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Inside Pavlok – The History of the Pavlok Hardware by Steve Trambert, Mechanical Engineer



(Maneesh Sethi (<https://pavlok.com/blog/author/maneesh/>) • Mar 15

2017

This is part of our Inside Pavlok series—a series of blog posts by the Pavlok team talking about the story of how we work. I'm excited to introduce the story of the Pavlok hardware by our Mechanical Engineer, Steve Trambert. This post is dear to me, as it tells the history of Pavlok from inception (ahem – slap in the face) to our current stage. Hardware is one of the most difficult projects a person or company can take on, so I feel strongly while reading the words below.

I hope you enjoy Steve's story as much as I do.

Hello! I'm Steve Trambert. I'm the mechanical engineer on the Pavlok team. I design the mechanical enclosures, packaging and accessories for Pavlok. I also manage our supply chain, maintain our relationships with vendors, and act as an informal Director of Hardware. That might sound like a lot, but – as I'm sure you'll learn from these introductory team blog posts – we all wear quite a number of hats here at Pavlok. Often 4 or 5 stacked awkwardly atop one another. Welcome to the exciting life of the entrepreneur!



The First 25 Final Pavloks We Shipped – 8/7/2015

In my free time I like to kayak, ski, tinker with 3D printers, and nerd out over foreign policy. I've actually got a second bachelor's degree in International Relations. That's the amount of nerd I am.

I've been on the team here for almost 2 years now. In March, 2015, I watched Maneesh speak on a panel of experts at a wearable tech event, got a beer with him afterwards, made him a 3D-printed prototype necklace two weeks later, and was then immediately invited to join the team. The key to getting a job at Pavlok is a demonstrated ability to inflict pain on Maneesh.



The original necklace prototype that got me my job



An interview I did in 2016 about my time at Pavlok.

Enough about me though, let's talk about something way more interesting... Pavlok history! Specifically my area of expertise - **Pavlok Hardware History!**

As a young company, the saga of Pavlok thus far has been passed down largely through oral tradition. Think of this as my humble attempt to start preserving that history, because some of this stuff is quite cool!

It seems fitting that Pavlok's history be first committed to writing in the form of a blog post, because the history of Pavlok really began with a blog post:

[First Step on the Pavlok Hardware History Trail: Kara](#)

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Why I Hired A Girl On Craigslist to Slap Me In The Face — And How It Quadrupled My Productivity

10/18/2012 IN MAKE MONEY PRODUCTIVITY [Like 10K](#) [Tweet](#)

Meet the Pavlok hardware in its very first iteration. Her name is Kara, and Maneesh hired her on Craigslist to slap him.

You should absolutely feel free to read The Blog Post yourself, you can find it [here](#) (<http://hackthesystem.com/blog/why-i-hired-a-girl-on-craigslist-to-slap-me-in-the-face-and-why-it-quadrupled-my-productivity/>) under Maneesh's old *Hack the System* masthead. Suffice it to say, Maneesh discovered – and demonstrated with cold data – that his productivity increased significantly when he had someone with him whose job was to keep him on-task and accountable to his goals.

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Keywords...

We've always been an odd company, it seems fitting that we have a suitably odd origin story.

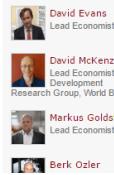
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Behavioral design: slap or tax yourself into productivity?

SUBMITTED BY DAVID MCKENZIE ON SUN, 11/18/2012

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Even the World Bank got in on this story!

