Entrepreneurial Engineer

Arrow & Indiegogo

We’ll Take You There

Support from Ideation to Production

Special Issue 2016
Analog Devices Solves the Toughest Engineering Challenges

ADI joins Arrow and Indiegogo as an official technology partner of the Arrow Certification program.

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Analog Devices
AHEAD OF WHAT’S POSSIBLE™
How Arrow, Indiegogo and Analog Devices Help You Take a Good Idea Farther

You roll it around in your mind. You bounce it off countless walls. And when it finally starts to take shape and reveal itself, that’s when you know it has potential. Potential to drop jaws, open minds, and even change industries. That’s when you know you have a good idea.

Now the question is, “how far can you take it?”

As part of the resources available through Arrow Electronics and Indiegogo, Analog Devices helps solve the real-world challenges found in bridging the physical and digital with technologies that can sense, measure, and connect—especially in the world of the IoT.
Who we are

Analog Devices is a semiconductor company and part of the Fortune 1000. Whether it’s making a call on your smart phone or detecting gravitational waves from colliding black holes, we’ve been collaborating on major innovations that have been ahead of what’s possible for more than 50 years. Here are a few examples of how we do that.

Using better technology to grow a better tomato

On the outside, New England-grown tomatoes look much like other tomatoes. But in terms of flavor, they’re rarely the first choice among farmers, chefs, and restaurateurs. So we started the Analog Devices Internet of Tomatoes project—a precision agriculture experiment to figure out whether environmental monitoring could lead to helping farmers harvest tastier, more abundant, and more sustainably grown tomatoes.

By leveraging our technical expertise in sensing, measuring, and interpreting the world around us, and our deep knowledge of the IoT ecosystem, Analog Devices built a complete sensor-to-cloud solution that will empower farmers to make better decisions throughout the growing cycle, ultimately improving quality, economic, and environmental outcomes.

Working with partners to realize ideas that are ahead of what’s possible

According to the U.S. Centers for Disease Control, approximately one million knee and hip replacement surgeries are performed each year in the United States. Typically, knee or hip replacement procedures require realigning the knee or hip by putting a rod down the kneecap or hip and manually eyeballing the alignment with the help of mechanical guides.

OrthAlign®, an innovation leader in medical technology, had an idea to improve the precision and reduce the cost of the procedure. Rather than incorporating camera-based navigation into their solution—which adds significant expense and size to a surgical navigation system—OrthAlign’s design team used Analog Devices iSensor MEMS IMU (inertial measurement unit) to enable an orthopedic surgeon to determine, within seconds, the center-of-rotation of—in the case of a knee replacement—a patient’s femur.

ADI worked closely with OrthAlign to provide solutions that would not only enable their design vision, but get to market quicker, serving surgeons and patients sooner.

OrthAlign garnered praise from customers and the industry (including receiving the prestigious 2015 Frost & Sullivan Innovation Award). More importantly, tens of thousands of cases have been successfully completed, worldwide, using OrthAlign technology, helping to improve outcomes and benefit lives.

Nurturing the spirit of the startup

We know that ideas need fuel—emotional, financial, and entrepreneurial. That’s why we started Analog Garage, a business incubator and idea accelerator to support innovators inside and outside ADI. Our mission is to identify and nurture disruptive technologies, capabilities, and business models. We look for areas we can experiment with today, so that we’ll be ready tomorrow for our customers. It’s also to keep alive the startup spirit that helps us stay ahead of what’s possible. It’s the kind of passion and commitment to advanced research and development we hope you’d appreciate from a partner.

To learn more, please visit us here!
Why You Should Crowdfund

There’s no getting away from it. Engineers who have the goal of launching a business need funding, and out of all the methods available for raising money, crowdfunding might be the best way to go to market with innovative technology.
Crowdfunding is not only faster than most other fundraising methods, but it also gives you crucial user feedback early on, allowing you to make necessary and desirable improvements to your designs.

As you weigh your options for bringing your idea to life, here are a few reasons why you should consider crowdfunding above all the others:

**Go to market faster.** Before crowdfunding, entrepreneurs had limited options for raising capital. They could apply for a small business loan, search for grants, pitch to venture capitalists, borrow money from family members and friends, or tap into their savings. Crowdfunding, however, provides a way for you to raise the necessary funds in order to more quickly launch an idea, and it also connects you with early adopters.

