

Strangely enough, you could almost say that former defense secretary Robert McNamara gets credit for one of the most unusual developments in modern guitar-making. Under him, the defense department changed its rules for awarding contracts in the '60s, causing hardships at several firms, including Kaman Corporation, a Connecticut-based maker of helicopters. In response, the company's board of directors decided to diversify into industrial products and consumer goods, to reduce their dependence on defense contracts.

As Charles Kaman, the founder and CEO of the company tells it, "This caused us quite a bit of concern because everything in the consumer area required very large capitalization. We looked at motorhomes, fiberglass skiffs, sailboats, camping gear, sporting gear, and so on, but nothing fit." Then one day, Kaman, an avid guitarist who had played professionally in his younger days, stopped by the Martin guitar factory in Nazareth, Pennsylvania, to get his D-18 repaired. He was struck by the time-consuming handwork that went into each guitar—in contrast with the mechanized manufacturing of the high-tech aircraft business. At that point he decided that perhaps Kaman's technology and Martin's craftsmanship could be a good partnership.

Kaman, obviously, never struck a deal with Martin, but after scouting other guitar companies of the day, including Harmony, decided to go into the guitar business. "It was immediately apparent to me," he recalls, "that if you tooled a guitar for the future you could get an awful lot of the costs out of it without sacrificing the personal touch, finishing, bracing, and all the rest."

The guitar he produced, the Ovation Balladeer, had a rounded back, made of fiberglass, instead of wood. Building out of materials other than wood was in Kaman's mind from the start. He says, "We knew from the beginning that the fiberglass would be more durable and get away from wood's inherent problems of cracking and splitting and all that. We built by experimentation. We'd build it and see what it sounded like. We

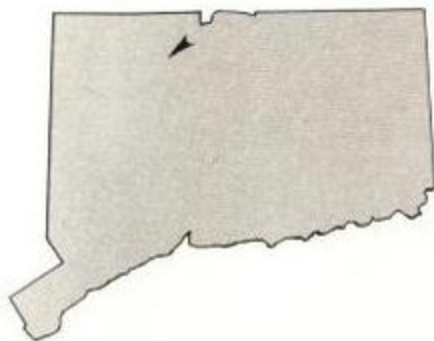


Charles Kaman (left), and Kaman Music President Bill Kaman, are both avid guitarists.

ALL PHOTOS: JIM HATLO

## Ovation Guitar

New Hartford,  
Connecticut



BY JIM HATLO & PHIL HOOD

finally hit on a design that is still the standard bowl for Ovation's Elite, Prestige, and Adamas models."

Since that first design, the Ovation guitar has undergone almost continuous change. Individual piezo pickups for each string were added in 1970, a development that for a

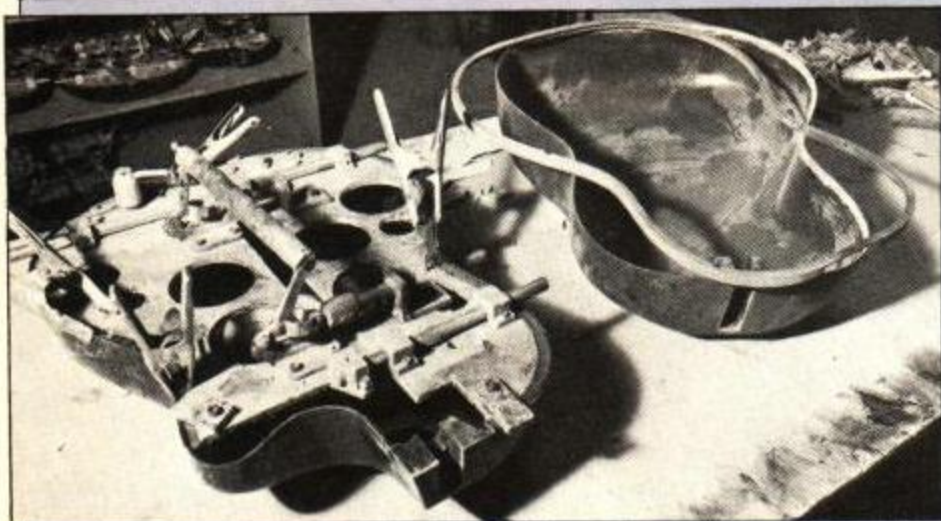
time became synonymous with the Ovation name, and has now been widely imitated. Throughout the '70s the company experimented with a wide range of bracing systems for guitar tops, using as many as 12 different designs at one point. In 1976 they also developed the birch veneer/graphite laminate soundboard, introduced in the Adamas line of guitars. The top consisted of a thin .030" core of birch veneer sandwiched between .005" layers of graphite epoxy compound. "With this top," says Kaman, "the whole guitar was impervious to moisture."

