**Alex Klein:** 0:00

The time now is very much like at the beginning of the internet, where there are organizations that are just going completely AI native, that live and breathe AI, that are thinking about how to bring it into all of their processes, and then there are organizations that are like oh yeah, we're aware of this and we think we may have a strategy around it. We want to make products that we can use ourselves and really enjoy and have, you know, no qualms with using them above any other competitor products in our potential price range or live products that we can recommend to our friends and family.

**Craig Smith:** 0:32

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**Alex Klein:** 2:11

So I'm Alex Klein. I'm 33. I live in London. I've got a team here of 30 people. We've been working together for over 10 years now. Many of us and our company creates products that are designed to leverage the most advanced technologies to relieve people suffering on a day-to-day basis. And how did the idea of STEM come about? We actually did not come to music via targeting music. As an industry, the very first product we made back in 2013 was a bright orange box. It's actually behind me, above my head filled with color-coded computer components and a storybook, a page-by-page storybook that would show you how to put the components together. It was a STEM computer kit. It was a STEM toy. It was one of the first STEM products that would teach kids about STEM. You could buy it from Toys R Us. Buy it from Target. The first user was my six-year-old cousin, Mika, who wanted to build his own computer. Those sold under the brand name Kano. Kano was named after the founder of Judo, a Japanese primary school teacher named Kano Jigoro. So that's chapter one for us. We have this notion that we live in this world. I used to be a journalist, actually, so I used to work at the New Republic Newsweek, Daily Beast, and wrote stories for New York Magazine the Nation. I was covering things like Occupy Wall Street, Mitt Romney's tax returns, the Church of Scientology, just a wide range of political, economic, some tech, and Instagram's acquisition. I had a sort of passing relationship with the Times, actually, Craig, because Jill Abramson was one of my journalism teachers in university. Really, where was she teaching? She taught a course at Yale. She taught a journey, oh or so yeah.

**Craig Smith:** 4:43

While she was editor or before this was.

**Alex Klein:** 4:47

I believe before, where she at the time was deputy editor or she had.

**Craig Smith:** 4:54

Right yeah, she was deputy for a while, yeah exactly Very interesting person.

**Alex Klein:** 4:59

So we went on a tour of the Times and I've always had a. In fact, I applied for an internship at the Times in university. It was rejected, if I'm believable. My career might have gone very differently had I been accepted.

**Craig Smith:** 5:16

Yeah, you're probably. It's probably good that you were rejected rather than getting sucked into the vortex of the Times.

**Alex Klein:** 5:27

Yeah, the journalism world was super welcoming to me at that time. I was like a college student and I was able to get a few internships here and there. I was into computer science and I was using early data collection techniques to build infographics and that kind of stuff. But I think, the kind of spirit of being a working journalist I was at Tina Brown's Newsweek Daily Beast carried into STEM, which was the idea that, well, what if you could build a technology product and a technology ecosystem where the idea wasn't just like you get delivered this and it's on the fires here? What if you could get a piece of technology that you could actually see how it works and put the pieces together yourself and participate more in the technology that you use every day? That idea carried through to what eventually became the STEM player, which uses generative AI to generate the pieces, the puzzle pieces of any song you throw at it and then you can just isolate the vocal, isolate the drum or even put the pieces of different songs together as simply as putting together Legos, or even automatically. That's the journey from journalism to STEM. Computer kits for kids sold over a million of those around the world worked with Warner Brothers, disney, microsoft was an investor and then, three years ago, did our first music product, the STEM player, which eventually became a collaboration with Kanye West. That's how a lot of people discovered the device.