**Validate your design.** If your product attracts many backers, then you’ve received validation that it might do well in the market. Many successful entrepreneurs have taken advantage of this momentum to make a more impressive product debut later on. Venture capitalists keep an eye on crowdfunding platforms to find new projects with big potential. Validation used to be a costly hassle, but crowdfunding makes it faster and more scalable.

**Gather free user research.** Instead of hiring people to try your product or searching for trial users through social media, you can access enthusiasts eager to test the viability of your product through crowdfunding. Backer feedback has helped numerous campaigners refine their designs before going to market.

**Identify early adopters.** Crowdfunding puts you in touch with your target users. For example, through Indiegogo’s categories and online promotions, you’ll connect with consumers already searching for a solution like yours. Then, they’ll recommend the page to their friends, increasing awareness of your product at an early stage.

**At which point in the design process should I start my crowdfunding campaign?**

You should have a working prototype of your product before launching a campaign. Backers on Indiegogo don’t know you or your qualifications—the only reason they will fund your campaign is if they understand your product and believe that you can produce it. A working prototype will prove that. Also, backers will be anxious to receive your product once they’ve funded it. We recommend that you have a bill of materials (BOM) and position yourself at about six months from manufacturing so that you can successfully fulfill your promises to backers. If you rush through the process, you might undercharge for your product because you haven’t yet determined the exact cost of production. Avoid losing money on your campaign by planning ahead.

**How much market research should I do?**

First, it’s important to do some general research, but you should also recognize that crowdfunding often presents a more expedient path to getting a sense of the marketplace than traditional market research. Backer feedback regularly helps engineers improve on their designs throughout the crowdfunding process, and when you make the most of the same opportunity, your solution will make a better impression once it goes to market.
What do I need to succeed with crowdfunding?

Start with a solid plan. Here are the best practices to keep in mind as you prepare for your campaign:

• Grow your audience ahead of time. Campaigns that reach 30% of their goal in the first two days are much more likely to exceed their ultimate crowdfunding goal.

• Set realistic goals. Establishing a low fundraising goal—at first—can set your campaign up for success. You’ll more easily get 100% of the money and convince backers that they can trust your business. Then, you’ll have the momentum to create stretch goals and raise more money.

• Update your backers. Email your backers to keep them engaged in your campaign. The average conversion rate from email is 34% higher than other forms of outreach.

• Share tasks among team members. Divide the workload so that you can establish an effective campaign. If your strength lies in engineering, delegate marketing tasks to a family member or friend who has more experience with promotion.

How do I choose the right platform?

Your crowdfunding partner can have a significant impact on your success. Indiegogo takes pride in offering key benefits that set them apart from other platforms:

• Expert support and partnerships that can help you make the jump all the way to retail (if that’s your goal)

• Pre- and post-campaign tools

• The flexibility to choose how and when to get your money, with options including Flexible and Fixed Funding

• Access to the latest technologies that make it easier for backers to support your campaign, such as Apple Pay and Stripe payments

• Fulfillment support from dedicated partners, including Amplifier and Brookstone

• The ability to sell your product on major e-commerce platforms through dedicated retail partners, including Amazon and Newegg

• Round-the-clock support from real people

Indiegogo and Arrow have teamed up to better support entrepreneurs. Through an innovative Arrow Certification program, you can have valuable access to partners who will help you with design, prototyping, and manufacturing. If you have a product that incorporates electrical components, for example, engineering experts will review your BOM and design for manufacturing and assembly (DFM), offering professional guidance to help you refine your product. You have the option to get certified by Arrow—give your campaign a strong sense of credibility in the eyes of backers and develop the most impressive product possible.

We want to support engineers all the way to market. Sign up for our go-to-market program with Arrow or start your crowdfunding campaign today.
Innovation requires engineering solutions that can turn impossible ideas into awesome realities.

Taking an amazing concept from imagination to production requires the right mix of technical capabilities, component engineering and production expertise. TE Connectivity (TE), a global leader in connectivity and sensors, Arrow and Indiegogo want to be part of your project and help you bring your concept to life.

