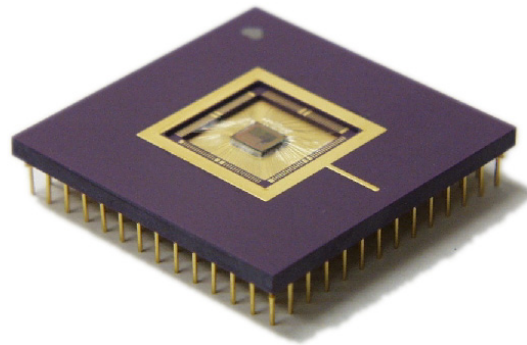


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# Mobius

## Microsystems

*Mixed Signal Technology Solutions*



# Business Plan

This executive summary is intended solely for informational purposes. The information contained herein is believed to be reliable, but the management team makes no representations or warranties with respect to this information. The financial projections that are part of this plan represent estimates based on extensive research and on assumptions considered reasonable, but they are of course not guaranteed. The contents of this plan are confidential and are not to be reproduced without express written consent of Mobius Microsystems Inc.

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## The Executive Overview

The world today is a mix of digital and analog technologies. System engineers typically assemble discrete components to meet the requirements of this mixed-signal world. Mobius Microsystems (Mobius) will commercialize and market several patent-pending mixed-signal technologies that enable a next generation of silicon products to deliver high-performance, low-noise, mixed-signal solutions. Mobius' initial mixed-signal technology will be delivered with the launch of a digital monolithic oscillator (DMO), commonly called a processor clock, designed to provide the highest performance, lowest power, cost reduced solution for on-chip clock generation. Follow-on products will include additional DMO products with both higher and lower clock speeds, and a series of mixed signal products focused at analog front-end (AFE) applications for mixed-signal sensing and eventually a complete framework for mixed-signal system-on-chip (SoC) designs.

### The Problem

Printed circuit board applications require a number of core technologies to be assembled. To manufacture a chemical sensor, a number of analog circuits for interpretation of a chemical signal are integrated with other mixed-signal circuits that convert the data from an analog to digital format. This design becomes a section of a complex circuit that collects the data and communicates the information via another interface to other electronics that display the information. This multifaceted printed circuit board example is typically an expensive, high power system that is physically large and exemplifies why the electronics industry constantly looks for cost reductions, elimination of complexity, and reduction of power dissipation.

### The Value Proposition

Mobius has positioned itself as an instrumental force in the current paradigm shift in the semiconductor component industry from purely digital or analog products to truly mixed-signal products. Mobius' semiconductor design macros provide configurable mixed signal technology that eliminates numerous components described above. These macros provide the customer with a reduced cost bill of materials, higher integration of components for product miniaturization demand, simplified product development, increased reliability, significantly reduced power consumption, and reduced time to market.

### The Mobius Team & Solution

Mobius tackled this significant opportunity by organizing a core team of industry knowledge, entrepreneurial business management, and semiconductor research skill sets focused at providing the first product accurate enough for on-chip clock generation.

University of Michigan Ph.D. Candidate, Michael S. McCorquodale working together with veteran entrepreneur Richard J. Goldstein founded Mobius Microsystems Inc. using technology developed by Michael during his doctoral studies. This new concept for microcontroller and processor excitation, commonly called a “System Clock”, totally replaces the current state of the art discrete solution implementation. Each time a designer implements a product that contains the Mobius Digital Monolithic Oscillator (DMO), or “on-chip clock,” the result will be several reductions in cost, circuit complexity, size, and power consumption. The savings are truly impressive, with cost reduction ratio of 3 times and power reduction ratio of 25 times the current discrete component designs.

### **The Business & Revenue Model**

Mobius’ revenue comes from two sources, licensing either the design and/or manufacturing of DMO products and from manufacturing royalties of delivered DMO products. License and royalty business models are well accepted within the semiconductor IP business. This model is ideal for the commercialized delivery of Mobius intellectual property soft and hard macros. The following table shows the preliminary estimates for revenue and expenses forecasted to 2005.

<b>Proforma Financials In Thousands</b>	<b>Year Ended December 31,</b>			
	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Total Revenue	350	6,828	21,331	44,760
Total Operating Expense	1,751	2,443	3,429	5,142
Operating Income	(1,436)	3,922	16,812	37,788
Other Income / Expense & Taxes	9	(1304)	(6527)	(12716)
Net Income	(1,427)	2,618	10,285	25,072

*Table 1: Mobius’ revenue forecast to 2005*

### **The Preliminary Funding Requirements and Use of Funds**

Mobius is currently seeking \$6,500,000 in start-up capital. Mobius plans to seek an initial \$1,500,000 in startup funds from angel investors, with the remaining funds from either a strategic partner or venture capital source. The equity funding will be used for office and basic infrastructure, engineering design workstations and software, commercialization/marketing/sales personnel, and collateral for the launch of the initial DMO soft and hard macro products. Mobius Microsystems Inc. expects to offer its investors an equity exit by 2006.

### Company Overview

Mobius Microsystems was founded in 2001 to exploit several technological advances developed and now being patented at The University of Michigan. These technological advancements were a direct result of the cooperative efforts of Ph.D. candidate Michael S. McCorquodale and Dr. Richard B. Brown. In January 2002, Michael enlisted the help of veteran technology entrepreneur Richard J. Goldstein to incorporate Mobius Microsystems as a Delaware “C” corporation. The business concept is a direct outgrowth of microsystems research that had been conducted under associated grants with the Center for Wireless Integrated Microsystems (WIMS) at the University of Michigan.

### The Board Of Directors

- ***Richard J. Goldstein, Chairman, President & CEO:*** Richard, a veteran technology entrepreneur with 25 years of experience and 15 years of Profit & Loss leadership. Prior positions were with Fortune 500 companies such as Rockwell and Robert Bosch GmbH, and start-up companies such as ASAP Software, or recently as Chief Operating Officer at Synergetic Micro Systems of Downers Grove, IL. Synergetic successfully launched in 2001 a three-year system-on-chip development program targeted at embedded communications. Synergetic was also sold in 2001 to a public company in multi-million dollar merger.
- ***Michael S. McCorquodale, Vice Chairman, Chief Technology Officer:*** Michael is a Ph.D. candidate in Electrical Engineering at The University of Michigan conducting research in monolithic MEMS based oscillators for microsystems applications. Possessing significant industrial IC design experience, Michael has had assignments at Hughes Space and Communications Co., Los Angeles, CA, and has collaborated on research efforts with Analog Devices Inc., Wilmington, MA, IBM, Austin, TX, and MOSIS, Marina Del Ray, CA.
- ***Dr. Richard Brown, Director at Large (Board Assignment, Technology):*** Dr. Brown is currently the acting chair of Electrical Engineering and Computer Science at The University of Michigan.
- ***Frank Wood, Director at Large (Board Assignment, Sales Marketing & Operations):*** Frank is currently Vice President of Electrical South Corporation. Previous management positions were with General Electric, Advanced Micro Devices, Group Schneider, and Total Control Products.
- ***Mark Albert, Director at Large (Board Assignment, Legal & Fund Raising):*** Mark is a partner at Perkins & Coie LLP and his practice focuses on the representation of emerging growth companies, venture capital funds and investment banks.

