

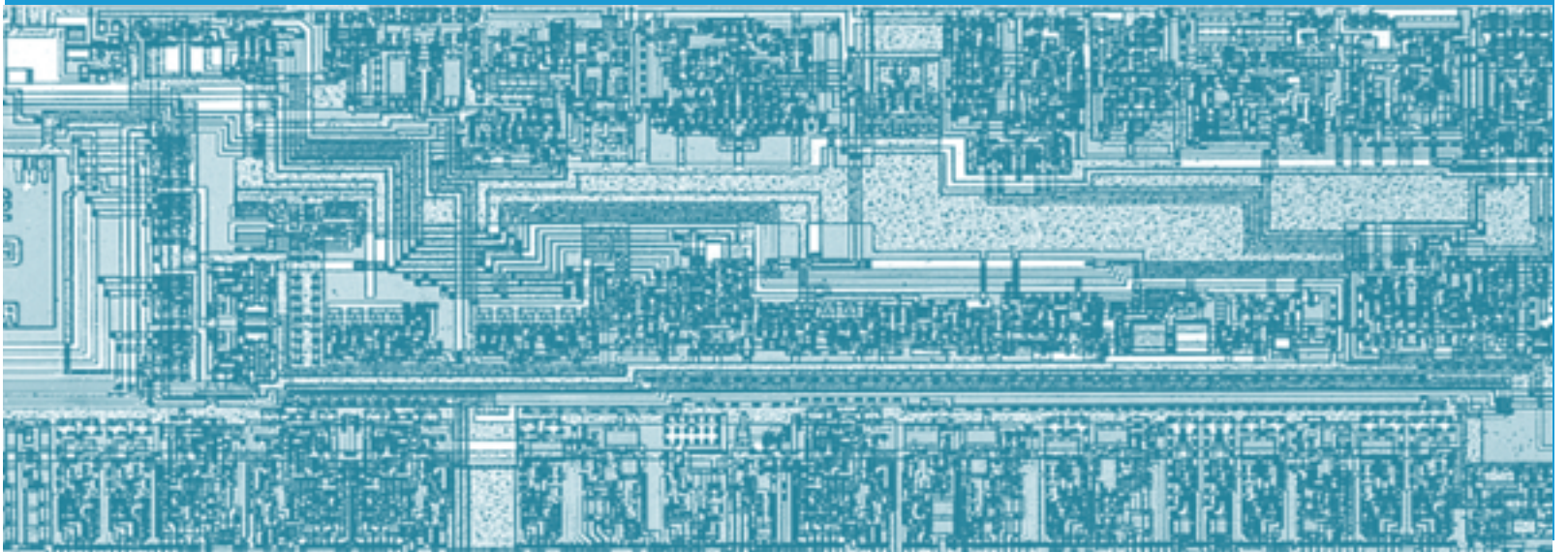


[www.siliconcatalyst.com](http://www.siliconcatalyst.com)

# SILICON STARTUP SOLUTIONS

A SILICON CATALYST NEWSLETTER

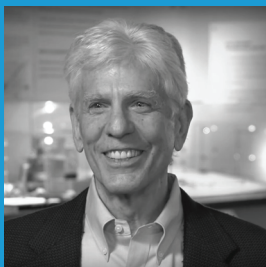
A VALUABLE RESOURCE FOR THE SEMICONDUCTOR STARTUP COMMUNITY





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Those of you familiar with our newsletter are aware that in each issue we feature an interview with one of our Portfolio Companies along with an interview with one of our In-Kind Partners. We have added a new feature that will likely become a mainstay of the publication, an interview with one of our advisors.

