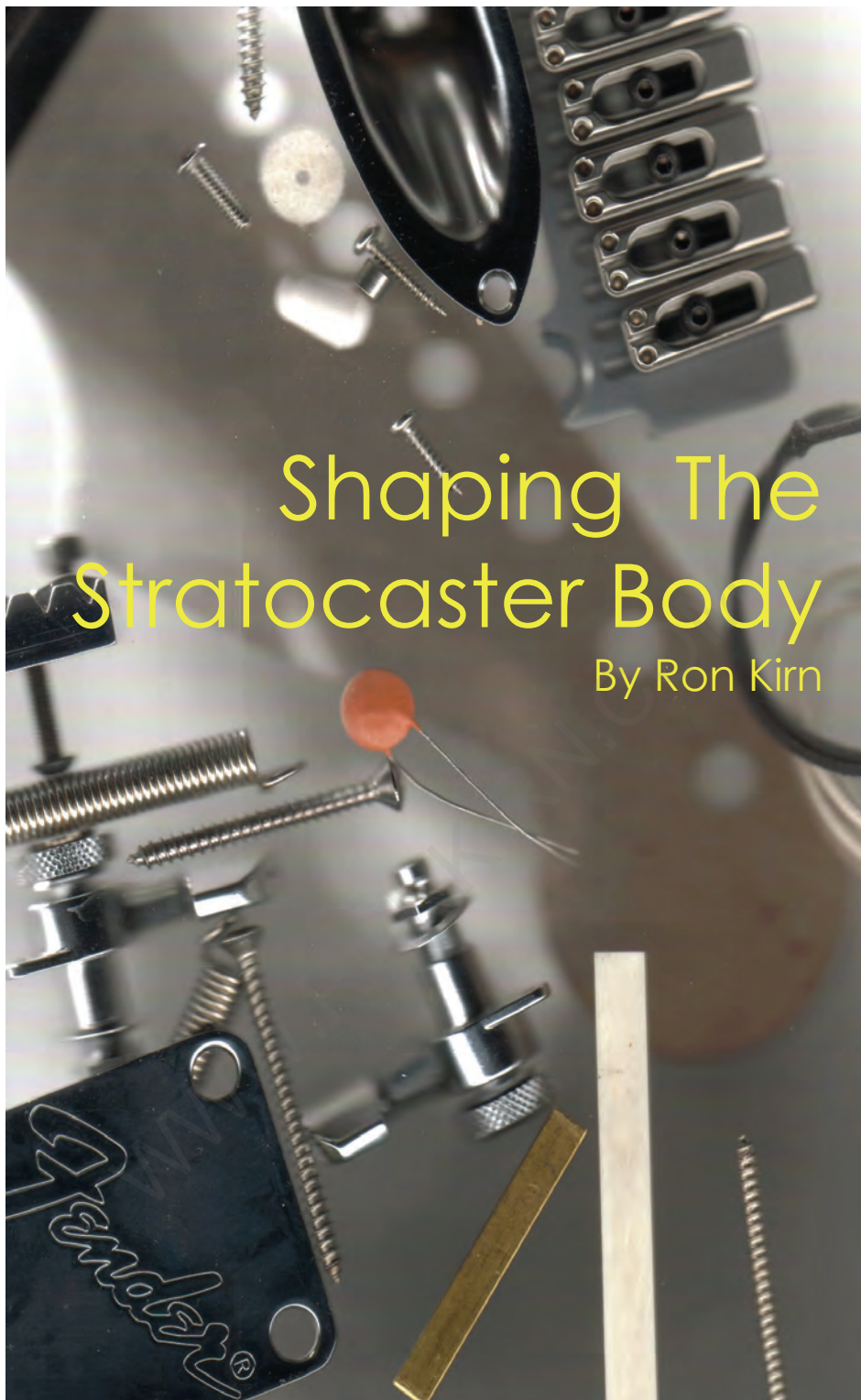


Shaping The Stratocaster Body

By Ron Kirn



Shaping The Stratocaster Body

Everything you need to know to
Shape and carve
The Body
you have always wanted

A "How To" manual

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About this Book

There are many publications available with great instructions regarding guitar construction. The one problem I have detected in most of them is, they assume you have a complete wood working shop with \$50,000.00 worth of tools. Other assumptions are, you have a professional spray booth for painting your project, and have been applying Nitro-Cellulose Lacquer for years. This is not at all realistic for an amateur accumulating components waiting to assemble a professional player's guitar.

