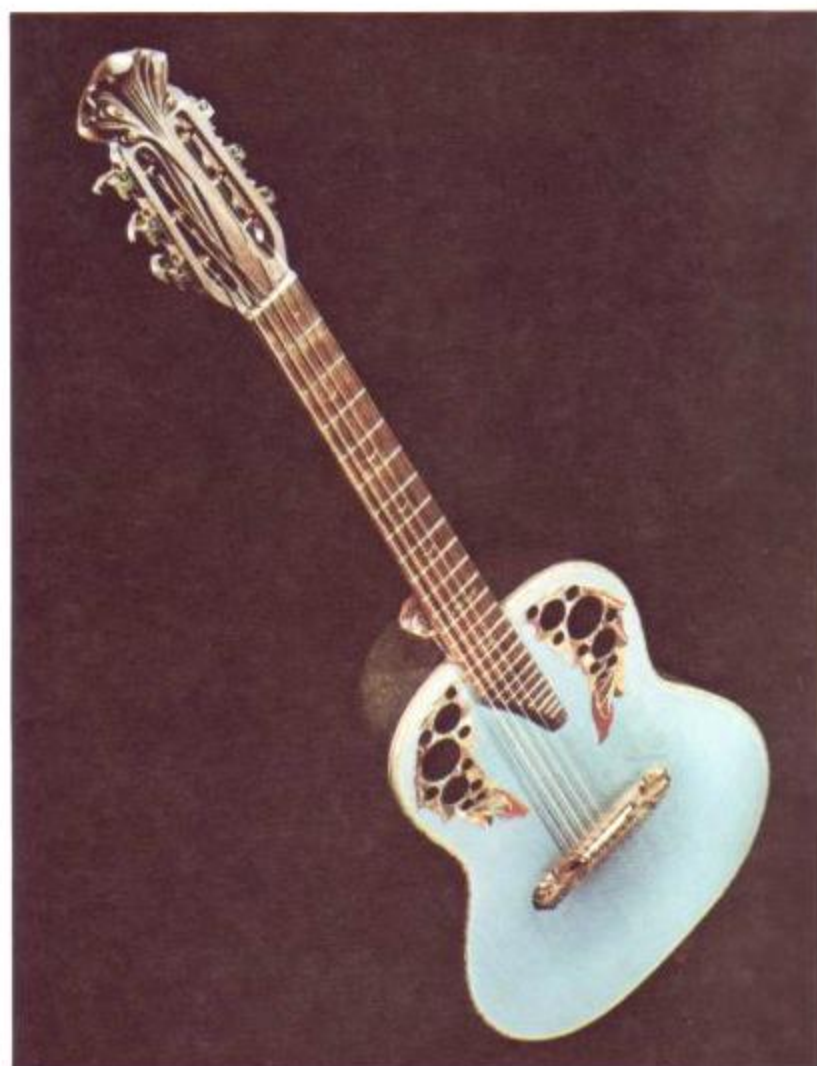


*when Adamas speaks .....*







No thought or deliberate effort is needed for the ear and brain to instantly integrate thousands of pulsations into a galaxy of sounds with a transient character that is unique to that moment. We may enjoy it but are not really able to rationalize the beauty of the phenomenon.

As long as we can recognize and take pleasure in a really great sound it doesn't seem too important to dissect and analyze it.

For centuries, luthiers have had the enviable chore of anticipating the sounds and character that they would demand from their boxes and strings. Such creation is surely an art form.

A few of us at Kaman have had the opportunity to span the seeming incongruity of space age technologies and the advancement of sound quality that has been the luthier's realm for generations.