## The Operational Management & Core Technical Team

- **Richard J. Goldstein, President & CEO (Biography above)**
- **Michael S. McCorquodale, Chief Technical Officer (Biography above)**
- **James Vincke, Chief Financial Officer:** Jim is a veteran entrepreneur with twenty years of experience in business development and technology. Jim was a critical part of the successes at Mechanical Dynamics Inc. (MDI) of Ann Arbor, MI, joining MDI as a startup and holding several executive positions including Chief Financial Officer during the \$30M IPO.
- **Vice President of Sales & Marketing:** The Mobius Management team has determined that the Vice President of Sales & Marketing position must be filled with an experienced sales and marketing professional. Mobius intends to locate an office for this very key executive in Silicon Valley, CA, as a majority of the customer base has operations in or around this area. A search to locate qualified candidates is currently underway by the President & CEO.
- **Computer Aided Design Engineer:** The Computer Aided Design Engineer is responsible for maintaining all CAD tools and computer platforms. This person is also responsible for maintaining and managing the Mobius design framework.
- **MEMS/Microsystems Engineer:** The MEMS/Microsystems Engineer is responsible for MEMS technology design and integration. Moreover, this person will be responsible for identifying applications where MEMS technology will demonstrate significant value added in Mobius Macro products.
- **Analog/Radio Frequency Circuit Engineer:** The Analog/Radio Frequency Circuit Engineer is responsible for specifying and managing the development of the analog transistor electronics.
- **Mixed Signal Circuit Engineer** The Mixed Signal Circuit Engineer is responsible for integrating the resulting efforts of the other engineering disciplines.
- **Office Coordinator:** The Office Coordinator is responsible for the basic day-to-day office operations of the business. This position will include all data entry, communications, office security and other responsibilities as required to keep the entire company operating at peak efficiency.

## Product Description

### Concept

Two distinct and convergent trends have recently emerged in the semiconductor industry. First, the demand for semiconductor products with low power, high reliability, small size, and low cost have forced manufacturers to integrate every function possible on-chip. Second, the analog and digital domains must now be addressed concurrently in these next generation products. These trends have given way to the emergence of on-chip, also known as monolithic, mixed-signal technology. The Mobius vision is to become the world leader in configurable mixed-signal intellectual property that is delivered as soft or hard macros for application in any semiconductor product with a microcontroller or microprocessor core operating in the range of 100MHz to 1 GHz. Mobius' technologies will revolutionize these embedded devices by introducing mixed-signal interfaces and on-chip clock generation for truly versatile monolithic mixed-signal semiconductor products.

The initial product concept has been developed through the examination of problems associated with clock generation for microcontroller and microprocessors. The current state of the art for existing clock generation includes an external circuit of discrete components. The Mobius Digital Monolithic Oscillator (DMO) replaces all of these components with high-performance on-chip clock generation circuitry. This migration is realized through the use of a hybrid of Microelectromechanical Systems (MEMS) and Complementary Metal-Oxide Semiconductor (CMOS) technologies. Table 2 describes the current implementation for clock generation and the target problems Mobius has set out to improve.

Current Solution	Mobius Solution
External crystal technology operating at one fixed frequency	On-chip solution that integrates continuous and discrete variable frequency operation
Multiple external discrete components that consume printed circuit board space	On-chip integration that does not consume any additional printed circuit board space
Nominal operating power consumption of 100mW	Nominal operating power consumption of 4mW
Multiple interconnects that could impact reliability	On-chip implementation that eliminates extra interconnects and improves reliability

Table 2: Mobius' target problem solutions

Additional technologies include a complete low-voltage and low-power analog front end (AFE) for sensing and actuation in mixed-signal applications. The effort to commercialize these and related technologies is described in the sections that follow.

## Customer Value

Mobius' target customers are the manufacturers of semiconductor devices that serve nearly any type of application for electronic system design. Companies such as Taiwan Semiconductor, IBM, National Semiconductor, Atmel, Motorola and others are continually searching for innovative technology that can be easily added to improve or add significant value to existing semiconductor designs. In particular, each of the markets that Mobius will serve continually looks for value from:

- Cheaper total component costs
- Smaller components
- Components that afford simpler development
- More reliable components
- Increased functionality
- Components that consume less power

Mobius addresses all of these needs with its Digital Monolithic Oscillator (DMO) Clock Technology, as summarized in the table below:

Needs	Solution
Cheaper total component costs	At least a 3 times reduction in applied cost by eliminating the discrete solution with an On Chip solution
Smaller printed circuit boards	By adding the clock function to the semiconductor, several square inches of printed circuit board space are eliminated
Components that afford simpler development	Development is easier since engineering efforts need not be spent understanding interface problems between various circuits.
More reliable components	Circuit level integration is much more reliable than board level integration. Cold solder joints are a significant failure mechanism at the board level.
Increased functionality	Power and size reductions afford engineers opportunities for increased functionality through incorporation of additional components.
Components that consume less power	DMO product reduces consumed power by 25 times, increasing battery life and reliability

Table 3: Customer needs and solutions delivered by Mobius

## The Product and Commercialization Process

The end product delivered by Mobius to its customers is a library containing the hard or soft design macros for manufacturing. Hard macros are fixed design blocks, while soft macros are configurable. The macro is a physical representation of the design that can be dropped into a much larger semiconductor product and then manufactured by the customer. Appendix 14 provides a visual perspective of Mobius technology as applied to semiconductor components.

This model limits the manufacturing burden to prototype development for Mobius while production manufacturing is managed by the customer. Lastly, delivery of hard and soft macros protects Mobius' IP assets, since the delivered product is a copyrighted physical representation of the design, and extremely difficult to reverse engineer.