I offer this so that anyone with a fundamental understanding of basic hand tools can make a body for the guitar project.

Discussed here are my experiences as I have shaped bodies for a bolt on neck solid body guitar. Often copied is the Fender Stratocaster®. Some topics are not discussed in detail because they are explained quite adequately in the web sites listed. Please check them out before writing and ragging on me.

First, note that Tele®, Telecaster®, Strat®, Stratocaster®, Fender®, and Texas Specials® are all registered trademarks of Fender Musical Instruments Corporation. The author has no affiliation with this company.

Also:

There exists in the aftermarket, reproduction parts, made well enough to fool all but the best appraiser. I do not recommend you constructing a copy of existing guitars for any other purpose than your own edification.

Constructing a counterfeit of any registered trademark product with the intent to sell, or otherwise distribute, is a violation of State and Federal laws.

Build it, play it, fool your friends, with it, but do not sell it as an original. You don't want any un-scheduled stays at a Federal facility with a big ugly sweaty roommate that takes a bath every couple of weeks if he needs it or not, a roommate that is looking for a nice young dude to get very, very friendly with. You don't want that do you?

Chapter 1

What have you gotten into?

First, let me be frank. This is not a project for a novice in the wood shop. Unless you are competent with power tools, professional power tools, and know when and where to place your fingers, do not attempt this. Its damn hard to play a guitar with only six fingers remaining.

Second: This is no way to save money, It will cost you far more to make a body than to buy one. I'll give a cost analysis later.

What I would suggest, if you're committed to shaping your own body, is to get several of your friends to join you. By making three or for bodies at a time you can break even.

Third: Actually this should be first, be safety conscience. The tools are dangerous in the hands of the inexperienced. The lacquer or whatever finish you are applying and associated chemicals are just as dangerous. The damage just doesn't show up for several years. The music you will be playing is dangerous too, hell just listen to it.

So now you're asking, " Just why in the heck do I want to build my own guitar body?" Well, the answer is, there is

nothing like playing a quality guitar you have made from scratch. All the Fenders, Gibsons, Ibanez, PRS or whatever just will not come close. That's why.

Also, it will take about a month to shape the body, fit the electronics, and paint your masterpiece. The number one reason for major screw-ups is impatience. So take your time.

There will be days when it seems as though nothing goes right. I have learned, and share with you. . . Just give it up on days like that. Go do something else.

The primary tool you will be using is an electric router, that's row-ter, like cow her. It's not a router, like roooooo ter. You use those in computer networks. Ok, so I thought it was funny.

Make a mistake, slip, or have a brain fart, while the router is on and in your hands, and one of three things happen, sometimes two. You screw up an expensive piece of wood. You screw up an expensive piece of your flesh. Or you get the crap scared out of you and nothing bad happens. Hope for the scared thing.

Remember, when working with wood, the slower you move, the better the cut, so take it easy. Don't rush anything, and you may survive with enough of your fingers intact to play the thing.

Now, first thing, go to your local lumber yard, buy a 24 X 48 inch sheet of 3/4 inch MDF (medium density fiberboard) and make working templates from the masters I sent you. That way when the router slips, and it will, it is simply an inconvenience, not a catastrophe.

I know, you're smart, you're not going to let the router slip. Well the difference between stupid and ignorant comes to mine. Before I made the above suggestion, you were ignorant of what may happen. If you ignore the good advice, you're. . . Well you get the point.

CHAPTER 2

Who Ya Gonna Call

The tools and supplies you will need are as follows:

BASIC

Router, 3/8 inch radius round over bit with ball bearing , 2 ea 1/2 inch X 1 1/2 inch pattern bit with a top ball bearing one with a bottom ball bearing. 1/2 inch X 3/4 inch pattern bit with a top ball bearing. 1 electric drill and a set of drill bits, A saber saw, 10 sheets each of 100 grit, 180 grit and 220 grit sandpaper. A Body blank 1 3/4 inches X 13 inches X 20 inches. The choice of wood is yours.