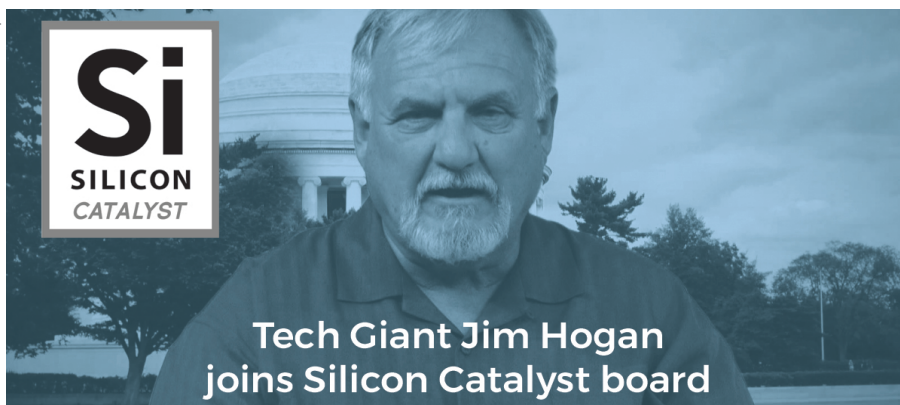
Our network of advisors is growing exponentially. In this issue, we feature an interview with one of our advisors who has been exceptionally valuable to the Silicon Catalyst ecosystem, namely John East. East was CEO of Actel. For the 20 years before that he worked at AMD and Fairchild. John is a member of a growing group of seasoned veterans here at Silicon Catalyst who proffer valuable guidance to several of our startups.

In the coming weeks, you will see an Advisors section added to the silicon-catalyst.com website.

Another big step forward for Silicon Catalyst has been the addition of Jim Hogan to our board. Jim is a legend in our industry and is the quintessential activist board member providing advice in strategy, fundraising, and personnel, among other areas of vital importance to a company with a global footprint. We are honored to have him sit on our board. Over the past three years, Silicon Catalyst has gained a critical mass, having screened well over 200 startups, with 16 Portfolio Companies having been accepted into our incubator since 2015. His engagement and valuable input at this point in our company's evolution is a significant milestone.

The header on this page is a reference to media coverage CEO Pete Rodriguez received in the Silicon Valley Business Journal.

The momentum continues ...





## WELCOME



### RICK LAZANSKY

founder, chairman, c?o -  
silicon catalyst  
serial entrepreneur  
and incubator fanatic

(Summer of 2018)

#### On the subject of opportunities in externalities

It is summer and my daughters, Kate and Clare, are home on break from their first year at UCSB. Freshman years are great. Theirs has offered them the opportunity to intellectually graze across the savannah of topics in academia while they struggle along with five thousand other frosh to get into the impacted classes in their anticipated majors. One of those subjects is economics. Between their binge watching the series "Impractical Jokers", our shared lament of the dismantling of the EPA, and discussing Silicon Catalyst, we've been discussing one corner of economics - the concept of externalities.

For an economist, an externality is "the cost or benefit that affects a party who did not choose to incur that cost or benefit". It's important to note that it can be a positive or negative consequence. A commonly offered

example is pollution that is unaccounted for in the transactions of an industry. Without taxation or the imposition of a regulation there is a price unpaid - namely from the negative impact of pollution. It's a good reason for intervention by governments, and actually a good reason for government itself.

When you think about it you can see examples all around. For the entrepreneurs, that may represent opportunities hidden in plain sight. When we plan our products and services we often get the 'boundaries' wrong. The negatives are obvious - we don't get paid for documentation of our products, so why hire and pay for technical writers? The obvious answer, which is "it's expected" is insufficient. Yes we do write something. We have engineers do the minimal job (which is the best I ever managed personally) to satisfy a minimum expectation. Still, there is a cost, which often leads to wasted time, frustration, or outright failure to actually use our products.

Some of the Silicon Catalyst companies will produce full solutions, hopefully with recurring revenue (please take that as a hint). Others will manufacture and sell chips. As a third category, a goodly number will only or additionally offer their products in the form of "IP" or intellectual property. All three inherently have the opportunity to recognize and correct for externalities. And those externalities aren't always negative. Often there is a huge opportunity to benefit.

Some good friends and I built a great IP business. One of our tenets was that we could make product with automation, partially, a job that engineers did that really shouldn't have to do. Specifically they were designing ASICs, which interacted with external memories which they didn't design. To design them though, they had to write

models of that memory to verify that their ASICs would work. They did code those models, and they coded them very poorly. From our perspective, our job was to build a tool to automate writing better ones.