**Craig Smith:** 7:13

Yeah, I want to back up a little bit the storybook STEM construction product. You know, I spent most of my adult life in China and I was very early in my career in the garment trade. We were manufacturing in China, so I have a familiarity with contracting manufacturers to build stuff and, as a matter of fact, these glasses, which are red, because I lose my reading glasses all the time, so I buy them red and I can always spot them around the room. And I got tired of paying $15 a month, $15 a pair online, and I went on Alibaba, found an eyeglass manufacturer, found one that had a style I liked, picked the color and I bought a minimum order of 120 pairs. So I've got eyeglasses for the rest of my life. But my point is that I'm kind of familiar with that. To me it is not a huge barrier having an idea and then finding a manufacturer to make it physical, and I've done that, you know, in, as I said, in the garment trade and different projects in my life. But that's not obvious to a lot of people. A lot of people see that, as you know, a lot of people have ideas, but actually manufacturing a product is beyond their imagination and capability. So how did you come about doing that?

**Alex Klein:** 8:57

Yeah, it's a great point I mean at that time. So I came out of journalism, I've gone to get a master's degree in Cambridge, so I was doing an Mphil in politics, maybe with a view to going back and continuing writing in politics. And my cousin at the time was, you know, he'd been like a sort of tech forward internet guy for a while, journalism as well. He was like involved in the telegraph, bringing the telegraph to the internet, and he knew of this technology in in Cambridge called the Raspberry Pi, which you might have been sure yeah, so I'm. He put me onto it and then I sat down with Evan Upton, who had effectively invented the concept of the Raspberry Pi, taking a development board for mobile phone demonstration, basically a reference board, and redesigning the layout so that you could, you know, basically run a full operating system with full Linux distribution on it. And it started selling like hotcakes, largely, I think, because people were doing something similar to what you did with the eyeglasses, but with but with sensors and buttons, buying those from you know markets, from Alibaba, from from the east, assembling their own sort of maker projects at home with the Raspberry Pi as the brain. So doing things like you know, making a like a submarine, like an autonomous submarine, making like a weather balloon with a camera in it and taking pictures of the earth and running Bitcoin miners in different clusters, and it was this whole sort of cottage enthusiast, homebrew computer club situation. And there was this guy at the center of it called Evan. He was at Cambridge. I was at Cambridge, so my cousin was like you should go talk to him. And I actually went to interview him like for a story, like I was going to pitch a story on this back to Newsweek and I was just interested in it myself and he shared with me all these challenges about he. Basically, you know, there's so much demand for this but people, people have trouble understanding it. You know people have trouble getting into it and sort of the success that they had had manufacturing this, plus the challenge of accessibility that the product had, made me think, like you know, I didn't really know what I was gonna do next. I was like what if? My cousin was into the idea and into working with me on it, and you know he had a bit of capital and so he was like, well, why don't we do this? Like I will invest in this thing and you build me a product that, like me, you and my six year old son can build together. You know, you know design, you know tech, you like to write, write a book, like write a book to put the pieces of this Computer together. And that was the first product was like really family affair, like you know, on the living room in, not in their apartment, met up what friend showed it to them. I was introduced to this Israeli guy who had operations experience from a company called keter injection molded plastic chair company in israel. That kind of symbiosis of our relationship worked out really nicely and I launched the first product on kickstarter, which was a huge thing back then. It broke all the yeah, that kind of large, mass production of the first stem computer devices. So I think I was fortunate to meet the right people and to have to kind of start my company at a time when people were starting to get into the idea of electronics manufacturing on a like hobby scale, which was it was definitely not possible Twenty years ago and just went through a big jump in accessibility when things like the raspberry pi and other things came.

**Craig Smith:** 12:52

Yeah, and what were you doing at Cambridge?

