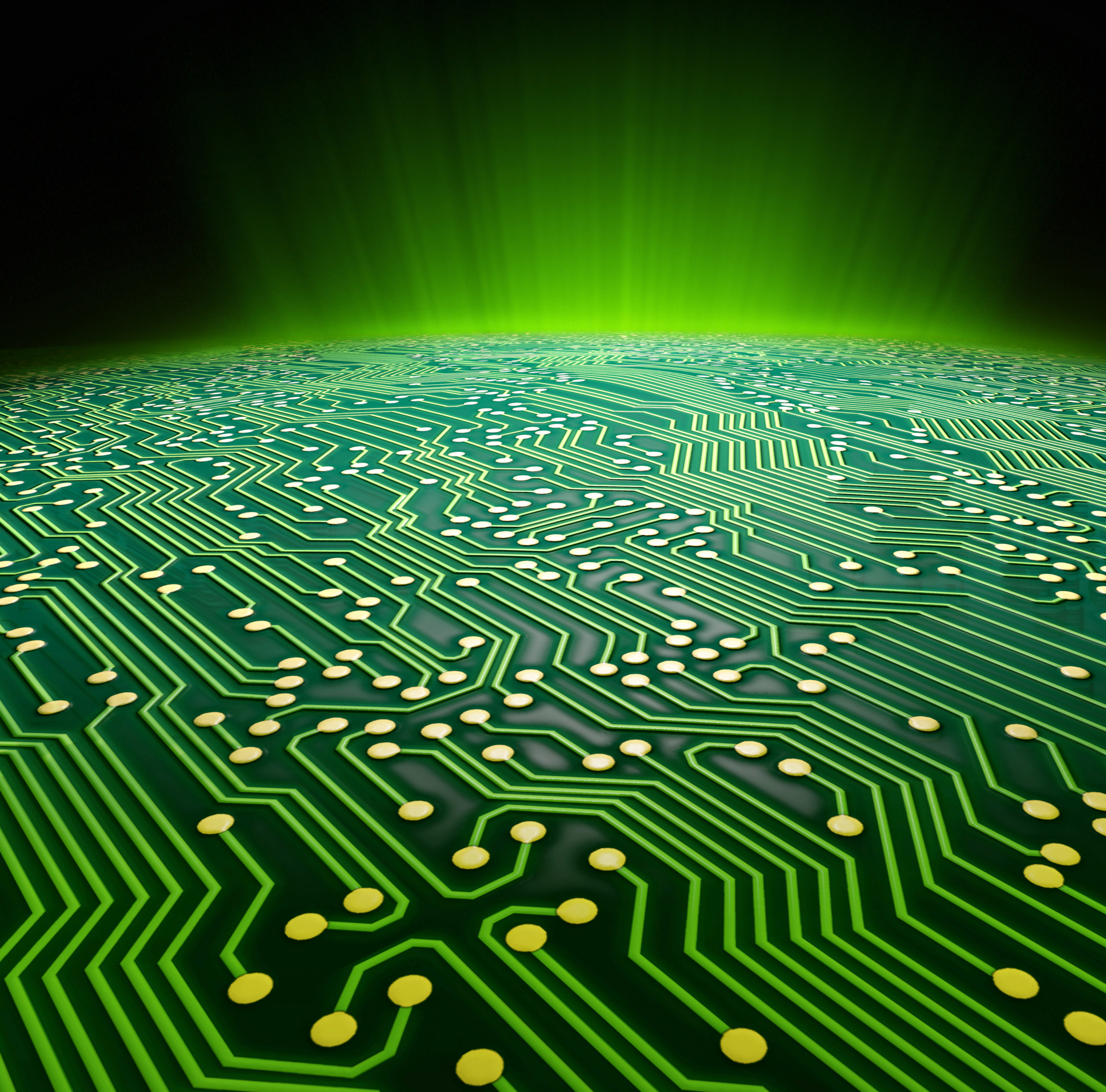
Rigid Flex PCBs



RIGID FLEX PCBS

Between the Internet of Things (IoT), wearable electronics, and flexible displays, there is an increasing demand for flexible and rigid flex PCB technology in the electronics industry. If PCB designers don't want to be left in the dust, it's of the utmost importance to learn and adapt to this new tech, where PCBs must be compact, nearly (or completely) wireless, and-- most obviously-- flexible. Through proper design planning, utilization of space, and usage of smart hardware, PCB designers can ensure that they stay on the front lines of the ever-improving electronic technology industry.

Join us as we explore topics related to rigid flex PCB design, including:

- How to Design your Rigid Flex PCB Within a Board Outline
- Flexible PCBs and the Internet of Things: How the Landscape of PCB Design is Rapidly Changing
- Flexible Future: The Industries That Are Forcing You To Learn Rigid Flex PCB Design
- Advantages of Flexible Circuits for Space Applications
- Internet of Things Hardware Platforms are Becoming Flexible

HOW TO DESIGN YOUR RIGID-FLEX PCB WITHIN A BOARD OUTLINE

Medical wearables need to be sleek, unencumbered, and compact; able to collect meaningful medical data with few (or no) wires attached to the patient. This creates demand for flexible board designs. While you're trying hard to push the limits of space, to use smart materials, and to minimize its footprint, it can be damn annoying when you fall out of a board outline (particularly when dealing with irregular board shapes). Read on to find out how to do this!

Image source: Flickr User IntelFreePress *(CC BY 2.0)*

When you were a kid scribbling away in your coloring book your mom probably told you that your pictures were beautiful, despite the fact that you had no regard for coloring in the lines. Well, no matter how much your mom might think that your creations are super special, you really need to keep your PCB design objects within the board outline. This is especially true for those of you who are designing unusually shaped products with rigid flex designs.

As a designer, you know that the demand for flexible PCBs is currently being driven in part by the medical wearablesindustry. Wearable Internet of Things (IoT) devices are being explored by healthcare professionals for physiological data used for diagnostics, research, and personal health metrics. Moreso, they are changing the way people see fitness by inspiring positive attitudes towards it. Medical wearables need to be sleek, unencumbered, and compact; able to collect meaningful medical data with few (or no) wires attached to the patient. This creates demand for flexible board designs. While you're trying hard to push the limits of space, to use smart materials, and to minimize its footprint, it can be damn annoying when you fall out of a board outline (particularly when dealing with irregular board shapes).