Blind luck favored us. We interacted a lot with the actual users. In fact, we worked 1/3 of the time in their offices, so we spoke a lot. That regular dialog led to our being eventually convinced that they wanted to buy models of actual memories, and we could use our own product to do that. They were not all that impressed with using software to automatically create good models. They just wanted their ASIC simulations to be accurate.

So ... where are the externalities in this story? We imposed a cost on the ASIC designer. When we buckled down and used our own products to create models for specific memories from third parties, we captured a benefit from those memory manufacturers. We had executable specifications which replaced the manufacturers' data sheets in large part, and we became a vital part of their marketing those very memories.

OK, as I've already pointed out, it was largely an accidental and somewhat tardy recognition. It happened though because we worked constantly with the actual users, and we were open enough to recognize that the boundaries of our products that we'd imagined weren't what the actual customers wanted.

Don't miss your opportunities to adjust the boundaries of your goods and services. Use your advisors to help you get your product breadth and focus right. Be brave about venturing out (Watch Jia Jiang's TED talk "What I learned from 100 Days of Rejection" - I think it's priceless. So if you think Jia is brave, go watch "Impractical Jokers").





# SILICON STARTUP SOLUTIONS

**A CONVERSATION WITH DAVID HUFFMAN  
CEO OF POWER DOWN SEMICONDUCTOR, INC  
A SILICON CATALYST PORTFOLIO COMPANY**



**Power Down Semiconductor**

In response to the pressing need for a practical, cost-effective, and CAD tool supported solution to low power IC development, Low Power Processing™ (or LPP™) was developed by Power Down Semiconductor, Inc. This “silicon proven” pseudo-adiabatic technique will become the leading ultra-low power semiconductor solution for all portable battery-operated and energy harvesting applications.



**David Huffman**

**Power Down Semiconductor, Inc**

**Q. PLEASE TELL ME ABOUT YOUR STARTUP AND GOALS?**

**A.** Power Down Semiconductor is an IP company primarily focused on ultra-low power (ULP) integrated circuits for mobile applications. More specifically, we’re developing active matrix display technology for cell phones, tablets, laptops and any other portable device with a screen. In tandem with display applications, we also have the ability to significantly reduce the processing power consumption of MCUs and CPUs for IoT and high performance computing respectively. One of the salient features of our “Low Power Processing” (or LPP) technology is that power consumption is reduced

without sacrificing performance. Other competing technologies reduce the supply rail voltage in order to reduce the power which limits the clock speed. LPP avoids this by “resonating” the IC with an external crystal, inductor, or MEMs resonant device.

**Q. PLEASE TELL ME ABOUT YOUR BACKGROUND?**

**A.** I began my career on the East Coast in the aerospace industry designing ASICs for commercial and military satellite programs. The power and weight of flight hardware are two of the most important considerations when constructing a satellite. Hence, board- and box-level designs are reduced to the ASIC level whenever possible.

From the aerospace industry I shifted gears to the commercial sector and developed chips for audio, wireline communication, and video graphics. My video experience is what brought me to a West Coast startup focused on LCOS (liquid crystal on silicon) microdisplays. A few years later I found myself back in audio designing switching power amplifiers at another startup company followed by yet another startup designing sensor interface chips for low-frequency rotational vibration cancellation in hard disk drives, followed by more wireline communications in the 100G & 200G fiber optic IC space. I like to say that my career has spanned ICs from “DC to light”.

**Q. WHAT INSPIRED YOU TO START THIS COMPANY?**

**A.** As an analog engineer by trade, my first real introduction into ultra-low power adiabatic circuitry was in the late 90’s at my first startup company. I found the concept fascinating, yet completely impractical given that adiabatic circuitry did not fit into conventional design methodology and CAD tool flows. Over the years I tried various architectures to allow adiabatic circuits to be designed, verified, and tested using a modern tool flow and that’s how “Low Power Processing” using “resonant drive technology” was borne. Power Down Semi was formed to commercialize this new burgeoning technology.