**Alex Klein:** 12:55

I studied political economy so I was studying public debt, I'm sure treasury, the US treasury, the UK central bank and the in the kind of relationship between High levels of securitize public debts in what we're called at the time developed economies and growing levels of socioeconomic inequality in society, and looking to see if I could Gain enough of an econometric understanding of the two phenomena to make an argument that they were connected. So it was sort of deep economics research, which I'm not a sort of counterintuitive theme that, like Greater public debt equals greater inequality, when you know, typically it was thought at the time, well, you take on a big public debt to equalize society, have a welfare State and system that you know gives everyone a safety net and a fair starting point, and I was. I was sort of arguing that the principal, yes, but in practice the large Sprees of monetary base expansion that the central banks have been on had Not been channeled into welfare improvement programs in the way that they have been described in pitch to the American and English people as. But we're really more about inflating asset values and I think, yeah, that was. I was very much considering a more wonky trajectory of my life. For sure, I still try to stay pretty wonky, but there's definitely a lot more to like.

**Craig Smith:** 14:40

Yeah, and was that a graduate program, or were you undergraduate, or what? What? What's the education you've been through?

**Alex Klein:** 14:47

was that, that was an M Phil. I'm like a master's of philosophy, which is like one year at Cambridge after you do your undergrad. My undergrad I got a BA in ethics, politics and economics but I minored, minored kind of in In writing and journalism and computer science was always kind of a hobby thing for me. I never really expected it would become my career right, yeah, okay.

**Craig Smith:** 15:13

And then this is fascinating. And then stem the product. Yeah, describe again how you came about Building that. It was directly from the storybook Product.

**Alex Klein:** 15:32

Yeah, exactly so we have this kind of product formula of like there's a box and inside there's, like the, these beautifully like design pieces and you put them together. Then the device shows you how to put together some blocks on a screen and you make something that this construction is step step kit, slash, software s things. We did all these different domains, so we'd like to have a computer which was like something you plugged into a TV. We made a tablet which had a touch screen. We done A magic wand, like it was literally an electronic one that you build and then cast a spell on a screen. We did a board of lights that you would like to paint on. We made a camera that you can actually put together and then change out the lenses and do digital photos and make your own instagram filter.

**Craig Smith:** 16:31

so it's all like.

**Alex Klein:** 16:32

Making like. The slogan of the company was like anyone can make it. You know anyone can make it. You might think it's only for some, but anyone can make it. So then we applied this idea to music and we've been experimenting with machine learning for the Harry Potter product because the Harry Potter product effectively has to filter out a lot of Motion data in order to capture the precise motions of the Harry Potter spells, such as Wingardium, Leviosa, etc. We went to do a music product, next called the speaker kit or the stem speaker. That was like this kind of orb like thing. You would put the top and the bottom together and then there were these knobs on where you would like to control the stems. Is there the music as it was playing through? You could kind of filter the music up and down. And that was ultimately the product that I think Helped solidify our relationship with Kanye. Because when we saw it was when he saw that was up and running, he was like can I put my album on this? Because he always liked our design. You know, when I first met him at the consumer electronics show in Las Vegas He'd like picked up our computer kit and he was like this is fresh. Can you give me this dope clear tablet joint and we got on the phone and you know he had a real enthusiasm for the look and feel of what we were doing and he said he liked the simplicity and he liked that anyone could understand it. And yeah, I mean, it was a very, a magical moment for me because I'd always been such a fan of his music and I'd seen him as a really inventive thinker and I had, you know, at that time he had a lot of criticism because he'd endorsed president Trump and that was always a concern for me because, you know, I feel that that president Trump is a fascist. So when my favorite artist endorsed him, that always was a concern for me. But I kind of put it aside for years and we became friends and we became Kind of creative allies. You know, I would, I would help him with his music. I wrote lyrics on one of his albums strangely enough, I'm a lyricist on Jesus is King, yeah, which was so great and a blessing and he would help me think through some things you know About my business, about how to present the products, how to communicate products, and that was a that was fruitful. We worked on many different products actually Refrigerators, lights, appliances, speakers, had we touch all sorts of different domains, even telecommunications, but what Ultimately came out was the stem player and, interestingly enough, because this is the iron I podcast the thing that in some ways contributed, at least from a product perspective, to our kind of exiting the partnership was not only the terrible things that he said and the terrible, hurtful anti-Semitic things that he said although, as we say in Judaism, dianoo, that would have been enough but it was also. He was very opposed to the use of AI at all in the product and I always saw it as a very magical element that you could bring any song separated into the stems, and hear it in this new way. His view was it should be just Kanye music on my stem player and that to me, it was kind of a place where we started to, you know, kind of move apart. I remember one quote recently that I heard was that the time now is very much like the time at the beginning of the internet, where there are organizations that are just going completely AI native, that live and breathe AI, that are thinking about how to bring it into all of their processes, and then there are organizations that are like oh yeah, we're aware of this and we think we may have a strategy around it. It's very similar at the beginning of the internet and I think we were just. You know, we'd like to believe we're in the right camp and thinking that something truly transformative has certainly occurred in the certainly, as you put it, the applications of fundamental research. And you know, three years, really three years ago, the major breakthroughs were made and now they're starting to be instantiated in the consumer products.

