



Neal Feay top programmer Juan Torres works with a solid model imported into GibbsCAM from SolidWorks. Torres, determined to become a programmer, accepted a challenge from Alex Rasmussen and taught himself to use GibbsCAM without training.

## Making Music in Metal

***Neal Feay Company Uses CAD/CAM Software, Specially Designed Cutting Tools and Advanced Machining Systems to Produce Unique, High-End Audio Equipment Chassis.***

*Story and photos by  
C. H. Bush, editor*

**M**ost contract manufacturers are generally satisfied to produce high-quality products on time to customer specifications and at a profit. At Goleta, CA's 66-year-old Neal Feay Company, however, one additional major requirement has been added.

"Our products have to be beautiful, too," says Alex Rasmussen, who is the third-generation president of the family-owned business and head of the company's in-house industrial design services. "We do industrial design, mechanical engineering and manufacture of complex chassis for high-end audio equipment. Our customers are some of the premiere audio equipment manufacturers in the world. They simply can't and won't settle for ordinary sheetmetal chassis for their products. Both they and their customers demand beauty and functionality in their designs."

The Neal Feay customers Rasmussen mentioned include such names as Classe Audio, Dolby, Crestron and, recently added, Constellation Audio.

"My grandfather, Neal Rasmussen, started the company in 1944 making jewelry and slide rules," Rasmussen says. "In the 1970's the company began producing skateboards and medical instruments, then finally under my father's leadership moved into high-end audio/video/home theater products. That's what we still do today, but with the added services of mechanical engineering and industrial design."

### ***Slow, Steady Evolution***

Neal Rasmussen began the company selling his own prod-

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**Two generations of Rasmussens discuss best machining approaches using Neal Feay's newest machining center—a dual-pallet, 4-axis Kitamura Mycenter HX300iF horizontal. Neal Rasmussen, left, took the company into chassis manufacture and Alex, has moved the company into engineering and industrial design.**

ucts, little novelties made of aluminum.

“All the products he sold had a high cosmetic finish,” Rasmussen says. “Eventually he developed his own selective anodizing process he called Anofax, which allowed him to put labels and logos on the products using anodizing instead of painting. For quite a while, we were the sole source of the process for people like Parker Hannifin, Mosley, United Recording, Ampex and Raytheon. Eventually a lot of other companies picked up on it and now use it to mark their panels. Having that process actually led us into manufacturing the front panels for their equipment.”

Over time the company added more and more services until it produced the entire chassis for its customers.

“Today we have our own 50,000-square-foot facility with in-house sheet metal capabilities, including a 3,000-watt laser, several punch presses and five press brakes,” Rasmussen says. “We have nine vertical mills and two state-of-the-art, dual-pallet horizontal CNC mills, which allow us to provide customers with quick prototyping or large-scale production. We have a new in-house anodizing facility for Type II, Class 1 and 2 anodizing. The new facility allows us to provide very high-quality finishes in both stock and custom colors.”

Rasmussen believes that the combination of manufacturing and anodizing in house initially was what really set his company apart from the competition.

“Because of that combination, we were always unique,” he says, “but now that we have added engineering and industrial design to our mix of services, we’re even more so.”

But even with all the in-house equipment, Neal Feay still has one bit of manual craftsmanship in its arsenal.

“Ninety percent of our work is hand-finished by highly trained artisans who bring a jewelry-quality finish to our aluminum millwork,” Rasmussen explains. “That final touch gives our products a look you can’t find elsewhere.”

## **Industrial Design**

Over the years each generation of the Rasmussen presidents brought his own contribution to Neal Feay’s capabilities. Alex’s father, the second Neal Rasmussen, moved the company into chassis manufacture. Alex’s contribution has been to add award-winning industrial design and mechanical engineering capabilities to the company’s service arsenal.

**Example of the type of chassis designed and produced by Neal Feay Company. Shown is an Altair Constellation preamplifier.**

“I joined the company as soon as I graduated with a business degree from USC,” he says. “Before that, though, I worked for the company from age seven on. I was doing fairly technical things by the time I was thirteen, and I worked every summer through college. I’ve always been interested in art and design, and that led me to get involved in industrial design at the company. The result is that during the past 20 years I started putting my two cents into the design, and before I knew it, I had designed 175 product lines for 65 different companies.”

Rasmussen’s chassis designs are unique, combining total functionality with modern, beautiful shapes and beautiful finishes on the aluminum. (See photo below.)

“I like to design with clear anodizing,” he says, “because that shows the form, the shadows, the sculpting much better.”

Neal Feay’s front panels typically are machined from solid stock.

“Probably our most common raw material is 3/8” extrusion,” Rasmussen says, “so we start with a hunk of 3/8” material, then machine details into the back that are functional and details on the front that are primarily cosmetic.”

## **Special Cutting Tools**

Rasmussen’s designs are very modern, elegant and have beautiful finishes to achieve what he calls “perceived value.”

“Because we produce much of a chassis from a solid panel, in the past we needed a lot of machining time,” he says. “But to stay competitive we needed a way to get those complex shapes and lustrous finishes faster and more efficiently.”

To achieve that, Rasmussen conceived the idea of creating large, specially shaped cutting tools that would give him the shapes and finishes he wants with minimal machining.

“We don’t want to create our forms using multiple passes with small tools,” he explains. “That leaves too much polishing for later. Instead, we design large cutting tools that will give us the shapes we want in one pass. Typically we do some quick roughing with one tool and then use the special tool to create a form and pristine finish. With that we get what we want quickly and efficiently, and our customers get the beautiful chassis they and their customers want.”



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*CNC operator Aaron Pachego sets up an Akira Seiki Performa V5 VMC to run chassis hardware.*

## **The Role of CAD/CAM**

Neal Feay designs are done first in SolidWorks and then passed into GibbsCAM for production of g-code to run the company's CNC machines.

"We've used GibbsCAM for 25 years," Rasmussen says. "Almost from the time they got started. One of the reasons we've stayed loyal to Gibbs is that Gibbs is a go partner with SolidWorks, which is our front-end design software. The SolidWorks files don't have to go through any translation to go into Gibbs. Another reason we've stuck with Gibbs is that it is extremely easy to learn and use."

Rasmussen points to one of his employees as a case in point.

"Juan Torres, the man who currently is our number one programmer, literally taught himself Gibbs on his own time," he says. "He kept bugging me and bugging me about wanting to learn to program. I didn't believe he could do it, so I didn't want to invest money in training him. Finally, I said, 'You can sit here at night on your own time and try to figure it out. If you can learn it, I'll give you a shot. Well, he did it and now he's our top programmer.'"

In the beginning Torres was using the standard approach

to producing tool paths with GibbsCAM. But that consumed more time than Rasmussen wanted, so he contacted his GibbsCAM reseller.

"We sent Juan to school for a day," said Rasmussen. "While he was there, he learned to use GibbsCAM's built-in SolidSurfacer to do direct machining of solids. The SolidSurfacer module provides high-level surface and solids modeling capabilities and advanced functionality for machining surfaces and solids. That saved us a lot of time. We also recently upgraded the software to include the Gibbs tombstone management module, which allows us to program for multiple parts on a tombstone fixture setup. We needed that to maximize the efficient use of tombstones on our dual pallet horizontals."

Rasmussen feels the company is well equipped and managed to remain competitive for years to come, but he's already thinking about the next step in its growth.

"We believe ultimately that diversity is the best protection against downturns in the economy," he says, "so we're actively talking to architects and designers to possibly get into highend home furnishings, like furniture, door levers, frames, mirror frames. Right now the whole world of high-end industrial design is open to us."