Each macro must be ported and configured to a specific manufacturing facility. Additionally, each prototype must be developed and proven at each facility. Under the research environment, Mobius has developed the DMO in both IBM's 0.13-micron Cu 9S SOI process and TSMC's 0.18-micron mixed-signal CMOS process. Additionally, the AFE has been developed in TSMC's process. For these processes, the commercialization effort will require addition of built-in test and soft configuration capabilities. The strategic decision to prototype the technology in these processes was made because IBM is emerging as the premiere SOI facility while TSMC is clearly the industry leader for bulk CMOS manufacturing. With prototypes already developed in these technologies, Mobius is positioned to capture a large initial market. For additional processes, prototype development will be required. Mobius will contract MOSIS of Marina del Rey, CA, as a multi-user service for these prototype developments. Using MOSIS is a low cost and low volume solution for this prototyping activity. Appendix 15 illustrates these commercialization activities of Mobius.

### **Product Development and Commercialization Timeline**

Mobius possesses strong relationships through its participation in research opportunities between major semiconductor companies and The University of Michigan. The initial Mobius Digital Monolithic Oscillator prototype was a cooperative development program with The University of Michigan, IBM, Taiwan Semiconductor (TSMC), and MOSIS. The IP of this development program has been disclosed for patent to The University of Michigan Technology Management Office. The table on the following page outlines the development and commercialization timeline for the Mobius product line over the next two years.

### **Continued Development**

Mobius has a strong foundation in research and development. As such, Mobius intends to develop a complete mixed-signal IP design framework for semiconductor products. The commercialization efforts surrounding the DMO and AFE are the path realizing this environment. Specifically, throughout its development, Mobius will bundle the soft and hard macros into libraries. These libraries will then be delivered to semiconductor design and manufacturing houses for the development of mixed-signal system-on-chip (SoC) products. Mobius intends to achieve a position in the industry as the authority on

monolithic mixed-signal IP for SoC development. The implementation schedule in appendix 16 illustrates the continued development timeline.

Initial Products Development and Commercialization Timeline									
Calendar Years 2001 to 2003									
Product Status	Prior to Q4 2001	Q4 2001	Q1 2002	Q2 2002	Q3 2002	Q4 2002	Q1 2003	Q2 2003	Q3 2003
		<ul style="list-style-type: none"> <li>• Preliminary designs were co-developed with National Semiconductor, Santa Clara, CA</li> <li>• Initial prototype was successful, but IP is co-owned</li> <li>• The Mobius design team initiates independent development of key functional blocks that enable patents of final products</li> </ul>	<ul style="list-style-type: none"> <li>• DMO and AFE technology moves from engineering to prototype through facilities at IBM, East Fishkill, NY and TSMC, Taiwan via MOSIS, Marina del Rey, CA</li> <li>• Patent applications are submitted for DMO and AFE</li> <li>• DMO macro product commercialization programs are initiated</li> <li>• Incorporation completed</li> </ul>		<ul style="list-style-type: none"> <li>• First DMO prototypes delivered by IBM and verified</li> <li>• Additional revision of DMO at IBM</li> <li>• Sale and marketing plans are initiated</li> <li>• First contract negotiated (IBM, National)</li> <li>• Angel capital injection \$1.5 Million</li> </ul>		<ul style="list-style-type: none"> <li>• Initial sales and deliveries of commercialized DMO macros</li> <li>• Commercialized DMO macro is ported to additional technologies</li> <li>• Mobius commercialization and modeling patents filed</li> <li>• Institutional capital injection \$5 Million</li> </ul>		<ul style="list-style-type: none"> <li>• Initial sales and deliveries of first silicon product</li> <li>• AFE macro product commercial effort initiated</li> <li>• Technology made public through technical and commercial conferences and publications</li> </ul>

Table 4: Mobius' initial products development and commercialization timeline

### Industry Analysis

Semiconductor Industry Association (SIA) estimates the total semiconductor industry revenue in 2001 at approximately \$150 billion, with an estimated 8% CARG going forward. Overall semiconductor revenue is heavily influenced by common macro-economic conditions. In general, the semiconductor industry is maturing, with large volumes of business becoming a commodity.

Traditionally, digital products have dominated the semiconductor industry. However, recent trends have focused the industry at higher levels of mixed-signal integration. Accordingly within the semiconductor industry, certain segments are showing substantial growth rates. In particular, Dataquest estimates the market for system-on-chip (SoC) products was approximately \$20 Billion in 2000, and expected to grow to approximately \$60 Billion by 2004. The inherent advantages of SoC technology, as outlined earlier, are expected to fuel the growth rate of these components. There are several critical factors required to stimulate the growth of the SoC market, including design tool advancements, post processing technology evolution, and the continuation of third party IP development. As the complexity of integrated circuit designs continue to grow, suppliers are becoming more dependent on outside IP development to deliver value to their customers. Drew Peck, a semiconductor analyst from SG Cowen Securities Corp., NY stated recently, "The model for sales [of soft and hard macro products] works for ARM, MIPS, and Rambus because they offer widely adopted, proprietary blocks that have become de-facto standards. Customers aren't likely to develop these blocks in-house because the functions are very complicated." SG Cowen estimates the 2000 semiconductor IP industry at approximately \$700 million in revenue, with a 40% CAGR

Another developing trend in the semiconductor industry is the use of silicon-on-insulator (SOI) substrates. Currently, the industry standard is bulk silicon. Mobius has designed and is manufacturing prototypes in both technologies. Mobius expects to be one of the first IP companies to capture the SOI market. The advantages of SOI include the ability to design for manufacture high-speed, low-power, low-voltage, and low-noise chips. SOI technology allows the convergence of currently disparate technologies, including microelectromechanical systems (MEMS), analog, digital, and radio frequency circuits. The market research firm, Rose Associates estimates the SOI market is currently at \$40 million per year and growing at 40% to 50% CAGR. This market is projected to reach 10 percent of the total bulk silicon market by 2005.

## Initial Target Market Analysis

The initial target market for Mobius' mixed-signal semiconductor IP products is the microprocessor, microcontroller, and programmable logic market. The potential business base for sales of the Mobius DMO is truly immense. The projected revenue for the total processor market in 2002 is \$47.4 billion (SIA, Forward Concepts), arising from the sale of an estimated 11.85 Billion units (average direct manufactured cost per unit of \$4.00). By 2004, these numbers are projected to grow to \$61.4 billion and 15.35 Billion units, respectively. *Every single unit manufactured represents potential incremental revenue for Mobius since there currently is no on-chip clock technology marketed that can provide a similar variability and accuracy.*

## Market Segmentation

Mobius' target market is segmented into three areas: manufacturing-only companies (Fabricators), fabless semiconductor companies, and complete design and manufacturing houses. Companies representative of these segments include Taiwan Semiconductor (TSMC), inSilicon, and IBM respectively. These segments are further fragmented into the markets that are supplied by these companies. Mobius has developed a unique push and specific pull marketing strategy that will address these market segments.