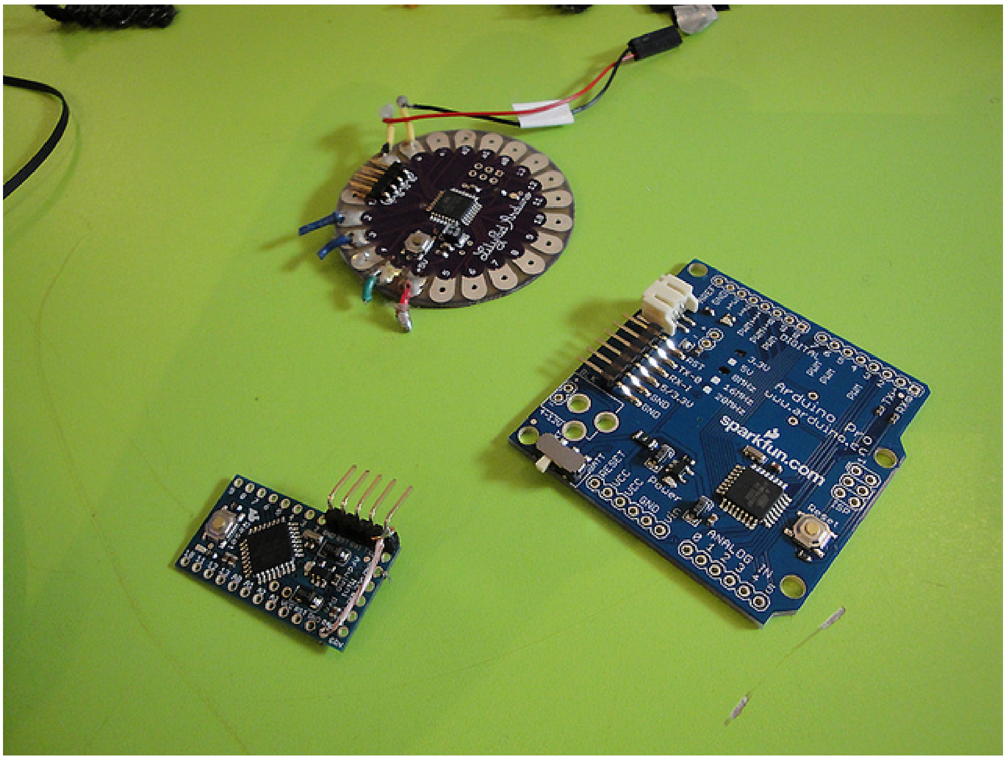
FUNDAMENTAL BEST PRACTICES TO FOR STAYING AWAY FROM THE EDGE

Before you start making your design specific to rigid flex boards, it's important that your foundation is correct. You can save yourself a world of pain by keeping these two best practices in check.

1. *Keeping Copper Away From the Edge:* Large areas of copper or copper pours (for grounding or carrying power supply for example) are often required on boards. Bringing copper to the board's edge presents a risk of the layers shorting at the edges when the board is cut. Due to this issue, a best practice has been established for keeping copper at least 15 mil (~ 0.4mm) away from the expected edge. (Protip: Polygon Pours and Copper Regions can be used in Altium Designer.)

2. *Keeping Planes Away From the Edge:* Another best practice to keep in mind with your board designs is to pull back planes away from the edge, as this runs the risk of the sides shorting against a chassis.

Basically, the moral of the story is, keep away from the edge from the very beginning so that you don't have to waste time going back and readjusting your design! That being said, you aren't totally in the clear unless you consider the types of edges you are working with.



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SUPPORTED EDGE TYPES FOR RIGID FLEX DESIGNS

Working with a rigid flex board means working with specific types of edges. When performing your outline clearance check, it's important to keep these edges in mind:

- *Outline Edge:* An important aspect of PCB design and manufacturing is clearly indicating the outline of your board so that your manufacturer will know how to cut the boards. When dealing with rigid flex designs, board geometries may get more complicated than a simple rectangular shape (making clear outlines especially important).

- *Cavity Edge:* Cavities can create space for placing an integrated circuit within a board substrate. Embedded designs are a favored technique for reducing product footprint, which as we've touched upon is an important aspect of designing medical wearables. When dealing with embedded designs, it's crucial for the designers to be aware of cavity edges.

- *Cutout Edge:* Sometimes your rigid flex designs may require cutouts. Making sure to clearly define the edges of a cutout is an important design step.

- *Split Barrier:* The edge defined by a split line. Split lines are increasingly important with multilayer designs. The multilayer approach to circuit board design is advantageous for the medical wearable market in terms of size efficiency.

- *Split Continuation:* Also known as a permeable boundary. When dealing with multilayer designs you'll also want to keep this edge in mind. By setting the clearance value for an object-kind to zero, you can instruct Altium Designer that it is allowed to pass over the edge type.

Image source: Flickr User theglobalpanorama (CC BY 2.0)