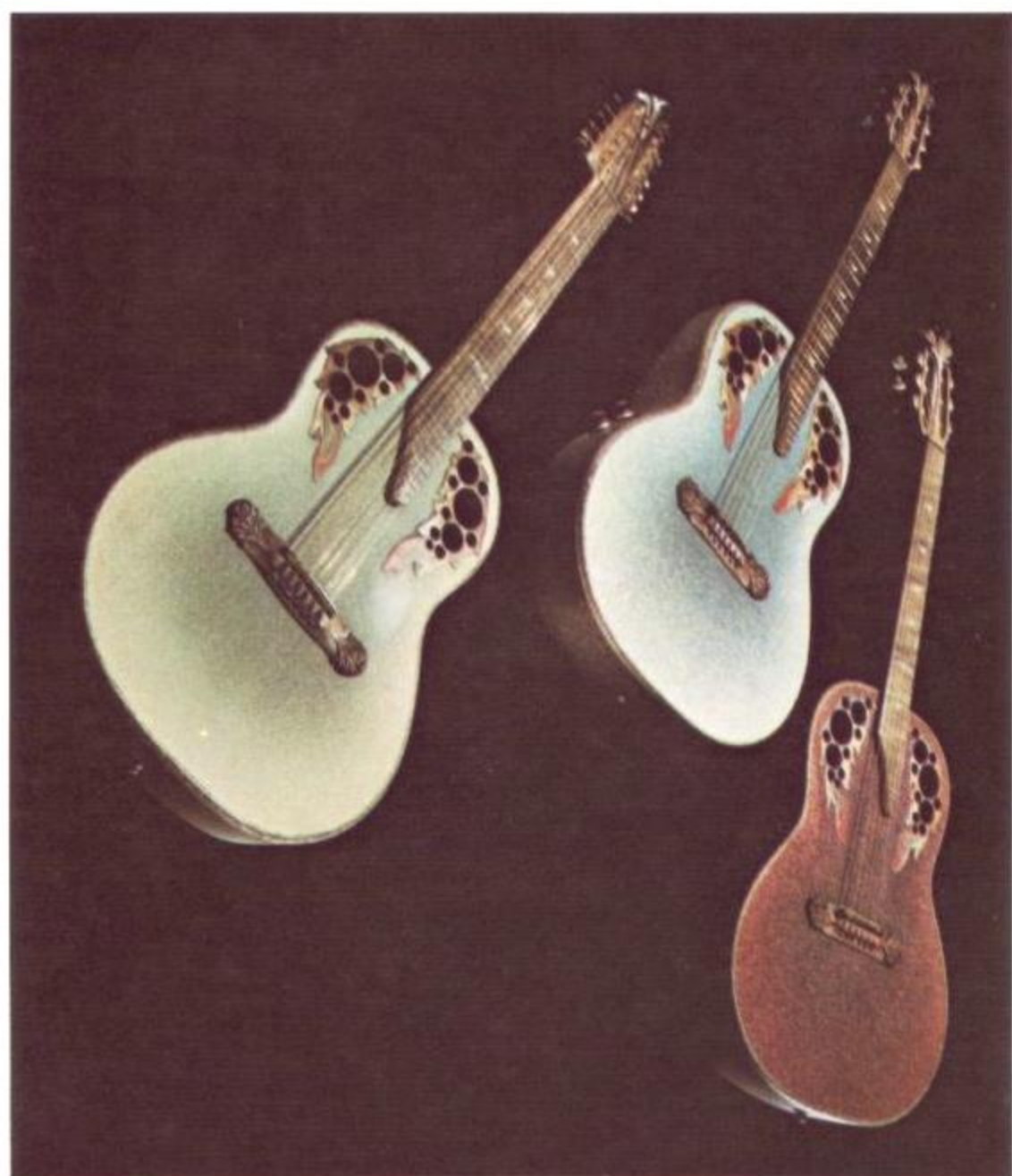
We know that we can enhance, and refine, and create new standards of beauty and power that our luthier forebears could only dream of and strive for.



Ten years ago our contribution began with Ovation guitars which have been well received. We have been both gratified and encouraged to continue our efforts. Our aerospace heritage contributed the roundback designs as well as the Lyrachord material. More recently, the materials of the space age have advanced our opportunities to design up to the potentials of materials that didn't even exist a few years ago. Carbon graphite is a prime example.