## PRODUCT ANALYSIS AND COMPETITION

Mobius' initial product, the DMO, directly replaces all of the discrete components required for off-chip clock generation. The following tables detail Mobius' competitive value proposition. By incorporating a Mobius DMO, our customers gain additional sales revenue that would normally go to discrete component suppliers, while adding significant value to their product by providing a solution that has lower power consumption, greater accuracy, and smaller size. The following tables illustrate the DMO technical and cost value as compared to current clock generation technology.

DMO Replaced Components	Component Price Qty 5000	DMO estimated costs	Price
Oscillator	\$1.88	Amortized Licensing	\$0.20
Crystal	\$0.39	Royalties	\$0.10
Resistors & Capacitors	\$0.18	Fabrication	\$0.09
Assembly	\$0.30		
Total Costs	\$2.75	Total	\$0.39

Table 5: Cost comparison of current implementation vs. Mobius DMO

Specification	Discrete Oscillator	Mobius DMO
Power Consumption	100 mW	4 mW
Size	.5 sq-in of PC board	.09 mm <sup>2</sup> of Silicon Die
Reliability	Good	Excellent
Frequency Stability	High	High
Operational Frequency	Fixed	Variable
Tuning Range	Fixed	1GHz to 100MHz

*Table 6: Performance comparison of current implementation vs. Mobius DMO*

Currently, Mobius has no direct competition for the DMO product. To our knowledge, there is no IP company or integrated semiconductor company that is actively attempting to develop high-performance on-chip clock generation circuitry. Moreover, while executing their patent search during the filing process, The Technology Management Office at The University of Michigan has found no technology that is significantly close to the Mobius DMO. Speed to the market is critical for success, as there are some potential indirect and future competitors.

The incumbent suppliers of crystals and oscillators are the most exposed to the DMO product. The crystal and oscillator products are essentially commoditized, with a few large players dominating the market. iSuppli estimates the total revenue for crystals and oscillators in 2001 to be approximately \$3 Billion. The main suppliers of crystals and oscillators are Epson America and Citizens. The response from Epson and Citizens to an on-chip clock is limited. Since the current products are commodities, there is no room to compete on price. Also, Epson and Citizens have no expertise in developing IP for semiconductor applications. Crystal technology is significantly different from microsystems technology. Unlike the DMO, which is a high performance, tunable, low power, integrated solution, crystals are large, discrete, and fixed frequency products.

The chip design and IP industry includes a wide number of potential competitors. Currently, some chip designers, such as Cygnal, offer an on-chip clock option in their product. However, this type of clock generation circuitry is not high performance and typically only used in a diagnostic mode. Additionally, monolithic ring oscillators are occasionally utilized for low-end prototyping, but all integrated circuit (IC) designers still must to use discrete clock components to create a marketable and functioning product.

Because the benefits of an on-chip clock are so compelling, any traction the Mobius DMO gains will surely compel other IP developers and SoC companies to attempt to offer a similar product. Likely potential competitors include companies with micro-machining expertise, such as Motorola. Moreover,

competitors in the Radio Frequency (RF) market that could compete with Mobius are smaller companies such as Discera and Soft Mixed-Signal. Discera is a fledging start-up company with RF technology that could potentially compete against Mobius, but only with a significant technical redesign effort. Discera’s target is localized to the cellular RF components market. Mobius does not expect to actively participate in this particular market. Soft Mixed-Signal is a relatively new company that employs a licensing/royalty revenue model for delivery of macros. This company and its revenue model mirror Mobius for macro sales, however, Soft Mixed-Signal has targeted a different market space for mixed-signal products. In either case, no competitors have shown any products with a similar or better value proposition that could successfully compete with Mobius’ DMO and AFE macros. The following table compares the company profiles.

Available Macros	Discera	Soft Mixed-Signal	Mobius
Analog Front-End	Not Available	Available for Limited Applications	Available
Monolithic Oscillator	In Development	Not Available	Available
Low-Voltage, Low-Power Analog	Not Available	Not Available	Available
Primary Market	Cellular RF Components	Networking, Ethernet	Processor Market

*Table 7: Comparison of available offerings between Mobius and competitors*

### **Mobius’ Unfair Competitive Advantage**

Mobius possesses a four-part unfair competitive advantage.

1. The Mobius technical team has developed defensible intellectual property at The University of Michigan and The Technology Management Office is in the process of filing U.S. patents. Legal counsel from The University will protect these patents. Mobius will also continue to develop patented IP as product commercialization cycles are completed.
2. The Mobius technical team has emerged from the burgeoning field of microsystems. Few, if any, people in the world possess the technical talent equal to that of the Mobius team. Mobius is several design cycles ahead of any competitor and these cycles have enabled Mobius to develop state-of-the-art trade secrets around the design flow and framework for efficient microsystems commercialization. This design framework, born of the DMO and AFE development, will allow Mobius to innovate and bring to market future IP at a faster rate than any competitor.

3. Mobius will maintain strong ties to the research community as an industrial member of The Center for Wireless Integrated Microsystems at The University of Michigan and will therefore possess exclusive “first look” rights to all patented technology that emerges from The Center.
4. Mobius’ technological development has emerged at a time when the semiconductor IP industry is relatively mature. Through close observation of the industry, Mobius has selected the most successful business model, contract framework, and negotiation strategies for its customers and shareholders. Power over customers will be achieved through a multiple licensing strategy, significantly reduced time to market, and protected leading-edge technology.

### Marketing Push Strategy

The first stage of Mobius' marketing plan will consist of a push strategy in order to establish a strong market presence with low-dollar expenditures and within a relatively short time frame. The consolidated nature of the semiconductor industry promotes such a strategy, as each licensee represents up to hundreds of millions of units per year. The goal of the push strategy will be to engage semiconductor manufacturers in license agreements and ensure that they have made the investments or relationships necessary to perform post-processes and testing.

Armed with the necessary licenses to configure and produce Mobius' "on-chip clock," the existing sales forces of chip manufacturers will be incentivized to pass the added value through to their customers. Mobius' IP model will ensure long-term relationships with manufacturers as their ROI for each license increases with each unit sold. The first stage of the push strategy will be a direct sales and marketing campaign to four of the largest semiconductor manufacturers in the world: IBM, Taiwan Semiconductor Manufacturing Company (TSMC), National Semiconductor (National), and Atmel Corporation (Atmel). Combined, these four companies represent over \$12 billion in semiconductor sales potential. Personal relationships between members of Mobius' management team already exist with these companies and informal discussions are currently in progress. Secondary targets include programmable logic fabricators and designers such as Altera, Xilinx, Actel, and Quick Logic.