**Craig Smith:** 21:24

Yeah, let me just ask a couple of questions before moving on with where you're going. Just for listeners, the product on the shelf behind you, the stem in that product, is the acronym for science, technology, engineering and mathematics. But the stem in the stem player refers to is a musical term right For for is it one instrument or one group of instruments or sounds within a larger?

**Alex Klein:** 22:06

Yeah, the position Maybe I can even share my screen here Is that within the rules of the podcast? Yeah, sure, yeah, go for it. But you know, the stems of songs are the pieces of the songs, they're the ingredients, you know. So, the vocal, the drum, the bass, the instrumental, you know those are the, those are the stems, and so our technology allows you to split any song into those pieces and hear them independently. So you get the basic idea, which is, if you go to stem back, you can hear the vocals, the drums, the bass, the instrumental of any song, either by itself or in combination with the others, in any way you choose. So it makes the music a deeper listening experience and also we can get to this, maybe later. It also allows for songs to be combined in new ways.

**Craig Smith:** 23:11

Yeah, and and? Is that using some machine learning algorithm to separate the channels? That's it. I've talked to people on Birdsong. For example, I did an episode on isolating individual bird songs within a cacophony of the forest.

**Alex Klein:** 23:34

Yeah, so yeah, the problem of what's called in audio like source separation is basically the same in those two instances you're looking to, you know the audio comes into your ears and you know there's just, you know, millions, billions, depending on what scale you're looking at, of different frequencies that are all intersecting and but certain human recognizable things have due cluster around certain frequencies. So, for example, you know voices tend to be of a higher frequency than percussive elements or base elements in a song. You know the bird songs of a particular species of birds may cluster around a similar recognizable set of frequencies. So source separation has actually been a thing for like 50 years. Even since radio is around, like I'm getting this radio stream in, can I just in an analog way filter out the signals and get kind of different bands of the audio and either like security and radar based or their security and radar applications of some of the same technologies. The big change came really in the last three years to source separation, when generative machine learning techniques were applied, effectively supplementing the weaknesses of traditional signal based source separation, which is, to your ear, a machine, just from an analog perspective, filtering out a particular band of frequencies even if that band dynamically changes with a bunch of subsequent parameters. Your ear will categorize as a voice just ranges of frequencies that are more nuanced and subtle than can be picked up by just a brute force sorting algorithm. So the generative approach is basically to start with source separation and then use tagged data, so data that's been tagged as vocals, drums, bass or instrumental or, yeah, I guess, as a, you know, a Finch, a Skylark, or to supplement and actually fill in what's missing out of those analog separated stems. And techniques, even from the synthesis of voice, like Google's WaveNet architecture, which is now used to in most voice simulating technologies, can be used funnily enough to fill in the missing parts of like a drum or a bass, because there's some similar qualities, it seems, and how humans perceive the different parts of music to the, how they perceive the human voice. So those were two of the big breakthroughs, using a more generative approach to traditional analog separation using techniques from human speech synthesis in the prediction objective functions of that technique. And on top of that there are also improvements that have been made in just data handling and data processing that make it faster to actually get those stems out of the model and to the client, whether it's like a web browser and application or a piece of hardware. So that's sort of stem separation, as at least as we do it and as it exists today.

