Mobius Microsystems
Convergence of Semiconductor Technologies

Mobius Microsystems Incorporated
3430 E. Jefferson Ave. #140
Detroit, MI 48207
614.571.5299
management@mobius-microsystems.com
www.mobius-microsystems.com

Great Lakes Entrepreneur's Quest

Mobius Microsystems, Inc.

Team ID # 1011

Team Members

Michael S. McCorquodale
Chief Executive Officer
mccorquodale@mobius-microsystems.com
313.205.3489

Jeffrey G. Wilkins
Chief Operating Officer
wilkins@mobius-microsystems.com
614.571.5299

James E. Vincke
Chief Financial Officer
vincke@mobius-microsystems.com
734.834.4481

Coach: John Kelley

Executive Summary

***Mobius Microsystems* brings to market a truly breakthrough semiconductor technology: an on-chip clock generator that is small, high-performance, low-power, tunable, and half the cost of existing solutions.**

The Problem

Electronic systems require a number of core technologies to be assembled. Typically, these systems include combinations of mechanical, analog, and digital technologies. In airbag deployment systems for example, a mechanical accelerometer is connected with analog circuits for interpretation of the deceleration signal. Mixed-signal circuits are included to convert the data from analog to digital format. The digital circuits then collect the data, perform signal processing to determine the nature of the impact, and communicate the information to additional peripheral electronics that mechanically deploy the airbag. These systems are typically assembled as a variety of integrated circuits on a printed circuit board (PCB). These assembled systems are:

- *Large* because several different integrated circuits (ICs) are required and the package for each individual circuit is significantly larger than the circuit itself
- *Expensive* because the package for each individual IC comprises up to 65% of its cost
- *Power-hungry* because the power required to send a signal from one IC to another IC is approximately ten times greater than the power required to send a signal within the same IC
- *Complicated* because the system engineer must understand the interfaces between each different IC
- *Less reliable* because IC interconnects on a circuit board fail at a higher rate than connections within the IC itself
- *Limited* in terms of functionality commonly due to size and power constraints

The microsystems industry has emerged to address these problems. Microsystems are intelligent miniaturized systems comprising sensing, processing, and actuating functions integrated on a single chip or multi-chip hybrid. Microsystems exploit the benefits of closely integrating two or more of the following technologies: electrical, mechanical, optical, chemical, biological, or magnetic.

The Vision, Product, and Business Model

Products incorporating *Mobius* technology will lead the microsystems industry by integrating previously disparate technologies onto a single chip. Our solutions will help our customers reap orders of magnitude improvements in the products that they build. *Mobius'* initial microsystems solution is a high-performance, low-power, on-chip clock generator, marketed as the "Digital Monolithic Clock", or "DMC." For all synchronous semiconductor ICs to operate, the clock function is as necessary as power itself. The clock is the signal that sets the processor speed to a specific frequency, such as 1 Gigahertz (GHz). Currently, the state-of-the-art clocking solution consists of a large discrete crystal component located on the printed circuit board with supporting electronics that occupy space on the chip. The unprecedented features of *Mobius'* DMC technology include:

- Complete on-chip implementation of the clock generator requiring no external components
- High-performance enabled by Microelectromechanical Systems (MEMS) technology
- MEMS that are completely compatible with standard integrated circuit manufacturing on a standard line requiring *no additional processing steps or costs*
- Stable, tunable operating frequency that reduces power consumption and increases flexibility
- Lower power consumption as compared to existing high-performance clock generation technologies
- Lower cost as compared to existing high-performance clock generation technologies

The DMC will be sold in the industry-accepted format of hard semiconductor intellectual property (IP), much like a blueprint, allowing system engineers to design the DMC directly into their products. Prototypes have been manufactured at *Taiwan Semiconductor Manufacturing Company* (*TSMC*) in the 0.18-micron CMOS process and at *IBM* in the 0.13-micron Cu9S silicon-on-insulator (SOI) process.

Mobius will employ a value-added semiconductor IP business model. The product is delivered to the customer as a manufacturing blueprint, or macro. Revenue originates primarily from two sources: licensing the macro as well as royalties generated when customers' chips are manufactured. Value-added services will surround product deployment into each customer's products. Profitable companies such as *ARM*, *MIPS*, *Rambus*, and *Parthus* have all achieved success with similar business models.

The Value Proposition to Our Customers

The value proposition of *Mobius*' DMC technology is most compelling when examined in a specific end product application. If *Mobius*' DMC technology were to be incorporated into a *Compaq* iPAQ Personal Digital Assistant (PDA), it would offer significant reductions in price, size, and power consumption as shown in the table below:

Example: iPAQ PDA	Using Current Technology	Using *Mobius*' Technology
Clock Hardware Costs	~$1.00	~$0.45
Clock Space Requirements	323mm² on PC Board	0.09mm² on semiconductor
Clock Power Requirements	32mW	4mW

Table 1: Mobius' value proposition applied to the Compaq iPAQ-3600 utilizing new DMC

The *Mobius* DMC would allow *Compaq* to build a smaller, less-expensive, more functional PDA with greater battery life, thus better satisfying its demanding customers.

The *Mobius* Team

- **Michael S. McCorquodale, CEO/CTO**: Doctoral Fellow in Electrical Engineering at the University of Michigan; Significant IC design and development expertise at *Hughes Space and Communications, Inc.*
- **Jeffrey G. Wilkins, COO**: Michigan M.B.A., 2003; Business development and finance experience at *Huntington National Bank* and *Velocys, Inc.* (Spin-off of *Battelle Memorial Institute)*
- **Christopher A. Cooke, VP Business Development**: OSU M.B.A., 2003; Technology sales, management, and marketing expertise at *Digital River, Inc.*, *Metatec International*, and *CheckFree Corporation*
- **James E. Vincke, CFO**: 23 years of management and financial expertise as member of executive team at *Mechanical Dynamics, Inc.* including CFO during $30M IPO

Market and Customers

To bring the DMC to market, *Mobius* will initially target the $720 million total addressable market for clock generation for system-on-chip (SoC) devices. SoC technology delivers increased functionality by integrating processing cores, memory, and logic in a single package. Due to its broad application, SoC is a bright spot in the $141 billion semiconductor industry representing $32 billion in sales growing at 25% to 30% a year. Portable electronics such as cell phones, PDAs, and wireless LAN are some of the largest end-markets for SoC due to these products' need for the high functionality and low cost SoC delivers.

Assuming an average SoC selling price of $20 per chip, the $32 billion SoC market represents 1.6 billion units produced annually. Each of these devices currently requires $1 in clock generation components, meaning $1.6 billion spent annually for the clock function. Multiplying 1.6 billion SoC units by *Mobius*' average selling price of $0.45 per DMC unit, this translates to $720 million in potential annual revenue for *Mobius*' first addressable market. *Mobius* is able to cut more than half the cost out of clock generation for the SoC market alone.

The total market potential for the DMC is substantially greater than clock generation for SoC alone, given that every synchronous semiconductor produced (the bulk of the market) requires a clock signal to operate. *Mobius* has chosen to focus on the SoC market as its first market due to the market's size and growth, as well as dynamics such as fast design cycles, comfort with IP and IP providers, early adoption of emerging technologies, and choice of fabrication facilities (*TSMC* and *IBM*).

To bring the DMC to market, *Mobius* will join established IP partnership programs with leading SoC companies, such as *Altera*, *Motorola*, and *Xilinx*. As a verified IP partner, the *Mobius* DMC can be easily dropped into these companies' new designs. A direct sales effort by *Mobius* and contracted technical sales representatives will then be required to get "designed-in" at the product level where the total value proposition is best understood (high-performance, low-cost, low-power, tunable, flexible). Design wins will pull license and royalty revenue through the established IP partnerships.

Competition

Mobius' DMC will potentially compete with three existing clock generation technologies. These are:

- Hybrid components using off-chip crystals and on-chip oscillators (most common)
- Fully discrete components using crystal technology (moderately common)
- Fully integrated electronics using a low-performance ring oscillator or similar technology (rare)

There are advantages and shortcomings with each technology; however, there is currently no inexpensive, small-sized, low-power, high-performance, tunable, reliable, and accurate solution for clock generation. Due to the fact that no existing technologies are microsystems-based, *Mobius* expects competition to originate from other start-up ventures or established companies with microsystems know-how (e.g. *Motorola*, *Analog Devices*). Due to the time and resources necessary to develop microsystems solutions as well as the industry's comfort with IP licensing, it is less expensive for microsystems companies to purchase *Mobius* IP for their products. At this time, *Mobius* is not aware of any other companies pursuing high-performance on-chip clock generation. A portfolio of provisional patent applications were filed by the University of Michigan throughout 2002 on the DMC, with Mr. McCorquodale, *Mobius*' CEO/CTO, as the inventor. Full utility patent applications were filed with the U.S. Patent and Trademark Office in February, 2003. This technology will be exclusively licensed to *Mobius* for commercial use. *Mobius* is confident in its IP position and its technological lead.