### "The Mobius Big 4"

The most recent semiconductor industry outlook indicates that a bottom has been made and unit volumes and revenue will accelerate during 2002. Mobius has targeted its initial four targets as the fabricators who are in the best position to capitalize on the industry's nadir and recovery.

- 1.1. **Taiwan Semiconductor** is the first and largest dedicated semiconductor foundry in the world. Among its hundreds of customers include names like Philips Electronics and Motorola to fab-less chip makers like Broadcom and NVIDIA. Wafers accounted for 92% of TSMC's \$5 billion in sales in 2000.
2. **IBM** began making computer chips in 1994, and the company accounted for \$3 billion of the \$20 billion application-specific integrated circuit (ASIC) market in 2000. In addition to ASIC's, IBM's semiconductor business includes microprocessors, communications chips, and embedded processors.

3. 3. **National Semiconductor** is one of the leaders in system-on-chip designs and manufacturing. The \$2 billion (2000 sales) company manufactures a large variety of integrated circuits and specializes in discrete analog and digital chips. Analog devices accounted for over two-thirds of 2000 sales.
4. 4. **Atmel** is another very large ASIC manufacturer, representing 26% of its \$2 billion in 2000 sales. Other potential Mobius-potential products include microcontroller (15% of sales) and programmable logic chips (7%). Motorola is the company's largest customer, with 12% of Atmel's total business.

No additional sales people beyond the V.P. of Sales & Marketing will be needed for the initial stages of the push strategy, as existing Mobius relationships will be the primary drivers. Once the potential of existing relationships have been realized, it is estimated that one sales person will be recruited for expansion efforts in both Asia and Israel (including Europe).

#### **Products**

Mobius plans to sell design and manufacturing licenses to chip fabricators, as well as a compatible software package, which will allow them to configure Mobius' designs to the specific integrated circuit that they are manufacturing.

#### **Price**

The pricing schedule will be straightforward and aligned with current industry standards. Initial prices will be \$350K for the design license, \$350K for the manufacturing license, or \$600K for both licenses. Included in the contracts will be a \$0.10 manufacturing fee per chip. A tiered pricing structure may be considered, as negotiations require.

#### **Place**

Initial distribution will likely occur via optical disk, which will contain the necessary intellectual property and software for the DMO's application. It is anticipated that secure Internet technology will facilitate later distribution. As mentioned above, management at first and later a small sales force will be used for consultative selling to the semiconductor companies' marketing departments who are responsible for procurement of IP. In addition, Internet technology will be utilized for the sales function wherever possible. Mobius' IP-based business model eliminates the need for costly warehousing and delivery functions.

#### **Promotion**

Promotion of Mobius' products in the push strategy will largely consist of utilizing personal relationships with fabricators, as well as market education. Industry publications and press releases used

in the pull strategy may be seen by the fabricators, however direct marketing to this customer segment will undoubtedly be the most effective promotional method.

### **The Challenge**

The short-term challenge of the push strategy lies with the post-process activities necessary for the DMO to operate. In order to complete the fabrication and testing of Mobius' initial product, fabricators such as those mentioned above must utilize specific equipment in a post-manufacturing process to release mechanical processes within the microprocessor or microcontroller so that the clock can operate freely within the chip. While fabricators do not need to make any additional capital expenditures for this post-process, the added processing time does represent an additional investment for which our customers must earn a return.

This challenge is overcome by the significant value proposition which Mobius' DMO represents to the fabricators. The DMO represents to the fabricator a sale, which would have previously gone to off-chip discrete component suppliers, as well as added margin over our \$0.10 manufacturing fee. Additionally, the fabricators will be able to earn a premium for the size, accuracy, and power savings our DMO represents to their end customers. The post-process investment necessary to produce Mobius' "on-chip clock" has already been made by some manufacturers, such as MEMS device fabricators, and is necessary for other chip designs. Those fabricators that serve Mobius' industry segments are all expected to eventually utilize post-processes in their chip manufacturing procedure.

### **Marketing Pull Strategy**

The marketing pull strategy is based on low cost guerilla marketing tactics. Marketing "Pull" dollars will be spent on the worthy situations and not without considerable cost-reward analysis. The key aspect of this guerilla strategy will be ability of Mobius to communicate the financial value proposition, ease of integration advantages, and higher functional benefits of resulting products utilizing DMO technology.

1. **Product:** The products that Mobius will pull through the market are the design licenses that various non-manufacturing customers will use to design and develop their own applications.
2. **Place:** The primary segments Mobius will focus design licenses marketing efforts are Integrators and IP suppliers. Integrators include companies such as V-Automation, Nashua, NH, Inicore, Fremont, CA and Faraday, San Jose, CA because they specialize in the integration of third party IP products. These companies characterize the "Pull" segment for design & development of SoC and ASIC products. Focusing marketing efforts at the design levels naturally creates demand at

the Foundries that Mobius has targeted with the “Push” Strategy. Target IP suppliers include In Silicon, San Jose, CA, MIPS, Mountain View, CA, and ARM Cores, Cambridge, England. Mobius can create significant demand in every fabrication facility worldwide by becoming the de facto standard clock for integrated circuit time functions. Each of these customers are constantly innovating new features to support the next generation of semiconductor products. The Mobius DMO adds significant value to all products that these customers market.

3. Pricing: As previously discussed in the “Push” discussion of the marketing strategy, Mobius will price design licenses at \$350,000. Customers that design and manufacture will need the complete site-license program, which is priced at \$600,000. In these cases, Mobius will also collect, on a quarterly basis, royalties of 10¢ per unit shipped.
4. Promotion: Based on historical data for the semiconductor IP industry, there is little value to Mobius to launch of the DMO with a major advertising campaign. Instead, Mobius plans to use the web, web press conferencing, and industry exhibitions as the primary vehicle to introduce and market the DMO “On-Chip Clock”. The latest innovations in web advertising and the ability of periodical companies like CMP, Cahners, & Penton to use their web presence to promote a web based press conference or other web based information transfer opportunities, provide Mobius with a very cost effective and global resource for the commercial launch of the DMO. Additionally, Mobius will be present in various semiconductor technical forums for the presentation of white papers. The leaders in the semiconductor industry have successfully used this type of commercial push for many years. Primary conferences that Mobius will present at are:
  - Microprocessor Forum
  - Design Con
  - Design Automation
  - Embedded Processor Forum
  - Embedded Systems Forum
  - SocIP2002

## SWOT ANALYSIS

### Strengths

IP vendors are typically small, young companies whose customers are very large and well established, such as our “Big 4.” While in most industries this dynamic may lead to a situation in which buyers can exert tremendous power over suppliers, such as in the auto industry, wherein the OEM’s can control price and after-sale service, this is not the case in the IP market. The constraints of time-to-market and industry competition require all semiconductor vendors and IC OEM’s to source IP from vendors such as Mobius. Power over customers can be achieved through innovative products, which present a significant technological advance as well as a substantial value proposition. Mobius’ DMO satisfies both of these requirements and will no doubt lead the company towards competitive advantage.

