



ScoGo guitars
Custom feel never sounded so good

ScoGo Guitars

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Design and Construction

Guitars are often designed for non-musical reasons. Large companies that want to sell as many guitars as possible often rely on market research to dictate design. This works better for kitchen appliances than for musical instruments. Another factory approach involves building a "clone" by duplicating any of several popular designs. Guitarists can have an instrument made that is not just built to imitate a particular sound. Some guitars are designed to overdrive an amp easily or sound "country" or "bluesy", often sacrificing much of the tonal spectrum in the process. A single instrument can be made with a wide tonal range, so that it can be play any style of music.

A mechanically sound guitar can be thought of as a support for a set of strings. This support must be strong, light, durable, and as resistant as possible to the effects of temperature and humidity. My background is in engineering, and I work with an Engineer, Le Phan, to build the guitar designs using Computer Aided Design (CAD) software. This three dimensional mathematical model of an object (or group of objects) contains the characteristics of the items represented. Some of these characteristics are weight, stiffness (resistance to bending and twisting), color, texture, size and shape.



This picture shows a computer representation of one of my guitars. This is complete down to the size, shape, and material of each individual fret as well as all other

components such as pickups, controls, strings, and bridge. Using the CAD program, we can calculate certain physical aspects of the design such as the weight and center of gravity. The computer can also show where and how much the neck will bend under string tension. If necessary, materials can be changed, shapes modified, reinforcement added---all inside the computer before a single piece of wood has been cut. This can be especially helpful with high neck tension instruments like twelve string guitars and six string basses! This image shows that this model's center of gravity, or balance point, is calculated as 10.807 inches from the left end of the instrument---the middle of the "waist" on the guitar. This takes into account the individual weight, volume, and location of every component in the model.

When all guitars were hollow and acoustic, the necks were glued to the bodies. This is strong and lightweight and it allows the hollow body to enhance volume and tone. With the development of the solid body guitar it became unnecessary to preserve the "hollowness" of the body, and so other ways of attaching the neck became possible. One of these is the neck-through design, which eliminates the neck-body attachment altogether by lengthening the neck until it reaches completely through to the other end of the guitar.



The body of the guitar is then attached to the sides of the neck. This has several advantages. One is the strength of having one continuous piece instead of two pieces that are attached together. The other has to do with rigidity. Guitar sounds begin with the strings. String vibrations which are transferred to the guitar are no longer sensed by a magnetic pickup. Rigidity is a key factor in the sustain of the instrument and neck-through guitars can be very rigid.

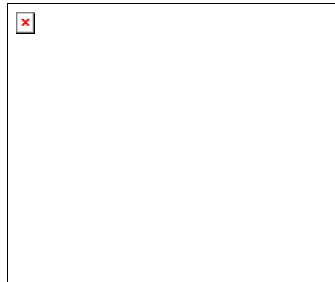
On the left is a picture of a chambered body guitar showing the neck-through construction. The truss rod slot has been given several coats of varnish to seal it against moisture. The hollowed out body chambers will be coated in the same way, so that the entire guitar is sealed inside and out. A comfortable neck is extremely important. Many of the necks on today's guitars are too thin, too narrow, or both. It's a mistake to assume that these allow faster playing. The neck must allow the hand and thumb to rest comfortably on the back of the neck and far enough away from the fingerboard that leverage allows the muscles and tendons to work without strain. The small amount of additional wood has other advantages as well. The neck is stronger, the guitar is richer harmonically and sustain is noticeably better. String spacing also is often too narrow for players with larger hands, especially those who play with their fingers instead of a pick. Care should be taken to insure that the neck on your guitar is right for you. Listen to your body on this one. Your music will be better for it.



This picture shows an oversize blank of Gabon ebony about to be cut into a fingerboard. These blanks are larger than the finished board so that the best part of each blank can be selected. The density and stiffness of ebony strengthens the neck and enhances the sustain of the guitar. It is important that the guitar can be played without strain. Weight (not too much) and balance are important factors and I use the

computer to tell me what I have so that I can make changes digitally, before starting construction.

Looks are subjective and the customer has free reign to please himself. Comfort, however is something else. No one should have to tolerate hand cramps or a body design that rubs a sore spot on an arm while they play. Many guitars seem to have been designed for looks first with comfort coming in a distant second. But a guitar should almost melt into the musician's body while being played, and this should be true regardless of playing position. The player's discomfort takes something away from the music.



This picture shows a guitar being rough shaped. The three piece laminated body is made of quilted mahogany, front and back, with a walnut center. The finish on a guitar is not simply cosmetic. A finish should protect the instrument from moisture, scratches, and spills. A customer can request a particular finish, but my own preference is varnish. Varnish is not typically found on factory guitars because it is more difficult to spray than lacquer or

shellac and so does not lend itself well to mass production. Varnish, though, has some characteristics that I find attractive. It is harder and more chemically inert than lacquer or shellac and so will better protect the instrument from scratches, spills, and humidity. A hand rubbed tung oil varnish will also enhance the natural beauty of fine wood without hiding it behind stains or thick films. Varnish on the neck also does not stick to sweaty hands! A good paste wax (not the automotive kind, which often has silicone) finishes things off nicely.

While almost any combination of pickups, active or passive electronics, piezo saddles, etc. can be installed, I like to keep things simple. Many pickups have a limited frequency response. This is one reason why the tone controls on some electric guitars are so underused. Turning down the tone control makes the sound "muddy" when there is little low end coming from the pickup. I want to be able to give a guitar to anyone to play knowing that they will be able to find their "sound" by simply adjusting the controls. Rather than trying to duplicate a 50 year old design, Joe Barden makes modern high-fidelity, dead-quiet pickups, and I prefer these in my guitars. To learn more about Joe Barden Pickups, visit his web site at

<http://web.archive.org/web/20021014031328/http://www.joebarden.com/>.



Photographs can't really show the beauty and elegance of the quilted mahogany on the left. It has been described as looking like "honey with gold ribbons". The guitar on the right with the black walnut top proves that exotic looking wood doesn't have to be imported. This one can be played at the American Institute of Guitar in New York City.

For additional information, please contact ScoGo Guitars, 374 Strasburg Avenue, Parkesburg, PA 19365. Phone: (610) 857-0280 Fax: (610) 857-0576 Email: scott@scogo.com.

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