

52 SOUNDS

BRINGING PASSIONS FOR MUSIC AND ENGINEERING FULL CIRCLE
WITH SOLIDWORKS SOLUTIONS

Case Study



The engineer and musical artist Akash leveraged SOLIDWORKS product development solutions to found 52 Sounds and invent the patent-pending Infinity Pedal Module, an innovative, modular approach to make it easier for professional guitarists to manage, expand, and transport guitar foot pedal boards while on tour.

Challenge:

Combine passions for music and engineering by quickly developing products — beginning with an innovative, modular guitar foot pedal system — that improve the lives of everyday professional musicians.

Solution:

Implement **3DEXPERIENCE** Works product development solutions as part of the **SOLIDWORKS** for Startups program.

Results:

- Developed patent-pending, modular guitar foot pedal system
- Validated modular guitar foot pedal platform via simulation
- Lowered production costs via 3D printing
- Boosted simulation performance by using cores in the cloud

Akash Dighe began his career as a mechanical engineer, working for companies involved in engineering complex, high-end systems, ranging from spacecraft solar panels to race cars, and a high-energy laser system protecting against drones that was used by the U.S. Army and Air Force. The founder and owner of 52 Sounds, a music equipment product development company and recording studio based in New Mexico, Dighe knew that he wanted to be an engineer since he was four years old, and spent his childhood taking things apart and putting them back together. As he grew older, Dighe also developed a passion for the guitar, songwriting, music production, and performing.

Although his passions for music and engineering were on separate paths — Dighe would design complex systems during the day and play gigs as the musical artist *AKASH* in the evening — it wasn't until he quit his daytime engineering job and went on a concert tour in 2023 that he realized that he could combine both of his passions into a concentrated effort by establishing 52 Sounds, where he can be a musician, a producer, a product developer, and a mechanical engineer.



"It's been a long journey with many struggles to bring my music and engineering passions together, and I needed **SOLIDWORKS tools to bring me home."**

– Akash Dighe, Founder, Owner, Mechanical Engineer, and Professional Musician

AKASH founded 52 Sounds in January 2024 and immediately began working on new product ideas.

Having used **SOLIDWORKS**® design software from high school through college and employment, AKASH had already been working on some of the concepts before founding his company. He chose **SOLIDWORKS** to develop musical equipment products because of his familiarity and success with the solution, and 52 Sounds acquired design, simulation, data management, and visualization solutions as part of the **SOLIDWORKS** for Startups program, which provides access to the **3DEXPERIENCE**® an expanded portfolio of product development solutions on the platform.

"I've used other CAD systems in the past, but nothing compares to **SOLIDWORKS**," AKASH explains. "**SOLIDWORKS** is a lot more precise, and you know the product that you are going to get with **SOLIDWORKS**. I also value how **SOLIDWORKS** operates with 3D printers, which will be an important production method."

INNOVATIVE, PATENT-PENDING MODULAR GUITAR FOOT PEDAL SYSTEM

AKASH's experiences building sound studios, producing his second studio album, **Perpetual Motion**, and performing on the road as a professional musician provided the insights and inspiration that sparked musical equipment product ideas to improve the lives of everyday musicians. One of those ideas involved developing an innovative, modular approach to managing guitar foot pedals, which ultimately became the Infinity Pedal Module.

Guitarists arrange an array of foot pedals on stage to change the sound of their instruments. Often, these pedals are mounted on plywood, sheet