Mobius’ timing is also a considerable strength, with regards to the IP industry’s maturity. While still only a few years old, the IP industry has advanced considerably as vendors and buyers have become more comfortable with each other and contract negotiation tensions have eased. Mobius will be able to take advantage of standardized frameworks for contracts including the Virtual Component Exchange (VCX), which has introduced commonality to legal contracts within the IP industry. The VCX maintains a web-based contract configuration that allows buyers and sellers of IP to choose from clauses that are frequently found within IP contracts. Such tools that have come about with the industry’s maturation will aide Mobius in getting its products to market substantially faster than some of its IP vendor predecessors. The added speed and acquired knowledge adds additional value to Mobius and its products.

### Weaknesses

“The primary problem with IP licensing is that few suppliers have been able to establish themselves as mainstream intellectual property providers and to capture substantial profits to reinvest in the development of next-generation intellectual property.” (Gartner, 2001) Historically, failure of the IP model has stemmed from lack of strategic planning and lack of well-thought-out business models.

Companies such as ARM, MIPS, and Rambus have proved success can be achieved if the appropriate business plan is in place and the necessary strategic planning has been done. Other companies have tried to copy these companies but have been unsuccessful due to a lack of strategic planning. The industry is evolving rapidly, and the exact business model that made ARM successful will not likely work today. Contract negotiation requirements are in a state of flux, and it is necessary to maintain close relations with the IP industry as a whole to keep up to date on the latest negotiation and contract developments.

One of the challenges the Mobius must overcome is our initial IP offering of a single product. Some potential buyers may be concerned that the company's lack of experience in IP contract negotiation and limited industry experience will slow time to market. While this may be a perceived weakness at first, the DMO's innovation and broad application will easily overcome any hesitation by potential licensees. An up-front, established contract framework that will cover future product introductions and eliminate contractual or legal delay will also be established early to overcome any concerns or hesitation. Established industry relationships on the part of Mobius' management team will be utilized to understand industry standard and leading-edge contract formulas. If necessary, partnerships will be established and utilized to ensure initial sales success. Tools now available to the IP industry, such as the Virtual Component Exchange (VCX), which allows users to select standard clauses commonly found in IP contracts, will be fully employed to Mobius' advantage.

#### Opportunities

Semiconductor intellectual property is becoming vital to performance as the industry moves to system-level ICs. Chip companies and system designers are searching for intellectual property that can differentiate their products and improve time to market without the necessary R&D costs.

"System-level integration (SLI) or system-on-a-chip (SOC) is the most important development in the semiconductor industry since the advent of the microprocessor 20 years ago." (Gartner, 2001) SOC has made and will continue to make seemingly complex electronic systems very affordable. The market for SLI/SOC devices was about \$20 billion in 2000, and it is expected to grow to \$60 billion by 2004 (Gartner, 2001).

There are many critical pieces required to develop the new generation of SLI/SOC devices, including design tools, leading-edge process technology and semiconductor IP. ASIC suppliers have tried to develop all of these on their own, but they have found it difficult. The niche industries that developed had focus and much better economies of scale. Now that design tools and process technology are relatively under control, the area that possesses the greatest opportunities is semiconductor intellectual property. The third-party intellectual property market is extremely important to the semiconductor industry and as a result, almost functions as a partnership between the designer, the manufacturer, and the third-party intellectual supplier. Mobius has annuity-like profits to gain if we build the right relationships early on and can offer significant value down the chain.

## Threats

Given the size of Mobius' opportunity, potential for competing products that come about through reengineering efforts do pose a threat in the long term. In the short term, intellectual property protection and necessary R&D efforts limit this competition. Motorola and Analog Devices are the two companies with the right qualifications, resources, and focus to develop a competing product. Specifically, these companies possess not only design and manufacturing capabilities in-house, but they also have experience commercializing microsystems products. It is important to note that both of these companies develop IP primarily for internal use. Moreover, this IP is typically maintained as proprietary in order for each company to deliver competitive semiconductor components. At worst, Mobius could be locked out of product lines offered by these two companies.

An additional threat to Mobius is the current shakeout of the semiconductor IP industry. This shakeout and associated perceptions created by innovation poor semiconductor IP companies may make it difficult for Mobius to win long term licensing agreements with major semiconductor design and manufacturing companies. Mobius differentiates itself from these IP companies not only by its ability to innovate, but also by maintaining a multi-product line that is customer driven and offers wide appeal. The DMO and the AFE represent exactly the types of products that fit this description. The winners are differentiated from the losers in this current IP shakeout by dominating products such as these.

## Business System

### Revenue Model

Mobius employs a business model that generates revenue through a licensing plus per unit royalty fee. These license and royalty models are well accepted within the semiconductor industry. The model provides Mobius with the flexibility to deliver commercialized soft and hard macros that are built around Mobius intellectual property or to expand the deliverable products to include complete SoC macro solutions without the investment of more than \$1 Billion dollars to build a manufacturing facility.

This model also provides Mobius with the ability to control prototypes, testing packaging, delivery, sales, and distribution of all deliverables from Mobius.

Mobius will charge \$600,000 for a design and manufacturing site license and \$350,000 for a design only site license at each facility. Additionally, a royalty of ten cents per unit manufactured will be charged. The revenue stream is time-sensitive. Initial contracts will bring in licensing fees in early, but large revenue streams will not be seen until customers fabricate devices. Therefore, Mobius will seek to protect its revenue stream by following semiconductor design cycles closely and targeting high volume markets with quick design turnover.

### **Business Location and Infrastructure**

Mobius will be based in Detroit; MI. Southeast Michigan has become a world-renowned hub for microsystems research, development, and commercialization. Currently, a breadth of talent in the field is available from The University of Michigan, Wayne State University, and Michigan State University. Technology is the core of the Mobius business concept and Detroit is a centralized location to recruit this technical talent and to allow Mobius to expand to its potential. Additionally, tax incentives and low cost of infrastructure make Detroit the appropriate location. Mobius is engaged in negotiations with the Detroit Economic Growth Corporation and the Michigan Economic Development Corporation to maximize the opportunities realized by these incentives.