MORE ADVANCED

Jointer, Band Saw, Planer (13" width) Small cooler with a lotta beer, Compressor, Hose, Spray gun, a Table mounted 2 hp Router and a good collection of router bits. Two pieces of lumber 7" X 20" X 2". Maybe the cooler should be listed under basic.

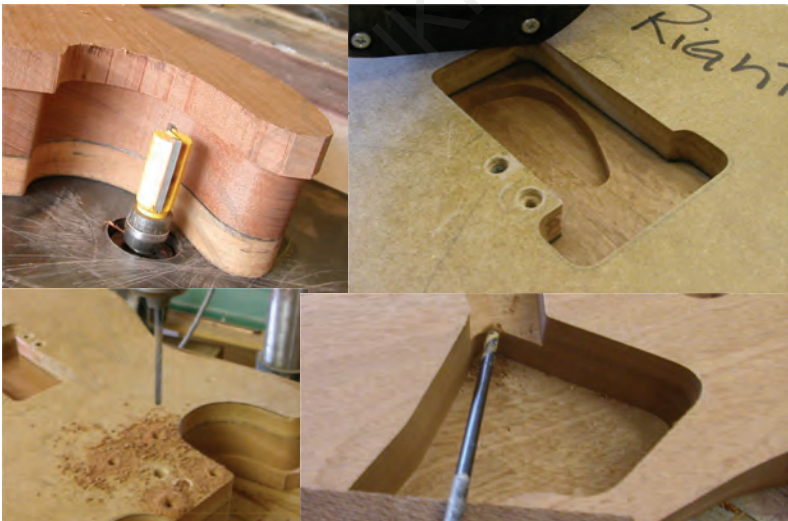
If you are buying these, you can buy bargain tools from wherever, BUT! Get a good router. There are some pretty good deals on eBay. For the bits, go to pricerutter.com

Now for the cost of the stuff. A body blank of a medium grade, Alder, Swamp Ash, etc will be about \$50.00. The Router will cost between \$50.00 and \$200.00 depending on what you find. I use several Porter Cable 1 3/4 hp at \$150.00 ea, and a 2 hp Bosch that cost 21 bux, yep, \$21.00. I went to a cabinet shop and asked if they had any non-working tools they wanted to get rid of. It cost me \$21.00 for the new ball bearing to repair it. Of course, you have to be able to fix such stuff.

The router bits will be \$10.00 - \$20.00 each, more, if you get them locally. You have to have a drill already, and the bits that go with it. If you don't own this basic tool. Forget making a body. If your goofy enough to pursue it anyway, a good drill is \$50.00 and the bits will be about \$15.00. The Saber Saw will set you back about \$45.00, and the sand paper another \$10.00

If you are in the advanced category, the Jointer is \$400.00 from Grizzly.com. The planner will be another 400 bux. A compressor is \$250.00 at Sears. The Spray guns are about 20 bux from eBay. I get the inexpensive foreign Binks rip-offs and throw 'em away after I get tired of cleaning 'em.

Now the cooler, Sam's, BJ's and Costco all have a nice one for \$150.00. Budweiser is \$12.00 a case, so 10 cases for the first couple of days. . .



Chapter 3

Let's Get To It

First, I strongly urge you to make a working set of templates from 3/4' MDF available at Home Depot or any good lumber yard. Keeping a pattern tracing bit on a 1/4 inch thick template can be tricky. Also when, notice I said WHEN, the router slips and the bit collides with the template, you simply make a new one. This saves considerably of the severity of the profanity. Keep the originals as masters.

If you are advanced, and will be gluing-up your body blank, you must run the two pieces of lumber through the jointer to produce a flat edge. Use a glue that is compatible with the wood you have selected. For instance Cocobolo does not respond well to the traditional carpenter's glues. Clamp the blank with pipe clamps, and let it cure over night.

Once the glue has cured, run the stock through the planer until the thickness is 1 3/4 inches thick, for a body similar to a Fender Telecaster or Stratocaster

You are now ready to begin shaping.

You have two templates, take the one with the rear tremolo rout and run a flathead screw into each of the two mounting holes, one in the center of the Neck plate area and the other near the Rear tremolo rout. The hole it puts in the body will be covered by the neck and the Tremolo cover. Now, trace the outline onto your body blank, including the cavities. This will indicate the shape of the finished body. Now remove the two screws, and the template. Set them in a safe place.