The Adamas, still one of the company's top models, also features "epaulet" soundholes, a series of small holes in the upper bout of the body—rather than a traditional round soundhole. This helps reduce feedback tendencies and equalize the overall frequency response curve of the instrument.

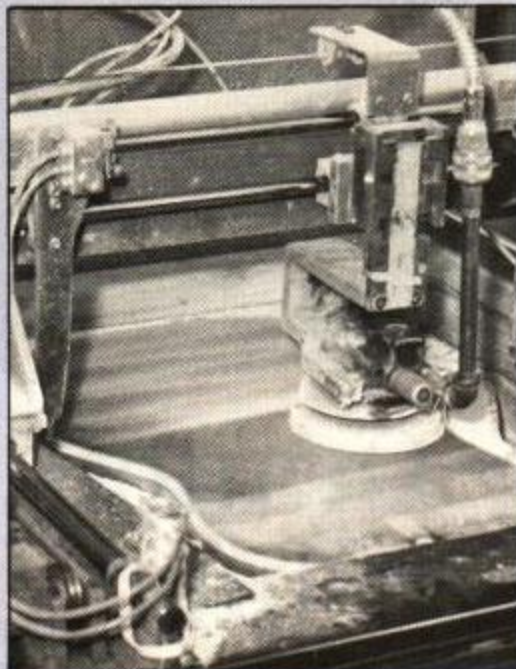
Kaman's first guitars had spruce tops, and many Ovation models still do. "Our first attempts," he says, "were made with the top turned inside out on the bowl-back. In that way we could experiment at will with the bracing patterns, and this was all set up with the oscillograph and oscillator that drove it. We studied those tops from frequencies of about 50 cycles [Hz] to 3000 cycles. It was in that way that we learned what portions of the top bracing contribute to the various resonant frequencies. When we thought we had the frequencies about right, we built one

*Continued*

# Ovation



Above: A mounting ring for the soundboard and binding is glued into position inside the molded back of the Ovation guitar. Right: The braces for the top are glued in position in a mold. Then high-frequency soundwaves are sent through the mold, causing the braces to bond in just one minute. The worker is scraping excess glue from the braces.



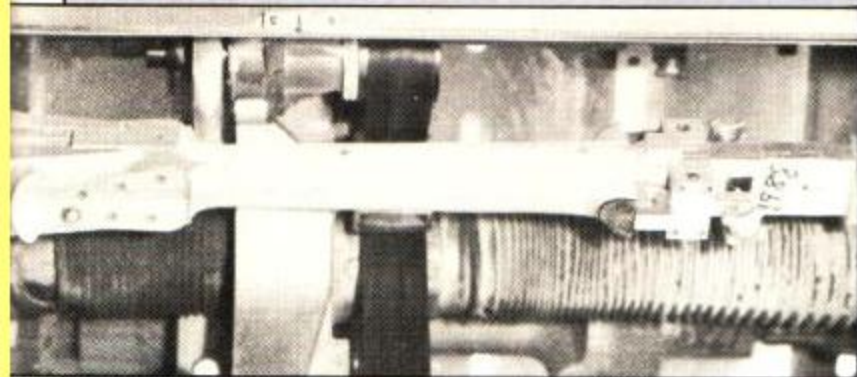
Left and center: The soundboards are lightly sanded and buffed after painting. Right: A special mounting template is used to locate the bridge on the soundboard of the guitar.



Above: Once the neck is complete the binding is sanded smooth. Right: The workman checks for high and low frets by using a straightedge (note that the beadstock is "weighted" to mimic the pull of the strings). Then a sanding block is run over the level frets to smooth any rough edges.