Turn your Impossible Ideas into an Awesome Reality with a TE Connectivity Technology Partnership
A TE technology partnership allows you to capitalize on a wide range of high quality, high performance and cost effective modules and components within Arrow and Indiegogo’s groundbreaking crowdfund-to-production platform. By utilizing Arrow’s certification program, and receiving an “Arrow Certified” campaign badge, your campaign gains access to business enabling tools, services and expertise. You can leverage capabilities that include everything from technical design support and (Bill of Material) BOM optimization to engineering tool access and Arrow media exposure. Access to these resources adds immediate credibility to the campaign, boosting the confidence of potential backers to show that your project has what it takes to go to market.

Product development with tight deadlines requires collaboration with experienced partners that have a shared vision for success. The smart, integrated and interoperable product of today is becoming increasingly complex inside a rapidly changing and highly competitive market space. There is little time to invest in solving underlying hardware challenges, so entrepreneurs need to base designs on solid, reliable technology. More than this, designs must encompass the need for eco-friendly solutions to ensure a cleaner, safer and more beautiful world. TE manufacturers its extensive range of sensors, connectors, relays, passives and antennas in close proximity to its clients, enabling the reduction of their global carbon footprint while at the same time fostering reliable and responsive component supplies. Regulatory approvals continue to develop and standards become increasingly difficult to meet. The electromagnetic interference, power efficiency and environmental requirements of today may not be sufficient to meet the requirements of your product tomorrow. TE’s advanced development labs continually explore ways to help meet the needs of next generation products in direct involvement with a diverse range of industries including automotive, appliance, data communications, industrial systems and consumer electronics. This exposure to the world’s top manufacturers puts TE at the heart of technological breakthroughs, helping to develop commercially viable solutions. By adopting TE as a technology partner, you can tap into this R&D investment and stay up to date with the best solutions available.

If power or signals flow through it, TE has a solution to connect and sense it. Electrical connections and electronic devices are a potential source of electromagnetic and radio frequency interference. TE helps innovators solve tough EMI emission problems by providing cost effective filtering with products such as the Corcom V series filters used in applications like bicycle rental kiosks. As bicycle kiosks grow in popularity throughout the globe, TE’s Corcom series enable manufacturers to help meet the demanding levels of compensation for both emissive and conducted interference.

Your idea may need to overcome traditional connector restrictions and classical design constraints. TE connectors help you realize performance and reliability essential to the technology of tomorrow. Imagine the ultimate connector solution; what would it be like? Unlimited mating cycles, total rotational freedom, simple, flexible, reliable and safe connections carrying
power and high speed data. Wouldn’t it be amazing if they could operate in extreme, dusty environments, and be able to replace complex and expensive harnesses and mechanical slip rings that are prone to failure? TE can help you realize the impossible with the innovative ARISO Contactless Connector System. Enabling the reliable delivery of power and data connected in the harshest environments the ARISO Contactless Connector System can build in flexibility, help improve reliability, simplify maintenance and reduce system cost.

When it comes to turning your impossible ideas into realities, the sky is the limit with TE. TE’s contribution to aerospace innovation is demonstrated by providing negative temperature coefficient (NTC) thermistors to NASA’s Juno spacecraft. As the mission explores Jupiter’s atmosphere, the fluxgate magnetometers experience severe temperature changes, effecting reliable measurement. As the spacecraft gathers data and ultimately crashes into the atmosphere of Jupiter, TE’s NTCs measure the magnetometer temperature to clarify readings and improve the reliability of the system.

Other examples of TE’s technology used in mission critical applications include pressure sensors that can monitor rocket-body shell stress in aerospace applications, and MEMS accelerometer solutions used in the Solar Impulse project. Perhaps the most amazing example of rugged reliability and technical achievement is the first spacecraft to explore the Jovian system—Pioneer 10. After a successful mission that exceeded expectations, the spacecraft containing TE’s legacy NTC components achieved interstellar escape velocity and is currently over 10 billion miles from earth. For over 40 years, TE’s space-qualified precision sensing and connectivity solutions have orbited our planet, travelled the solar system and are heading towards the stars.