If you have access to a band saw use it for the following, otherwise this is where you use the saber saw. Cut out the body, leaving about 1/8 inch clearance from the line you have just traced. This will

leave about 1/8 inch of wood remaining to be removed with the router.

Once you have rough cut the shape of the body, replace the template, and set-up your router with the template following bit. It will have a bearing at the top. This will ride along the edge of the template and cut a perfect shape.

Note that you do not have to remove all the wood in one pass. In fact, you will get better results if you take a small amount in each of several passes. I would recommend that you clamp the work to a work table, rout the exposed end, then reverse the clamp position to what you just finished and rout the remainder.

You have noticed that the router bit did not cut all the way down the side of the body. This is because a bit long enough to accomplish that in one pass, and a router powerful enough to accomplish it would set you back another \$400.00. For 20 bucks you got a bit with a ball bearing on the bottom.

Take the bit with the bearing on the bottom, and rout the remainder of the body with the bearing tracking along the previously routed circumference of the body. What you have already routed will act as the template for this remaining rout.

Once the entire circumference of the body is routed you should rout the Tremolo mechanism cavity. It will be 3/4 inch deep except where the tremolo block extends through the body. From the back of the body, rout this 1 5/8 inch deep. Use multiple passes increasing the router bit cutting depth until the correct depth is achieved. The 1 1/4 inch top bearing bit is the one to use here. To cut the final 1/2 inch the bearing will be tracking along the previously routed top section of the cavity. You can remove the template to accomplish this.

If at this point you have learned about router tear-out, or chatter, both of which will leave a un-even surface. You will need to know how to repair them. I use automotive body filler. It hardens in about 10 minutes and is very easy to sand. The reason this is important, the second router pass will duplicate every irregularity that resulted from the first router pass. So take a few moments to smooth any bad wood. The body filler will have directions.

Continue the shaping process. The part of the body that has already been routed will act as the template for the second routing process you are now doing. Again, remove small amounts of wood in slow passes until the router is no longer cutting. You are through with phase one.

At this point, you should rout the cavities. The holes where the Pick-ups go will be 3/4 inches deep. The section that receives the electronics will be 1 1/2 deep. DO NOT ROUT ALL THE WAY THROUGH THE BODY!!

You will need to clamp a straight edge to guide the router as you rout the cavities where the pickup area merges with the electronics area. There will be no wood for the bearing to track along.

Routing the deep electronics section will require you do it in several passes, increasing the cut depth until it's 1 1/2 inches deep.

Make the first two cuts with the template as your guide, then remove the template, lower the 3/4 inch top bearing bit so that the bearing now runs along the previously routed cavity wall and make a third cut, continue until it's the correct depth.

Adjust the straight cut router bit with the top bearing so that the bearing will run along the edge that you have already routed. It is only 3/4 inch deep here, so you will be gently lowering the router into the wood as it cuts, once the router base is resting on the guitar surface, follow the outline of the electronics cavity. The straight edge will guide it along the top.

Once this cut is made, lower the bit again and repeat the above instructions, continue until the depth is 1 1/2 inches deep.

Use the same multiple pass method to rout the jack plate mounting hole. It should be 1 1/2 inches deep. You will need to drill a hole from the side of the jack plate hole to the electronics cavity, and while you're at it, drill a small hole from the electronics cavity to the tremolo cavity.

Also take a 7/8 inch speed boar wood bit and drill at an angle the area of the jack plate mounting hole to allow the back side of the jack to fit.

You can also drill the neck mounting holes. I recommend using a drill press to ensure they are perpendicular to the surface of the body. If you don't have a drill press, a hand drill can be used, just be careful to get the holes as true as possible. Actually this isn't hyper critical. A note: These holes should be slightly larger than the neck mounting screws. It allows for a little neck movement to adjust the guitar during set-up. I have seen necks where the screws had to be screwed all the way through the body. That isn't necessary, and makes final set-up damn near impossible.

Your Body should resemble the Strat you desire now, but we now have to address the neck pocket.

Attach Template number two. Be very careful to get the edges aligned with the body as perfectly as possible. If you're sloppy here, the neck pocket rout will be off slightly and it will be a bitch to get aligned correctly. So take your time and get it right. Make it 5/8 inch deep.