The Financial Model

Mobius' start-up strategy is focused at bringing its initial technology to market as quickly as possible with minimal capital requirements. *Mobius* will begin sales efforts in early 2003 and expects to close its first sale of an IP license in the third quarter of 2003. The company forecasts to sell a total of four licenses in 2003 (at an average of $150,000 per license), ramping up to thirteen licenses in 2004. As is customary in this industry, a direct sales force and technical sales representatives will be utilized for the majority of sales efforts. *Mobius* founders will self-fund company operations until the first sale is completed, after which an equity investment is expected. The following table shows summary pro forma financial information forecasted to 2007:

Pro Forma Financials (000's) YE 12/31	2003	2004	2005	2006	2007
Total Revenue	573	2,813	7,071	12,469	19,408
Gross Profit	463	2,153	5,388	9,528	15,017
Net Income (loss)	(181)	(135)	809	1,526	2,843
Equity Capital Proceeds	610	500	—	—	—
Cash Flow (after equity proceeds)	315	310	343	944	2,001

Table 2: Mobius' Pro Forma Financials from FY 2003 to 2007

The Preliminary Funding Requirements and Critical Path

Mobius is currently seeking $500,000 in investment capital from outside investors, with seed capital of $110,000 provided by *Mobius*' founders. The initial investment will be sought after *Mobius* closes its first IP license sale, which is expected in the third quarter of 2003. Invested capital will be used to hire marketing and technical expertise, customize the DMC technology for additional manufacturing processes, and fund R&D enhancements to the DMC. A second investment round of $500,000 may be sought six to nine months after the first round investment. The additional capital would be used to set up a sales office in Munich, Germany, as well as hire additional management and technical expertise.

Mobius is looking for a long-term investment or strategic partner that can provide resources to support the initial and near-term product commercialization efforts. The *Mobius* team will continually focus its efforts on growing the company while maximizing shareholder wealth. Investment exit opportunities will be evaluated thoroughly throughout the company's growth cycle. *Mobius* is concentrating on a concurrent two-stage critical path to a first sale and subsequent capital injection in Q3 of 2003:

- Thorough test and verification of beta prototypes from *Taiwan Semiconductor Manufacturing Company* (beta prototypes completed and delivered 4/03, test and verification 5/03) and test and verification of alpha prototypes from *IBM* (completed and delivered 3/03, test and verification 6/03)
- Execution of the exclusive licensing agreement with the University of Michigan (expected 5/03)

Table of Contents

Technology and Product

The *Mobius* Technology Vision

Mobius Microsystems will commercialize cutting-edge advances in microsystems research to address current and future demands present in the semiconductor industry. Microsystems are intelligent miniaturized systems comprising sensing, processing, and actuating functions on a single chip or multi-chip hybrid. By closely integrating two or more of the following technologies: electrical, mechanical, optical, chemical, biological, or magnetic, *Mobius*' microsystems products will allow its customers to build more-functional and less-expensive products that are significantly smaller in size and consume less power.

The Advantages of Microsystems

Mobius has tapped the potential of microsystems to develop a revolutionary new high-performance clock generator for synchronous semiconductors. The convergence of the various technologies named above create new opportunities to deliver the following benefits to electronic product manufacturers:

- Lower total component costs that allow customers to improve margins in highly competitive markets
- Smaller components that allow customers to satisfy the demand for miniaturization
- Components that consume less power enable products to run longer, a key driving force in portable electronics
- Components that simplify development and accelerate time to market in industries where rapid innovation is critical to capture market opportunities
- More reliable components that ensure customers' ability to deliver quality and achieve customer satisfaction
- Increased functionality that satisfies customers' insatiable need for feature-rich products

Mobius will launch its initial technology with a focus on the following market needs:

- Semiconductor products with low-power, high-reliability, small-size, and low-cost
- Convergence of the mechanical, analog, and digital domains onto a single integrated circuit (IC)
- Utilization of Microelectromechanical Systems (MEMS) technology to meet performance and integration demands that cannot be achieved with standard transistor circuits alone

Mobius intends to become the industry leader in microsystems technology by producing products that meet these demands within high-growth and high-volume markets.

Initial Product Offering

Mobius' initial microsystems solution is a high-performance, low-power, tunable on-chip clock generator, marketed as the *"Mobius* Digital Monolithic Clock," or "DMC." All synchronous semiconductor ICs fundamentally require both power and a clock to operate. The clock is the signal that sets the processor speed to a frequency such as 1 Gigahertz (GHz). The unprecedented features of *Mobius*' DMC technology include the following:

- Completely on-chip implementation of the clock generator requiring no external components
- High performance enabled by Microelectromechanical Systems (MEMS) technology
- MEMS circuitry that is completely compatible with standard integrated circuits and manufactured on a standard fabrication line requiring *no additional processing steps or costs*
- Tunable operating frequency, which reduces power consumption and increases flexibility, unlike current fixed-frequency technology
- Considerably lower power consumption compared to existing high-performance clock generation technology
- Lower cost as compared to alternative high-performance clock generation technologies

Alpha and beta *Mobius* DMC prototypes have already been manufactured at *Taiwan Semiconductor Manufacturing Company* (*TSMC*) and alpha prototypes at *IBM*; all are undergoing exhaustive testing. The *Mobius* DMC will be delivered to customers in the industry-accepted format of hard semiconductor intellectual property, also known as IP, which is the blueprint for the manufacturing of an integrated circuit. The details of semiconductor IP are discussed in the sections that follow.

Additional Technology and Research and Development

Initially, *Mobius* will focus its resources upon commercialization of the DMC, however *Mobius* will not be a single-product company. With a strong foundation conducting research and development in microsystems at The University of Michigan, a leading microsystems research institution, management intends to fuel *Mobius*' growth with the commercialization of additional microsystems technologies. One potential product already prototyped in the *TSMC* 0.18-micron CMOS process is an analog front end (AFE) that is low-power, low-voltage, and compatible with standard digital integrated circuits. The patent-pending *Mobius* AFE would provide customers with an on-chip interface between the widest variety of sensors and a processor as compared to currently available technology.

Customer Value

Mobius' initial product offers the best value to companies that build system-on-chip (SoC) products. SoC is the latest evolution in chip design wherein core functions are integrated onto a single chip. Companies, such as *Motorola, Broadcom,* and *Sony*, employ SoC designs and continually search for innovative technology that can be easily incorporated to improve their semiconductor products. Key problems for these companies revolve around getting innovative products to market in the shortest amount of time. *Mobius* solves many of their problems with its DMC technology, as summarized in the table below:

Needs	The *Mobius* DMC Solution
Less expensive total component and system costs	A cost reduction of up to 80% for clock generation by eliminating discrete components with an on-chip solution
Smaller and fewer components	By adding the clock function on-chip, square inches used for off-chip clock generation are eliminated and the number of discrete components is reduced
Reduce product delays and costs associated with component inventory	Adding the clock function on-chip reduces component inventory and supply chain costs associated with off-chip components
Components that afford simpler development and shorten design cycles	Development is simplified through the simpler integration of on-chip IP, versus board-level integration of crystals
Components that consume less power	On-chip clock product reduces consumed clock generation power by up to 85%, thereby increasing battery life
Increased functionality	Tunability over a range of frequencies; Power and size reductions afford engineers the opportunity to incorporate additional features
More reliable components	Circuit level integration is much more reliable than board level integration
Decreased time to market	*Mobius*' intellectual property permits innovation with little to no R&D time or investment
Increased share of total system revenue	*Mobius*' customers realize clock generation revenue previously captured by discrete clock component suppliers

Table 1: Customer needs and the correlated solution delivered by the Mobius Digital Monolithic Clock

The *Mobius* DMC has application and value to a much broader market than SoC as every synchronous semiconductor manufactured requires a clock to operate and many market segments have similar needs to the SoC market. SoC represents the most attractive initial market for the *Mobius* DMC technology due to its position on the forefront of semiconductor innovation. The SoC market is in the best position to broadly adopt microsystems technology and many companies have already invested in microsystems research. Specific characteristics of the SoC market that make it ideal for *Mobius*' initial product launch include:

Market Dynamics	SoC Market
Utilization of Emerging Technology	High early acceptance to gain product advantage
Design Cycle	Fast design cycles to meet market opportunities (as short as 6 months) that rarely involve prototyping
Comfort with Innovative Semiconductor Intellectual Property and IP Vendors	High acceptance to add functionality, meet design cycle demands and maintain flexibility
Expectations of IP Vendor	Value-added service
Volume	Medium to high (Many consumer product categories)
Foundry for Manufacturing	*Taiwan Semiconductor Manufacturing Company (TSMC), IBM, United Microelectronics Corporation, and AMI Semiconductor*

Table 2: SoC market dynamics

Mobius offers a compelling value proposition with its technology and embraces the major dynamics of the SoC market.

Competing Technologies

Mobius' DMC will compete with three different technology options for clock generation that are currently available to customers. A summary of each competing technology and its performance metrics are provided in the bullets and table below:

- A hybrid of discrete and integrated components using off-chip crystals and on-chip oscillators (most common)
- Fully discrete components using crystal technology (moderately common)
- Fully integrated electronics using a ring oscillator or similar technology (rare)

Technology Metric	Hybrid	Discrete	Integrated	*Mobius*
Cost	Moderate	Expensive	**Inexpensive**	**Inexpensive**
Size	Moderate	Large	**Very small**	**Very small**
Power consumption	Moderate	Very high	**Very low**	**Very low**
Tunability	None	None	Limited	**Wide**
Reliability	Moderate	Moderate	**High**	**High**
Frequency Stability	**Excellent**	**Excellent**	Very poor	**Excellent**
Frequency Accuracy	**Excellent**	**Excellent**	Very poor	Very Good

Table 3: Summary of technology metrics as compared to available technology and Mobius technology

Demands within the clock generator market have moved away from wholly discrete or integrated solutions, where some demands are simply missed, toward hybrid clock solutions where most demands are only modestly satisfied. While *Mobius* does not intend to displace every clock generation technology, this table identifies a clear gap in the marketplace:

> *Currently, no inexpensive, small-size, low-power, high-performance, tunable, reliable, and accurate on-chip solution exists for clock generation in the semiconductor market. Mobius' technology is meeting a market need that is currently unaddressed in an acceptable manner.*

