THE HANSELMINUTES PODCAST
Fresh Air for Developers

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**Controllerism and digital music with artist and inventor
Moldover**

Musician, artist, and inventor Moldover creates, tours, and explores new frontiers in electronic music and also coined the term "Controllerism." He's currently creating a new original album packaged in a playable circuit board instrument! Moldover explains Controllerism to Scott, how it differs from Turntablism. How does Moldover make his instruments and mold his sound?

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Lawrence Ryan: From hanselminutes.com, it's Hanselminutes, a weekly discussion with web developer and technologist, Scott Hanselman. This is Lawrence Ryan announcing show #447. In this episode, Scott talks with musician, artist, and inventor Moldover about exploring new frontiers in electronic music.

Scott Hanselman: Hi, this is Scott Hanselman. This is another episode of Hanselminutes, and I'm talking with Moldover who is a musician, an artist, and an inventor from the Bay Area, who I met over a year ago in Stockholm, Sweden. How's it going?

Moldover: Hi, Scott. It's going well. Good to be here.

Scott Hanselman: I really appreciate you chatting with me today. You've got a really, really diverse background. You've got a lot of stuff going on, but I wanted to talk to you about this idea of controllerism and explain to people who have never heard that word before. What does that mean: controllerism?

Moldover: Oh, it's a word I started using back in 2007 when I was performing with a laptop and a sort of hacked-up keyboard MIDI controller. It was challenging to explain what I was doing because I had a lot of custom software. I had this very customized physical interface, and the music I was doing was, I'd like to think, kind of ahead of its time. So, you know. You can either use an older way to describe that, like, "I'm doing live electronic music" or something like that, but I thought a new word was just kind of a neat way to peak people's interest, and the word I came up with to explain it seemed to do a pretty good job because there's a lot of understanding. DJ culture had become very mainstream, and everybody knew at that time what DJs do and the extension of that; that is, turntablism was also super popular. Just capitalizing on that popular understanding of a term to coin a new term seemed like a great idea. So, I went for it.

Scott Hanselman: Would you…not in any way to discount or say that turntablism is something less skillful, but, when I saw you perform, I got the impression that you were doing a lot of work. You know what I mean? I didn't feel like it was…a lot of work was done ahead of time. When I watch a DJ on a turntable, I sense that perhaps they put together the gig and

they're kind of there with their gig as opposed to they are the gig and they brought the gig with them.

Moldover: Yeah. Well, the performances I'm doing now are a little removed from that. I've picked up the guitar again since and started writing songs since, so my performance style has changed from what it was when I coined that term. But, yeah. It's true. What I was doing then, just like what I'm doing now, was much more technically complex than what DJs or turntablists do. It was really more about just reaching an audience, and also encouraging other people to do the same thing, because every time I would do a workshop or sit down with a friend who was already a musician or already a DJ and showed them technology I was using, they were just blown away. And, if I gave them the opportunity to play it, they just had the most fun. They'd light up like little kids. So, a lot of it was just wanting to spread the ideas and grow the culture and build a community of music makers who could do the same things that I was doing, just to have people around.

Scott Hanselman: Before this kind of resurgence and excitement around electronic music, what would someone have available to them? If I say today, "I'm going to enter the world of electronic music." I just buy a MIDI keyboard and do some sampling and that's the extent of what I'm able to do?

Moldover: Well, there's so much crazy stuff now. I mean, computer based…I got into electronic music right when things were moving quickly from hardware…like hardware Rackmount Synthesizers or synthesizer sampler keyboards and workstations and stuff like that, into computers where everything was like virtual copies of that and then some. So, I did not go through a phase of buying old analog keyboards and learning how to use a hardware sampler. I had some bits of that gear, but I was much more excited about the stuff that my computer could do. I was really into computers. I had a computer in my home since growing up, and I learned to program. I was really into games, so I was just really comfortable with the whole computer world. Anyway, jeez, we're way past that now. The things you can do with a laptop or even a tablet or a smartphone just far surpassed anything I was doing at that time, and it's become incredibly easy to just connect all these things and make music happen. I can't even imagine…I'm going to Berklee College of Music next week in Boston, and it will be really interesting to see what young people who are coming up in electronic music are doing.

Scott Hanselman: Mm hmm. Now, why did you feel the need to make physical controllers? Like you said, you can do pretty much everything in software. Why isn't just a regular keyboard enough? What is it about the physicality in the making of your own controller?

