Mobius’ Core Technology

• Mobius is a fabless semiconductor component and IP company specializing in clock/timing products
• Flagship technology: All-Si clock generation capable of replacing quartz XTAL frequency references
• IP macro for USB-232 bridge ctrl. shown: shipping @ 200kU/month

• Mobius was the first company to build a USB-compliant all-Si clock
• 9 patents
• 0.18mm² in 0.35µm CMOS
Mobius’ captive team (20 on staff)
- Design center in Detroit, MI (research from UMich)
- Management, M&S, and governance in Si Valley

Capital sources
- Seed: ~15 angels (MI, IL, OH) and 2 boutique VCs (MI)
- Series A: 2 tier-1 VCs (Si Valley)

Partners
- Foundry partner in Taiwan (TSMC)
- Die sorting in Taiwan (Winstek)
- Packaging partner in Philippines (OSE)
- Production test partner in Thailand (UTAC)

Customers
- Primary customer base in Asia (Taiwan, Korea, Japan)
- End products sold worldwide (USA, EU, Asia, etc.)
Mobius’ Background

- **Fundamental research and business development**
  - UMICH NSF ERC in WIMS: Brown and McCorquodale
  - Zell-Lurie Entrepreneurial Institute at UMICH
- **Founding (seed stage)**
  - $2M equity financing for launch
  - Proved technology with IP business model
- **Early success**
  - Gained traction with 2 customers during seed stage
  - Governor’s award for largest hi-tech growth potential (‘05)
  - Technology Innovation of the Year in MI (‘06)
- **Professional financing (series A)**
  - $8.1M equity financing to build component business
- **Current status**
  - Developing discrete timing components
Personal Experiences

• **University**
  – Pursued fundamental research as Ph.D. fellow/candidate
  – Elected MBA courses in entrepreneurship (despite admin. challenges)
  – Recruited seed stage team from business school
  – Participated in related academic activities including business plan competitions (9 awards)

• **Seed stage**
  – Responsible for raising over $2M from a network of angels and VCs
  – Acted as CEO and Chairman of the Board for 18 months
  – Acted as VP of Engineering and managed engineering programs

• **Series-A stage**
  – Developed new plan for discrete component business
  – Responsible for raising $8.1M from tier-1 Si Valley VCs
  – Moved to CTO role; no direct reports in engineering
  – Maintained board seat
Hi-Tech Start-Up Facts

- **Education**
  - Most entrepreneurial education housed in business schools
  - Most engineers do not have access to business development resources

- **Founders**
  - Most hi-tech companies start from a reduction to practice
  - Most hi-tech companies started by technologists, not MBAs
  - Most successful companies were founded by young people

- **Financing**
  - Most hi-tech start-ups are capital intensive
  - Post-bubble capital moved to later stages; seed financing required
  - Most IT dollars going to software, not physical sciences
  - Large institutional round typically required eventually, but often not at first

- **Management**
  - Seed stage: Founder must directly manage (difficult due to insufficient training)
  - Post institutional round: Most management responsibilities transferred to “professional managers”

- **Global Component**
  - Partners and customers all over the world
Critical Observations

• **Education**
  – Many institutions have a poor culture toward entrepreneurship
  – Poor business development resources/training for engineers
  – Poor educational resources in IP development for engineers
  – Tech. founders struggle due to lack of management training
  – Tech. founders have little management credibility post series-A

• **Extracurricular**
  – Professional networking is a critically missing component to most engineering programs
  – Engineering continues to look unattractive to many students without exposure to entrepreneurship (or similar opportunities)

• **Real world**
  – Hi-tech companies are started by technologists, not MBAs
  – Management, finance, etc. are not difficult
  – Engineers simply enter the market nearly completely untrained
**Recommendations**

- **Education**
  - Develop entrepreneurial institutes and/or curricula in Colleges of Engineering (e.g. UC-Davis)
  - Diversify graduate curriculum as most hi-tech start-ups with defensible IP develop from graduate research
  - Offer IP development courses for engineers (e.g. U of Michigan)
  - Develop positive culture toward entrepreneurship (e.g. Berkeley)
  - Create academic and/or financial incentives for faculty and students to become involved in emerging business (e.g. U of Utah)

- **Extracurricular**
  - Emphasize professional networking as part of career development
  - Work with local resources (such as seed investors) to facilitate technology transfer
Conclusions

• Hi-tech start-ups are founded by technologists

• Founding technologists require broad skills
  – Engineering
  – IP development
  – Business development with global partners
  – Technical marketing
  – Fundraising and finance
  – Management

• These requisite skills are underdeveloped if at all
  – Limited academic resources; challenges electing available courses in other programs
  – Lack of extracurricular opportunities for development

• The consequences
  – Unnecessary early stage challenges for founders
  – Missed development opportunities as business grows