You must use a 1/2 inch diameter router bit here, because the neck heel corner radius are 1/2 inch. I mention this in case you are using whatever router bits you found laying around.

Use the same process on pick-up cavity. Remember, the templates only 1/4 inch thick here and the pick-up holes are only 3/4 inches deep so you will not be removing the template. The router bit extended to the maximum will make the correct 3/4 inch deep cut. Take it slow, and remove small amounts of wood until the correct dimensions are achieved. If you followed my advice and made the MDF templates this becomes much easier.



Chapter 4

The Neck pocket

The template is cut to allow any Fender or Fender licensed Stratocaster neck to fit. That said, you must remember that the fit will depend on the quality of YOUR workmanship and the amount of paint that accumulates in the on the neck pocket walls during finishing. Some sanding may be needed to get the final fit. **DO NOT FORCE THE NECK.** You will crack the thin wood where the body meets the neck.

To rout the neck pocket, attach template #2 with the screws through the registration holes. Be certain the edges are even all the way around the body. This ensures that the template is accurately placed.

The Neck pocket is 5/8 inch deep. Take it slowly. Particularly where the body curves into the neck. The wood is will be cut thin here and can split, tear, or break of completely. Any of the above would be a real bummer, but easy to fix with the automotive body filler.

The thought of body filler might be repugnant to many of you, but, let me tell you a little story.

The birth of the Fender guitars in 1949, when I was three, was spawned by Leo's electronics' experience. He was a radio repairman. About the same time Gibson was working with Les Paul to create the Les Paul Gibson's.

The Gibson guitars were relatively expensive for their day. About \$500.00. That would translate into about \$8000.00 today. The obvious target was the professional musician.

Leo saw that a much larger market existed among those that just wanted to pick at home. Thus the NoCaster was cre-

ated. It sold for about 100 bux. That translates into about \$1600.00 today. Still not cheap back then. Thus the Telecaster (Custom Shop) still sells for the same as it did when it was first marketed if you adjust for inflation over the years. The Les Paul (their custom shop) had to be discounted by 50% because it was too expensive to start with.

What's this got to do with auto body filler? Well the way Leo kept the cost down by using readily available materials. Like Dupont's automotive lacquers Duco and Lucite. Also automotive techniques were used, by hand to shape and refine the shape of those earliest Fenders. Thus automotive finishing methods are at home in the body of the guitar.

Back to the neck pocket. As you are routing the pocket use slow movements and remove as little wood as you can in multiple passes. The edges can splinter and break. While it won't effect the playability or sound, it will piss you off.

Now you can rout the top tremolo cavity, I recommend pre-drilling a 9/16 or 5/8 hole in the tremolo cutout to allow the router bit to enter the body.

Simply run the router with the top bearing 1/2 inch straight cut bit. That completes the tremolo rout. There should be a little overhang where the top tremolo rout meets the rear tremolo rout,.

Depending on which tremolo you will be using, use the following directions for the appropriate unit. For the 6 screw Traditional, before you remove the template, take a 3/32 drill and drill into the body the six tremolo mounting screw holes. They should be about 3/4 inches deep. If for the 2 post Traditional, simply drill the 2 outside holes for the mounting posts.

The Wilkinson will require two 10mm holed to be drilled, the small holes in the Wilkinson Template are to locate the center of the 10 mm holes. BUT!! Check the mounting posts to be sure, some Wilkinson's have different sizes.

A tip: Stop by the hardware store and pick up a few metric screws, M3 if I recall, to run into the Wilkinson's stud mounts, This allows you to beat on the screw to drive it into a test hole and later into the guitar body without having to hit, thus marring

the Wilkinson studs. You can remove the mount with a claw hammer hooked under the screw.

Two other miscellaneous holes need to be drilled, Now is a good time. You may need a 12 inch 1/4 inch drill it will make it easier.

Drill a hole from inside the tremolo cavity through to the deep electronics cavity. This is for a ground wire that will go from a ground point in the electronics to the tremolo spring claw.

The second hole goes from the deep electronics cavity to the Jack cavity. This is for the two wires that run from the jack to the electronic circuit.

At this point all that remains is rounding the outside edges and the custom body contours, OH! And the finish.