Commercialization Process

The DMC will be delivered by *Mobius* to its customers as hard intellectual property, or IP, technically known as a hard macro for manufacturing. Hard IP is a physical representation of the design, similar to a blueprint. The IP can be designed into a

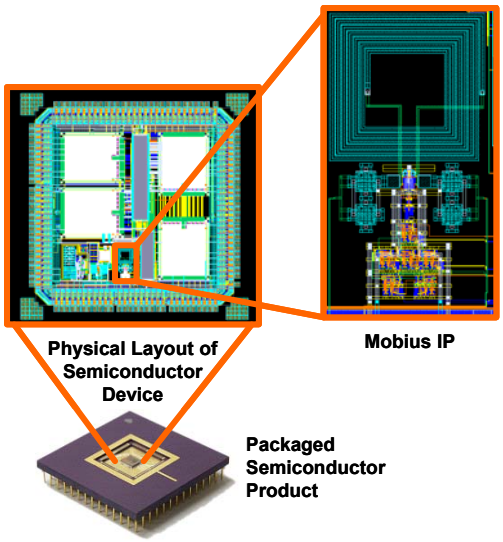

Figure 1: Semiconductor IP design illustration

much larger semiconductor product and then manufactured as Figure 1 illustrates. The IP licensing business model limits the manufacturing burden to only prototypes for *Mobius,* as production scale manufacturing is financed and managed by the customer. Delivery of hard macros protects *Mobius*' IP assets, since the delivered product is a patent-protected physical representation of the design that is difficult to reverse engineer. Most importantly, an IP model will allow *Mobius* to gain market entry with minimal capital requirements and high gross margins, similar to a software company. Profitable companies such as *ARM*, *MIPS*, *Rambus*, and *Parthus* have all utilized similar models successfully.

Each *Mobius* macro must be transferred, configured, and proven for each specific manufacturing facility process. *Mobius* has already prototyped the DMC in both *IBM's* 0.13-micron Cu9S silicon-on-insulator (SOI) process and *TSMC's* 0.18-micron mixed-signal CMOS process. For the *TSMC* and *IBM* processes, *Mobius*' commercialization effort will require only specification of the part, development of a design manual, software bundling of the macro and simulation models, and implementation of security protocol against piracy. 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 silicon CMOS manufacturing. Leveraging these relationships already in place, *Mobius* will partner with these manufacturers through their IP partnership programs allowing *TSMC's* and *IBM's* many customers to easily include the *Mobius* DMC in their manufactured products. 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* has and will continue to use *MOSIS* of Marina del Rey, CA, for prototype developments. *MOSIS* is a low-cost and low-volume multi-user foundry service for this activity.

Product Development Summary and Timeline

Q4 2001 - Q1 2002	Q2 2002 - Q3 2002	Q4 2002 - Q1 2003	Q2 2003 - Q3 2003
DMC technology moves from engineering to prototype through facilities at *IBM*, East Fishkill, NY and *TSMC*, Taiwan Provisional patent applications are filed for the DMC DMC macro product commercialization programs are initiated *Mobius* full-scale business development begins	DMC technology is placed into an SoC design for prototyping at *TSMC* Alpha DMC prototypes delivered by *TSMC* Sales and marketing plans begin development End-market applications identified for research environment prototype Incorporation completed and company founded	Alpha DMC prototypes from *TSMC* verified SoC prototypes verified Full utility patent applications are filed Last market-ready research prototype transferred to *TSMC* for fabrication *Mobius* commercialization related patents filed Alpha DMC prototypes delivered by *IBM*	Formal license agreement executed with The University of Michigan Initial sales and deliveries of commercialized DMC macros Commercialized DMC macro ported to additional technologies Technology presented through technical and commercial conferences and publications

Table 4: Mobius' initial product development and commercialization timeline

The *Mobius* DMC has been designed and developed at The University of Michigan by Michael S. McCorquodale and Dr. Richard B. Brown as part of Mr. McCorquodale's doctoral research. The intellectual property surrounding the developed technology has been disclosed to The University of Michigan and full utility patents have been filed with the U.S. Patent and Trademark Office (USPTO). (*Mobius*' complete IP position is discussed more thoroughly in the corporate strategy section).

The prototypes are currently undergoing exhaustive environmental, functional, and reliability testing. Both *IBM* and *Taiwan Semiconductor* have offered additional pro bono manufacturing capacity for revisions and/or corrections of design issues if they may arise. Table 4 above captures the product development history and status as well as commercialization timeline.

The Company

Company Overview

Mobius is an emerging microsystems company founded by University of Michigan Doctoral Fellow, Michael McCorquodale and his research advisor, Dr. Richard Brown with Michigan MBA student Jeffrey Wilkins, Fisher College of Business MBA student Christopher Cooke, and veteran entrepreneur James Vincke. The company was founded in 2002 as a Delaware C-Corporation with operations in Michigan.

The *Mobius* business concept has evolved from several years of research and business development at The University of Michigan. Fundamental research has been executed by Mr. McCorquodale and Dr. Brown in The Electrical Engineering and Computer Science Department and in affiliation with The Wireless Integrated Microsystems Engineering Research Center (WIMS). WIMS is the only National Science Foundation Engineering Research Center in the United States devoted specifically to microsystems development. Business development has been in collaboration with The University of Michigan Business School, The Zell-Lurie Entrepreneurial Institute, and The Technology Management Office. Through its management team and above affiliations, *Mobius* is able to utilize the technical and business resources of two of the top educational and research universities in the world to build a successful, sustainable enterprise.

Critical Path

Mobius is concentrating on a concurrent two-stage critical path to a first sale and subsequent capital injection in Q3 of 2003:

- Thorough test and verification of beta prototypes from *Taiwan Semiconductor Manufacturing Company* (beta prototypes completed and delivered 4/03, test and verification 5/03) and test and verification of alpha prototypes from *IBM* (completed and delivered 3/03, test and verification 6/03)
- Execution of the exclusive licensing agreement with The University of Michigan (expected 5/03)

The Founding Team

Michael S. McCorquodale, CEO, CTO, and Chairman of the Board

Mr. McCorquodale holds the B.S.E. in Electrical Engineering from The University of Illinois at Urbana-Champaign and the M.S.E in Electrical Engineering from The University of Michigan, where he is now a Doctoral Fellow. He has originated unique microsystem design concepts and led design teams to win national and international semiconductor design competitions. His professional experiences include managing communication system engineering activities and developing high-performance integrated circuits while at *Hughes Space and Communications Company*, in Los Angeles, CA. He has also served in business development with the Technology Management Office at The University of Michigan where he helped identify the resources required for successful commercialization of microsystems research.

Jeffrey G. Wilkins, Chief Operating Officer

Mr. Wilkins comes to *Mobius* with a strong background in marketing and sales, finance, and entrepreneurship. Prior to pursuing his M.B.A. at the University of Michigan Business School, Mr. Wilkins gained finance and business development expertise through various positions within Corporate Banking at *Huntington National Bank* headquartered in Columbus, Ohio. Additional business development expertise was acquired at *Velocys, Inc.*, an early-stage spin-off of Battelle Memorial Institute, also in Columbus, Ohio, which is focused upon commercializing intellectual property developed in a research environment. He holds a B.A. degree from the University of Arizona and will graduate with a M.B.A. degree from the University of Michigan in April, 2003. Mr. Wilkins has also founded and run several successful entrepreneurial ventures.

Christopher A. Cooke, Vice President of Business Development

Mr. Cooke joins *Mobius* with over nine years of sales, marketing, and management experience in start-up and established technology companies. Prior to *Mobius*, Mr. Cooke managed an early-stage technology service business for *Metatec International* serving the enterprise software market. Recently, he managed and led the negotiation and divestiture of that business unit to

Digital River, Inc. Prior to *Metatec*, Mr. Cooke held several senior sales positions for *CheckFree Corporation*. While at *CheckFree*, Mr. Cooke participated in a successful IPO, four acquisitions, and helped grow revenues from $25 million to $250 million in just four years. Mr. Cooke holds a B.A. in Business Administration from Wittenberg University and will graduate with an M.B.A. from the Ohio State Fisher College of Business in June, 2003.

James Vincke, Chief Financial Officer
Mr. Vincke has over twenty-three years of experience in finance, business development and technology. He was an important part of the success of *Mechanical Dynamics Inc*. (MDI), a mechanical systems virtual prototyping company headquartered in Ann Arbor, MI. Mr. Vincke joined MDI as a startup and held several executive positions, including CFO during the $30M IPO. He holds B.S.E. and M.S.E. degrees in mechanical engineering, as well as a M.B.A., from the University of Michigan.

Dr. Richard B. Brown, Vice Chair of the Board
Dr. Brown has served as Vice-President of Engineering at *Holman Industries*, Oakdale, CA, and as Manager of Computer Development at *Cardinal Industries*, Webb City, MO. In 1985, he joined the faculty of The University of Michigan Department of Electrical Engineering and Computer Science, where he now serves as the Interim Chair of the Department. Dr. Brown has conducted major research projects in the areas of solid-state sensors, high temperature CMOS, SOI, mixed-signal circuits, and high performance and radiation-tolerant computing systems based on VLSI digital GaAs. He is also a co-founder of *Sensicore*, a startup company that produces solid-state chemical sensors for ions in water or blood. He holds B.S. and M.S. degrees in Electrical Engineering from Brigham Young University and a Ph.D. from The University of Utah.