The required infrastructure for initial start-up includes office space with high-speed data capabilities, computer hardware, and software. The hardware and software are critical for the development and commercialization of the intellectual property. Hardware will be purchased from SUN Microsystems. Software will be licensed annually from Cadence Design Systems and Coventorware.

### **Technology**

Mobius delivers a library to its customers containing the hard and soft design macros, which is the culmination of the intellectual property commercialization effort. Mobius will deliver the library to each customer via a variety of media formats including secure file transfer and compact disk. All formats will support secure licensing keys to safeguard Mobius from piracy of the technology. The initial hardware and software infrastructure will support this activity.

Future revisions of the technologies must be prototyped at the desired manufacturing facility. Mobius will utilize the MOSIS multi-user service for this activity. MOSIS provides access for low volume production to world-class semiconductor manufacturing facilities. Typical prototyping costs per 40-unit

batch are approximately \$20,000. Mobius will focus its prototyping efforts exclusively on facilities that manufacture high volume parts, such as Taiwan Semiconductor, in order to close large volume contracts. Appendix 15 outlines these activities.

### **Partnerships**

Mobius' initial technology will be licensed exclusively from The University of Michigan. Mobius is currently engaged in licensing negotiations with The University and is seeking a 5-7% equity only stake (no royalty) for acquisition of the licenses. Maintaining a close relationship with the research community is critical to the success of Mobius as emerging microsystems technologies come to fruition. To do so, Mobius will become an industrial member of the Center for Wireless Integrated Microsystems at The University of Michigan. Through this relationship, Mobius will not only provide direction for future technology developments, but also possesses exclusive "first-look" rights to all technology developed at The Center. The annual partnership fee is \$10,000.

## **Financial Planning and Financials**

### **Financial Methodology**

In analyzing the financial growth potential for Mobius, the financials take into account information from the market, known licensing & royalty models and customer input to project a picture of future profits and capital requirements. The market data is based on known usage and validated by reports published by Cahiers at the In-Site web site, or by CMP publications.

To complete the pro forma income statement, balance sheet and cash flow statement a two-tiered approach was used. First, costs and capital expenditures through 2003 that could be accurately estimated

were entered into the projections. Secondly, a comparable IP company was used to predict the long-term cost structure and capital needs for a more mature firm.

### **Revenues**

Mobius does not expect to generate revenues until the fourth quarter of 2002. Revenue will be generated primarily through the sale of one DMO license. The main driver in revenue will be royalty revenue that will begin to flow from manufactured designs during second quarter of 2003. The growth of the royalty revenue will be directly dependent on additional sales of manufacturing or design licenses throughout the planning period. Market growth in general has been estimated using Semiconductor Industry Association (SIA) projects for the growth of the microprocessor, microcontroller and system on chip projections for 2003 through 2005. The pro forma financials associated to these projections can be found in Appendix 1 thru 9

### **Costs**

Mobius projects three main cost centers: Research/Development, Commercialization efforts and SG&A. The research, development, and commercialization costs have been pooled under engineering. Sales and marketing have been pooled as a second cost center with G&A pooled as the third cost center.

Research, development, selling and administrative costs are expected to be driven by numbers of personnel in each area and are estimated on a per cost center basis. Proforma Profit & Loss, Balance Sheets and cash flow have been modeled based on employee and facilitation growth required to address a market dominance position for each Mobius product. These estimates could change based on market conditions and Mobius' ability to execute the sales and marketing plan

# APPENDICES

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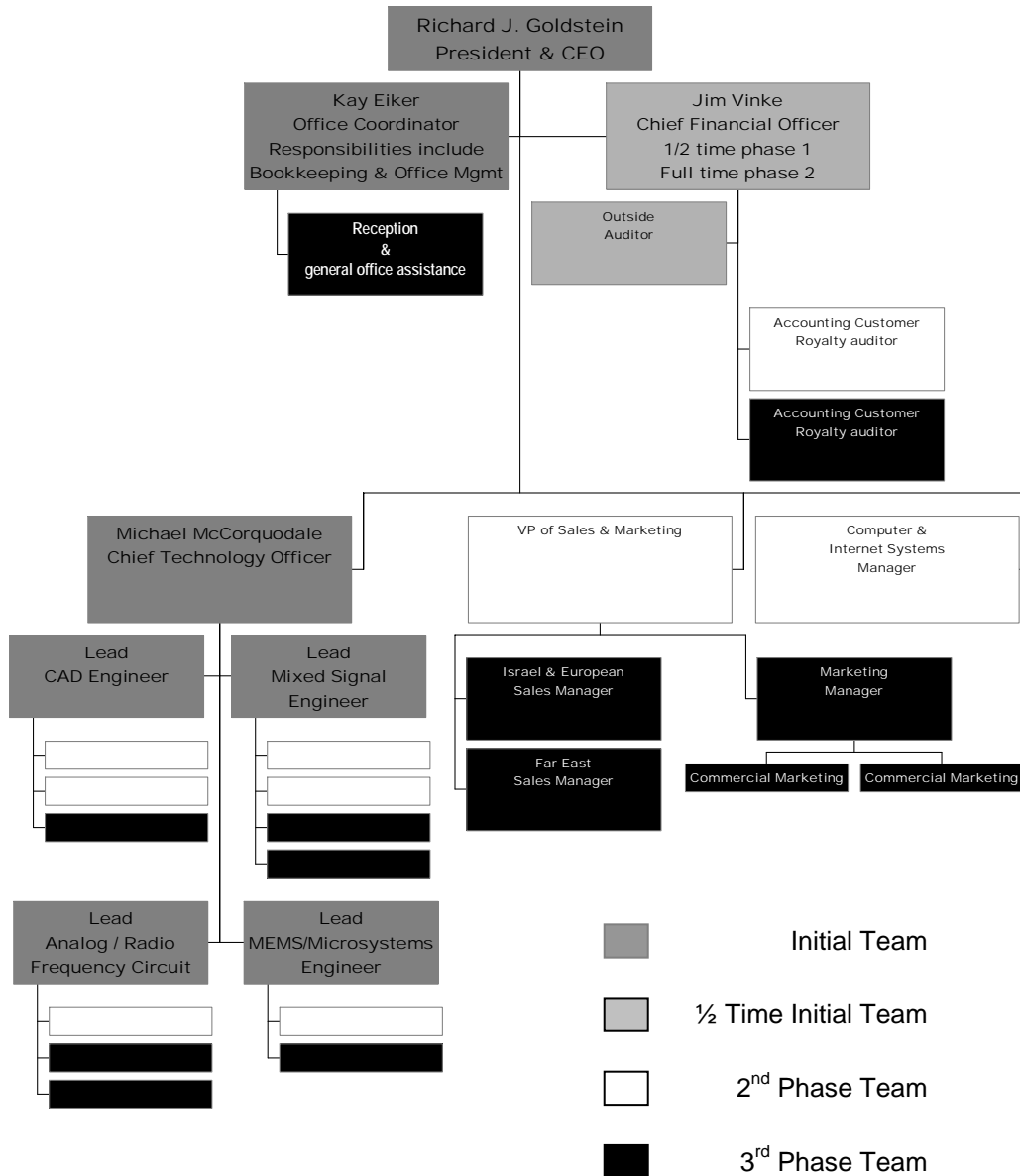