The response was tremendous. The article was featured in the [Daily Mail](#) (<http://www.dailymail.co.uk/news/article-2219484/Computer-programmer-quadruples-productivity-hiring-woman-slap-face-time-catches-looking-Facebook.html>), [Telegraph](#) (<http://www.telegraph.co.uk/technology/facebook/9616910/Man-slapped-when-he-looks-at-Facebook-to-increase-productivity.html>), [Huffington Post](#) (http://www.huffingtonpost.com/2012/10/18/maneesh-sethi-blogger-hires-craigslist-slapper-to-hit-him-unproductive_n_1980274.html), [Buzz 60](#) (http://www.youtube.com/watch?v=rMN_jj5gTlk), [Digg](#) (<https://img.skitch.com/20121018-qdm6fu9hqnsjy5i54ip4ywrq5.png>), [NPR](#) (<http://www.npr.org/2012/10/20/163280614/bluff-the-listener>), [Mix 106.5](#) (<http://mix1065fm.cbslocal.com/2012/10/18/want-to-triple-your-productivity-hire-someone-to-slap-you-in-the-face-when-you-slack-off/>), [The Daily Dot](#) (<http://www.dailymdot.com/society/maneesh-sethi-face-slap-experiment/>), [Business Insider](#) (http://www.businessinsider.com/this-guy-hired-someone-to-slap-him-in-the-face-every-time-he-got-on-facebook-2012-10?fb_action_ids=10152227350610574&fb_action_types=og.recommends&fb_source=other_multiline&action_object_map=%7b%2210152227350610574%22%3A%25102017518809%7d&action_type_map=%7b%2210152227350610574%22%3A%22og.recommends%22%7d&action_ref_map), [Venturebeat](#) (<http://venturebeat.com/2012/10/16/how-i-quadrupled-my-productivity-by-hiring-someone-to-slap-me/>), [Yahoo! Finance](#) (<http://finance.yahoo.com/news/guy-hired-someone-slap-him-015800416.html>) and many more (<https://docs.google.com/file/d/0B3pbPZvqaGfTOGdockVDRDBMRTg/edit?usp=sharing>). This article was intended to pose an interesting idea wrapped inside of a joke, but a sizeable contingent of readers began asking if there was something they could do to realize similar results without resorting to something as drastic as a professional slapper.

So, Maneesh had his lightbulb moment – what if he everyone could get slapped in the face? Unfortunately, slapping doesn't scale, so he hit the lab with the next best thing: a dog shock collar. The idea: hack it to zap him whenever he went on Facebook. He called up a friend – [Dan Kaminsky](#) (https://en.wikipedia.org/wiki/Dan_Kaminsky) – to rig it up with an Arduino and some code.

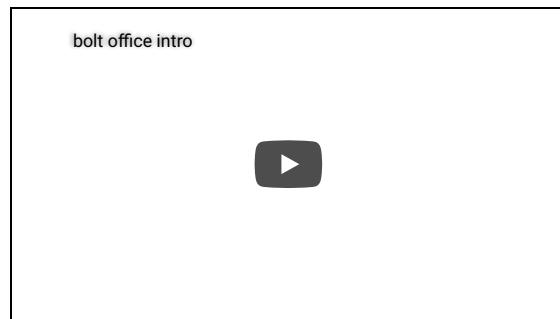
The only thing that might make this origin story better is some footage – and we've got some! Take a look the very first night of Pavlok's existence: <https://youtu.be/SQW9bqw5O1E?t=16s>

Thus Pavlok – or, more accurately, Behavioral Technology Group – was born. Maneesh began pulling a team together with the goal of inventing a tool to help people backstop their willpower.