The Advisory Board

Jeffrey M. Wilkins
An experienced entrepreneur and business leader, Mr. Wilkins serves as chairman of the board of *Metatec International*, Inc., a company he founded and led until December, 2001. A pioneer in the optical disc-based information distribution business, Wilkins founded *Discovery Systems* in 1985. The company was renamed *Metatec Corporation* in 1991, and quickly became a leading national technology and CD-ROM manufacturing company. Prior to founding *Metatec*, Mr. Wilkins founded *CompuServe, Inc*. and served as the company's CEO from 1969 - 1985. As *CompuServe's* leader, he initiated the global emergence of online information services to personal computer owners and other businesses including a telecommunications network for data transmission, the first full-service electronic mail system for business, and custom computer application services to a variety of organizations. Mr. Wilkins holds the B.S. and M.S. degrees in electrical engineering from The University of Arizona.

Joe Giachino
After holding positions at *Teledyne*, *Babcock and Wilcox*, and *Bailey Controls*, Mr. Giachino joined *Ford Motor Company* in 1976. At *Ford*, Mr. Giachino has held a number of positions, including Program Manager for the Sensor Business Resource Center, Supervisor of Sensor and Actuator Technology, Supervisor of Forward Model Sensors, and Principal Engineer for Advanced Sensors. He led the cross-disciplinary teams that developed the Ford Silicon Capacitive Absolute Pressure (SCAP) Sensor, the Ford Silicon Micromachined Fuel Injector Nozzle, the Ford Micromachined Air Bag Accelerometer, and plastic packaging for thermistor sensing elements. He received the Henry Ford Technology Award for the development of the SCAP device. In 1997 he was elected a Fellow of the IEEE for "contributions to micromechanical and MEMS control systems." He is the holder of eleven U.S. patents. Mr. Giachino retired recently from *Visteon* to assume a new position at The University of Michigan where he is involved in commercialization of Microsystems research.

Keith L. Kraver
Mr. Kraver holds the B.S.E. in Electrical Engineering from Arizona State University and the M.S.E. in Electrical Engineering from the University of Michigan. In addition to microprocessor design work already completed, Mr. Kraver's doctoral research pertains to low-voltage and low-power analog and mixed-signal IC design for embedded sensor applications. Mr. Kraver's professional experience includes work at *National Semiconductor*, Santa Clara, CA, where he led the development of two low-voltage and low-power general-purpose amplifiers for cellular phone and battery powered sensing applications. Keith is currently with *Motorola* as he completes his dissertation.

Positions to be Filled Upon Initial Sale and Equity Investment

Initial commercialization and a first sale will be completed by the founding team. To maintain the company's growth, the following positions will be filled, once an initial sale of the DMC product is secured and an equity investment is made:

Director of Marketing & Sales
The Director of Sales & Marketing position must be filled with an experienced sales and marketing professional from the semiconductor industry. *Mobius* intends to locate an office for this key position in the Silicon Valley area of Northern California, since a majority *Mobius*' potential customer base has operations in this region. A search to locate qualified candidates is currently underway by the founding team.

Microsystems Engineer
The Microsystems Engineer will be responsible for MEMS technology design and integration. This person will be responsible for helping to integrate the *Mobius* DMC product with initial customers' semiconductor products.

Industry and Market

Industry Analysis

The semiconductor industry is one of the largest with an estimated $141 billion in total sales for 2002, up from $139 billion in 2001 (S&P, 2003). Due to the fact that semiconductors play a part in so many segments of the world economy, the industry is largely influenced by macroeconomic factors. Industry projections show sales growing approximately 18% in 2003 and 23% in 2004 (S&P, 2003). In general, the semiconductor industry is maturing, with large volumes of business becoming commoditized. The discrete clock generation market is a good example of this, as there is little product differentiation and very thin margins.

The semiconductor industry was born and still thrives because electronic product engineers continue to deliver better products at lower cost by combining more functions into a single integrated circuit, or chip. The development of system-on-chip (SoC) technology is a recent manifestation of this 25+ year trend. Consumer devices such as cell phones and digital cameras would not nearly be as prevalent if not for the affordability and functionality of system-on-chip devices. Demand for inexpensive electronic products such as these have focused the industry on even higher levels of on-chip integration. Accordingly, the SoC segment is a bright spot within the semiconductor industry, with growth rates in the 25% to 30% range (Gartner, 2002).

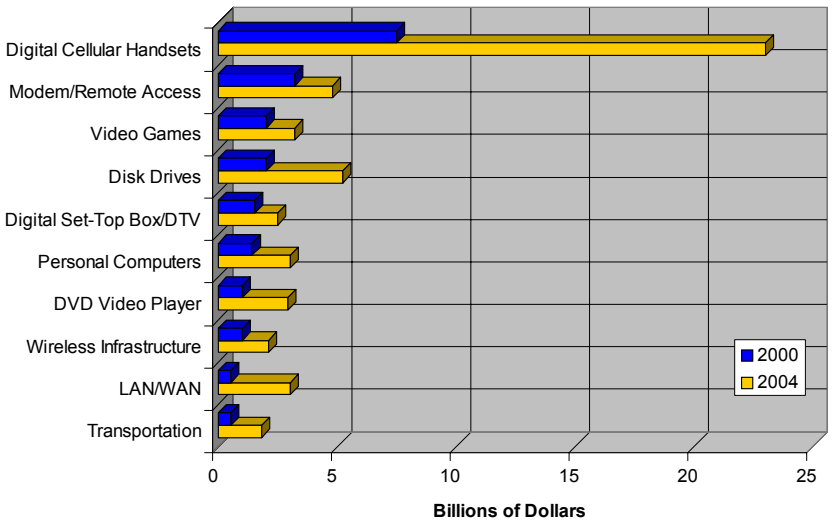

Figure 2: Top 10 worldwide SoC applications (*Source: Gartner Dataquest, 2001*)

Dataquest estimates the SoC market was $32 billion in 2002 and is expected to grow to approximately $60 billion by 2004. Reasons why more products are using SoC designs are clear: SoC products are functionally superior, smaller size, lower cost, and consume less power than discrete component systems or multiple chip systems. The many benefits of SoC technology lead to better end-products such as cell phones, PDAs, video gaming systems, hard disk drives, and a plethora of consumer electronics. Figure 2 illustrates the top 10 worldwide SoC applications and their relative market sizes for 2000 and 2004. In every case, SoC components enable product manufacturers to get more functional products to market in a shorter time.

Third-party intellectual property is a key driver of the SoC market. Gartner states:

> *"Semiconductor intellectual property is taking center stage as the industry moves to system-level ICs* [*i.e. SoCs*]. *Chip suppliers and system designers are desperately searching for intellectual property that can help differentiate their products and help improve their time to market without being burdened with the total R&D cost. The third-party intellectual property market has emerged as the answer."*

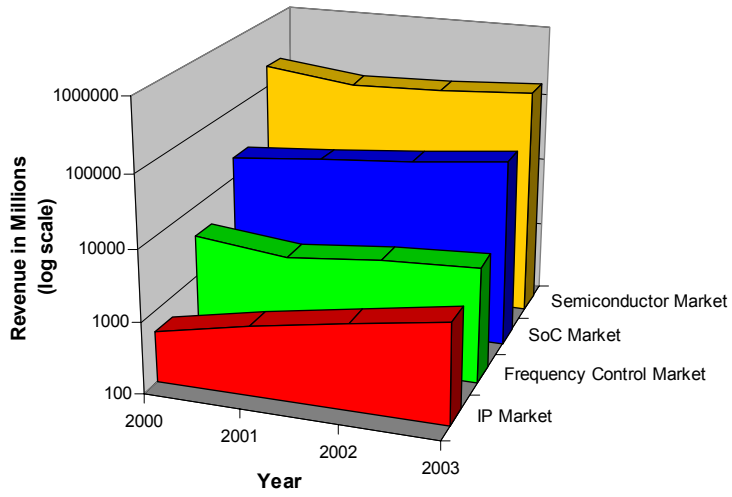

Figure 3: Relevant market growth trends (*Source CSFB, 2001*)

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 and hit market windows. Rather than designing every component in-house, the IP market allows designers and manufacturers to simply purchase needed components from companies with focused expertise and drop the IP into their designs. IP is purchased during the system design phase of a product's development cycle, when the chip design team must determine what parts of the chip's design they own or can produce, and what parts they must source from third-party vendors such as *Mobius*. The semiconductor IP industry reached approximately $892 million in revenue in 2001, up from $714 million in 2000 (Gartner). The growth of the aforementioned industries and markets is captured in Figure 3. The trends show significant growth in the IP market which is feeding growth in the SoC market. Also shown is the large incumbent frequency control market. These figures do not include clock generation IP, as there currently is no such solution in the IP market. Intellectual property revenues are dominated by *ARM*, *MIPS*, and *Rambus*, whose IP is very broad-based in its application. These companies have been very successful by creating IP blocks that have become industry standard in microprocessing and memory.

Mobius' DMC technology has broader market application than any IP block on the market. Every single synchronous semiconductor device manufactured requires a clock to operate. No other clock generator on the market can profess the same capabilities as the *Mobius* DMC. *Mobius* aims to be the industry standard within the high-performance clock generation market.

Initial Target Market Analysis

The initial target market for *Mobius*' DMC is the SoC market for a variety of end-market applications. The DMC addresses key demands in almost every semiconductor market segment (small-size, high-performance, low-power, more-flexible, low-cost). The SoC segment's comfort with IP usage, rapid adoption of emerging technology, high sensitivity to power consumption, varied end-market use, and rapid growth rates make it a particularly attractive initial market (also see Table 2 on page 3). Assuming a total market size of $32 billion and a conservative SoC average selling price of $20 per unit, the SoC market represents a total opportunity of 1.6 billion units manufactured annually. Multiplying by an average selling price of $0.45 per DMC (as detailed in the financials section of this plan), *Mobius*' first product claims a total addressable market of greater than $720 million per year in the SoC segment alone. Figure 4 breaks down and illustrates this initial high-growth market opportunity.