**Q. WHY ARE YOU PART OF SILICON CATALYST?**

**A.** The startup environment for IC companies has been challenging for the past decade as heavy consolidation, spiraling fabrication costs, and long development cycles have plagued the semiconductor industry. On the other hand, the web has created much lower cost and faster development cycle opportunities which have been more attractive to the VC community in general. Many of these VC firms may opine that chips are “Down and Out”, but this is a false statement. Silicon Catalyst recognizes that there is still plenty of innovation and opportunity in the world of silicon.

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# SILICON STARTUP SOLUTIONS

## A CONVERSATION WITH DAVID HUFFMAN CEO OF POWER DOWN SEMICONDUCTOR, INC A SILICON CATALYST PORTFOLIO COMPANY



Power Down Semiconductor

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**Q. WHAT IS IT LIKE AS A STARTUP WORKING IN THE SEMI SPACE IN SILICON VALLEY?**  
**A. THERE IS NO BETTER PLACE TO START AN IC COMPANY THAN RIGHT HERE IN THE SAN FRANCISCO BAY AREA.**

The industry chip veterans that make up Silicon Catalyst will show that with their guidance and support for fledgling IC companies that amazing returns can be generated. "Fishing where others aren't" is oftentimes a great strategy.

Being a part of Silicon Catalyst offers PDSemi a much greater chance to achieve success than "going it alone". In particular, access to advisors and potential customers is invaluable to a startup. They also offer CEO training and pitch deck optimization tutorials as well as a host of in-kind partner CAD tools and IC testing/characterization services. By gaining access to expensive CAD tools, early investors have reduced risk by not having to absorb this cost. One aspect of membership that cannot be overlooked is the opportunity to rub elbows with like-minded entrepreneurs. It's refreshing to share your experiences, collaborate on technology, and vent your struggles with people that understand what you're going through.

### **Q. WHAT HAVE YOU LEARNED IN THE PAST YEAR?**

**A.** What I've learned in the past year is that I have still have much to learn. The CEO position requires a new set of skills that need to be developed. Throughout my career I've always been comfortable riding the steep part of the learning curve, and I'm enjoying this challenge as I move from technical management into an executive position.

### **Q. WHAT ARE YOUR GOALS FOR 2018?**

**A.** Our first goal for 2018 is to build a fully-functional ULP LCD display prototype for a major display manufacturer, preferably Korean or Japanese. With a demonstrable prototype, we hope to get our first round of funding.

Another major milestone will be PDSemi capturing the top spot for ULP MCUs based on the EEMBC benchmarks. PDSemi's LPP technology should be able to give a 6X improvement over the closest competitor at the same performance rate.

Having these 2 feathers in our cap will provide us with the credibility to pave the way for high volume production in both display and IoT devices.

### **Q. WHAT RECOMMENDATIONS DO YOU HAVE FOR SEMICONDUCTOR ENTREPRENEURS?**

**A.** For a budding Silicon Valley entrepreneur doing silicon, I would strongly advise joining an incubator if possible. Prior to joining Silicon Catalyst my attempts at fundraising were impossibly frustrating. I didn't package my story properly to show the necessary financial risk mitigation and total upside that they are looking for and willing to fund. You will never sell a VC on the merits of the technology by itself. The pitch deck needs to be a bulletproof plan and the incubator team will help you put it all together.

### **Q. WHAT IS IT LIKE AS A STARTUP WORKING IN THE SEMI SPACE IN SILICON VALLEY?**

**A.** There is no better place to start an IC company than right here in the San Francisco Bay Area. As an East Coast transplant, I chose to relocate here 20 years ago because I knew Silicon Valley was the place to be for semiconductor professionals. No other place on earth has the enthusiasm, the talent, or the developmental resources for technology than what we have here. The Bay Area lifestyle and pleasant weather are what continue to attract those with big dreams and unbridled ambition. Yes, it's an expensive place to live, but as the saying goes, "You get what you pay for".





