Design for Quality & Manufacturing

A Case Study - NeoMagic

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NeoMagic History

- Founded - Summer 1993
- First Production Shipment - 1Q96
- Leading Supplier of Notebook Multimedia Chips
- Publicly Held Since 1Q97
Outline

Need a Vision
Add Value
Use a Commercially Viable Method
Execute
Establish a Track Record
Enable Customer to Succeed
A Team That Stays Focused Builds on Success
What Was The Vision?

Emerging Trends - Mobilizing Multimedia
The Paradox was

Opportunity: Mobilize Multimedia
How Do You Add Value?

Compelling Product Proposition:
Differentiation Through Integration
Embedded DRAM Technology

- Increases Performance & Reliability
- Reduces Size & Power Consumption

MagicWare™: Pioneering eDRAM Technology
Your Method Must Be Commercially Viable

Economics of Embedded DRAM
Costs of Discrete Solution

Electro-Magnetic Interference (EMI Noise)

Board Space

Graphics Accelerator

Audio Controller

SDRAM Memory

SDRAM Memory

SDRAM Memory

SDRAM Memory

SDRAM Memory

SDRAM Memory
Hidden Cost of Discrete Solution

Graphics Accelerator

SDRAM Memory

Defect Rate

Audio Controller

SDRAM Memory
NeoMagic Solution
NeoMagic eDRAM Volume Experience

Cumulative Units Shipped (millions)
Execute

Build A Team That Stays Focused
Success Builds Up On Success
Entire Team Contributes to Design for Quality
Marketing
Analysis of Market Requirements

- Major customer product roadmaps
- Major customer feature requirements
- Competitive offerings and product roadmaps
- A well-defined product specification
Marketing
Evaluating the Market Size

- Research analysts’ forecasts
- Competitive cost structures
- What is the window of opportunity for the product?
Management
Evaluating Internal Variables

- An accurate evaluation is important - Ask the tough questions!
- Does the new product fit with your technology roadmap?
- Does it fit with the capability of one or more of your strategic partners?
- Will the product add value at a competitive price?
- Match market requirements to your Company’s capabilities.
Management
Analyzing Costs Versus ASPs

- What are the costs for design, development, production, testing cycles?
- What are the ASPs in the early market? In the later market?
- Can the product be cost reduced?
- What is the potential return on investment in each cycle?
Engineering

Three Phases of Design Development

Phase I - Development
- Well-defined specs, Choose correct technology,
- Right skills for every job, Right tools, Database management,
- Revision control,
- Design Reviews, simulations, emulation,
- Testability, fault grading etc.
- Develop processes, Create Cost reduction plan

Phase II - Verification
- Do you deliver what you promised?
- Compatibility Lab Tests (e.g. WHQL)
- Customer Qualification

Phase III - Pre-Production
- Customer line validation - Catch the problems early,
  get every line return from customer. Use bench testers, do
  Customer characterization
Manufacturing

- Identify fab partners with DRAM design capability & proven process technology
- Scrutinize their reliability and quality assurance procedures
- Develop tools for monitoring and increasing yields
- Keep consistent flow and controls
- Keep close ties with key customers
- Customer will succeed on system level only if integration leads to a lower defect rate
Execute

Stay Focused On Your Vision, Build on It

Manage Risk Prudently
Vision For Future

Enabling Technologies For the Internet Age

Internet