**Craig Smith:** 27:26

And I only have a half an hour left. I have a hard stop at five. There's so much to talk about. So, first of all, you're at CES showing a bunch of products, presumably at a booth and you know, you got your signage up, you got products and people are coming in. What? Kanye West just walks up or is it there? Like one of his people comes up, says, hey, this might be interesting. Would you like to meet with Kanye?

**Alex Klein:** 28:00

So one thing I learned about yay over the years, which was really I'll answer, but it's like he does a lot of stuff directly himself in a way that is very endearing because you know, we all know this world famous guy, but he's very much like he's raw, he goes out of himself, which is so the, the actual like I'll set the scene, which is I was at CES but I was actually not at the booth on the on the day Kanye came down. So I was in my hotel room, I was in my boxer shorts, I Was kind of sleepy and I was catching up on emails and you know, thinking, okay, it's the last day, no one's coming through. Really, we've gone through the big days and my colleague and friend Vdall at the time, just texted me. I pick up my phone and it's a picture and it's Table in front of our booth. We had a nice big area. We did the thing with Warner Brothers that year so a nice big area with two walls, a table with all the computers, and at the back of the table there was just Kanye standing holding looking at the computer and I was like. I was like oh damn. I was upset because I thought that Kanye is my favorite. I've been interviewed in 2015 and I'd said if there was one person I could pitch my business to, who I'm pitching yet, it would be Kanye, and I was kind of Annoyed but also, look at that, I wasn't there. I was like, oh, but then I was like, okay, let's see what we can do about this. So I called my other colleague, Greg, who was there, who actually studied at Berkeley College of Music and is a great drummer in his own right, and I was like Greg, what's going on? He's like, yeah, kind, he's just here and he's you know, he says, you know he loves the tablet. He, you know, said get me that dope clear tablet joint, which I'll never forget. Yeah, well, get him a tablet. And I was like, yeah, we're getting them one. Like I was like, hey, you know, go put him on the phone. And he was like I don't know how it's like there's people gathering or because he'd now spent a long time at our stand, people gathering, people realized who he was. He only had to sort of handlers with him and Greg was like I don't know, I can't, I don't know if I can get to him. And I was like Greg, just walk through the crowd, walk past his bodyguard and hand him the phone and say Alex, the founder of Cano wants to speak to you. And he's like all right, I just hear this rustling and you know I hear this kind of voice in the background and I hear Greg's voice and then I hear more rustling and I hear like Hello. I was like hey, is this Kanye? And he was like. He was like yeah. I was like oh, wow, nice to meet you. And he's like yeah, man, nice to meet you too. I love what you're doing. It's fresh. I was like, oh well, coming from you, that means so much. What do you like about it? And he's like I love the simplicity, I love the transparency, I like that anyone can understand it. I asked him a couple questions about his kids, how they deal with technology, and he was like it was very loud, we couldn't really hear each other. And then it was like, hey, I'd like you to come to Calabasas to work with me on education, farming, the next generation of technology. And this was very yeah, you know he was. He was always like doing all the, he was always thinking about all these different things. And you know, I went to go meet him at his house for breakfast and the meeting got changed. And you know, Kris Jenner stumbled into the meeting and so Kim was there and the meeting got redirected. And you know, yeah, and I just kind of like he was looking at all our pros, because we always make tons of products. I've worked with the same people for a really long time, my colleagues like Bruno, James, Tom, we've just been going for it and even though our first thing was for kids, the whole idea was really always about more than just kids. It was about really stem as perceived as most broadly, it was about the idea of, like you know, the world being something you can take into pieces and put back together again, and I think the the project with Kanye gave us a lot of confidence that the quality of our product design and the quality of our team and business was such that the biggest names in the world were interested in getting involved. And then the advent of a Solution to the problem of music decomposition around the same time, plus with this Kanye relationship, just kind of came together to make stem player something that you know obviously has set the stage for many years, the stage for many other innovations in the space and I think now has given us a new platform to grow from as well.