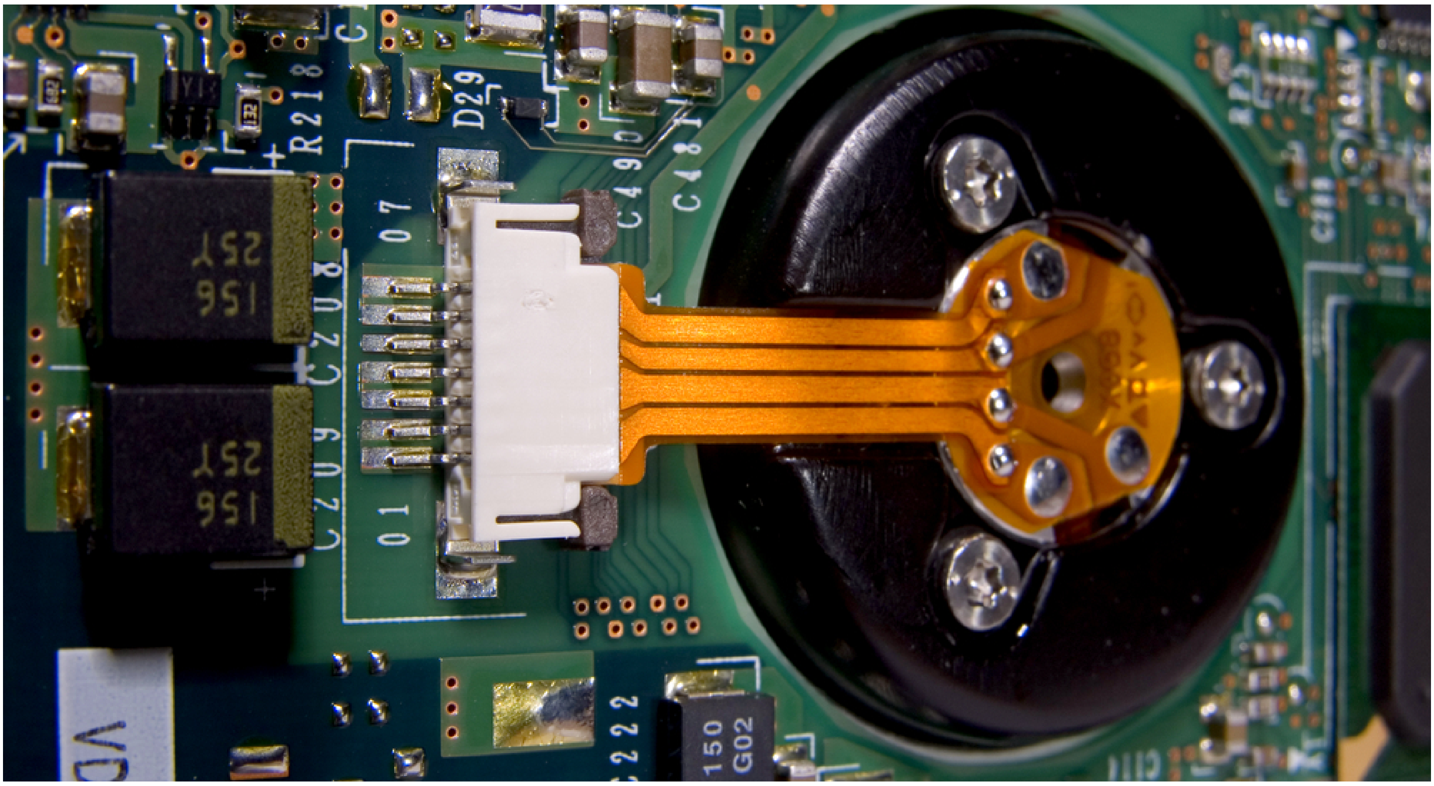
UTILIZING ALTIUM DESIGNER FOR YOUR RIGID FLEX BOARD OUTLINES

While you're probably capable of designing within the lines of your board, the right software can make this task easier. The Board Outline Clearance Rule in Altium Designer's Manufacturing Category has been added in order for designers to specify how close design primitives can be placed to the edge.

By utilizing the Minimum Clearance Matrix in Altium Designer multiple clearances for different pairings can be defined. The alternative is to use a single clearance value for all object-to-edge configurations on your board (but depending on your design this may not always be adequate).

There is a lot more to the edge than just being the lead guitarist in U2. You've got to show the edge some respect, and don't infringe on its territory too much with your designs. Luckily, the correct PCB design layout software will help save you time with planning, so that you can get right into creating.

FLEXIBLE PCBS AND THE INTERNET OF THINGS: HOW THE LANDSCAPE OF PCB DESIGN IS RAPIDLY CHANGING



The Internet of Things is a new category of exciting gadgets and appliances transforming the consumer market. However, developing that smartwatch isn't as easy as putting it on. PCB designers are encountering unique challenges when developing powerful hardware solutions for these products. These PCB's have to pack performance into a small space while preserving reliability and product budget. Thankfully, recent improvements to an oft-overlooked category of PCB's have turned the tables on that challenge. Flexible PCB's have emerged as the best strategy for designers on Internet-of-Things projects.

As a PCB Designer, I know that my field of work has morphed radically over the last two decades. Fresh out of school in the mid-1990's, all of my early projects centered on either of two main areas: computers or computer peripherals. Sure, there was the odd stereo or clock radio, but 90% of the time I was working on a desktop motherboard or something close to it. This meant that, on an average day, my design efforts had a lot of real estate to work with. All on a two layer board, too. It was a different time. Thankfully, it didn't stay like that forever.

Connection to the cloud is a key feature of the internet of things.

Fast forward to today, and I'm still designing PCB's in the computer space. Big beige boxes aren't the name of the game anymore - instead, it's all about the Internet of Things (IoT). Through these embedded computers, a whole new category of gadgets and devices has opened up, especially those under the "smart home" moniker.

Coffee makers, kettles, refrigerators, lighting, watches, and even cars are all picking up this 21st-century technology. Integrating features like cloud control, remote access, and even machine learning (your air conditioner turns on as you commute back from work), it really is starting to feel like the future. Of course, for us PCB designers and electrical engineers, it means a lot more than party tricks and fuzzy logic toasters.

INTERNET OF THINGS: MORE COMPLICATED THAN YOU MIGHT EXPECT

For obvious reasons, building a PCB for an IoT device is a real challenge. Space, for instance, is at a premium. Most IoT products are small appliances, controls, or wearables directed at the consumer market, who like things neat and compact. Moreover, many of these devices are not designed with the hardware in mind. Instead, it's all about the aesthetic, which means irregularly-shaped small spaces for hardware.

Then, there's the matter of performance. No one's going to be thrilled if their fridge needs to "load," and if takes a lot of oomph to get that smartwatch to bring up YouTube. Your PCB will probably be packed with IC's and at least one SoC, if not two. Finally, we need to consider reliability; consumers who buy these gadgets will expect them to "just work." This means whatever design choices you make need to have rock solid foundations. There just isn't room for error (or anything else for that matter) like there used to be. So then, what are the smart designers doing?

Smartwatches are a typical application of the Internet of Things. They require a lot of performance in a small package.

FLEXIBLE PCBS: AN IOT PROJECT'S BEST FRIEND

Allow me to share some personal experience with you. The simple two layer boards I reminisced about are a no-go. They just can't do enough with small form factors. Now you're probably thinking, "well what about high-density, multilayer boards?" Sure, that's technically correct, but in my experience, they're more trouble than they're worth. With plenty of IoT products (especially wearables) on the move, those boards break too easily. Not only that, they need a flat space to fit in. There's a better answer and it looks like everyone making IoT devices thinks so too. Flexible PCB's have become the go-to in the IoT space, elevating a formerly obscure type of PCB to newfound prominence. Made from layers of polyimide, flexible PCB's are capable of the same specifications of rigid circuit boards. They are widely adaptable without sacrificing long-term reliability and have demonstrated success in IoT applications. More importantly, their flexible nature lets them fit easily into the small and unconventional geometry of many IoT products.