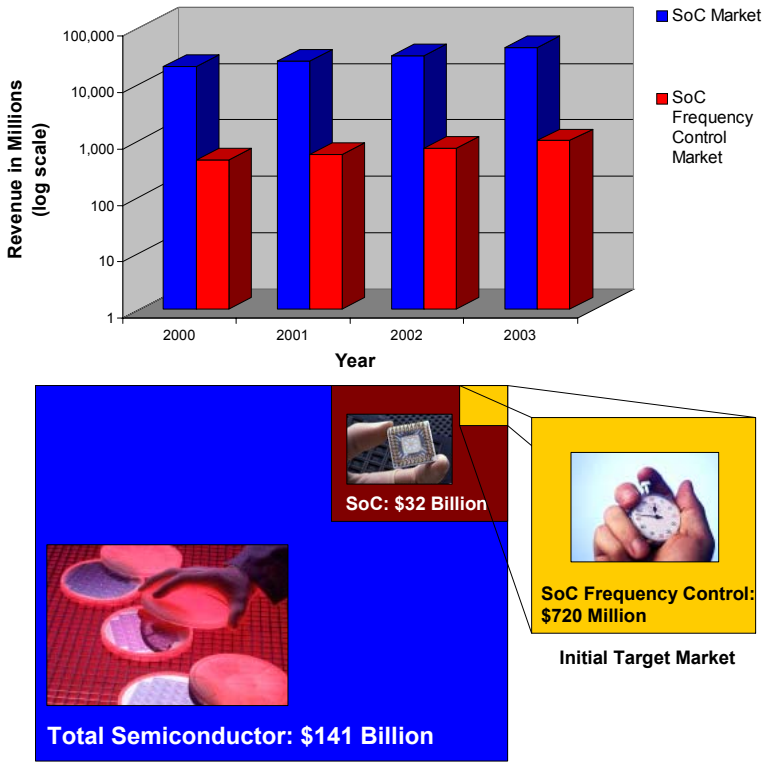

Figure 4: Total addressable market in SoC frequency control and market breakdown (*Source iSuppli, Gartner, Semico*)

Customer Segmentation

Mobius' initial target market can be segmented into end-product applications as represented by Figure 2 on page 7. Potential customers can be further segmented into the kinds of companies that produce IC's for electronic products. Sales of the *Mobius* DMC will be to one of the four kinds of companies summarized in the table below. Specific marketing activities are detailed in the Marketing Strategy section.

Type of Company	Function	Example
Integrated Device Manufacturer (IDM)	Designs and manufactures entire systems using own designs as well as third party IP	*Sony*
Integrated Circuit Manufacturer	Designs and manufacturers semiconductor products using own designs as well as IP	*Analog Devices*
Fabless Semiconductor Company	Designs semiconductor products, often with third party IP, and outsources manufacturing	*Broadcom*
Chip Design House	Designs semiconductor products, often with third party IP, for use by customers	*Synopsys*

Table 5: Types of SoC companies

Corporate Strategy

Competition

As described previously, *Mobius*' initial product, the DMC, will compete with three existing technology options for clock generation (see Table 3 on page 3 for a comparison):

- A hybrid of discrete and integrated components using off-chip crystals and on-chip oscillators (most common)
- Fully discrete components using crystal technology (moderately common)
- Fully integrated electronics using a ring oscillator or similar technology (rare)

Current competition exists from different sources as a result of these options. These competitors include the following:

- Discrete crystal oscillator manufacturers: *Epson*, *NDK*, *Toyocom* (See Figure 5)
- Integrated clock manufacturers: Various integrated circuit companies, such as *Motorola*, *Analog Devices*, and *Texas Instruments* build on-chip ring oscillators.
- Hybrid clock manufacturers: Various integrated circuit design companies, such as *Motorola*, *Analog Devices*, and *Texas Instruments* build on-chip oscillators with off-chip crystals from companies such as *Epson*, *NDK*, or *Toyocom*. Hybrid clock IP is also available from a variety of sources.

Integrated and hybrid clock technology is not novel. An electrical engineer with an adequate circuits background could develop such technology. To *Mobius*' knowledge and through the research executed for the patent applications of the DMC, there are currently no semiconductor companies actively attempting to develop high-performance on-chip clock generation. Given the existing technology options, the incumbent suppliers of discrete crystals and oscillators are the most exposed to the DMC product. These crystal and oscillator products are essentially commodities, with a few large players dominating the market. (Figure 5 shows the leading frequency con-

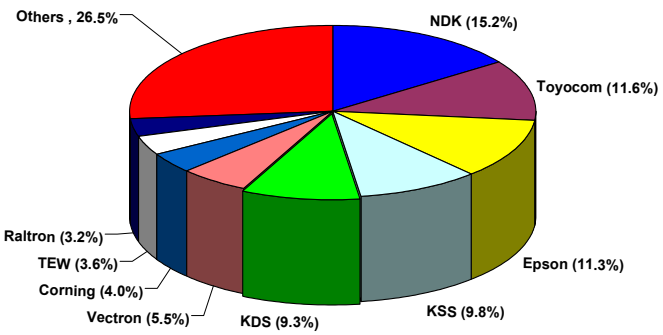

Figure 5: Frequency control market share by revenue in 2001

trol circuit suppliers market share in 2001.) *iSuppli* estimates the total revenue for crystals and oscillators in 2001 was $3 billion, with the main suppliers being *Epson*, *NDK*, and *Toyocom*. The expected response to the DMC from companies such as these is limited. Since the current products are commodities, there is very little room to compete on price. Also, these companies have no expertise developing microsystems technology. Unlike the DMC, which is a high-performance, tunable, low-power, integrated solution, crystals are relatively large, expensive, fixed-frequency, discrete devices. Moreover, crystal technology's application is much broader than semiconductor products and *Mobius*' initial target market is a mere fraction of the total market addressed by these companies. The growth rate of the existing frequency control market closely follows the overall semiconductor growth rate.

The vast majority of on-chip clock implementations are used in low-end microcontrollers and field programmable gate arrays operating below 50 MHz. *Mobius*' DMC is high-performance and can generate frequencies up to 1 GHz. Microcontroller manufacturers have long realized the value of on-chip clocks in reducing cost and power consumption. Nevertheless, the uses of existing on-chip clock designs are limited to low performance applications due to unacceptable frequency accuracy and stability. *Mobius* will not initially compete with these low-performance solutions.

Because the benefits of an on-chip clock are so compelling, any traction the *Mobius* DMC gains will likely attract other semiconductor companies to attempt to develop a similar product. Likely potential competitors include companies with microsystems expertise, such as *Motorola* and *Analog Devices*. Large companies are unlikely to move into the market until *Mobius* has garnered a significant revenue stream by displacement of the entrenched technology. The *Mobius* team believes that start-up companies pose the greatest threat initially. *Mobius* addresses these threats with its competitive advantage and countermeasures to risk as discussed in the section that follows.

Intellectual Property Strategy and Sustainable Competitive Advantage

Mobius will continue to bring emerging and patent-protected technologies to market for its customers. As such, *Mobius*' intellectual property strategy and competitive strategy are strongly focused on intellectual property protection and continued innovation. The following four points highlight the ways in which *Mobius* will create and sustain its competitive advantage:

1. The *Mobius* technical team has developed a robust intellectual property portfolio around the DMC. Provisional patent applications were filed throughout 2002 and full utility patents were filed with the USPTO in February, 2003. These patents will be protected by The University of Michigan and *Mobius'* legal counsel.
2. *Mobius* is several design cycles ahead of any competitor in its microsystems development and this lead has enabled the company to develop state-of-the-art trade secrets around its design methodology and framework. This unique design framework will allow *Mobius* to innovate and bring future microsystems technology to market at a faster rate than its competitors.
3. *Mobius* will maintain a "product-hopping" development strategy in which *Mobius* will ride out the profitability of each new innovation. Technologies will be sold rather than licensed when support of them is no longer cost effective due to price reductions from competition or introduction of next generation product lines.
4. *Mobius* plans to leverage its strong ties to one of the top microsystems research communities in the world, through its relationship with The University of Michigan and Center for Wireless Integrated Microsystems. Through these relationships, *Mobius* has "first-look" licensing rights for leading-edge technologies developed within the research center as well as the ability to direct research dollars toward *Mobius*' areas of interest.

Marketing Strategy and Tactics

The *Mobius* DMC has an opportunity to become the de-facto standard in high-performance clock generation, similar to *ARM*'s status within the IP-based microprocessor core market. To become the industry standard, *Mobius* will seek to sign exclusive licenses with the targeted leaders in various end-product segments for limited time periods (e.g. *Motorola* in cell phones). Once exclusivity periods have expired with these market leaders, the DMC will have become a necessary product for companies chasing *Mobius*' initial customers and *Mobius* will seek to capture substantial market share. Industry standard status will afford *Mobius* market-leader benefits such as economies-of-scale and margins above the industry average.

To create awareness quickly and with low cost, upon launch *Mobius* will seek to educate the market on the capability of the DMC technology through conferences, trade shows, publications, industry web sites, and respected contacts in the industry.

Personal relationships with several thought leaders in the semiconductor industry, including individuals at *National Semiconductor*, *Cadence* Europe, *Lightspeed Semiconductor*, *Motorola*, *IBM*, *IEEE*, and *TSMC* will be utilized for *Mobius*' initial market evangelism effort. Additionally, as is common for new products in the semiconductor industry, management will attempt to create substantial product "buzz" among the electronic product community by including the DMC on several cutting-edge prototypes in different application areas, as it has already done within the research environment. *Mobius* will market its technology to publications and organizations that hold competitions for product and design awards, enabling the company to win additional accolades and positive publicity.