**Craig Smith:** 32:43

Okay, and I mean I, I have more questions about the Kanye West episode. But so you build this product. He releases his album on it. The product blows up within a certain Market. Did it go through an arc? Is it still out there? And then I'd like to hear what you're, what you're working on now, absolutely.

**Alex Klein:** 33:08

So, yeah, no, the product. It was a really interesting story because there were so many different projects that we put together With yay and, of course, as a business person, I was like I wanted to finish one of these projects with yay. Like I, because we had a good relationship, you know, we were able to get a lot done, but he, he always struggled with finishing stuff and I felt like he would bring me into the equation when he wanted something to get finished and get done, because I'm, you know, I'm the kind of guy I'm like quite a like I want to get things done, you know, so, so, like he would bring me in and like, basically, it was around this album down to. You know, we went back and forth. You know we got into an argument. I went out to Wyoming, I was on the ranch with him, driving around in ATVs, and the stem player at the time wasn't even our main focus. We were focused on a different device, the stem player. You know, we started a project with him, but then the project got canceled and the contract got terminated and it was like we were focused on something else. So we ultimately decided we weren't sure if we were going to be able to move forward with Kanye at all, just because he wasn't really like Um. First of all, from a business perspective, there were, there were issues, and then it just didn't seem like although I really thought he was creatively gifted that he was actually going to get anything done. So I proceeded to just take out the stem player, as you know, our own product and it was during that time that we really emphasized and developed the, the AI element, that it was forget because we were like, well, if we're not going to get a Kanye album on this, we're going to just create it so that anyone can easily. And that's really the direction that we've taken since, right. But Kanye Did ultimately reach back out around. Donda did ask about, let's put something out. We had devices ready. We designed the exterior of the device to Kind of work well with what he was doing at the time and then he, right before the release of Donda, put his album on it. That was non-exclusive. We sold a good number of units just as pre-orders, because people were excited it's the first time they'd seen the device. Kanye gave it a big stamp of approval from an audio and music perspective, fashion, culture perspective. Then, during the rollout of his second album of that cycle, donda 2, he actually got to a point where he was so frustrated with his relationships with the record labels and with the major streaming platforms that he decided he would put His album only on the stem player. So it was completely exclusive. We worked on all the communications and the content and the marketing. Kanye, you know, put it on our device because I think he felt it was a better way to experience his music. You could hear the music in this new way and I'm very grateful in a certain sense to him for, you know, doing that. But I think also on his part, he was smart. He saw that this was like a future thinking thing. You know, the device ended up like it was everywhere. It was on Joe Rogan, snoop Dogg was sharing about it. Like, um, people were using the stem player box to propose marriage to their fiance, putting the ring in the box. It was like it was great, it was a great time, um, and that led to a certain wave. Um, we ultimately had to dissolve the partnership, but the stem player continued to sell. Uh, we sold out of the first 100 000 that we made um and uh, we've been preparing to release the stem too, uh, this december.

**Craig Smith:** 36:57

Okay, uh, now one question. Uh, why the hardware?