On more than a few projects, I've been able to take advantage of the space behind curved faceplates and bases. I didn't need as many connectors and ribbon cables either, and we all know how bulky they can be. Potentially, you could even create a common design that is able to fit within several IoT products of varying form factor (my boss loved that one). Flexible PCB's and the IoT - it is a match made in heaven.

With so many companies big and small running after a piece of the IoT pie, you'll probably be working on an IoT project in the near future. Naturally, if you're as skeptical as I am, you might be apprehensive designing a Flexible PCB. Given the existing challenges associated with an IoT project, why would you want to make things more complicated? But much like the "chicken and egg" problem, the expanding IoT market has both improved and been enabled by flexible PCB's.

About 8 years ago I can remember seeing some prototype flexible PCB's while meeting a vendor, and they were admittedly very simple. Today, modern techniques like SMT, microvias, multi-layer substrates and BGA IC's are readily applied. Thanks to better economy-of-scale, manufacturers can provide these features for cheaper. On the same budget, the range of design options on flex PCB's has expanded dramatically. In fact, in a cost-benefit analysis, Rigid PCB's are no longer an instant winner.

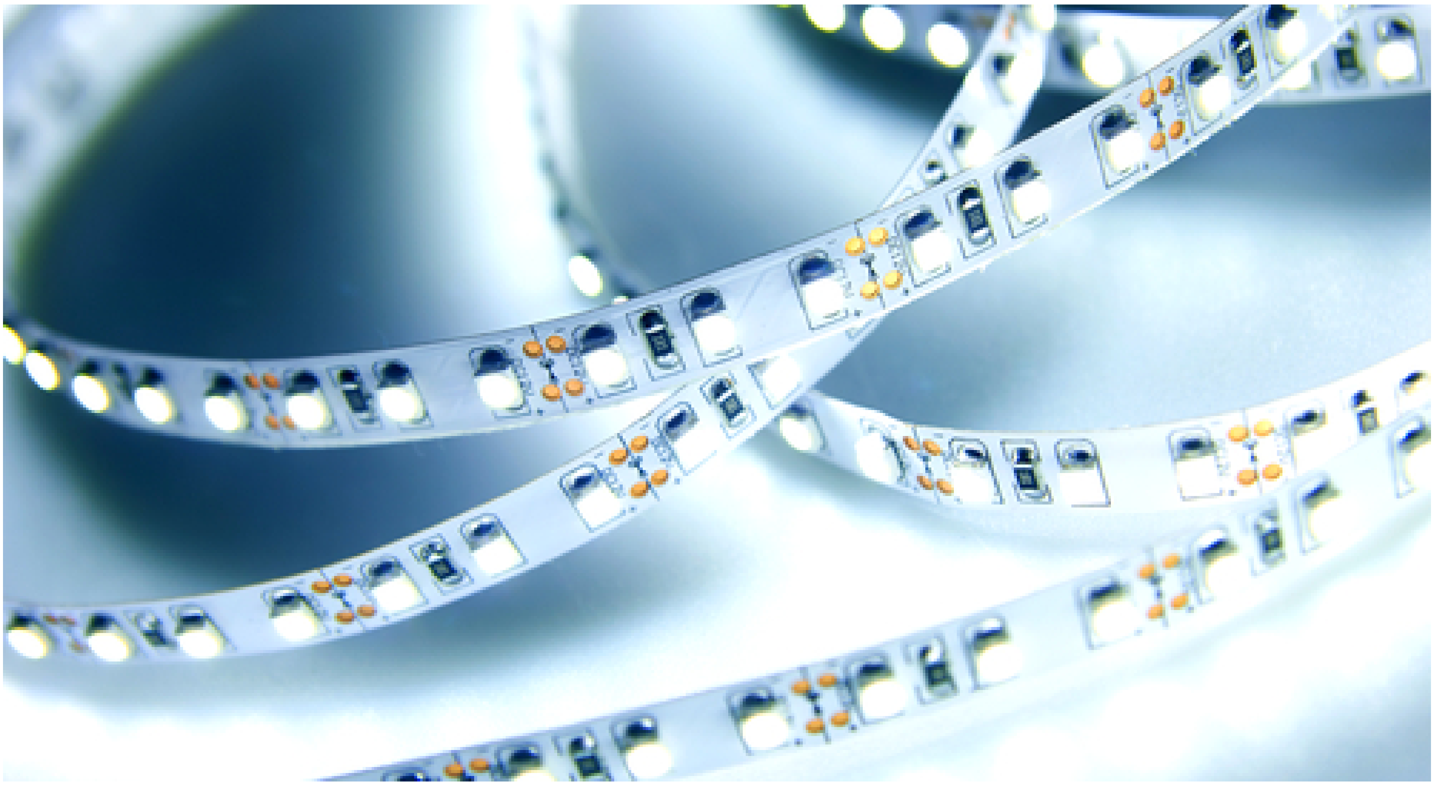
They've gotten stronger too, and as a result, possess greater reliability. There is, however, one thing that *hasn't* changed, and that's the design process itself. The workflow in your PCB CAD environment will be very similar: laying out traces, selecting and placing components, adding additional layers. On top of that, many recent design packages are bred to deal with flex designs and will give you insight on selecting dimensions and geometry. Honestly, even if you're not totally "sold" on Flexible PCB's, the landscape of PCB design will keep changing to make IoT happen. If they're not good enough today, then they're going to be great tomorrow.

As a fellow designer, I hope you're as enthusiastic as I am working with flexible PCB's. Both the technology and the design tools are much improved. Before you dive into the world of the IoT, it's a good idea to take stock of the tools and resources at your disposal.

Flexible PCB's have certainly transformed, but what about your PCB design package? Is it equipped to deal with the latest and greatest? Altium offers multiple solutions that scale to your needs while optimizing workflow.

Our professional PCB design packages are built to deal with the nuanced challenges of creating successful IoT products. With support for flexible PCB design, exhaustive testing tools, and an intuitive interface, Altium's software is a reliable, trustworthy foundation for your next IoT project.