Moldover: Yeah, that's a great question. It's something you don't know unless you've practiced a musical instrument or something similar. In practicing and learning a musical instrument, you do a lot of repetitive kind of things, like learning your scales or whatever. You repeat these motions over and over again with your muscles, with your hands, or with your voice or whatever, and that's what enables virtuosic performance and these really, really interesting and fun states of playing music where you're not cognitively thinking about moving your left index finger from this string to that string to play the next note. Your muscles have been so well trained that the music just kind of flows through you. Having that experience, studying guitar for a long time and a bunch of other instruments, that's what I knew I wanted from a musical instrument. So, when I started playing with computers and MIDI controllers, it quickly became apparent that there really weren't any good, affordable MIDI controllers to interact with the software that I had, and there wasn't anything…there were some very esoteric, specialized instruments. You could get multi-touch services back in 2002, but they were super expensive and they were kind of one-trick ponies. You could spend your whole allowance on one of those things and only be able to do one thing. So, to me, there was no instrument that came anywhere close to the maturity of what a guitar, a keyboard, or a drum kit is, so I decided I needed to create that.

Scott Hanselman: Was the Robocaster one of your first? This is your controller/guitar, an electric guitar, and you integrated a custom controller inside of that. Was that one of your first?

Moldover: No. The Robocaster guitar is actually one of the most recent. It's a funny thing. I just kind of did a 180. I was playing in a bunch of bands. I was a guitarist. I was leading my own band as a vocalist and guitarist, and doing all this much more traditional musician kind of stuff. I just got fed up with all the drama that can result from being in bands and that kind of situation, and I just left all that. So, I put the guitar away for several years; I actually didn't play it for a long, long time. I was just playing these controllers because it really was a lot of work at the time I was doing it, to make things behave. There was great software out there, but it wasn't anywhere near as mature as it is now. You kind of had to roll your own software, so to speak, with these higher-level, object-oriented languages that we use, like Reactor and Max/MSP. They're not exactly like coding, but they're ways that you can design your own software instruments. Just getting over that hurdle and getting a physical interface to work with that thing, and learning all the principles of instrument design: ergonomics, and tactile feedback, and all that kind of stuff. I had my hands full with the controllers, and integrating it now with the guitar and with the voice is a more recent development.

Scott Hanselman: I think you may have actually just indirectly answered the next question I was going to ask you. You just said, "tactile feedback," and I believe when I saw you in Sweden you were using the MOJO, or a version of the MOJO, which looks like a box with a whole bunch of arcade buttons on it, but it has more than just buttons. It's got sliders and knobs. There's a kinetic-ness to the controller. My question was going to be, "Why didn't you just use a big iPad?" Is it the physicality of the switches that is so important?

Moldover: Yeah. Number one is there was no iPad. There was a $3,000 device called a Lemur which did the multi-touch stuff that iPad does. But I even borrowed one of those and set that up to do the things I was doing with the MOJO. It just falls flat because there is no tactile feedback. You can't learn it by muscle memory, so you can never get to a virtuoso level of performance. And, if you see people performing with an iPad now, you have this same effect that you had back at the laptop days. You would see people on stage, "checking their email," which was kind of the performance esthetic that I was railing against and trying to change.

Scott Hanselman: I haven't seen a real pro DJ, but I've seen a number of DJs where it's like, "Really? Are you texting right now?"

Moldover: Well, yeah. DJing is one thing, but seeing what's billed as a live performance and then it just really being somebody behind a laptop…I found that really frustrating. And you kind of wind up doing the same thing now if you have and iPad – not because of an esthetic choice or anything but because the device requires you to look at it so you can see which button your finger is on top of. The tablets are really useful interfaces for computers and for producing music. All these other musical activities, they are great for. But, for live performance, the actual expression, the connection between human and machine, they are not that great.

Scott Hanselman: So, people will be able to go up and look at the show notes and see a picture of the MOJO and also see video of you using it, but one of the things I noticed: it wasn't just a box with some buttons. If I understand from watching you, you had buttons mounted around like a donut, around your microphone. I think you might have had foot pedals. You were basically everywhere at all times, with different interfaces. How many different pieces are involved in a live performance like that?

Moldover: The show I'm doing now is only three pieces of gear. There's the MOJO, which you described really well. That just controls the playback and manipulation of sounds from my computer; that's kind of like conducting the orchestra or cueing and arranging the band, if you will. I've got the Robocaster guitar where I play lead guitar parts and modify those with the controls on the guitar; that's like having the

pedalboard built into the face of the guitar, which you can do some really interesting things with. And then the thing you're describing that was attached to my microphone, that's a prototype of an instrument I don't have a name for. It's just a microphone controller. It's growing out of the same world of the Robocaster where it's like, "Oh. What can I do to augment it?" I've learned the guitar really well; what can I do with this controller building idea to augment what I do with guitar? I'm doing the same thing with voice as well. So you saw a prototype. This is like a giant clip with a bunch of arcade buttons on it, and the next one is going to look like…probably like a trumpet but smaller.

