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**Centerfold: Israel's Semiconductor Companies**

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# **Layer It Out: Have Semiconductors Come to the Consumer's Level?**

**Dov Moran sees huge market  
for chameleon device 'modu' 2**

Jessica Steinberg

**Narrowing of the exits for  
semiconductor firms? 10**

Interview with Ori Kirshner

**Today's hottest consumer  
gadgets 12**

David Shamah



# Becoming a trusted supplier to fabs and foundries

**It is not easy to become a trusted supplier to the semiconductor industry. Offer Danon and Ariel Karmeli, partners in the Israel-based business consulting firm Auctus, explain what it takes.**

**T**he semiconductor industry is a maturing market with a continuous need for miniaturization, high throughput and ever increasing yields. These requirements create substantial challenges, both for manufacturers and industry-solution suppliers. Meeting technological challenges while keeping capital expenditures down is key, but supplier trust and reliability may be even more important purchasing criteria today. The average setup cost for a 300mm mega-fab is in the neighborhood of \$5 billion, which leaves little tolerance for trial and error and requires purchasing decisions to be made according to reliability.

For suppliers, "trust and reliability" come in different forms and shapes, going beyond product reliability to include company size, track record, reputation and service.

This article assesses the ability of small- and mid-sized Israeli capital equipment manufacturers to become established suppliers to the semiconductor industry. A key assumption is that to survive and sustain growth, revenue above \$100 million is needed. Nova Measuring Instruments Ltd., headquartered in Rehovot, is used as a case study for this assessment.

## **Nova Measuring Instruments**

Nova develops, produces and markets metrology systems for process control that are integrated into process equipment tools or are used as stand-alone metrology platforms by the semiconductor manufacturing industry. The company was established in 1993 by Giora Dishon and Moshe Finarov, formerly of Orbotech, to develop an advanced concept of integrating metrology and inspection tasks into the semiconductor process line. This was a revolutionary concept for the industry that had been primarily using highly expensive stand-alone systems.

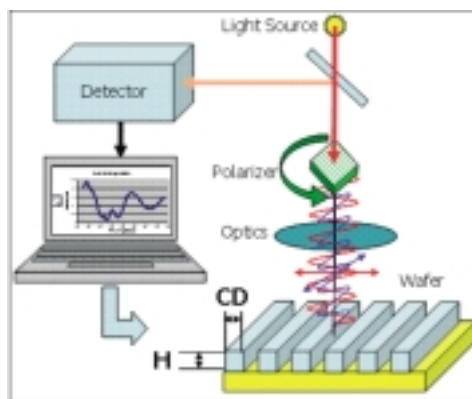
In 2000, Nova went public on NASDAQ, raising \$50 million. Between 2001-2004, the company suffered from the worldwide economic slowdown and industry downsizing following the burst of the Internet bubble. New top management in 2006, a changing market environment and product maturity helped Nova to achieve a record year in 2007, reaching revenues of \$58 million and an operating profit of \$2 million.

Today, Nova has 260 employees located worldwide. Its expertise lies in thin film and

optical CD (see Figure 1) and shape profiling metrology systems, addressing the complex measurements and process control challenges of high volume manufacturing (HVM) in 300 and 200 mm IC manufacturing.

Nova currently positions itself as an integrated solutions supplier in the metrology segment, where it partners with large process solution providers for sales. It also developed and sells stand-alone solutions, which are marketed and serviced directly. Nova's three-year strategic plan is to break the \$100 million "glass ceiling" and become a key player in the stand-alone OCD market.

**Figure 1:**



Optical CD (OCD) technology measures the 3D geometry of semiconductor devices. In recent years, OCD has gained acceptance by semiconductor manufacturers as a key technology for providing feedback for process control in many areas of the fab. OCD utilizes reflectance measured from periodic structures using polarized light. The measured reflectance is fitted to a physical model, allowing the extraction of profile information for features as thin as 20nm with sub-nm accuracy.

## **Israel's semiconductor capital equipment industry**

In the past 10 years, many Israeli companies have attempted to become substantial players in the semiconductor industry, but only few have succeeded on their own or at all. The statistics are usually against start-ups in this market. Industry metrics predict that it takes 7-10 years and \$70-100 million in R&D expenditures to develop a product and reach profitability.

Companies such as Orbot Instruments, Opal, Negevtech, Jordan Valley and Nova have been around for that period of time. Some have been acquired, and others, like Nova, have continued their efforts to gain market share. None have



*Offer Danon*



*Ariel Karmeli*

## Becoming a trusted supplier to fabs and foundries

*Continued from page 11*

succeeded in reaching the \$100 million ceiling by themselves. This, of course, raises the question of whether mergers and acquisitions are the only survival options for Israeli technology companies in this capital-intensive industry.

Israeli companies have the technology and access to capital. However, the culture beyond entrepreneurial management is often missing, and customer closeness and professional management are not sufficiently developed. Israeli business culture rarely thinks about execution, process engineering, management or sustainable advantage. In Israel, the focus lies on innovation and technology, but those are the things that will take a company from concept to selling a few million dollars a year. All too often the shift from start-up to a mature company doesn't occur. Mature companies are characterized by management, which includes true industry experts, sales people who come from the industry, reliable products and a strong ability to manage cross-cultural communications.

### **Can Nova become a \$100 million company?**

In recent years, Nova has shifted focus to the OCD stand-alone market based on technology originally developed for its integrated systems. These stand-alone solutions may enable the

company to become an established player and grow its operations above the \$100 million ceiling. This minimum turnover is needed in order to cope with market fluctuations, enable R&D, and withstand the continuous attacks of various kinds by larger competitors.

In order to succeed, Nova will have to become a "trusted" partner and that takes time and investment. The reliability of its products, their seamless integration and Nova's market presence – all factors on which Nova is placing considerable emphasis – will play a crucial role.

Furthermore, Nova will have to further develop its identity as an entrenched marketing company, intimately familiar with industry trends and customer needs. The ability to listen and incorporate customer feedback into R&D efforts plays a crucial role in this process.

Taking into consideration the shift in management and the company's growing capacity to build trust, Nova has the potential to reach its medium-term goal. Its disruptive OCD technology and recruitment of industry experts into its management team should enable Nova to acquire substantial market share in the huge CD-SEM segment. ■