FLEXIBLE FUTURE: THE INDUSTRIES THAT ARE FORCING YOU TO LEARN RIGID FLEX PCB DESIGN



Do you ever feel like time is a passing a little more quickly than it should? It seems like just yesterday I was growling in frustration as I learned how to use dial-up internet. Now I growl in frustration as I attempt to figure out how to set up my state-of-the-art broadband router. It seems like as soon as I master the current technology, it's time for the next big thing and I have to start all over again.

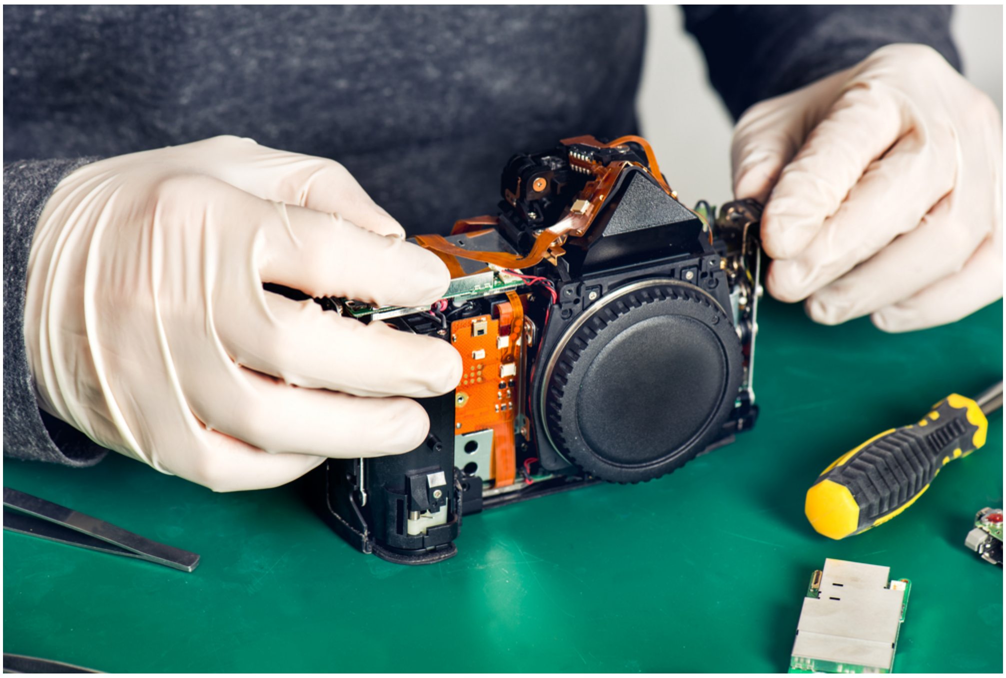
Well my PCB designer friends, it's time for you to learn the next big thing in PCB design: flex and rigid flex. In the fast growing world of PCBs, flexible PCBs are growing the fastest. The Internet of Things (IoT), wearable electronics, and flexible displays are all pushing the industry towards flexible and rigid flex PCBs. That means it's time for you to roll your eyes, let out a sigh, and start to learn the design principles for the next generation of PCBs.

FLEXIBLE PCBS ARE GROWING QUICKLY

Learning new design techniques hurts, but money can help ease the pain. The global PCB market is growing, with some studies estimating the market will grow to $73.8 billion in 2021 from $63.5 billion in 2016. A large portion of this growth is expected to be from flexible PCBs. Some reports project flexible PCBs to grow to $15.2 billion by 2020 and $27 billion by 2022. I may not give a hoot about next gen PCBs, but I will holler for a dollar. Flexible PCBs are already outpacing rigid PCBs. In 2014 rigid PCB sales decreased slightly, while flexible PCB sales increased. Adapt or die is the law of nature and of the PCB design world. If you stay in the past with only rigid designs, you'll get left behind.

INDUSTRIES PUSHING FLEXIBLE PCBS

It's one thing to observe that flexible PCBs are growing, and another to know which industries are pushing that trend. Currently, the Internet of Things and wearable electronics are largely responsible for flexible PCB growth. I believe that flexible displays will become another catalyst in the near future.



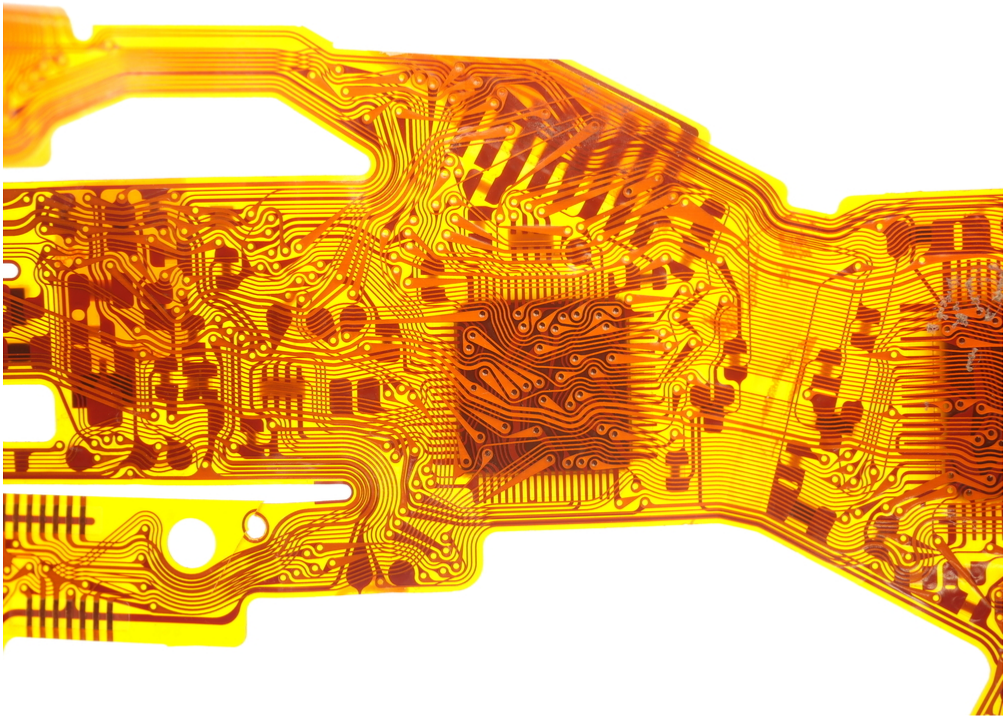
Digital cameras are already using lots of flexible PCBs.