Second Stop: Early Days

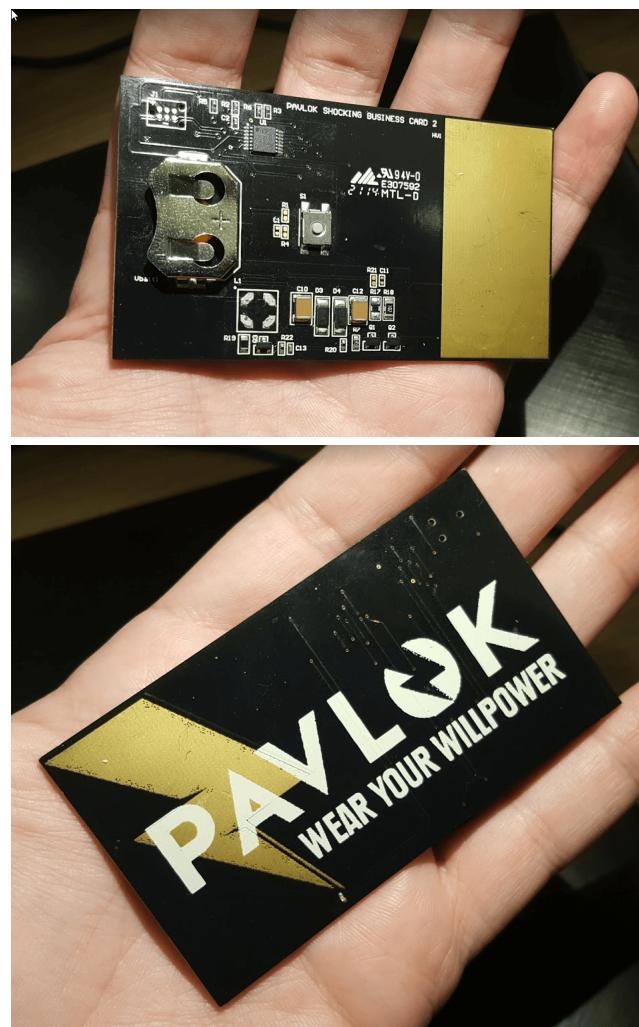
Here there be monsters; the earliest days of Pavlok are shrouded in a degree of haze and mystery. The folks who were on board at this point experimented with all sorts of ideas that you've probably never heard of. For example, one of Pavlok's early patent applications was for electronic shoelaces that wouldn't unlace until the wearer met their step goal. Another was for a wristband that would literally lock to your wrist – this is where the "lock" in "Pavlok" comes from.

Ultimately, however, the team settled on the Pavlok concept that we know and love today. Much of this growing-up was facilitated by our entry into Bolt. Bolt is a startup accelerator that invests specifically in promising young hardware startups. They lent us space to work in their Boston office, access to engineers and experts, and an excellent community of fellow hardware entrepreneurs.

[Bolt Office Intro Video](#)

Third Stop: Prototypes

Do you like baby photos? There's something magical about seeing what your full-grown friends looked like when they were awkward toddlers with a lot of learning to do. That's what the first Pavlok prototypes were like. Here are a couple baby photos of Pavlok:



What you're looking at is the very first prototype of our shock circuit. If you've got eagle eyes, you might notice something a little curious about the top photo – the tiny silkscreen text on the back of the circuit board says "Pavlok Shocking Business Card." We figured that as long as we were making a prototype shock circuit, why not design it in the form of a shocking business card? The lightning bolt on the front and the big pad on the back serve as the electrodes. If you really want to make an impression at a networking event, you can hit the "shock" button on the card just as you're handing it over to your latest contact.

We're very mature.

The shocking business card was essentially "one half" of our original prototype. The other half was a second board, intended to test the rest of our rough electronics design – processing and bluetooth connectivity. You can see it in the "family portrait" photo later in

this post.

Building on the lessons learned from those first prototypes, we built... *drumroll* the Alpha Unit.



The Alpha was the first iteration of Pavlok that was truly wearable. These were big, clunky devices. They had some serious character though – each Alpha was individually laser-engraved with its own short-run serial number. Conductivity came through two strips of conductive rubber at the back of the device, which were fastened to it with wire and some scary looking screws:



My, what big teeth you have.



Want to watch some neat ancient history? Check out one of our first hands-on video reviews, produced by Yahoo Tech after spending some quality time with an Alpha prototype:
<https://www.yahoo.com/tech/i-strap-the-gadget-to-my-wrist-and-double-click-101397371719.html> (<https://www.yahoo.com/tech/i-strap-the-gadget-to-my-wrist-and-double-click-101397371719.html>)

There's another interesting thing about the Alpha unit – it saved the company. Hardware R&D is an expensive proposition, and as a startup it can be difficult to cover your costs while you make your way from concept to mass production. In Pavlok's case, we came to May 2014 with just 3 weeks of capital left in the bank. At that point we were still months away from being ready to launch our Indiegogo campaign. So Maneesh took a gamble. He hosted a habit-breaking webinar for about 120 Pavlok fans, and made them an offer – they could become our earliest of early birds by buying one of our Pavlok Alpha units. It came with coaching service from Maneesh personally, and a strong warning that the device was still very rough around the edges.