# SILICON **STARTUP** SOLUTIONS

## EVENTS



**9/18/2018**  
**AI HARDWARE**  
**SUMMIT**

**11/4/2018**  
**SEMI ITPC 2018**

**9/23/2018**  
**ENERGY CONVERSION**  
**CONGRESS & EXPO**

**11/13/2018**  
**SEMICON EUROPA**

**9/25/2018**  
**IEEE HIGH PERFORMANCE**  
**EXTREME**  
**COMPUTING CONFERENCE**

**02/02/2019**  
**SPIE PHOTONICS WEST**

**10/09/2018**  
**GSA SEMICONDUCTOR**  
**SUMMIT EAST**

**3/17/2019**  
**2019 IEEE APPLIED POW-**  
**ER ELECTRONICS CON-**  
**FERENCE**

**10/17/2018**  
**PWRSOC**

# 2018 - 2019



## INTERVIEW WITH SILICON CATALYST ADVISOR JOHN EAST

John East has had a long and important career in the semiconductor industry in Silicon Valley. He served as Chief Executive Officer and President at Actel Corporation from 1988 to 2010. Prior to that, he had worked for other Silicon Valley semiconductor companies including Advanced Micro Devices, Raytheon Semiconductor, and Fairchild Corporation. He has served on the Boards of Directors at Atrenta, Tortuga Logic, Alacritech, Zehntel, MCC, Single Chip Systems, Pericom Semiconductor, and Adaptec.

### Q. HOW DID YOU GET INTO SEMICONDUCTORS?

**A.** As a kid, I liked to tinker around with crystal sets. When I was ten years old, I got an Amateur Radio License. So --- not surprisingly, I decided to become an electrical engineer when I went to UC Berkeley. When I graduated, I became an integrated circuit design and product engineer at Fairchild back in 1968, when many of the famous guys were still around. The old guard was there or had just been there ---- Guys like Jerry Sanders, Charlie Sporck, Bob Noyce, Gordon Moore, Andy Grove ----- It was a fun time!!

### Q. TELL US ABOUT YOUR EXPERIENCE WORKING WITH STARTUPS

**A.** After I retired from Actel, I didn't want to spend the rest of my life golfing and working crossword puzzles. I wanted to serve a useful purpose. But -- being on a public board these days just doesn't appeal to me. The "official" thing to do when you retire from a CEO job is to go on boards of directors. I had been on a handful of boards before retiring and continued to do that after I retired. The problem was, I loved working on products, customers, and markets --- those things are fun and interesting. Unfortunately, the

trend is that the board meetings at large companies have less to do with what is fun and interesting and more to do with legal, social, and financial matters. The combination of products, markets, and customers is what makes or breaks a company. If you handle those things right, you make a lot of money. If you don't, you go broke. But --- with public company boards these days, you spend so little time on that kind of thing. . It seemed to me that the answer to that was to work with startups. So -- that's what I'm doing today.

I've worked with three incubators including Silicon Catalyst and have also worked with some startups that are not associated with an incubator. My first incubator experience happened with EvoNexus, an incubator located in Southern California. They connected me with a company called Tortuga Logic. I started working with Tortuga as an advisor and then joined their board of directors after they got their seed.

My years as an individual-contributor were mostly spent doing engineering --- I didn't do much hands-on marketing in my youth. Now, though, I worry more about markets and customers. Those areas are totally undervalued by most startups. You win by having more customers. Not by having more megahertz or fewer femtofarads.



**John East**  
**Silicon Catalyst Advisor**

I've never worked at a company where my biggest ongoing problem wasn't sales. But ---- that sad fact often eludes the CEOs of super-technical start-ups until it's too late. So -- my role in start-ups often comes down to pushing the sales and marketing efforts when everyone else is pushing the engineering.

### Q. HOW DO YOU EVALUATE STARTUPS THAT YOU WANT TO WORK WITH?

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## INTERVIEW WITH SILICON CATALYST ADVISOR

### JOHN EAST

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**Q. HOW DO YOU EVALUATE STARTUPS THAT YOU WANT TO WORK WITH?**

**A.** First, I look at the market. I like three fields in particular — IoT, security, and AI.

**A.** First, I look at the market. I like three fields in particular. --- IoT, security, and AI. They are growing areas that I'm particularly interested in. I know a bit about them but would like to learn more. There's no better way to learn than to get involved.

Second, I look for people that I like. You don't want to work with jerks. Life is too short!!! You want to make sure you have good chemistry with the folks you'll be working with.