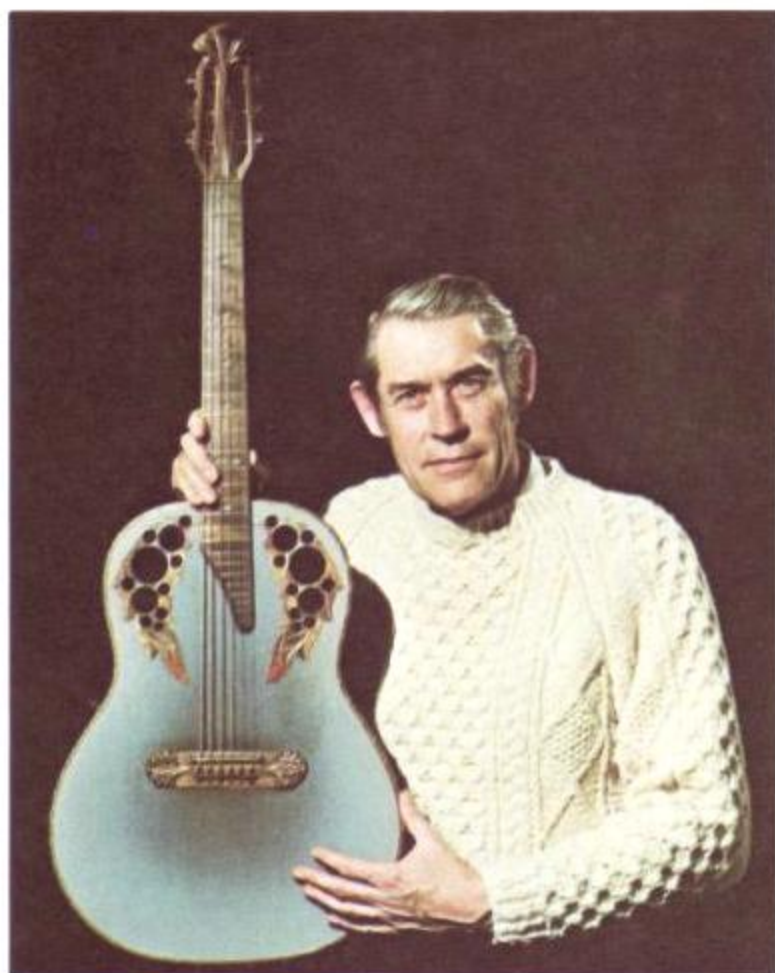
Graphite materials are stiffer than titanium, strong as steel and weigh half as much as aluminum. The material is made from organic fibers by heating them in a purged atmosphere at about 400°C long enough to drive off all non-carbonaceous material. It is then taken up to temperatures from 1900°C to 2600°C for a couple of weeks until conditions satisfy the requirements for development of the crystalline form of carbon. Originally developed for supersonic aircraft, the cost has only recently been reduced to permit use for guitars.

We are calling our newest guitar Adamas. It's really a work of love with the single purpose of reaching as far as we can to create a new level of purity and quality in sound. At this time we have developed a six string and a twelve string model with a classic version to follow.





The Adamas Story began in 1972 when we were having an engineering discussion on the merits of graphite fibers, their extreme light weight in relation to super strength. Of course, this was in context with airplanes and space vehicles but good ideas and applications are grist for the mill. This was no exception. If it were possible to make a guitar top that would be both thinner and stronger, the potential for an advanced resonating surface with greatly increased sensitivities and control was impossible to resist.



And so the lab work began. We are in a unique situation in that we have our own lab with PHD's and chemists and metallurgists on hand that have the flexibility of mind and attitude necessary to apply basic knowledge to a new concept. Our final construction consists of two .005" plies of carbon graphite in a sandwich construction with one .035" ply of birch veneer. This gives us a plate strength many times that of spruce with about one third the thickness. We call this a fibronic graphite soundboard. The other name we couldn't resist is Adamas, which is a Latin word for diamond in it's native form, carbon.

The combination of unidirectional graphite fibers and the ability to vary the direction of the grain of the wood core has allowed us to favor the higher harmonic mode shapes without compromising the bass and mid range tones. The wood is extremely important to the construction since it contributes the hysteresis not obtainable otherwise. Carbon fibers are enormously strong in reaction to string tension but also greatly enhance the tonal qualities of the guitar. New playing techniques could well derive from the significant and audibly satisfying improvement in the length-to-decay rate.

In reaching for improved top strength and quality it became very apparent that the customary sound hole contributes a fundamental weakness in all guitars that is accommodated in the bracing system. But this in turn is a deterrent to sound, a penalty we are not willing to pay any longer. Thus we transferred the sound hole function to the less influential upper bout where strength is at a maximum and vibratory excursions are minimal. This new porting concept enhances the integrity of the top as a vibrating membrane while permitting us to use our newest brace system to transmit sound rather than support the weakness of the sound hole. String loads and caving of the top in the bridge area became a far lesser function of bracing strength, size and weight. As you can see, we are singleminded in the belief that more strength, with less bulk and weight, is the key to a superior resonator.



