,000	11,600	17,900	25,900	39,000	51,500	66,000	61.7%
16-18"	100	300	880	1,800	2,800	4,400	6,600	9,600	91.9%
19-20"	0	20	60	140	200	400	600	1,000	
21-24"	10	30	40	60	100	200	300	400	69.4%
Total	4,180	7,000	13,000	20,000	29,000	44,000	59,000	77,000	51.6%
<pSi-TFT>									
15"	0	0	0	0	50	90	150	300	


Display Demand by PDA Type
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Other
E-mail Terminal
Other PDAs
Palm OS compatible
1999
2000
2001
2002
2003
2004
2005
2006


Digital Cellular Display Forecast
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
OELD
Low T pSi・TFT
aSi・TFT, TFD
STN
1999
2000
2001
2002
2003
2004
2005
2006


Competitive Analysis of Large-Screen TFT Vendors
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
2000/1-2Q
2000/3-4Q
2001/1-2Q
Samsung
LG Philips
Hitachi
Unipac/Acer
Sharp
Toshiba
NEC
IBM
Chimei
Tottori Sanyo