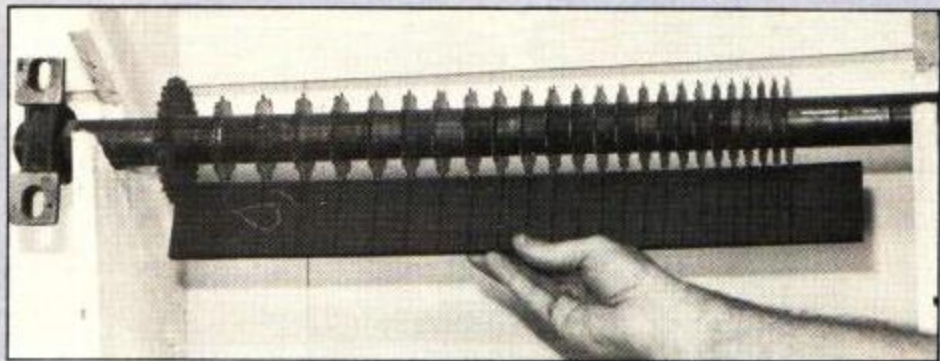
## Ovation



*Clockwise from top left: A special shaper is used to sand two necks simultaneously; Kaman bars (the company's special reinforcement rods) are fitted into the neck blanks; Special fret-cutting tool; A worker fits the inlays for as many as a dozen necks at one time.*



## Necks In Progress



right-side up."

Since the beginning, most of the Ovation guitars have been constructed in an old brick building in New Hartford, Connecticut,

approximately 30 minutes from the company's headquarters in Bloomfield. It originally housed a textile factory after the Civil War. The nearby river still flows under the

building and the old waterwheels and leather belts that drove the textile machinery are still located in the basement. But upstairs things move at a twentieth century pace.

## Ovation

The shoproom floor is well organized, with parts stacked neatly at various workstations. Workers are trained in several jobs, so they can stay fresh by switching tasks several times each day. In addition to building guitars, this factory also handles repair and warranty work. On the day *Frets* visited, 160 guitars were in the shop for customer service.

Any good guitar starts with a good soundboard, and Ovations are no exception. The company grades their spruce tops for flexibility, generally using the wood with the most flex for the higher grades of guitars. Once the soundboard is shaped and sanded to the proper thickness, the braces are glued in position. Unlike traditional X-braced guitars, Ovations are primarily braced parallel to the grain, to maximize flexibility. The braces are glued into position with a white wood glue. Then an ultrasonic bonder sends high-frequency soundwaves through the top, exciting the molecules and bonding the assembly in one minute. Without this device, the braces would take up to four hours to set.

Ovation's thinking about joining the body to the top is similarly unorthodox. Where many luthiers are concerned about the effect of the backs and sides on the instrument's overall sound, Ovation tries to isolate the top from the back and sides, so it

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—Charles Kaman

vibrates freely. The body binding and the top sit on a mounting ring that joins the top (see photos page 52) to the back. The ring, and the hardness of the bowl-back material, keeps the back from damping the top's vibrations.

Necks are laminated from five pieces of mahogany, maple, and wood veneers. The laminated slabs are glued together and then cut to make individual necks. The blanks are shaped on a lathe that can handle up to six necks at once. Final shaping is done the old-fashioned way, by hand.

Three different woods are used for fretboards: ebony, from Sri Lanka; rosewood from South America; and American walnut. A worker will ordinarily work on up to a dozen fretboards at a time, cutting fret slots, and inlaying the fretboard markers.

Once the guitar neck and body are joined, the bridge is positioned by way of a special jig (see photos, page 52). The headstock is subjected to weight on a pulley to simulate the pull of the strings when tuned to pitch. Once the neck is properly aligned and the fret height is checked, the frets are given a final dressing. Then the guitar is strung up, played, checked with an electronic tuner, and if it passes final inspection, it is ready to be shipped to one of Ovation's thousands of dealers, worldwide.

Ovation's innovative approach has paid off handsomely. Now, according to president Bill Kaman, Charles' son who started working summers in the New Hartford factory when he was just 14, Kaman Music Corporation has diversified into four divisions. These handle sound electronics (Seiko keyboards, KMD amps); musical education products; percussion; and guitars (Ovation, Takamine, Applause). The guitar division also runs Kaman Musical Strings in Bloomfield, where computer-controlled winding machines produce up to 800 gross of strings a day.

Now aren't you glad they didn't go into building Winnebagos? 