Leveraging its awareness, *Mobius* must next create demand at the electronic product level (e.g. the cell phone) to pull revenue through IP partnerships at the chip level (e.g. the cell phone's SoC). IP partnering in most cases will simply require joining the chip companies' established IP partnership programs at little to no cost. While chip companies will pay *Mobius* to license the DMC for inclusion in their chip designs, *Mobius'* sales efforts will focus on electronic product developers who will ultimately pay for the DMC in the cost of the chips they purchase. In the example of a cell phone, *Mobius* might partner with *Broadcom* or *Motorola* (the chip developer) and sell *Samsung* (the cell phone developer) on the benefits of including the DMC on the next chip it buys from *Broadcom* or *Motorola.* Often, the chip developer will also help to sell its customers on the benefits of including the DMC in its designs. The *Mobius* DMC represents incremental revenue and margin to the chip developer that would otherwise be captured by the discrete and integrated clock component manufacturers.

The founding team and contracted commission-based technical sales representatives will lead the initial sales effort although a director of marketing and sales hired from within the industry will be added to the team to lead the effort in Q3 2003.

Product

Mobius plans to sell IP licenses to system engineers within design houses, fabless semiconductor companies, integrated circuit manufacturing companies, and integrated device manufacturing companies. Included with the license will be a compatible software package, which will allow customers to simulate *Mobius*' designs within the specific integrated circuit that they are producing and then ultimately place the macro, or blueprint, for manufacturing the DMC into their chip designs. *Mobius* will also offer services for a fee to facilitate the incorporation of the DMC into the customer's integrated circuit.

Price

Realistically, it is understood that each IP license within the semiconductor industry is valued on a deal-by-deal basis. Exclusive licenses have more value than commodity IP, as do the more critical components versus those with lower importance to the overall design. While market conditions will ultimately dictate *Mobius*' pricing strategy, management anticipates that pricing for the DMC will be straightforward and aligned with current industry practices. Initial prices are projected to be in the range of $100K to $300K for each license, depending on the number of end product units produced. Additionally, there will be a royalty of $0.15 to $0.50 per chip, scaled inversely to the unit volume. Thus a tiered pricing structure will be utilized whereby customers realize less cost per unit as volume increases. (See Revenue Model for more detail.)

Place

Initial distribution will occur through direct sales and contracted technical sales representatives with product delivery via compact disk containing the necessary intellectual property and software for the DMC's application. Secure Internet technology will likely facilitate later distribution. *Mobius*' initial IP-based business model eliminates the need for costly warehousing and delivery functions. Low-cost e-business channels will be utilized for sales and/or distribution wherever possible.

Promotion

Initial promotion of *Mobius*' products will largely consist of utilizing personal relationships as well as market education and evangelism. Every attempt will be made to gain exposure through company, product, or technology publicity, trade show presence, and awards. Beyond initial low-cost promotional efforts, presence on industry websites and direct sales by the management team and hired technical sales representative organizations such as *Voyageur* will be *Mobius*' main methods of promotion as these are the most effective practices within the semiconductor industry.

The latest innovations in web advertising and the ability of periodical companies like *CMP*, *Cahners*, and *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 promotion of the DMC. Additionally, *Mobius* will be present in various semi-

conductor technical forums for the presentation of technical papers. The leaders in the semiconductor industry have successfully used this type of commercial push for many years. *Mobius* has already presented at the *Design Automation and Test in Europe Conference*, and has been invited to orally present its technology at the following conferences in the near future:

International Symposium on Circuits and Systems
Date: May 25-28, 2003
Location: Bangkok, Thailand

Radio Frequency Integrated Circuits Conference
Date: June 8-13, 2003
Location: Philadelphia, PA

Investment Risks

General Business Risk

Mobius faces common business risks associated with liability, unforeseen acts of nature, property damage, errors and omissions, and other general business risk factors.

Economic Risk

Mobius faces risks associated with macroeconomic and business conditions, particularly those associated with total demand for semiconductor-related products.

Rapid Changes in Technology and Standards

Business planning contained herein is based upon available information from published sources and industry contacts. Should semiconductor standards shift rapidly or substantially, decisions or strategies contained within this plan may no longer be applicable. *Mobius* will continue to remain in-touch with industry and market news and will adapt to changes as necessary.

Personnel Risk

To initiate and maintain revenue growth, *Mobius* must recruit and retain skilled personnel to implement and support its microsystems products. There are challenges associated with these activities within the semiconductor industry and there is no assurance that *Mobius* will be successful in its team building efforts.

Competition

To management's knowledge, no company is currently pursuing microsystems development specifically for clock generation, however several companies may have the capability to develop comparable solutions. While some of this risk is mitigated by *Mobius'* intellectual property protection, unforeseen competitors may possess greater financial resources than *Mobius* and their market entry could negatively impact *Mobius'* revenue and cash flow projections.

Financial Terms from Customers

Mobius projects specific payment terms from its customers in its financial projections. These terms were projected from observing the terms granted comparable IP companies by their customers. Should actual payment terms or schedules vary from those projected in this plan, *Mobius'* actual cash flow could be adversely affected.

Pro Forma Risk

Unforeseen delays in technology commercialization, lower acceptance levels within the marketplace, cost variance, and many other factors could have a material affect on *Mobius'* ability to achieve its financial projections. Such changes could have negative impacts on an investment in *Mobius.*

Follow-On Funding Risk

Mobius may require additional funding to continue operations. Inability to raise additional capital within the necessary time frame could adversely affect the company's operations.

Management Risk

Mobius' ability to execute its business plan will require additional management expertise. Failure to recruit and retain effective management could negatively impact the company's ability to achieve its objectives. The loss of existing key personnel could immediately impact *Mobius'* operations.

Business Location and Organization

Location

Mobius is currently operating in Ann Arbor, Michigan. Southeast Michigan, with the presence of the automotive industry, is a globally recognized center for microsystems research, development, and commercialization. Currently, a breadth of talent in the field is available from The University of Michigan, Michigan State University, Michigan Technological University, Wayne State University, *Delphi*, and *Visteon*. Emerging technology is fundamental to the *Mobius* business concept and Detroit is a centralized location to recruit technical talent allowing *Mobius* to continue to commercialize cutting-edge technologies.

As *Mobius* expands, regional sales offices will be deployed near customer design centers. These sales offices will be staffed with direct sales people and sales application engineers. The first sales office is expected to open in the Silicon Valley region of California in 2003, followed by an office in Munich, Germany in 2004.

Organizational Structure

Mobius plans to utilize a matrixed organizational structure in which functional roles of research and development, marketing and sales, and finance and administration will be assigned to project teams headed by project managers. Project managers will be responsible for all aspects of their projects including relationship management, profitability, and resource management. The *Mobius* executive team will be responsible for organizational development, assisting the project teams, directing project investment, as well as identifying new areas for investment or development. The compensation structure of the majority of *Mobius*' personnel will be heavily weighted toward incentives with a profit sharing plan and a stock ownership plan.

Technology and Infrastructure

Mobius delivers a complete environment to its customers containing simulation models for development and the design macro for manufacturing. *Mobius* will deliver the environment to each customer via a variety of media formats including secure file transfer protocol (FTP) and compact disk (CD). All formats will support secure licensing keys to protect *Mobius* from the threat of technology piracy. The initial hardware and software infrastructure will support this activity.

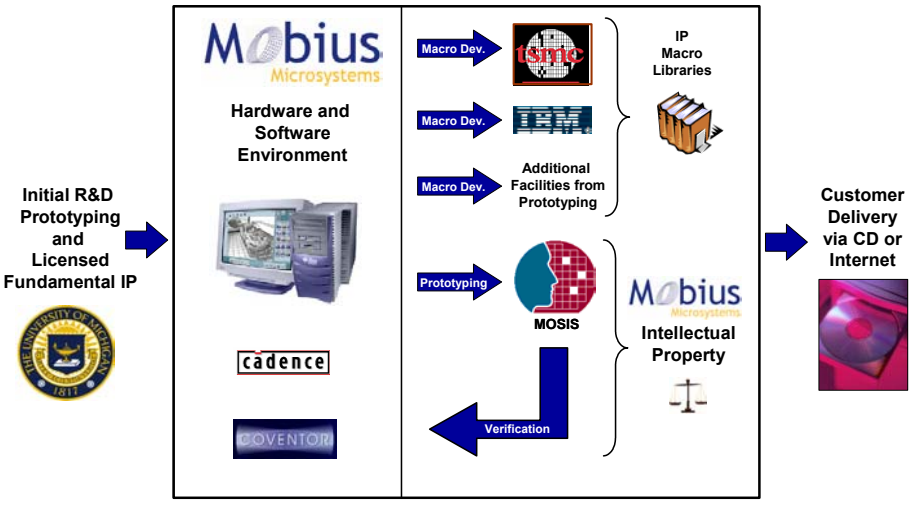

Figure 6: Mobius commercialization activities

Future revisions and ports of *Mobius*' IP products must be prototyped at the desired manufacturing facility for verification. *Mobius* will utilize the *MOSIS* multi-user semiconductor manufacturing service for this activity. *MOSIS* provides access for low volume production at world-class semiconductor manufacturing facilities. Typical prototyping costs per 40-unit batch are approximately $20,000. *Mobius* will target prototyping efforts exclusively on facilities that manufacture high-volume SoC products, such as *Taiwan Semiconductor or IBM*, in order to close large-volume contracts. Figure 6 illustrates these activities. The required infrastructure for initial start-up includes only computer hardware and software for engineering, marketing, and sales activities and testing facilities. Hardware and software will be purchased or licensed from leading vendors (shown above). Semiconductor testing facilities will initially be rented at low cost through established relationships with local universities.