Scott Hanselman: That's cool. It worked really well. It gave a sense of a modern day one-man band. You were up there and you're on the tightrope, and there's no net. I think that's the sense of, "What's he going to do next. He could make a mistake." "Whoa, did he just do that?" As opposed to the, "Oh, he set this playlist up before he got here."

Moldover: Yeah, that's one of the key elements of live music performance is the risk. There's really nothing live and there's nothing exciting about it for me as a performer or as an audience watching, I think, if there is no possibility of something going wrong. And, if nothing goes wrong for an entire show, I feel kind of unsatisfied because, as an audience member for other people's shows, those are my favorite parts, when the guy gets ready to play and nothing is coming out of the microphone and he has to spend the first three minutes of his show trouble-shooting something. In the past, I've seen people do that and always been really entertained by it, and people come to me after my shows and are often like, "Oh, man. That was really cool when that one mic stopped working so you ran over to the mic from the next band and started using that one" or whatever. Yeah. Risk. Risk is part of live music, and I build in a certain amount of risk; there's a certain amount of control, too, because you want to have something you can rely on, some sort of confident structure you can lean back on and know that you'll sound good if you have a cold that night or just had a fight with your girlfriend, or whatever. It's cool to not have too much risk.

Scott Hanselman: It's interesting that you mention risk so much because, if I understand correctly (and, again, I'm just learning about this world), the non-risky thing for you to do would be to buy controllers. Go to native instruments. Go to Denon, spend a lot of money; go to New Mark Industries, spend big money, 50/60 grand worth of equipment, and now you're a person who has bought his Iron Man armor. Except you built your Iron Man armor yourself.

Moldover: Yeah. I still buy instruments for studio production. I just got a pair of new studio monitors that are great.

Scott Hanselman: Well, sure. Like regular instruments.

Moldover: Yeah, all kinds of stuff. It's part of my arsenal. There's something, I don't know. It's this path that I've gone, and it gives a lot of character to my shows. For a minute, it felt like a novelty thing and it would just be like people would always be talking more about my gear than about my music. But I think it has come around full circle where I just had to own the technology, figuratively speaking, to where these instruments...I've been playing the MOJO for, I don't know, like six years now. It used be like, "Yes!" I've played guitar for 15, and this feels like an extension of my body, but this box full of buttons and stuff feels a little strange. Now, I'm just as comfortable with it, and I think that's the magical part, is when you can have all this wacky technology, things people will likely not have seen before but you can use it in a way that makes it seem effortless. To an observer, it's just kind of magical, you know? Humans using tools to extend their creative output.

Scott Hanselman: One of the things that I think is unique about you, and as I've been wandering around doing research in trying to understand what you do and why you do it, is that you're not keeping this to yourself. You're not only giving the music out there, you're putting the music out and you're putting yourself out there, but you've actually put the design of the MOJO controller and made it open source. People could potentially, if they knew what they were doing, make one.

Moldover: Yeah. Well, I've benefitted so much from information that other people have shared, and that's the thing that makes the internet great. It's a delicate balance because you can't just give away the product of all your labor for free, or how are you going to make a living? But whenever possible, I try to give stuff away. And definitely, if it doesn't have use to me, I see no reason to hide the secret. And really early on I think I got a good lesson because, even before I came up with the word controllerism, I just had this challenge of helping audiences and even friends and fans understand the technology I'm using. And, having to do that kind of explaining is what drove me to make videos. I have a lot of YouTube content, and people more frequently are like, "Ah. I've seen your videos," than, "Oh, I heard your record." (And they aren't talking about music videos; they're talking about some weird video where I'm like, "Hey, check out these instruments I invented. Here's how I made them. Here's the website you can download all the plans. Here, watch me make one" in super fast-forward time lapse. I like doing that stuff. I think it combines what I think is one of the most noble professions, which is teaching, which is a very humanitarian, serving others kind of thing, with something that can feel a little more self-serving, which is performing and composing and being a solo artist.

Scott Hanselman: Yeah, that definitely seems like the kind of stuff I would want to see at Maker Faire. I was just at the Maker Faire here in Portland with my kids and all of your stuff, all of your projects, fit right in.

Moldover: Yeah, Maker Faire is amazing. I've been to the Bay Area one a few times, and I was at the New York Maker Faire two years ago. That's a really great culture. I love that, and I support it whenever I can.