**Alex Klein:** 37:02

I mean, this could all be on a, on a web interface well, the, the, I think with the stem one, the stem player, there was a collectible quality. There was a sort of um, I'm holding the music in my hand, um, I'm using this New kind of interface to interact with music in a new way. It was almost like an art piece, you know it was like, it was very, it was a very conceptual product in a way. It was like you get this and you get the album and you can listen to the album in this new way, like you can flip it, reverse it, chop it, loop it. But I think, for the Direction of for all, for accessibility, we knew that it wouldn't soon become a technology and a service that you could access on other people's hardware, as we like to call it your MacBooks, your iPhones, and we did go in that direction, and we do have a service where you can enjoy some of the magic of STEM audio now in your browser, on your phone, wherever you are, and that's under frequent iteration and development, with a good number of active users. The reason for the hardware, though, is because we have abandoned hardware. We do see some opportunities. Frankly, in music, audio hardware today, we see an opportunity to create devices that feel different from the existing devices that are softer and squishier and more like an extension of your body. You know that are like one piece and can stretch and bend and are malleable more like, again, an organic system rather than a technological one and inside them a more organic style, intelligence based on a neural network, one that can take what you love to listen to from the Bluetooth stream or even directly on the device and augmented and transform it just subtly. So you're still listening to the, you know, to the Beatles or the Beach Boys or playboy Cardi or little little Dirk, but you're being introduced to new music because being mixed in a stem is actually being mixed in and we see that as a new form of music discovery, enabled by AI, and actually a new way for music to be monetized. So that's probably the last reason. From a monetization perspective, the whole music industry is pretty janky right now. Stuff is not working. You know the pie has not expanded enough and everyone's just competing for space on these tiny little squares, on this tiny little bigger square. We think if you can make a speaker and headphones connected to the Internet where you can experience music in a really unique, transformative way, artists are going to want to distribute music to those devices as well as these ones that everyone else has, and consumers may be willing to pay a premium to hear music in this new format, which brings you closer to the music on devices.

**Craig Smith:** 40:08

Do you have one of the stem players within reach? Just so that I've seen them, but I'm not sure everybody listening has Open it up here.

**Alex Klein:** 40:25

And then on it.

**Craig Smith:** 40:45

Speed up and I don't even like the life I was screaming at. My daddy told me, in Christ, like I was screaming at the river, just like Mike before right, like before right like before right, like and like an effect. Yeah, yeah, that's fascinating. And the new one. So you're working on a new iteration.

**Alex Klein:** 41:36

Yes, so without revealing too much about the new one. So with this device that you know, the music comes loaded on it and if you want to add new music to it, you have to take the cable, plug it in and plug it into a computer and then you can access that web interface where you can manage the content on board, add your own music to it. We really want, with the next device, to remove that umbilical cord to the existing ecosystem, so the stem will be slightly larger. But it will also be a Bluetooth speaker with a much louder, just gorgeous sound, I think better sound from our ears perspective and also we had some amazing artists work on it. The nicest full list sound profile in a very unique form factor that you can put your existing music onto via Bluetooth. They just play music through it like any Bluetooth speaker and it will transform that music into stems live and in real time. So wow, yeah, that's you know, maybe I did just give away a lot actually, but that's, you know, you heard it here first. That stem to stem to power really should be something that takes your everyday listening experience and elevates it, rather than being something, you know, kind of special and precious and that has maybe a beautiful applicability when you take it out of the box.

**Craig Smith:** 43:22

Right, wow, and so on is the AI in it. Are you building up, because so much is happening, certainly since this first iteration? Are you using any of that new technology, the sort of the conversational interface, for example, or other forms of generative AI?

**Alex Klein:** 43:49

Yeah, I mean there's many forms of AI, but that are kind of included in the product. You know, depending on how you define AI, I suppose. But for the new product, at least in the way in which it's advanced, the stem separation uses a hybrid transformers model, not unlike the transformers model that chat, gpt for and 3.5 are based on. The generation of mixes uses an AI, an AI beat detection model that allows you to find the downbeat throughout a song even if the beats per minute change. We also use machine learning, deep I'd say deep learning techniques to filter through your library to find songs that will match together and will mash up and sound good together and then the data set that the system is trained on has grown because we've generated so many stems Since then. We haven't performed the new training yet, but we do anticipate that. Well, maybe I shouldn't even say we anticipate. We're interested to see what happens when, when we perform that new training. We're hopeful.