Third, I look for a product that I think has a market, and one that won't be inundated by hundreds of competitors doing the same thing.

If you find those three things, you can have a win and can have some fun while you're winning.

I only sign on as an advisor to a startup if they agree to put me on the board when they do form one. Why? Generally, I get emotionally involved and spend a lot more time than a typical advisor does, so I inevitably want more influence in the company's future than an advisor would have.

**Q. WHAT SILICON CATALYST STARTUPS HAVE YOU WORKED WITH?**

**A.** I currently am on the board of directors of SPARK Microsystems. I had

gone to one of the first Silicon Catalyst events, back when the incubator had about six companies total. Nick Kepler (Managing Partner at Silicon Catalyst) had recommended that I look at the startups, and SPARK in particular. I met Frederic Nabki, Co-Founder of SPARK, and liked him a lot and the concept really grew on me. The more I thought about it, the more I thought we could sell it. SPARK clearly knew what they were doing technically, and it seemed to all of us that they were onto something that could turn into a really big market. So -- I signed on as an advisor and then went on the board when they raised money late last year.

**Q. IS THERE A MISTAKE THAT YOU SEE MOST STARTUPS MAKING?**

You can easily get so wrapped up in making the product work that you don't think about the selling. A lot of times start-ups are based on technology developed by a technical founder who is an expert in the field. He or she usually devotes himself fully to developing the technology and isn't particularly familiar with the market. Sadly, it's never just about doing something that you know how to do. It always comes down to getting people to buy what you've done.

**Q. WHEN A STARTUP IS LOOKING FOR AN ADVISOR, WHAT ARE THE KEY THINGS THEY SHOULD LOOK FOR?**

**A.** The first observation I have is that some startups really want advice and some just want a name to put on their list of advisory board members.

I am an advisor to one company where I just grab lunch or dinner with the founders once a year or so and occasionally help with an introduction. I have no problem with that. There's a place for that. If that's what you are looking for, then you should focus on finding a guy with the right title. That's pretty simple.

In other cases though, the founder is thirsty for knowledge. Many of these startup founders have never worked in a corporate environment and they don't know anything about what it takes to make a wafer and to ship a part. They don't understand semiconductor quality systems or device characterization or why simulations don't always work. They know they have to do a layout and send the mask set to a fab, but then it goes into a black hole. They've never marketed. Never sold. Never kept books. Never raised money. If you're a founder like this who is aware that you don't know certain things but need to learn them, then you should look for an advisor who has these experiences and can

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## INTERVIEW WITH SILICON CATALYST ADVISOR

### JOHN EAST

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#### Q. IS THERE A MISTAKE THAT YOU SEE MOST STARTUPS MAKE?

A. Sadly, it's never just about doing something that you know how to do. It always comes down to getting people to buy what you've done.

teach. So --- in the end, it depends on what you want. If you want a big name, get a big name. If you know you haven't done business, then you better find someone who has done it. And of course, the chemistry thing is important! Don't sign up anyone who you don't enjoy being around!

cipline that might not otherwise be there and the audience of experts in the semiconductor field can often help spot and remedy upcoming problems before they become critical.

Bottom line:? ---- Anyone who is doing a silicon start-up without an incubator is probably screwing up.

of 100 million dollar companies. Not anymore. They're all gone. I don't think that will ever turn back around. There will be a handful of big companies (Intel, Texas Instruments, Broadcom, etc.) that dominate the business. Hopefully, though, there will be a never ending flow of startups bringing innovation.

#### Q. WHAT ARE YOUR THOUGHTS ABOUT INCUBATORS AND SHOULD STARTUPS DO THEM?

A. I love incubators, particularly for semiconductors. Who can afford to do a semiconductor start-up without help with the in-kind tools and services? Tape-outs never work right: you need to do them over and over again. You can't pay for that on your own, you need to get on a shuttle. To do a state of the art product tape-out requires a boat load of tools which you can't afford to buy on your own. Some of the fabs and design tool companies have programs with which you can get help but it usually isn't as complete as what an incubator like Silicon Catalyst can provide. So--- Yes. Semiconductor start-ups should jump at every opportunity to hook up with someone like Silicon Catalyst.