Research and Development Team

The initial research and development team will consist of Mr. McCorquodale as well as additional engineers as they are added. Primary tasks will include the development of a complete macro environment around the DMC; the development, prototyping, and testing of the DMC for additional manufacturing processes; and the administration of *Mobius*' servers, networks, computers, and software.

Human Resource Planning

Mobius' personnel plan as discussed throughout this document is summarized in the following table:

Personnel Plan for YE 12/31,	2003	2004	2005
Sales and Marketing	3	5	9
Research and Development	2	4	8
General and Administrative	1	1	3
Total People (at year end)	6	10	20

Table 6: Personnel resource plan

Partnerships

Mobius' DMC technology will be exclusively licensed from The University of Michigan for worldwide commercial use. *Mobius* is currently engaged in these licensing negotiations and expects to close an agreement covering both equity and royalty fees. These figures are assumed to be 3.0% and 1.5%, respectively, in the financial model of this plan.

Mobius intends to bring a wide variety of emerging microsystems technologies to fruition. As such, *Mobius* is an industrial member of the Center for Wireless Integrated Microsystems (WIMS), the only engineering research center in the country devoted solely to microsystems. As a WIMS member company, *Mobius* not only provides direction for future technology developments, but also possesses exclusive "first-look" licensing rights to technology developed at the center.

Financial Planning

Financial Methodology

The *Mobius* financial plan takes into account information from the market, known licensing and royalty models, and potential customer input to project future revenue and capital requirements. The attached appendices contain the detail for the discussion that follows. Appendices 1-3 present the quarterly income statement, balance sheet, and statement of cash flows, respectively, for the years 2003 through 2005. Appendix 4 contains the financial statement assumptions.

Revenue Model

Significant research was obtained on existing IP vendors as well as competing clock technologies. This data, along with *Mobius*' cost structure, and a price point necessary to achieve market penetration were all evaluated to determine the following revenue model. The model includes the following five components:

1. **Initial license fee:** This fee is paid per customer product line. A tiered pricing system will be utilized that is based upon the number of units manufactured by customers, with initial license fees ranging from $100,000 to $300,000. *Mobius* expects a 40%, 40%, 20% mix of license fees in the low, medium, and high volume categories, respectively. The gross margin on license fees is approximately 85%. Table 7 illustrates the tiered pricing structure.

Customer Units Manufactured with *Mobius* DMC				
Category	**Low range**	**High range**	**Initial License Fee**	**Royalty per unit**
Low volume	> 0	<400,000	$100,000	$0.50
Medium volume	>400,000	<1,000,000	$200,000	$0.25
High volume	>1,000,000	No Limit	$300,000	$0.15

Table 7: License agreement pricing model

2. **Re-use license fee:** This fee is paid each time a customer reuses *Mobius* IP in a new version or model of a product that included a licensed *Mobius* IP block. Based on typical SoC design cycles, re-use fees are expected 9-12 months from the signing of the initial license. These fees will average 20% of the initial license fee with gross margins of approximately 80%.
3. **Royalty:** Royalty payments are based on the number of units manufactured by customers. (See Table 7) Royalties will be generated when customers manufacture products, typically 9-15 months after license execution. Royalty revenue will lag other revenue sources, but it is expected to be 15-20% of revenue after 5 years. The gross margin on royalties will be in excess of 95%.
4. **Support and maintenance fees:** Customers will purchase support and maintenance contracts to cover services over the design and sales cycles of their products, typically for a period of 2 to 3 years. These fees are 15% of the initial license fee and have gross margins of 60%.
5. **Services:** Services have two components: design services for customers and research grants. Design services will be especially important to *Mobius*' initial customers, as it is expected the company will work closely with its customers to integrate *Mobius* IP with the customer's IC design. Research grants will be sought and used by *Mobius* to perform fundamental research on future products that present good opportunities for commercialization. Services are expected to have gross margins of 30%.

The initial and re-use license fees are expected to be the main drivers of revenue, accounting for 80% of revenue in 2003, but decreasing to 60% of revenues by 2007. Royalty revenue will be insignificant for the first two years of operations, thereafter accelerating to nearly 20% of revenue by 2007. Support and maintenance will be approximately 5% of revenue. Finally, services are expected to be 15% of overall revenue.

The combination of the initial license fee and the royalty payment is priced to be less than half the cost of existing clock solutions on a per unit basis. Currently customers pay at the very least $1 for clock generation. The cost incurred to the customer for the *Mobius* DMC is approximately $0.45 per unit at a quantity of one million units, calculated by amortizing the licensing fee and adding the royalty.

Revenues

Mobius has a reasonable expectation to generate its first IP license revenue in the third quarter of 2003. The majority of revenue during the first three years will be through initial license sales, with some re-use license revenue beginning in late 2004/ early 2005. Royalty revenue will begin to flow from manufactured units during the third quarter of 2004 and is expected to grow to be nearly 20% of total revenue by 2007. Support and maintenance contracts will be entered into one month after the initial license agreement, therefore commencing in the third quarter of 2003. Services are a combination of design services to customers and research grants. *Mobius* expects to receive its first research grant in the first quarter of 2004 for $100,000. This grant should contribute $12,000 monthly to revenue for the term of the grant. The design services should commence the month after the first license sale, and generate $5,000 per month in revenue initially.

Market growth in general has been estimated using *Dataquest* projections, among others, for the growth of the system-on-chip (SoC) markets through 2004 as addressed previously ($32 billion in 2002 to $60 billion in 2004). These estimates show a potential market of 1.6 billion units in 2002, assuming a $20 price per SoC. *Mobius* is projecting to capture 133,000 units in 2004 (0.004% of 2004 market) and 1.95 million units in 2005 (0.05% of 2005 market). *Mobius*' success will not be contingent upon becoming a major player in this market, but rather capturing only a small market share. Capturing a larger-than-projected share of this sizable opportunity would allow *Mobius* to quickly out-pace revenue projections. Additional products planned by

Mobius represent further opportunities for growth. The pro forma financials associated with these projections can be found in the appendices.

Costs

Mobius' costs are divided into two major categories: cost of revenue and operating expense. The cost of revenue is variable, with license fees, re-use licenses, and royalties all having gross margins of 80% or higher. The total cost of revenue will be in the range of 20% to 25%, coming in at the higher end of the range in the early years due to a higher proportion of service revenue.

Mobius will have three main operating expense centers: Research & Development (R&D), Marketing & Sales (M&S), and General & Administrative (G&A). All three operational centers represent a relatively fixed level of costs driven by personnel numbers in each area. The long-term business model (after 2007) projects operating expenses for M&S, R&D, and G&A at 25%, 20%, and 8% of revenue, respectively. This expense model is comparable to other IP companies' cost structures.

The majority of operating expenses are directly related to the number of employees. Most employees will have advanced degrees, including doctoral degrees in electrical engineering and computer science in the R&D group. The average annual salary per employee is estimated at $100,000 accordingly. In addition to personnel expenses, $25,000 to $50,000 in computer hardware and software investment is anticipated for each R&D employee.

Breakeven and Positive Cash Flow

IP license revenue will be the dominant source of revenue during the first couple years of operations. With IP licenses priced at $100,000 to $300,000, the timing of license sales will dramatically effect *Mobius'* periodic profit and cash flow.

The sales forecast is two IP license sales during each of the last two quarters of 2003. Losses are expected through the first quarter of 2004. *Mobius* then expects to be consistently profitable starting the second quarter of 2004 with consistent sales of IP licenses and the steady ramp-up of royalty revenue commencing during the third quarter of 2004. See Appendix 1 for details.

Cash flow from operations is negative through first quarter of 2005. Thereafter consistent positive cash flow is expected starting the second quarter of 2005. Accounts receivable is expected to require substantial amounts of working capital if *Mobius* agrees to the current industry practice of royalty payments paid bi-annually. *Mobius* will negotiate for better payment terms for this revenue stream or obtain a line of credit against receivables to counter any shortfall in working capital. See Appendix 3 for details.

Financial Planning, Equity, and Cash Management

Mobius intends on commencing operations in the second quarter of 2003 with a staff of four people. A considerable effort has been made to research and understand the startup costs of this venture and post startup business expansion. In addition, the executive management is very committed to a constant focus on cash and cash management. To that end, *Mobius* has taken great care in planning its equity funding efforts that support this business plan.

Mobius will self-fund operations until the company has completed its first IP license sale (expected Q3 2003). Management will invest approximately $110,000 to cover expenses during this period. New enterprise business risks associated with the development and commercialization of new technology, as well as initial marketing and sales activities, will be mitigated by the company during this period.

Mobius will seek $500,000 in outside equity investment during the third quarter of 2003. This investment will be sought after *Mobius* has completed its initial IP license sale and used for the following activities:

- Hiring and development of a professional marketing and sales team
- Customization of the technology for additional manufacturing processes
- R&D for enhancements to the DMC

A second investment round of $500,000 may be sought six to nine months after the first round investment. The additional capital will be used for the following:

- Open a sales office in Munich, Germany
- Hire additional management and technical expertise

The table below provides a summary of total revenue, operating income, and net income, as well as equity capital proceeds and cash flow, for the period from 2003 to 2007. Further financial details can be found in the appendices.