THE INTERNET OF THINGS

The Internet of Things is one electronics industry that is on the cusp of explosive growth. This growth means you'll soon be designing a lot more PCBs for IoT devices. Many of these new IoT PCBs will need to be flexible PCBs.

Take "smart" LED strip lighting for example. LED strip lighting needs to be flexible along its length so that people can bend it into whatever shape they need. Eventually, people will want things like smart towels that tell you if your hair is dry, or connected tissues that send people alerts to say "bless you." By their nature, these kinds of devices will require flexible PCBs.

Flexible PCBs can also be used to fit small 3D form factors. 3D printed PCBs are still on the horizon, so you have to get a bit creative to fill those awkward spaces. Rigid flex designs can let you fold your boards into rectangles, cubes, or octahedrons, and fit them into spaces where a flat board just wouldn't do. You may have to learn origami as well as rigid flex design.



In the future, most PCBs might end up looking like this.

WEARABLE DEVICES

I know you love PCBs so much you would wear them if you could. Well, today is your lucky day. Wearable electronic devices are on the rise, with sales expected to reach $30.6 billion by 2020. That much money could buy you a whole PCB wardrobe.

Wearable electronics are often embedded into clothes, and therefore need to be flexible. Sensoria's smart socks, for example, have sensors and a chip embedded in the fabric of a sock. Your socks and this idea may stink, but you'll just have to hold your nose and take the plunge. Wearable devices like this that require flexible PCBs are everywhere. From belts to baby hats our clothing is fast becoming connected, and most of it will need flexible PCBs.

Some wearable PCBs, like the one on the Shockbox, will need to be flexible in order to resist shock and vibration. Shockbox makes sensors that can be integrated into sports helmets. These sensors are supposed to reduce risk of concussion by providing parents and coaches data on head impact forces. To measure force the sensors must experience force. As rigid PCBs are much more likely to crack when experiencing dynamic forces these kinds of devices will need flexible PCBs.

FLEXIBLE DISPLAYS

You've probably heard about flexible displays, but have never seen one. I've heard you can find them at the end of a rainbow next to a Leprechaun's pot of gold. I recently found out that flexible screens actually do exist, they're just not in use yet. Once manufacturing costs come down, flexible screens will make their way into our devices. If the screen is flexible, everything else will have to be bendable as well. The waking nightmare that is a fully flexible PCB design for handheld is electronics is on its way.

If you thought your days of studying ended in college, you were wrong. The Internet of Things, wearable electronics, and flexible displays will force you to learn flex and rigid flex PCB design. So grab a pot of coffee and get ready to burn the midnight oil preparing for the future.

If you're going to be designing the next generation of rigid flex PCBs you'll need software that is as futuristic as smart socks. Altium Designer has been pioneering 3D PCB design software to help designers like you master rigid flex design.

Need someone to commiserate with about learning new design techniques? Call an expert at Altium.

ADVANTAGES OF FLEXIBLE CIRCUITS FOR SPACE APPLICATIONS

Sometimes people ask my why space travel is important. The answer seems obvious to me every night when I go to sleep. My pillow is made out of memory foam, which was developed by NASA. Their research efforts for space exploration have led to a host of other important discoveries and gadgets that we all benefit from today. Another useful technology that was originally developed for the aerospace industry is flexible circuits. Rigid flex and fully flexible PCBs have several advantages over traditional PCBs when it comes to flight around and Earth and far above it. Things like reduced weight and volume increased reliability, and more innovative design make flexible circuits a great choice for infinity and beyond. One particular material that highlights all of these advantages is Kapton®.

LIGHTWEIGHT AND LOW VOLUME

You might not think weight matters much in regards to space exploration. Everything is essentially weightless up there after all, right? Unfortunately, rockets and their payloads still experience gravity during liftoff. Carrying something from the ground into orbit is one of the most energy intensive parts of the whole process. Flexible circuits have low mass and take up less space than traditional PCBs, making them perfect for aerospace.

Flexible circuits are naturally lighter than a normal board. Instead of using a thick rigid substrate they are mounted on a thin film. Substrate weight savings are compounded as layers are added, which can result in up to 75% weight reduction. That may not seem significant, but when you've to pay for your own rocket fuel, every ounce matters.

Not only are flexible circuits lighter, they're also smaller. Obviously a thin film takes up less space than a thick substrate, but the main volume savings come from flexibility. Whereas a traditional board needs a set amount of 3D space, a flexible PCB can be squeezed or folded into nooks and crannies. They can also be bent into unique 3D shapes and fill unused space. With enough creativity, you can save up to 60% space when compared to normal boards. Size matters because a larger payload means a larger, and heavier, launch vehicle.

You don't want to be carrying any extra weight during launch.

RELIABILITY

When designing boards for space, reliability is hugely important. NASA launched Voyager One 36 years ago, and it's still flying. Your circuits need to be pretty trustworthy if they're going to be flying through space for 36 years. Flexible boards can withstand more dynamic forces than a traditional board, and they eliminate high failure interconnection points.

Spacecraft are subjected to all kinds of dynamic forces, primarily during takeoff. Dynamic forces are the bane of traditional boards, with vibrations causing up to 20% of failures. Flexible and rigid flex boards are made to twist during operation and can flex thousands of times before failing. This will help flexible boards bend instead of break and keep working in harsh conditions.

Connections like solder joints, crimps, etc. are a major risk for failure as well. These attachments can also be broken by dynamic forces. Flexible circuits remove this risk by eliminating connections. Most of the connections on flexible boards are made within the substrate. For a connection to fail, the whole PCB would have to fail. Thus, flexible circuits almost entirely remove a point of failure for your board.

Flexible circuits are perfect for deployable parts.

VERSATILITY

The vacuum of space is a daunting place full of difficult challenges. Engineers need versatile components in order to overcome those obstacles. Flexible circuits provide physical adaptability that can allow designers to implement odd shapes and extensible parts on their spacecraft.

Sometimes it's not convenient to jam a large rigid rectangle into a small area in a spacecraft. Flexible circuits can conform to whatever surfaces they're mounted on. This means they can be mounted wherever they're needed. Instead of running wires out from a central unit to far-flung sensor arrays, you could mount your circuit right next to the arrays.