There's a less obvious benefit too. Silicon Catalyst also does a good job of giving structure to a start-up. --- The quarterly presentations of company status and progress force some dis-

#### Q. WHAT DO YOU THINK THE FUTURE HOLDS FOR SEMICONDUCTOR STARTUPS?

A. We are now about a \$400 billion dollar industry. I remember when we were just passing \$1 billion for the first time. The biggest, most successful tech companies are totally dependent on silicon. Apple, Cisco, Intel, Facebook, etc etc. would die in a hurry if semiconductors ceased to exist. In fact -- the world as it is today would die without semiconductors.

But --- semiconductors have become a big-company business. We've had this surge of "big company eats little company". That's a little scary. I believe that most of the innovation still happens with the little guys. If there were no more little guys, innovation would slow down. Fortunately, we haven't come to that point yet. There always seem to be a few more startups coming on the scene. So, it's still a workable model, but it's different than the old model. The Valley used to be full

#### Q. ANY PARTING WORDS OF WISDOM?

A. I remember being associated briefly with Exxon, the huge oil company, back in the late seventies. They had an office in Manhattan with a bunch of super smart guys who understood technology. They had experts of every new technology that was coming along. They also had a separate bunch of experts who only understood markets and what was going to be wanted 5-10 years down the road. The goal of that effort was to find the intersection points. Where was an emerging technology going to intersect with a new, rapidly growing market? Where would a new market that was about to emerge intersect with a blossoming technology? That, to me, is a good way to look at things and an interesting way to conduct business. That's what start-ups should be doing and that is what Silicon Catalyst should be helping them do.



## SILICON CATALYST IN-KIND PARTNER PROFILE



### THE ROADMAP TO FIRST SILICON SUCCESS WITH INTRINSIX

#### INTRODUCTION

The decision to engage a design services company, such as Intrinsix, could very well be a smart choice for companies embarking on an IC design. However, the most critical part of this decision is to choose a qualified partner with deep expertise in the development of Integrated Circuits (ICs); one that has familiarity with the technologies you're using, one that has been through the process many times before, and one that will navigate the myriad inevitable obstacles to a timely and successful delivery.

Over the course of its 30-year history, Intrinsix has successfully completed thousands of projects, leading to billions of dollars in their clients' revenue. Many of these clients have gone on to become leaders in their respective markets. Throughout this time, Intrinsix has continuously invested in its people, improved its processes, platforms, and partnerships, and this has helped build a company that reliably and consistently delivers first-time success for its clients.

Silicon Catalyst's vibrant and growing portfolio of early stage companies need proven semiconductor design services to fuel their growth. Intrinsix addresses this need with IP and design services to support the full scope of semiconductor design, including leading edge digital, analog, RF and mixed-signal ICs. Intrinsix services for Silicon Catalyst Portfolio Companies span from product concept to fabricated and validated ICs ready for commercialization. In addition, Intrinsix is



**Jim Gobes**  
**CEO**  
**Intrinsix**

providing over 100 unique IP cores for design and verification including such elements as an extensive suite of processor peripherals for digital and mixed signal infrastructure chips, a family of analog jumpstart kits with building blocks for power, precision analog and RF projects, and a Cryptographic NSA Suite B Security Subsystem.

#### THE CHALLENGE OF BRINGING AN IC TO MARKET

Developing a custom IC is a complex, risky process, encompassing many steps. At a high level, the steps consist of:

##### 1. Functional Specification Design-

Driven by the market and end-product requirements, this step is the creation of the document(s) that will outline the functionality required of the IC, along with power and performance

constraints. This view of the IC from what it will do, not how it will do it, is an important first step.

##### 2. Architectural Design and Verification Planning

- this step is essentially a map of two things, now that we know what the chip will do: 1) how will it achieve that function and 2) how will we know that the chip design is complete enough to be fabricated. This first question of the architectural design includes a high-level design of the IC, identifying major functional units and interconnections, top level protocols both on and off chip, and any preexisting IP that can be used. This also includes analysis of expected performance through critical paths and power dissipation as well as planning for test and packaging requirements. A foundry must be chosen prior to or at the start of this stage. The second question of verification planning involves choosing the methodologies, tools, and infrastructure that will enable the team to measure when the design is done. It is critical that verification planning is accomplished directly from the functional specification by a different person or team than design. Interpretation anomalies are minimized through this discipline.