We are making the Adamas guitars for artists with different styles and techniques and are including a speed neck as well as a wider version for those who prefer to finger pick in a more classic style. The neck also incorporates a strip of graphite fiber in addition to the customary adjustment rod. This increases neck strength significantly and reduces the need for



adjustments of warp due to temperature and humidity changes. Since the carbon runs to the very end of the peghead, that area is also much stronger. The fingerboard and the neck have been impregnated in a retort with resin which is then polymerized to offer a surface stronger than wood and resistant to stains and string wear impossible only a little while ago.

The 12 string version has a 14 fret neck which allows us to take full advantage of the added strength of the carbon graphite strip. The top principles are exactly the same although the braces are stronger to accommodate the increased string tension given by 12 strings.

The electronic/acoustic versions of Adamas have been fitted with improved electronics and include a tone control as well as the volume control. The crystal pickups faithfully reproduce the gorgeous higher frequencies without loss of the rich bass or mid range. The effect is dramatic.



We have learned many things while working with the fibronic-graphite soundboard and can guarantee the fundamental frequency of 89 cycles within a few cycles. The response of  $\pm 3$  db over the playable range is very close to modern quality tape recording devices. Each of these guitars is balanced for its dynamic response in the lab prior to completion. This is measured electronically as well as mechanically to achieve the optimum ratio of stiffness, moment, and frequencies. All of the components of the Adamas guitars are weighed and rigidly controlled within a few grams.

Our final bracing pattern is beautifully simple and allows the mode shapes of key harmonics to be more symmetrical than ever before possible.

The excitement and timbre that we have thus been able to impart to these guitars is discernable to even the untrained ear. A comparison with other guitars only reinforces the effect. The projection is much greater, but the increase in sustain is simply startling.

For performers, both volume and quality are important but in the sound studio the tape is unforgiving and becomes the ultimate criterion for superior sound. We can alter the dynamic response of these guitars to the point where, at normal recording levels they can put out a nominally flat response. By nominally flat we mean a  $\pm 3$  db from 68 to 1000 cycles. The nearest competition we have found for this performance is Ovation's Custom Legend at  $\pm 6$  db while the best X braced guitars on the market measure  $\pm 10$  db over the same range, with the weakness most noticeable in the mid range drop off.

We all recognize that there are many tools in a sound studio that can enhance a performance, but basic sound qualities can not be created if they are not there to begin with. Given quality of sound, the creation of the sound studio can be a masterful blending of creativity, technique and presentation.



The level of balance and quality is so high that I have agreed to personally sound test and sign the makers label to be found inside each guitar. This may limit production quantities but insures the utmost in quality which is our biggest goal. The exacting standards and tolerances that we set for ourselves created a requirement for only the highest grade of imaginative and uninhibited artisans to work on Adamas. To match this dramatic sound quality we have indulged the aesthetics by the lavish use of carvings and decorative effects that can only be accomplished by impeccable hand labor. The Adamas has achieved a style distinctive while subtle, dramatic while pleasing. The effect is enhanced even further by high intensity lighting. Wood selections are exotic and unusual, such as the wood inlays around the sound holes which contain Teak from Burma, East Indian Rosewood, Birds Eye maple, Amaranth from South America, Padauk from the Andaman Islands, Sapele from Africa and, of course, the lovely Black Walnut is the counterpoint of warm natural color for a superb neck and fingerboard. Satin hand finishing and designers color is yesterday and tomorrow, an ageless beauty. We have chosen to limit ourselves to dusty blue, beige and dark red with coordinated accessories.

We are convinced that this striking and bold new decor is proper and fitting to enhance and compliment the new thrust of sound we have been able to achieve in Adamas.

The Adamas is revolutionary; it is new. No guitar that was made 50 to 100 years ago can sound like this one. We take great pride in it's achievement. While our artisans can take a full measure of credit for their accomplishments, we must also recognize the contribution of oscillographic records, the study of wave analyzers for harmonic content, and the meticulous numbers of the Tinius Olson machine so germane to precise measurement. The amount of all these labors to engineer and build each Adamas guitar exceeds the number of manhours it takes General Motors to assemble a Cadillac Seville.



*We* feel that we have used our tools  
wisely and in your best interests and we  
like this idea.

In any case, words can never substitute  
for the real thing. Play the Adamas. You  
know what you like. Play it side by side  
with the best you have or can find. It  
usually doesn't take long. Please share  
in our excitement!

*Charles A. Kaman*



*Adamas*  
*by*  
**OVATION**  
**INSTRUMENTS INC.**

MADE IN U.S.A.

A Kaman Music product.