**Craig Smith:** 45:19

Yeah, and is this? Are you? This is a consumer electronic device. I mean, that's your target market, but it looks to me as though it would have traction in the music production industry. Is that? Are you working on both sides, or are you solely focused on the consumer?

**Alex Klein:** 45:44

I think, I think we, we, we want to make products that we can use ourselves and really enjoy and and have, you know, no qualms with using them above any other competitor products in our potential price range or lives, products that we can recommend to our friends and family some of our friends and family, just because of the nature of what we do, you know they are music people, they are music producers, you know, and. But I think we're careful. You know it can be very tempting to go too far down the road of building features over a complicated experience. If you are you, you're primarily thinking about producers. We really want the experience to be simple, elegant and deep, but not so deep that we lose people along the way. We really want it to be like a six year old can pick this up and just just enjoy it right away and it becomes their go to music device.

**Craig Smith:** 46:56

Yeah, the. I mean, I'm just thinking. You know I'm getting old, I'm hard of hearing. It would be great to have a device that could separate out one voice in a party, for example, and you know that's beyond music. On the business side, has the original stem been profitable or is it still a sort of a development product and you're looking to make profits on your next product?

**Alex Klein:** 47:39

The original stem was actually more profitable than we expected after all the twists and turns with the partnership. So we were able to produce a net profit on those 96,000 units and the gross profit was even better because the margins were quite good. I mean, without sharing too much, we were able to, you know, return enough to keep the business funded for many months and to work on new technologies, specifically in audio but also in video. We applied some stem separation techniques to the video and it got some really interesting results. And on our site you can see the stem projector product, which is like a handheld projector, that projects on a wall or a ceiling, which also uses machine learning to augment video and transform it in a similar way to that the stem player does with music. So you know, the business is in a position where I think we'll be going into the stem to launch with a good amount of interest in the products. But yeah, of course there's a company that carries working capital and inventory. It's never been the kind of easiest business model to choose. But that said, is there any business model that's easy? At the end of the day, it's about, you know, making something great, producing a great product for customers, communicating it well. And it doesn't matter what your business model is, you just have to kind of pull your socks up and do it.

**Craig Smith:** 49:17

Yeah, that's fascinating. Ok, well, we're almost up to an hour. What's the website that people can look for?

**Alex Klein:** 49:27

The website is stemtech.

**Craig Smith:** 49:33

Yeah, I mean, I visited it, but OK, well, this is really fascinating. You're going to stay focused on music? Or, as I said, this technology, it seems, could go to so many different places.

**Alex Klein:** 49:49

That's a great question, I think, for us. When I first started the company, I think one goal that I had was to do as many different projects as possible, almost to hedge my bets, you know. But as I've kind of become more aware of just kind of the world and how complicated projects come together, especially ones involving many brilliant people, I've become more appreciative of the fact that it's not always about, like you know, it's not even as much about what you're doing. Sometimes it's about who you're doing it with and why you're doing it. You know, and that's what really keeps you going. And I think what we've found is, you know, our long term ambition is to apply, is to integrate this technology that's arising now into a better experience for every product in your life. You know whether and it goes back to what Kanye said education, farming, technology. I really do believe that the people who are working in these mediums today have an incredible responsibility and opportunity to shape, as the people working in this medium did 10, 15 years ago, you know, to shape society and shape the lives of billions of people. And I feel like you know, maybe we got that wrong, maybe with the first contact we had with AI on social media. You know this is our second contact with generative AI and you know we want to apply it to relieve suffering around the world, make amazing products that we would love to use ourselves and would have great value. But I think we're focused on music and audio because we see a problem set there that, if solved, will unlock so much productivity, so much joy for so many people that that can be our foundation to build a video, to build a cellular. So yeah, for the next three years I think you'll see us pretty much exclusively in this kind of music space and that's a pretty intentional focus to build a foundation for the future.

**Craig Smith:** 52:20

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