Flexibility also comes in handy when you want to implement extensible parts. We've all seen things like deployable solar arrays on satellites. Just like dynamic forces and vibration can weaken traditional boards, extending and retracting parts can cause wear and tear on conventional wires and PCBs. You would usually be taking a risk by incorporating that kind of apparatus. However, since flexible circuits are made for just that kind of motion, you can use expendable equipment without fear.

KAPTON®

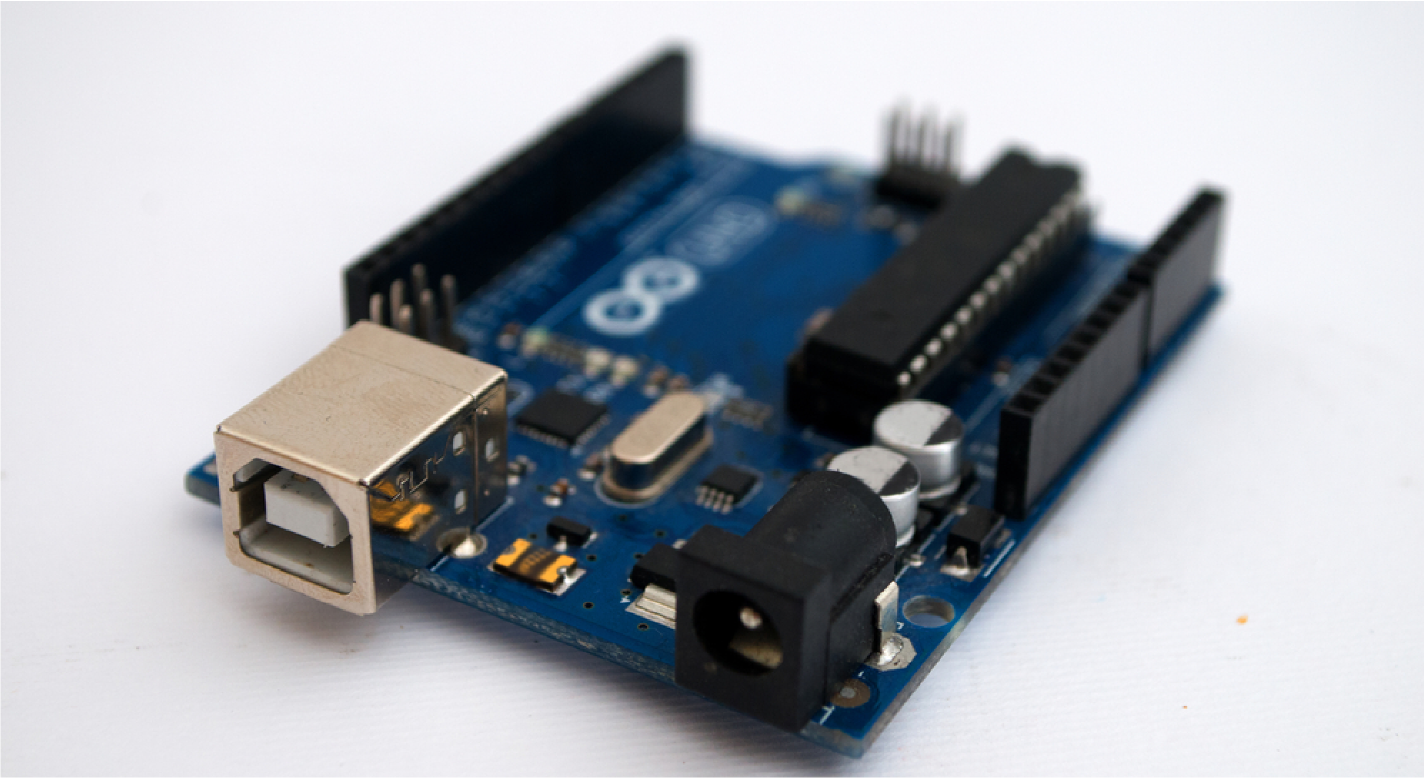
Flexible circuits are made out of many materials, but one, in particular, is already widely used for space applications. Kapton® is a thin polyimide film that has already been used on multiple space missions for everything from heaters to solar cells.

One reason Kapton® is often chosen is because of its light weight. This has made it a primary choice for everything from cable insulation in rockets to heaters on rovers. Kapton® is also used because of its mechanical properties and vibration resistance. These help it keep things like solar panels and optical sensors safe during operation. This material exhibits all of the qualities that make flexible circuits useful for space travel, so it's no surprise that so many space missions use it.

Whether you're sending all the way to Mars, or somewhere closer like the International Space Station, you want to be sure your payload arrives at its final destination. Flexible circuitry will help minimize your spacecraft's size and get it off the ground. It will also improve reliability, and give you more options when it comes to design.

Now that you understand why you should use flexible circuits, you need some PCB design software to help you make them. Lucky for you, Altium Designer has tools that can make flexible design easy. Altium will help you get your spacecraft off the ground in no time. Have more questions about flexible circuits? Call an expert at Altium.