Scott Hanselman: So just last year, you had a successful Kickstarter, and you're working on that while you're gigging and doing the million other things that you're doing. The thing that is so great about your Kickstarter that really caught my eye is that it's a circuit board instrument that is effectively in the package of a tape deck, like an old (see, I'm old) cassette. It's a cassette tape. It's like Awesome Mix #1. It's Guardians of the Galaxy. It's this amazing instrument all in the size of…credit card sized.

Moldover: Yeah. It's kind of the second iteration of an album artwork idea that executed with my last album. My last album I actually put out physical media; it was on CD. I got this idea from a friend who had made business cards out of circuit boards to make CD artwork out of circuit boards. So I did that, and it was virally successful. I got hundreds of thousands of hits on this video and sold way, way more, super-deluxe circuit board albums than I ever thought I would, so the idea was to repeat that success in more of a controlled with the Kickstarter. The cassette seemed like a natural next step. What is great about the cassette is, as far as a small, portable artifact…I mean, there's no cassette in there, but there's a cassette case, and you see that cassette case and you know it's music. That's one of the challenges; if you're still trying to produce physical artifacts for music, for releasing music like I am, there's this question of, "Does a USB stick really carry the weight and the message of 'I am an awesome music artifact?'" Even a customized USB stick. (laughter) There is a USB stick on it; it kind of is a custom USB stick, but it's a little bit fancier than that. It's a musical instrument.

Scott Hanselman: It's called the **Voice Crusher**?

Moldover: The **Voice Crusher**, yes. It's got a microphone and a speaker so you can use it battery powered. It's got a really low-fidelity pitch shifter built into it, and I circuit bent that in a bunch of different ways so you can mangle your voice into these distorted and shifted and modulated 8-bit weird sounds. That's where the Crusher comes from. It's not a pretty sounding kind of thing. But, it's really fun.

Scott Hanselman: Now, did you make this yourself? I mean, are you such a skilled, not only software…you said that you can do programming. You're a musician. You also have hardware skills? I

see pictures of prototypes. You had some mentorship from a friend to put this together?

Moldover: Yeah, this is me inching a little closer to being a super low-level electrical engineer. I had mentorship from somebody who is a proper electrical engineer, and I basically do a bunch of work and take it to him, ask him a bunch of questions, and then move on. That is really the first thing…I mean, I've made all these things, but they were all built with…it's a MIDI controller kit. They give you the microcontroller and you can just attach sensors to it. That's kind of how Arduino and a lot of these platforms work, because you don't really have to know programming. You don't really have to know electrical engineering. You can just learn enough to make the thing go. But, in this case, besides the actual pitch-shifting circuit which is an integrated circuit, all the other stuff was me figuring it out, learning how to make analog filters, and hack circuits in interesting and playable ways. This is the first manufacturing project, too, so I'm working with this Chinese manufacturer and learning how that wacky process works.

Scott Hanselman: It's a lot more complicated than people realize. I think that folks get the wrong idea about Kickstarter. They think it's a store. They think they bought something, they bought a widget. "Where's my widget? You didn't send me my widget in time." But this is almost a donation with a prize if you were right about who you donated it.

Moldover: Yeah, that's how I think of it. I mean, it's kind of weird wielding the Kickstarter campaign power, right? Because all these people have donated or pledged; there's all these different words you can use for what the form of that money is, and many of them are expecting very different things. I think I did a really good job of combining things that people really want, and most of the people that pledged to the campaign are existing fans of mine and people that have been following my work for a while. I think they can totally appreciate that I'm not an electrical engineer. I haven't worked with a Chinese manufacturer before. When you read all the updates and you see that little odyssey, as well as I'm producing a music album and just paying the bills with other gigs on the side, people are very sympathetic and understanding, I think. I'm glad you bring that up about Kickstarter, that it's not a store.

Scott Hanselman: Well, certainly people can go up and they can look on your site. They can hit 'buy.' They can see your debut album which was the circuit board CD, 2008, which was really, really cool. It's a nice, etched CD in a case which itself has circuits. It's really…it's a piece of art in itself before you even play it, which is really cool. Because, like you said, people aren't necessarily saying, "Hey, I heard your album." They're saying, "I saw you gig." There's a visual, very visual aspect of what you're doing. They can also, of course, preorder **Four Track** and the **Voice Crusher**,

but it's not done yet. This is going to take some time to put these things together.

Moldover: Yeah. They take time, but they're coming along great and I'm expecting to have the album finished by the end of the year.