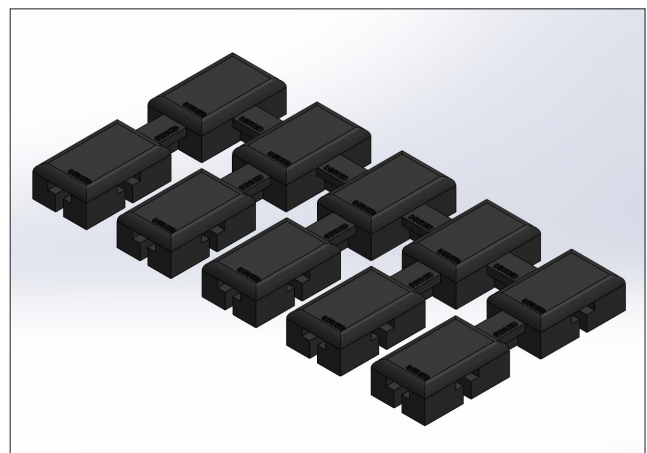
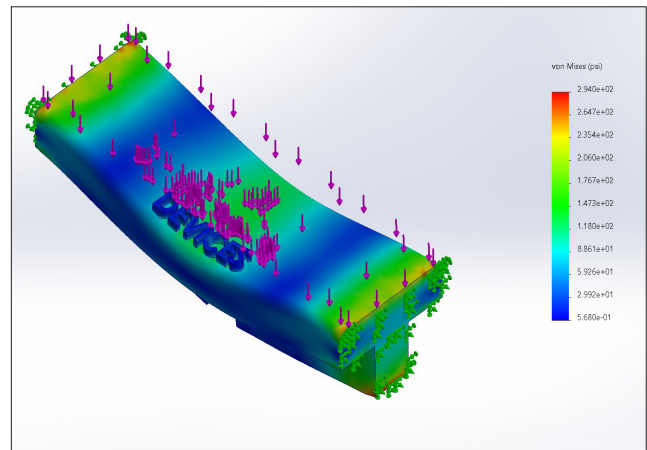
metal, or some other substructure, and are typically referred to as pedal boards. Whenever players want to add more pedals, especially when they run out of space on the board, they have to rebuild their pedal boards, which can become quite large and difficult to handle and transport. *AKASH* invented a modular approach to foot pedals and pedal boards that makes adding a new pedal literally a snap.

"With the Infinity Pedal Module, players can easily add pedals and the underlying structure via a modular slide- and snap-in cantilever beam approach," *AKASH* explains. "Guitarists can keep expanding their boards quickly and easily by connecting the pedal (part A) with the substructure (part B), which then connects to the board. The Infinity Pedal Module is patent pending, with the patent scheduled to be delivered in 2026, and SOLIDWORKS has been a big part of helping me achieve this goal."

SOLIDWORKS SIMULATION VALIDATES DESIGN PERFORMANCE

In addition to leveraging SOLIDWORKS design tools, 52 Sounds tapped the static analysis capabilities of SOLIDWORKS Simulation to validate and ensure that its modular pedals would perform as designed. "Pedal boards get stomped on by players of all sizes," *AKASH* points out. "When you're on the road on tour, a pedal board can take a lot of abuse."

"I needed to make sure that my modular pedal board components are rigid and structurally sound both individually and as a group when connected together so players can count on them while on tour," *AKASH* stresses. "SOLIDWORKS static simulation — and the ability to use additional computing cores in the cloud to reach a solution more quickly — along with rapid prototyping, helped to accelerate development and improve



52 Sounds relied on SOLIDWORKS design and simulation tools in the cloud on the **3DEXPERIENCE** platform to develop its modular slide- and snap-in cantilever beam approach to constructing guitar pedal boards and to ensure that pedal board components are rigid and structurally sound both individually and as a group when connected together, so players can count on them while on tour.

the durability of the product. The Infinity Modular Pedal is the first in a line of 'Infinite Devices' that I am creating to improve the lives of professional musicians. I learned about the challenges that an everyday musician must struggle through and overcome while on the road, and 52 Sounds devices will all play a role in easing those struggles. In developing these products, I'll be making greater use of SOLIDWORKS Simulation solutions moving forward."

COST-EFFECTIVE PRODUCTION VIA 3D PRINTING

Because he had previous experience operating a fabrication lab during college at the University of California, Irvine, AKASH formed a partnership with the Sante Fe Business Incubator to get its Archimedes Fab Lab restored and up and running. Using 3D printers, 52 Sounds has already begun producing the company's modular pedals more cost-effectively than with traditional manufacturing processes.

"By taking on private engineering contracts, 52 Sounds was able to self-fund its manufacturing needs and acquired six 3D printers to start production of Infinity Pedal Modules, which will be made with thermoplastic filament, and began filling orders at the end of May 2025," AKASH notes. "It's been a long journey with many struggles to bring my music and engineering passions together, and I needed SOLIDWORKS tools to bring me home."

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