Pro Forma FInancials (000's) YE 12/31	2003	2004	2005	2006	2007
Total Revenue	573	2,813	7,071	12,469	19,408
Gross Profit	463	2,153	5,388	9,528	15,017
Operating Income (loss)	(181)	(138)	1,134	2,532	4,708
Net Income (loss)	(181)	(135)	809	1,526	2,843
Equity Capital Proceeds	610	500	—	—	—
Cash Flow (after equity proceeds)	315	310	343	944	2,001

Table 8: Mobius' Pro Forma Financials from FY 2003 to 2007

Exit Strategy

The *Mobius* founding team is committed to building a lasting enterprise capable of creating significant value for shareholders and customers. The pro forma financials, built upon the execution strategies and market potential detailed in the previous sections, indicate that *Mobius* is positioned to scale its business, grow at high growth rates for many years, and realize substantial profit margins. The *Mobius* management team will continually seek opportunities to maximize shareholder value. These opportunities may present themselves through various liquidity alternatives, such as an IPO, merger, acquisition, or buy-out. Throughout the semiconductor IP industry, there are many precedents for each liquidity event.

Any exit strategy defined at this time is very speculative in nature. Over the course and execution of this business plan, the *Mobius* management team and board of directors will review exit strategy options as necessary to provide a value based evaluation of each opportunity.

Appendices Table of Contents

Appendix 1: Quarterly Statement of Income

MOBIUS MICROSYSTEMS, INC.
QUARTERLY PRO FORMA STATEMENT OF INCOME FOR THE PERIOD OF 2003 THROUGH 2005

	For The Fiscal Quarter Ending											
in thousands	3/31/03	6/30/03	9/30/03	12/31/03	3/31/04	6/30/04	9/30/04	12/31/04	3/31/05	6/30/05	9/30/05	12/31/05
Revenue:												
IP Licenses, Royalties, and ME&S	$ -	$ -	$ 201	$ 307	$ 315	$ 626	$ 728	$ 830	$ 1,148	$ 1,453	$ 1,670	$ 1,875
Services	-	35	10	20	42	76	91	106	175	220	245	285
Total Revenue	$ -	$ 35	$ 211	$ 327	$ 357	$ 702	$ 819	$ 936	$ 1,323	$ 1,673	$ 1,915	$ 2,160
Cost of revenue:												
IP Licenses, Royalties, and ME&S	-	-	34	52	55	109	128	146	195	245	283	313
Services	-	4	7	14	29	53	64	74	123	154	172	200
Total cost of revenue	-	4	41	66	85	163	192	220	318	399	454	512
Gross Profit	$ -	$ 32	$ 171	$ 261	$ 272	$ 539	$ 627	$ 716	$ 1,005	$ 1,274	$ 1,460	$ 1,648
Operating Expenses:												
Sales & Marketing	-	41	100	178	243	262	282	357	406	470	511	605
Research & Development	3	2	56	123	157	170	206	240	292	371	421	460
General & Administrative	-	21	46	74	80	88	96	110	146	155	201	216
Total operating expense	3	64	203	374	480	520	585	707	845	995	1,133	1,281
Operating income (loss)	$ (3)	$ (33)	$ (32)	$ (113)	$ (209)	$ 19	$ 42	$ 9	$ 161	$ 279	$ 327	$ 367
Other income, net	-	-	0	0	0	1	1	1	1	1	1	2
Income before income taxes	(3)	(33)	(32)	(113)	(208)	20	43	10	162	280	328	369
Provision for income taxes	-	-	-	-	-	-	-	-	-	50	131	148
Net income (loss)	(3)	(33)	(32)	(113)	(208)	20	43	10	162	229	197	221

Appendix 2: Quarterly Balance Sheets

MOBIUS MICROSYSTEMS, INC.
QUARTERLY PRO FORMA BALANCE SHEETS FOR THE PERIOD OF 2003 THROUGH 2005

	For The Fiscal Quarter Ending											
in thousands	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04	Dec-04	Mar-05	Jun-05	Sep-05	Dec-05
Assets:												
Cash and cash equivalents	$ 3	$ 118	$ 469	$ 321	$ 617	$ 622	$ 612	$ 631	$ 512	$ 668	$ 826	$ 975
Accounts receivable, net	-	-	120	180	192	244	341	394	678	868	1,061	1,236
Prepaid and deferred expenses	-	-	3	7	7	7	7	7	15	15	15	15
Total current assets	3	118	591	508	816	873	960	1,032	1,205	1,550	1,901	2,225
Property and equipment, net	2	2	97	92	87	141	133	125	117	237	223	208
Other assets	-	-	-	-	-	-	-	-	-	-	-	-
Total assets	5	120	688	600	903	1,013	1,092	1,157	1,321	1,788	2,124	2,433
Liabilities and Shareholder's Equity												
Current liabilities:												
Borrowings under lines of credit	-	-	-	-	-	-	-	-	-	-	-	-
Current portion of long term debt	-	-	27	27	27	43	43	43	43	78	76	69
Accounts payable	-	34	40	45	60	68	77	94	98	112	126	154
Accrued expenses	-	4	11	20	7	15	24	35	10	72	166	198
Deferred revenue	-	-	9	27	42	76	105	143	176	245	295	343
Total current liabilities	-	38	86	118	135	202	249	314	327	507	663	764
Long term debt, less current portion	-	-	51	45	38	62	51	40	30	87	70	57
Shareholder's equity												
Common stock	4	114	114	114	114	114	114	114	114	114	114	114
Preferred stock	-	-	500	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Current income (loss)	(3)	(36)	(68)	(181)	(208)	(188)	(145)	(135)	162	391	588	809
Retained earnings	4	4	4	4	(177)	(177)	(177)	(177)	(312)	(312)	(312)	(312)
Total shareholder's equity	5	83	551	438	729	750	792	803	964	1,194	1,391	1,612
Total liabilities and shareholder's equity	$ 5	$ 120	$ 688	$ 600	$ 903	$ 1,013	$ 1,092	$ 1,157	$ 1,321	$ 1,788	$ 2,124	$ 2,433

Appendix 3: Quarterly Cash Flows

MOBIUS MICROSYSTEMS, INC.
QUARTERLY PRO FORMA STATEMENT OF CASH FLOWS FOR THE PERIOD OF 2003 THROUGH 2005

	For The Fiscal Quarter Ending											
in thousands	Mar-03	Jun-03	Sep-03	Dec-03	Mar-04	Jun-04	Sep-04	Dec-04	Mar-05	Jun-05	Sep-05	Dec-05
Cash flows from operating activities:												
Net Income	(3)	(33)	(32)	(113)	(208)	20	43	10	162	229	197	221
Add items not requiring cash in the current period												
Depreciation and amortization	-	-	3	5	5	6	8	8	8	12	15	15
Changes in assets and liabilities												
Prepaid and deferred expenses	-	-	(3)	(4)	-	-	-	-	(8)	-	-	-
Accounts receivable	-	-	(120)	(60)	(12)	(52)	(97)	(53)	(284)	(190)	(193)	(175)
Other assets												
Accounts payable	-	34	6	5	15	9	9	17	5	14	14	28
Accrued expenses	-	4	7	8	(13)	8	9	11	(25)	62	94	32
Deferred revenue	-	-	9	18	15	34	29	37	34	68	50	48
Net cash provided (used) by operating activites	(3)	5	(129)	(141)	(197)	25	1	30	(108)	196	177	169
Cash flows from investing activities												
Capital expeditures	-	-	(98)	-	-	(60)	0	(0)	(0)	(133)	0	0
Net cash used in investing activities	-	-	(98)	-	-	(60)	0	(0)	(0)	(133)	0	0
Cash flows from financing activities												
Net borrowings (payments) under line of credit agreements	-	-	-	-	-	-	-	-	-	-	-	-
Proceeds from issuance of stock	-	110	500	-	500	-	-	-	-	-	-	-
Net borrowings (payments) of long term debt	-	-	78	(7)	(7)	40	(11)	(11)	(11)	93	(20)	(20)
Net cash provided by (used in) financing activities	-	110	578	(7)	493	40	(11)	(11)	(11)	93	(20)	(20)
Net increase (decrease) in cash	(3)	115	351	(148)	296	5	(10)	19	(119)	156	157	149
Cash at beginning of period	6	3	118	469	321	617	622	612	631	512	668	826
Cash at end of period	$ 3	$ 118	$ 469	$ 321	$ 617	$ 622	$ 612	$ 631	$ 512	$ 668	$ 826	$ 975

Appendix 4: Financial Statement Assumptions

MOBIUS MICROSYSTEMS, INC.
FINANCIAL STATEMENT ASSUMPTIONS

Income Statement Assumptions

Revenue:

- IP License Revenue will be recognized at license agreement signing and after the shipment of any necessary materials and documentation.
- IP Royalty Revenue will be recognized when royalty reports are received from customers on a monthly basis.
- Support and Maintenance will be recognized monthly over the length of the contract.
- Service Revenue will be recognized on a completion of contract basis.

Expense:

- Cost of revenue will be recognized at the same time revenue is recognized for each respective revenue line item.
- The majority of operating expenses are directly related to personnel costs with salaries based upon competitive compensation for advanced degree employees (average salary approx. $100,000/yr.).
- The combined tax rate is assumed to be 40%.

Balance Sheet Assumptions

- Accounts receivable - IP licenses are paid in two installments, first within thirty days of contract signing, the second installment within 60 days. IP Royalty is paid every 6 months, 45 days after the end of each quarter. Maintenance and Support is paid within 60 days of the start of the contract period. Services are paid within thirty days of monthly billings.
- Depreciation is based upon an average of five-year lives on a straight-line basis.
- Debt amounts represent bank loans to fund furniture and equipment.
- Accrued expenses represent taxes, outside accounting fees, and annual report fees: taxes paid quarterly, accounting and annual report fees paid annually.
- Accounts Payable based upon a 30-day payment cycle.

Cash Flow Statement Assumptions

- Founders stock is represented by common stock invested prior to start-up of operations and the above reporting periods.
- Preferred stock represents investors: Angel/venture capital investment of $500,000 Aug. 2003 and potential second round of $500,000 Mar. 2004.