Scott Hanselman: Very, very cool. Now, do you spend a lot of time…forgive my ignorance…soldering and tinkering and just trying to figure out how to make things sound right? How do you go about how you separate your time as far as there has to be time to tinker and be creative, but then you've got to gig and pay the rent?

Moldover: Yeah. It's an ever-challenging thing. Time management is a whole topic when I do a workshop. I have a lot of strategies. It involves lots of lists and reminders popping up on my phone. Different techniques for dealing with the world. Right now, I have a sticky in front of me that I made about a week ago because I was in Europe for three weeks, I was at Burning Man for a week, and trying to get really, really focused on the album again takes a lot of discipline. So this is just a list of like: put the phone in airplane mode, get it away from me, don't touch the internet until 3 in the afternoon. When responding to messages and email, it's okay to delete them if they don't require a response.

Scott Hanselman: It's okay to say, "No."

Moldover: It's okay to be brief. So, yeah. It's an ever-challenging thing, but it keeps life really interesting. My days are a lot more pleasurable when I spend some time in front of the computer doing something like more mouse and keyboard, and I spend some time with instruments and singing, and then I spend some time in the workshop tinkering. I love all these things, and being able to do them all every day usually makes me happiest.

Scott Hanselman: Where would you send someone who has maybe a child? I know you do workshops and you've taught. You also do private tutoring and things like that on Skype. But, if you have a kid who is interested in music, do you send them to download some software, to get Ableton Live or something like that? Where is step zero for someone who is interested in getting involved in this kind of a community?

Moldover: That's a great idea. I know a lot of people who do it successfully, as you're suggesting, through the internet, downloading some software, looking at video tutorials, and getting on forums and stuff to ask questions. That's definitely what I tell people. You know, I get a lot of people who discover me through the internet, so there are people all around the world. That's the kind of ground, the starting point that I give those people.

Scott Hanselman: Is there a particular piece of software? As a podcaster, I can say, "Go get Audacity." "Pick up a $30 mic and try it out." What's the, "I have a hundred bucks and I want to start to learn about controllerism. I want to learn about electronic music." Where's that step, that first step?

Moldover: I recommend Ableton because that's what got me into it.

Scott Hanselman: Really?

Moldover: It was the first version of Ableton in 2001, 2002. I was using plenty of other software before that, but my favorite tool was one called Sonic Foundry ACID. That was actually very similar to the first version of Ableton. I think it probably even inspired a lot of what Ableton is. I found that tool, and Ableton has gotten a lot more complex, actually. That's something I can't appreciate. You know, after nine revisions, it's got a zillion more features and it's not quite the little one-trick pony it used to be. But it's a very powerful and very…it's really powerful. But there's nothing else comparable to it as far as ease of use and immediacy, and the fact that it's called Live I think is great because they've stayed true to that word. They've kept it a very real-time application, and they kept lots of features in it that make it good for performance. There's no other piece of music software that's as mature as that, that started as a Live music performance instrument. It's pretty unique like that.

Scott Hanselman: Do your controllers interface with these applications, or are they self-contained? Are you pushing buttons and telling your computer to do something, or are you manipulating the sound in the controller itself?

Moldover: The controllers are all pretty dumb, so to speak. They're just sending out MIDI over USB to the computer, and anything fancy happens inside the computer.

Scott Hanselman: Cool. So people can go up to moldover.com. They can check out your store. They can see your videos. You're all over YouTube. You're talked about on Wikipedia as well. That's pretty cool.

Moldover: Where am I on Wikipedia? Oh, in the controllerism thing.

Scott Hanselman: Controllerism and turntablism, you're referenced. It's cool to be referenced on Wikipedia. (laughter)

Moldover: Yeah, I need to get my own page.

Scott Hanselman: Yeah, you do. That's a crime, man.

Moldover: How do you get your own Wikipedia page?

Scott Hanselman: I don't know. They deleted mine. I'm not notable.

Moldover: Deleted it? That's harsh.

Scott Hanselman: There's a whole discussion. They're like, "Yeah. He hasn't done enough stuff."

Moldover: Enough stuff. Okay.

Scott Hanselman: You gotta do more stuff. Get that second album, and then you'll be in. How many albums do you have?

Moldover: Of original music, just the one.

Scott Hanselman: Which people can get on Amazon MP3 Digital Download.

Moldover: Yeah, that one is absolutely everywhere. The follow-up is coming soon.

Scott Hanselman: Very cool. Well, thanks so much for chatting with me today.

Moldover: Yeah. My pleasure. This was super fun, Scott.

Scott Hanselman: This has been another episode of Hanselminutes, and I will see you again next week.