INTERNET OF THINGS HARDWARE PLATFORMS ARE BECOMING FLEXIBLE



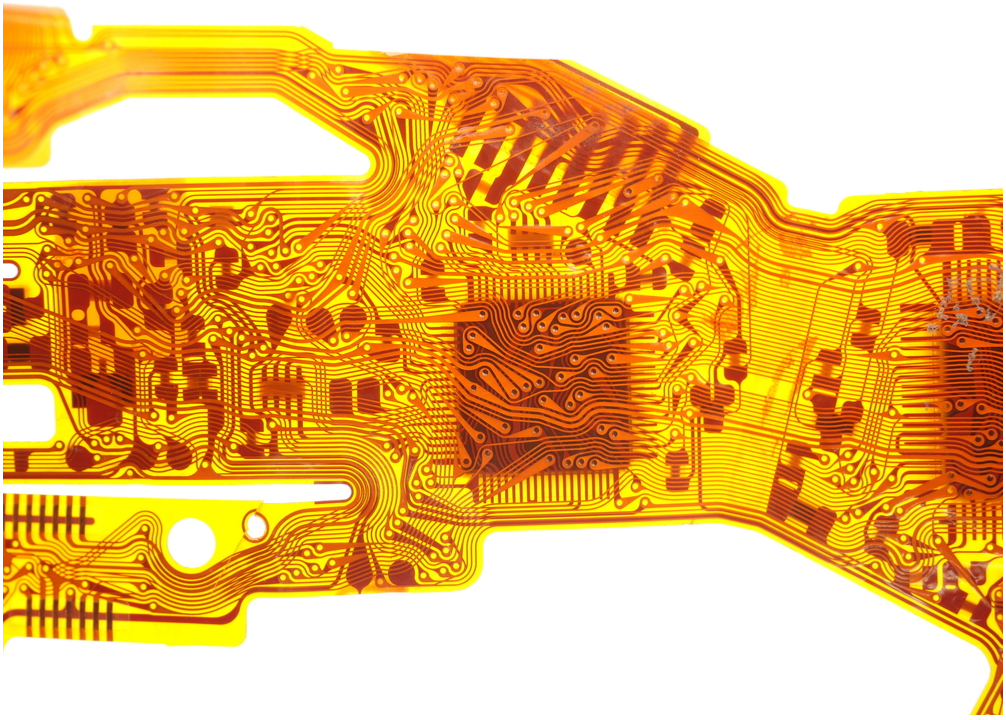
Do you remember all the fads and obsessions you had when you were a kid? When I was younger everyone was going crazy for Pokemon and whatever electronic gadgets they could get their hands on. These two crazes eventually combined into one ultimate trend, the Tamagotchi. It was a huge hit, building on the portable electronic fever and children's love of tiny unrealistic animals. Recently two fads in the PCB world have combined, flexible electronics and the Internet of Things (IoT). Hardware platforms like do it yourself development boards helped give birth to the IoT, and flexible hybrid electronics (FHE) are going to help bring it into adolescence. Engineers are beginning to design flexible boards and peripherals that are compatible with big brands like Arduino. You join the frenzy by designing easy to use boards with components that IoT developers need.

ADVANTAGES OF FLEXIBLE HARDWARE PLATFORMS

Fully flexible and rigid flex PCBs have long been confined to high tech industries like aerospace, where they help Rovers make it to other planets. Now, though, their advantages are being brought back down to Earth in development boards and their peripherals. Flexible hybrid electronics combine the low cost and performance of traditional electronics with the space and form factor advantages of flexible circuits.

While some entities are dreaming of a fully flexible future, currently we have to settle for a hybrid. Flexible hybrid electronics mount traditional components on flexible substrates. Traditional electronic components have been highly optimized over the years for cost, speed, and power consumption. While there are some flexible analogs, their performance pales in comparison. We're also more familiar with tried and true chips, which makes them easier to use in devices.

Rigid PCBs, though, have many flaws. The main ones being their tendency to break instead of bend, their size, and their inability to handle dynamic forces. Mounting components on a flexible substrate helps with all these problems. Obviously FHE are made to bend, in fact some can bend up to 200,000 times before failing. In addition to reliability, bendable boards have smaller form factors and can be folded to fit into spaces no normal PCB could go.



Flexible circuits are the future.

FHE, THE IOT, AND ARDUINO

These advantages make FHE an excellent choice for the IoT. The IoT is going to give birth to billions of devices by 2020. Many of these are going to be sensor based networks that operate in nooks and crannies to monitor infrastructure. Those devices are going to need to have unique form factors that will allow them to fit everywhere they need to go. Not only with these gadgets need to be small, they'll need to be simple. No one has time to individually design billions of devices, that's where Arduino comes in.

Arduino has long been a household name when it comes to development boards and do it yourself type electronics. At first, their boards seemed to just be for hobbyists, but they carry a lot of opportunity for commercial applications. That's why several companies are now developing FHE Arduino compatible boards and peripherals. Seeed Studio is one company that has put out a prototype board. With this proof of concept PCB, they aimed to see how small they could shrink an Arduino type board. Another company working in this space is Printoo. They're developing a whole range of Arduino compatible platforms that target the IoT market. You should expect to see other companies and designers try their hand at shrinking and bending Arduino boards in the near future.

Even cars will become part of the IoT.

YOUR PIECE OF THE PIE

Why shouldn't one of those designers be you? The open source hardware market was estimated to be worth $1 billion in 2015, and will only grow with the rising tide of the IoT. If you want to capture part of this market and its designers you need to design boards and peripherals that are simple, familiar, and useful.

While I do enjoy learning new things, I don't enjoy delving into a novel technology every project. That's one of the keys to Arduino's success, and it will be important for yours as well. If you want to design your own general hardware platforms for the IoT make them compatible with existing systems that people already use. Make sure users can program your board with commonly integrated development environments (IDEs) that they already use: Arduino, Cloud9, BlueJ, Geany IDE, etc. Tap into the open source development board markets that are already established and filled with designers.

Not only does your board need to feel familiar, it also needs to be useful. You should think about what kinds of products are on the horizon for the IoT. I can give you a few hints. Wearables are obviously on the rise, even for senior citizens, and need good flexible solutions in order to meet form factor requirements. Low power wide area networks will need hundreds of tiny, low power sensors, to gather data. Cars are also an unexpected extension of the IoT. They need small, lightweight, sensors and boards in order to meet body and weight requirements. Vehicles will be communicating with everything around them as well, from infrastructure to pedestrians. Every piece of that puzzle will require easy to integrate boards and peripherals.

The race has already begun for the Internet of Things, and flexible technology is entering the fray. Arduino has long been a contender in the IoT and now smart companies are starting to combine the two. You could be in on the ground level as well if you can design boards that mesh well with existing technology and meet the needs of IoT applications.

There's only one problem, how do you design flexible boards? FHE is a fairly new technology and isn't familiar to most designers. Lucky for you Altium Designer knows how to deal with both flexible and rigid-flex circuits. It's flush with great tools that can help you in design and can even create a 3D model of your circuit to make sure it fits enclosures.
Have more questions about flexible circuits? Call an expert at Altium.

ADDITIONAL RESOURCES

Thank you for reading the guide on Rigid Flex PCBs. To read more Altium resources, visit the Altium resource center here or join the discussion at the bottom of each original blog post:

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- Flexible PCBs and the Internet of Things: How the Landscape of PCB Design is Rapidly Changing
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- Internet of Things Hardware Platforms are Becoming Flexible