##### 3. Functional Design and Verification

- this step includes specification of the RTL, creation of test benches, and running tests to verify correct RTL. It is often performed iteratively, top-down and bottom-up until all of the functional units have been expressed in

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# SILICON STARTUP SOLUTIONS

## SILICON CATALYST IN-KIND PARTNER PROFILE



### THE ROADMAP TO FIRST SILICON SUCCESS WITH INTRINSIX

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RTL. Analog circuitry is designed and simulated here. Verification teams aid design by delivery of early test benches and managing the iterative tests and review of key metrics that provide confirmation of correct function, performance, and testability.

**4. Physical Design** - this includes creating the clocking structure, logic synthesis, floorplanning, place and route, and all tasks necessary for tapeout and release to manufacturing. While very automated, this step requires many interdisciplinary skills and knowledge of the latest automation tools and issues at each process node is critical.

#### **5. Fabrication, Packaging, Testing**

- Wafer fabrication, die testing, packaging. When prototype chips come back from this process, they don't always work exactly as the bring-up team expects. While sometimes the tests themselves are at fault - having the tools, skills, and experience to understand test, IC, board, and system issues (including software, firmware, and user interface complexity) are all equally important as well.

Each of these steps encompasses multiple technical decisions, often weighed against competing requirements and tradeoffs. Cost, scope, and schedule compete with each other and must be carefully, iteratively balanced to meet business goals.

As an in-kind partner Intrinsix brings resources, IP and a deep knowledge base to a new generation of product innovators in their formative stage. Intrinsix is proud to support Silicon

Catalyst's vision of reenergizing the semiconductor startup community and ecosystem. We look forward to collaborating with these early-stage companies as they develop their innovative products. Our working knowledge of, but independence from, the vast selection of fabs, technologies, tools, and IP that will become the core building blocks for these exciting startups will be pivotal as they navigate their future.

#### **WORKING WITH INTRINSIX**

Intrinsix typically employs a phased approach to project planning and execution, starting with an initial meeting that will flesh out the goals and scope of the project, followed by an architectural definition stage that identifies key architectural aspects of the IC, including protocols, IP, HW/SW content and partitioning, as well as verification strategies. When this stage is complete, a comprehensive design and verification plan is in place, forming a framework for the implementation and verification steps that follow. A professional project manager is assigned, typically before the initial meeting, who will serve as a focal point for the project, and as primary point person inside Intrinsix. There is a great deal of flexibility in how work is shared between the client and Intrinsix, ranging from an arrangement in which Intrinsix carries all of the workload, to a shared arrangement in which the client owns many of the project tasks. The breakdown will depend on the needs of the client and the project. In all cases, the client will be involved in regular project

meetings, participate in the major reviews, and sign off on milestones. And most importantly, the project is not considered complete until the customer is successful. This is the primary objective; and in the end, the success of Intrinsix depends on the success of its customers.

#### **SUMMARY**

Developing an IC is a complex and risky undertaking. Intrinsix has the experience and solutions to mitigate this complexity and risk through its emphasis on experienced people, strong and secure platforms, as well as time-tested metrics driven processes. Its diverse portfolio of partnerships also provides the framework and flexibility necessary to construct optimal solutions for client projects. It maintains an independent business model that places primary importance on customer needs, allowing a free choice of production partners that best meets security requirements, pricing needs, and expected volumes of the IC.

#### **NEXT STEPS**

It is not a coincidence that one of the highest values received by Intrinsix customers is in the Introductory meeting. Putting the desire for a lasting "first impression" aside, the vast numbers of open questions that are typical in advanced IC designs make fertile ground for the experts at Intrinsix to help narrow the questions and create an ideal set of paths for its customers to investigate. Contact Intrinsix today to discuss your project! <http://www.intrinsix.com/request-semiconductor-design-consultation>.



IT STARTS WITH STARTUPS