TE’s ecologically aware corporate vision encompasses the leading technology available in affordable and reliable solutions. Gain immediate traction by using TE’s leading edge technology to help bring your ideas to life by enabling you to meet the toughest international, and even space qualified standards of performance. Design hardware systems with TE’s solutions and choose a path that helps to reduce development risk through capitalizing on decades of application experience. Develop solutions through working with TE regional RF and EMI testing services to ensure components help meet your specific requirements in the real world. From single engineers to large development teams, projects can gain immediate benefit from TE’s forward thinking vision. Turn today’s impossible into tomorrow’s awesome with a TE technology partnership.

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Works Like, Looks Like: The Stages of Prototyping and Why They Matter

Before your great idea can take off running, it needs to learn how to walk. This is called the prototyping stage of development, and it’s integral to crowdfunding success. But not all entrepreneurs know just how important a prototype is, or how to make one. By taking an in-depth look at the prototyping process, entrepreneurs can make the most of their resources, maximize their funding, and have a more successful product launch.
Why Prototype?

Prototyping is the single best way to test your idea and see how your product will actually function in real life. By putting together a working model, you’re able to see exactly which components you need, where to get them, and how easily they can be obtained. In fact, we recommend you pursue crowdfunding for your tech idea after you have a working version of your project that looks as close as possible to the final version, a detailed bill of materials (BOM) and feel that you are realistically less than six months from shipping your product if you had the means.

Customers and potential backers want to see that your technology works. In most cases they won’t know you or your story personally, and if you can’t show them a working prototype they may not believe that the product can be made. A detailed BOM will also help you budget how much funding you’ll need to manufacture and scale your product. Campaigns that don’t prototype or that rush through prototyping can find that they undercharged for their product, which means they actually lose money on their campaign.

As with any product on the market, success is often dependent upon exposure. In general, journalists and reporters won’t cover a crowdfunding campaign without a prototype because they don’t want to be giving press time to vaporware—hardware and software that gets advertised but never gets made. Many campaigns benefit greatly from being able to send prototypes to journalists ahead of time.

The Prototype Process

Prototypes go through many phases of development, and by the time you bring your product to market, you’ll most likely see all of them. At the beginning stages of technical development, well before you launch a campaign for funding or publicity, you’ll hopefully develop a piece of technology that actually works to accomplish your vision. This is a works like prototype. It does the job, but it may look like nothing more than a development board, power source, and a mess of wiring. From here, many engineers will create a looks like prototype, in which they get their piece of technology to look the way that they want and compromise for functionality along the way. Both of these prototypes are called representational prototypes, and they’re constructed pre-campaign.

Ideally, you’ll also craft a design for manufacture (DFM) prototype pre-campaign as well. The DFM prototype takes into account the realities of manufacture and supply chain when choosing components, things like how much parts cost, where they can be found, what their replacements might be, and how fast they can be produced. In reality, many entrepreneurs find out about the realities of DFM only after running their campaign, which can result in some unfortunate hidden costs and sourcing problems when they have to deliver on their promises. This is why it’s critical to use partners like Arrow throughout your product’s development journey, who can provide tools, experts, and resources to ensure success.

The final phase of prototyping is arguably the most exciting: the first units off the assembly line. This is the culmination of all your hard work and analysis. You’ve most likely already run your campaign and hopefully found all the support you need. You’ve constructed a product that is optimized for mass production, and all that remains is final approval before launch.

Go to market with confidence—Get Arrow-Certified

Prototyping is an integral step in the production process, but it doesn’t have to be a daunting task. To help, Arrow.com has a searchable database of over a million products, state-of-the-art digital prototyping tools and scores of interactive reference designs, so you can see how your vision fits in with the best practices of others doing similar work. We also have engineers standing by to provide personalized prototyping help.

In fact, Arrow and Indiegogo have teamed up to help you go all the way from idea to launch. Arrow Certification is designed specifically to find tech innovators and get them to market. Every Indiegogo technology campaign that gets Arrow Certified automatically receives a personalized engineering review that takes into account BOM optimization and DFM factors. You’ll find out how to get the best parts for your project at the lowest prices as well as get guidance and understanding of part details and specifications to avoid costly delays in manufacturing.

Get support on your prototype and more. Learn more about Indiegogo & Arrow’s program, and get Arrow-Certified today.
Empowering Engineers

TE Connectivity joins Arrow and Indiegogo as an official technology partner of the Arrow Certification program.

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