Maneesh earned us \$30,000 in that webinar, and Pavlok stayed afloat. Pavlok shipped its first 25 alpha prototypes on July 31.2014 – exactly 364 days after the company was founded on August 31, 2013.

If you're one of the super-early adopters of Pavlok who purchased one of these Alpha units, I just want to take a moment to say thanks. This was a case where your faith in the mission – and in us – literally kept us going. In addition, the feedback you provided allowed us to make the final mass-production Pavlok eminently better.

Also, you should [shoot me an email!](#) We don't have many of these old dogs around, and we would love to buy your Alpha unit back from you to preserve as a piece of company history 😊

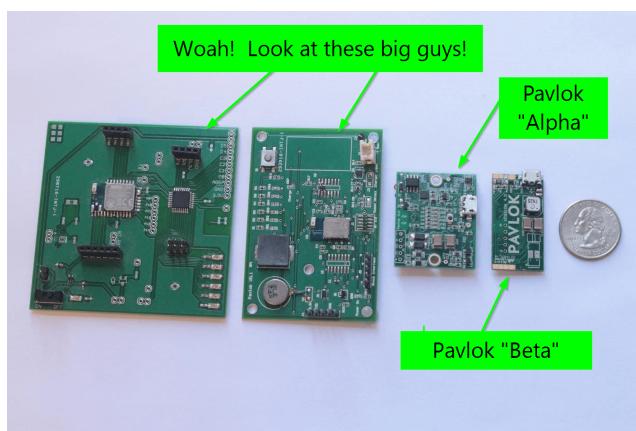
That last pre-production prototype that we built was the Pavlok Beta. Some of you might recognize it, as the Beta was the first prototype to see wide sale with Pavlok. We sold about 50 of them before our Indiegogo campaign, 300 more during the campaign, and a few more after the campaign. The new wristband was produced from silicone in a light-duty aluminum mold, and the enclosure was 3D-printed in our office on a Flashforge. The way it conducted was pretty interesting – it used copper tape, which we hand-soldered to two special pads on the board. Each unit took over an hour to build by hand. They were no fun to manufacture, but they do look pretty neat, don't they?



Want to see more of the Pavlok Beta? Here's a neat video review out of Germany:

<https://www.youtube.com/watch?v=94z30z48MEs> (<https://www.youtube.com/watch?v=94z30z48MEs>)

And if you've had trouble following along with the story of our prototypes, here's a family portrait to help you wrap your head around the progression:



Here's the Pavlok family portrait. The guy on the far left is more like a cousin – he's a dev board for BlueGiga. Continuing to the right, you see a pre-alpha prototype, our Alpha board, and our Beta board.

Fourth Stop: Crowdfunding

Woo! We made it to the crowdfunding stage – and boy did we make it. Pavlok's Indiegogo campaign went live on September 30, 2014, and quickly met its \$50,000 goal. In fact, by the time the campaign ended on November 30, we were 508% funded, with more than a quarter of a million dollars in backer funding. Feel free to [check out the Indiegogo page](https://www.indiegogo.com/projects/pavlok-breaks-bad-habits#/) (<https://www.indiegogo.com/projects/pavlok-breaks-bad-habits#/>) for a small dose of primary-source history!

InDemand

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Marenova Sets Boston, United States About

\$283,977 USD total funds raised
508% funded on November 30, 2014

STORY UPDATES (46) COMMENTS (293) BACKERS (1,761)

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Fitness Technology for Spring Collection

This is another moment where I'd like to pause to briefly thank our community. If you're reading this, and you're an Indiegogo backer, we're all grateful to you for helping us get off

the ground. We wouldn't be here without your support.