Chapter 5

The Round-Over

The 1/2 inch round-over bit with ball bearing you have is the tool for this job, Simply adjust the router base up or down to allow for a gentle roll over. Test the cut on a piece of scrap wood.

Before you begin, examine the outside edge of the body, it must be smooth. If there is router "chatter" visible take a sanding block and sand the perimeter until it is all smooth. Be careful around the neck pocket area.

The reason? The ball bearing is going to follow the outside edge exactly, whatever bumps exist will be duplicated in the rounded edge. It can be sanded later, but its easier to do it now.

Simply run the router around the edge, top and bottom I generally give each two passes, it creates a smoother surface.

Now, there is one area that you must be extremely careful. Where the rounded over edge flows into the edges of the neck pocket, you will have to stop routing BEFORE you get to these edges. This final 1/4 inch has to be hand shaped because the 1/2 inch radius changes and flows into a square edge on the bottom where the neck plate will go. On the top it flows into the thin edges of the neck pocket.

To shape these small areas, I use a 1 inch piece of dowel, (round wood) wrapped with 180 grit sand paper. Use it like a file and be gentle, move slowly.

this completes the router action. You can put it away. It's time for the contours.



Chapter 6 "Custom Contour Body"

The contours are hand shaped. Unless you have a Computer controlled routing machine.

You will need a sanding block. A good flat piece of wood 4 inches by about twelve. And the 100 grit sand paper. 60 or 80 grit is fine too. The ideal is to buy a few sanding belts and make a block to fit inside.

If you have a power grinder, you can get a coarse sanding disk to rapidly rough shape the contours. I really recommend using one, doing this by hand is hard and tedious. Any method you can think of to remove a lot of wood fast is recommended.

Simply draw a line diagonally across the body top to indicate where the contour starts. Sanding is self explanatory, just remove anything that doesn't look like a Strat.

The rounded edge that you just removed will have to be restored, by hand. Yepperz, by hand, actually its pretty easy. Simply use the same sanding block, first sand a 45% bevel around the edge blending it into the previously routed round-over. Now take a second cut with the sand block. You're just "eye-balling" it at this point. Continue until the round-over is continuous through the contoured top.

To see if it is correct, hold the body in the sunlight and roll the body, watching the shadow, it will reveal any irregular areas that still need work.

The back contour is concave, and a little more demanding. If you have the ability make a 6 inch X 12 inch sanding block that's rounded along the length. Then do it.

If you have access to the power grinder, rough out the wood to approximately the shape you want. Again, simply take out anything that doesn't look like the guitar you want. <grin>

Now take the sanding block with a coarse sandpaper and begin shaping. When the shape you have is correct use a finer grade paper to finish the shaping. Complete the edge round-over like you did on the front.



Chapter 7

Final Sanding

Final sanding is as important as the most delicate router techniques. It directly effects the final appearance. Take short cuts here and your masterpiece will have that classic home made piece of crap look. Enough said?

The outside edges, I do by hand with 180 grit and finish with 220 Grit. Keep sanding until all prior sand scratch marks are gone.

The flat sections of the body should be flat sanded with a good quality sanding block, using the same grades, 180, then 220. The way to check, is to hold the body in the light and allow the shadows to reveal any depressions that need to be corrected. I use the same method to check the hand shaped round-over in the contoured sections.

By rolling the body in the sunlight or strong light you can see in the shadow if the area has been rounded smoothly. Any irregularities you see in the shadows will be magnified by the polished finish you will be applying.

Sanding is simply a process of continuing until you are satisfied. Then it's time to apply a finish.



Helpful sites

<http://www.ronkirn.com/> < new. . coming keep checking
<http://www.tubesandmore.com/>
<http://www.carvin.com/>
<http://www.clarkparts.net/>
http://www.guitarnotes.com/links/guitars/guitar_parts1.shtml
<http://www.guitarshoppe.com/customguitars.htm>
<http://www.hipshotproducts.com/>
<http://hoffmanamps.com/>
<http://www.jenkinssoundshop.com/>
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<http://www.mannmadeusa.com/>
<http://www.rgmusic.com/parts.htm>
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<http://www.mightymite.com/>
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<http://www.guitarnuts.com/index.php> < Don't Miss
<http://www.towerpaint.com/index2.html>

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