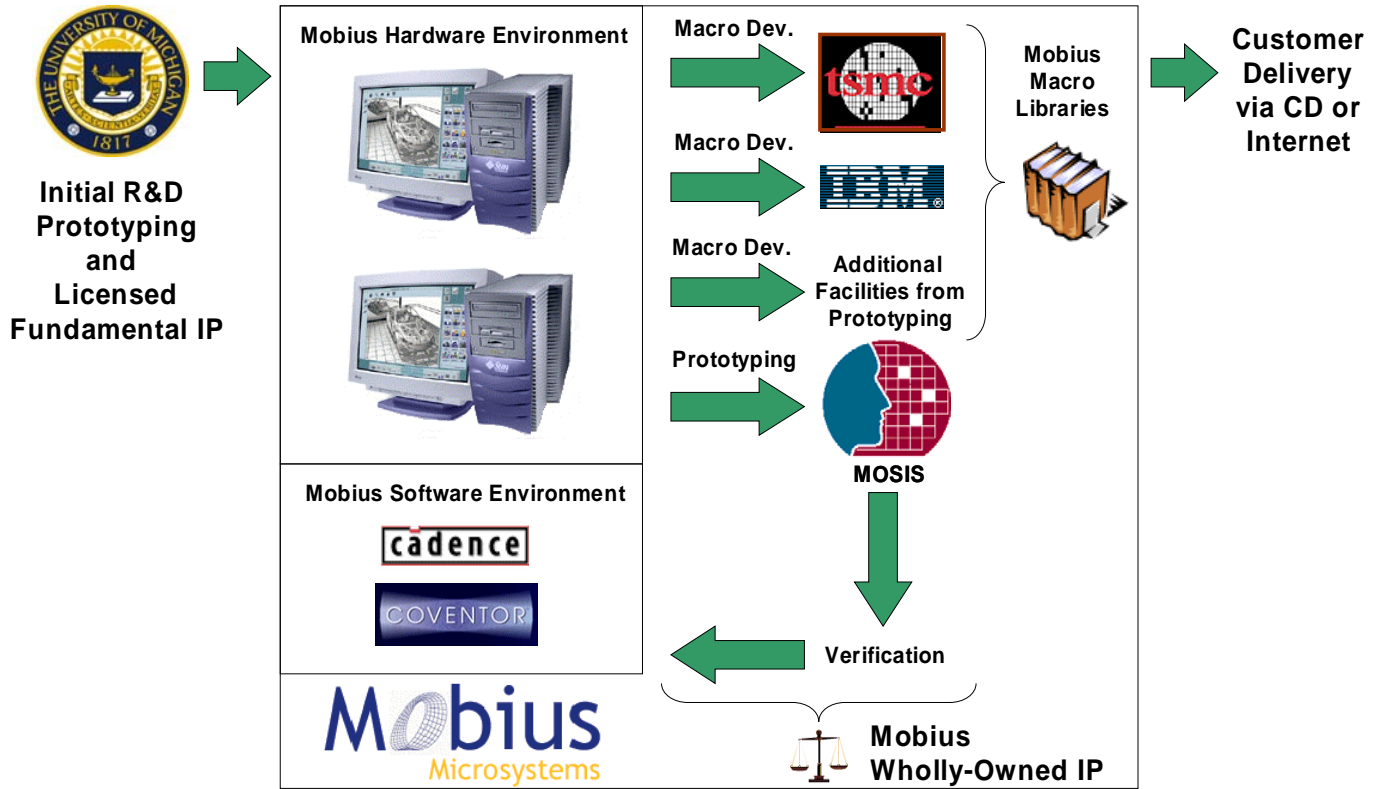




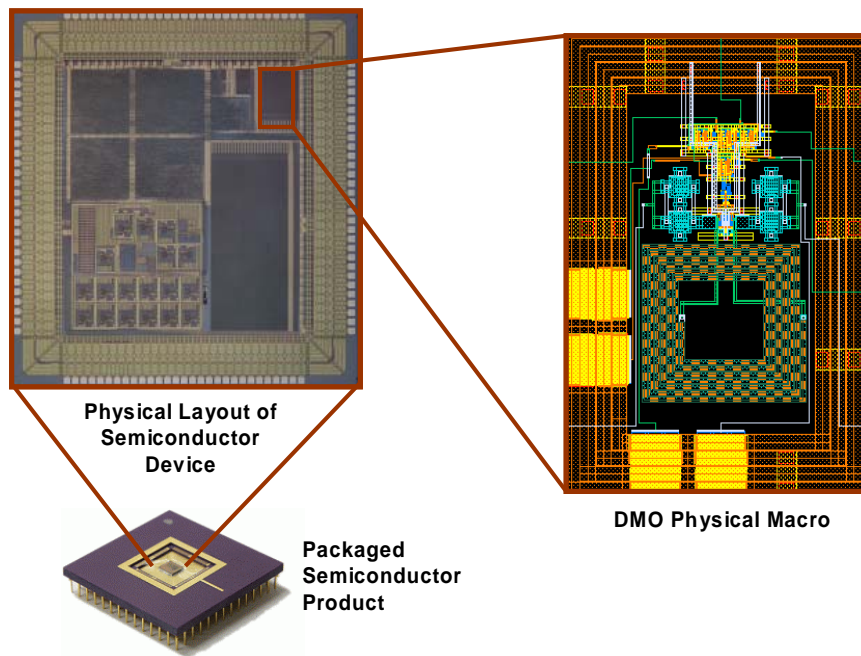
# Mobius Microsystems Inc.

## Est. 4 year Organizational Growth Chart





### Appendix 14: Mobius' Commercialization Activities



### Appendix 15: Mobius' Macros in Semiconductor Products