We're often asked for advice on how to go about launching a successful Kickstarter. In the words of Maneesh, our secret sauce is pretty straightforward: "If you want good crowdfunding publicity, make a product that shocks people." We earned a ton of press simply by virtue of being odd.

We're proud to be odd here at Pavlok. There are a million wearable fitness trackers out there, and studies show that they have almost no actual impact on user fitness. We make something truly different from anything else, and we're happy to do it.

Last Stop: Production Pavlok

And now we've made it to the present... the Pavlok you're undoubtedly familiar with, a device known to us as "The Production Unit." This is the point in the Pavlok timeline where I come in 😊 I joined the company in March 2015 to get this guy into mass production.



There's something interesting here; notice how I didn't say that I joined the company to design the production unit, only to get it into manufacturing? That's because I played only a minimal role in designing the Pavlok module itself. The true credit doesn't lie with any mechanical engineer, in fact. It actually lies with our illustrious electrical engineer, Sasha Iuelu! He completed the design and ordered the first injection molding tool before I even joined the company. How did he do it? By buying a Mech E textbook and studying up. It goes to show you that anyone can break into hardware these days if they have the will to learn and fast internet.

Rather than designing the module itself, I designed the Pavlok's wristband and packaging, and oversaw the selection of our manufacturing partners here in the USA and overseas. I also provided the team with a special sort of incentive to spur us on to ship our Indiegogo backer rewards:



Speaking of shipping, that was an awesome night! The very first units went out on August 7, 2015. Daniel, Maneesh and I personally carried them to Boston's late night post office. First, however, we took a detour to visit a backer who actually lived in Boston, to surprise him with a hand-delivered unit. Here is the very first Pavlok backer to receive their production unit.



It felt great to fulfill our Indiegogo orders. This was an exciting time, but it was also tough. I had to put nearly \$20k of company expenses on my personal credit card to buy all the parts we needed. Everyone pulled double-duty on the assembly line (though that part was pretty fun).



Let's talk a bit about the production unit. Our final device is surprisingly simple, which is of course by design. The shorter the BOM (bill of materials), and the less labor time involved in assembling those components, the lower the manufacturing cost. The production module is comprised of an internal circuit board which slips into an injection-molded ABS "body" component (this is the black plastic piece in the middle with the lightning bolt). It's secured inside by two die-cast zinc terminals, which attach to the body with snap-fit features. The terminals are plated with white bronze to give them their nice finish. White bronze allows us to achieve the attractive appearance of chrome plating, without having to forsake customers who have nickel allergies (the chrome plating process involves a layer of nickel).

We had trouble nailing that snap-fit in the early days, so – if you have a very old unit – it may

well have been simply glued shut with E-6000 by one of us on the team. The very early manufacturing process also involved putting Kapton tape on a ton of components to insulate and secure them, but we've managed to improve the manufacturability to the point where none is required anymore.

There's something that you might notice about both the production unit and the Beta unit. Unlike the Alpha's, they're separate devices that are removable from the central wristband. This offered us a number of advantages. For example, it allows users to pop the unit out of the wristband and pop it into a different color wristband or an alternate accessory like a necklace or belt clip. You can expect the first of those alternate accessories to appear for sale in the next few months, but I'll save that deeper exploration of what's-to-come for my next blog post 😊



This seems like a good place to wrap up. It was great to meet you, and I hope you enjoyed this rough history of how Pavlok's hardware came together. Stay tuned for future blog posts that dive into some of the more technical aspects of the design and manufacturing process that I glossed over here, such as how we found our manufacturing partners in the US and in China. And of course, a preview of some new hardware to come.

If you have any questions about or suggestions for Pavlok hardware, I'd love to hear from you! You can reach me at steve@pavlok.com. Otherwise, I'll talk to you again soon through this blog 😊

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