

Woodturner PRO, LLC

Cutting Board Trio

Lloyd Johnson, artist



Special points of interest:

- Cutting thin strips safely AND with consistent results
- Clamping Channel to improve pattern alignment
- Registration system to speed sawing and obtain consistent results



Inside this project:

INCRA Build-It System	2
Safety	2
Let's Get Started!	2
Stock Preparation	4
INCRA Build-It System Layout	4
Cutting Laminated Boards	5
Clamping Channel	5
2nd & 3rd Generations	6
Registration System	7
Finishing the Cutting Board	10
Closing Thoughts and Variations	10
About the Artist	11

About this project

This project was designed to introduce you to the unlimited design possibilities available by applying your woodworking skills to laminated boards. This project is actually three projects in one. You might choose to stop at a 1st generation board which would be the perfect introduction to working with laminations. Making a 2nd or 3rd generation cutting board is a great way to learn new techniques and improve your skill.

I selected Jatoba, Hard Rock Maple and Bloodwood as they have complimentary colors and similar densities, but your own experimentation is sure to provide stunning results.

Regardless of which board you make, the recipient of it will surely see that it is more than functional—it is a work of art. Although it would be perfect as a cheese board or French bread board, don't be surprised if it is hung on the wall and never used for cutting anything.

Project Sponsor: INCRA Precision Tools

INCRA supplied text goes here

INCRA Built-It System



The INCRA Build-It Modular Jig & Fixture Platform System is a highly versatile NEW method for quickly and easily creating an extremely wide variety of common and special purpose jigs, fixtures and those one-of-a-kind work helpers that you typically find hanging on the walls and rafters in just about any woodshop.

Any of these cutting boards can be built entirely with a planer or drum sander, a table saw and a sled made with the Build-It Starter Kit. For more information on the Build-It System, visit www.incra.com.

Safety

This project relies on a table saw for virtually all of the necessary sawing operations. For every cut, hold-down clamps have been used to secure both the board being cut and the cutoff. There is never a reason for your hands to be near the saw blade. PLEASE follow these safety tips:

- Read all warning labels and the owner's manual before operating the saw.
- When the saw is not in operation, it is a good habit to lower the blade below the table.
- Be sure the power is disconnected when performing maintenance or changing blades on the saw.
- Wear eye and ear protection.
- Adjust the fence so that it is perfectly parallel with the blade. If it is not parallel, the workpiece can easily become pinched between the blade and the fence, inducing violent kickback and causing injury.
- Always push the material past the saw, using a device that puts downward pressure on the stock. A standard push-stick puts pressure only at the trailing edge which MAY NOT prevent kickback.
- NEVER operate the table saw without a factory installed anti-kickback device or riving knife.
- Use hold-down devices, feather boards and clamps whenever possible.

Let's Get Started!

This project was designed using Lamination PRO, a software program that lets you simulate the process of building a laminated board with up to 7 strips of wood. The software then allows you to cut that board into strips and reassemble them, flipping alternate strips either left-to-right, top-to-bottom, or both, which creates a 1st generation board with 'chevron' patterns. You can then repeat this process two more times giving 2nd or 3rd generation designs.

For more information about Lamination PRO and our other software products, visit www.woodturnerpro.com.

Lamination PRO has a 'Laminate Wizard' that is used to create boards from strips of wood. The boards for this project are made from 1" thick strips of wood in a symmetric pattern as follows:

- 1-1/2" Jatoba
- 1/4" Maple
- 1/2" Bloodwood
- 1/4" Maple
- 1-1/4" Jatoba

Strips cut from the laminated board are glued together, flipping every other strip left-to-right resulting in a 1st generation board of 'chevrons' (Photo 2).

Each chevron (a repeating unit) consists of two strips—one with a pattern that declines and one that inclines. To make the 2nd generation board (Photo 3), cut through the centers of the declining patterns of the 1st generation board.

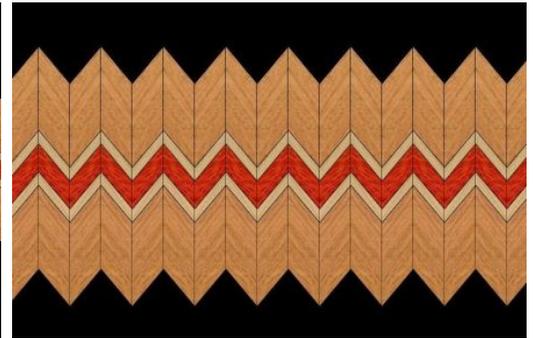
Similarly, cutting through the declining centers of the 2nd generation board yields a 3rd generation board (Photo 4).

If the plan calls for cutting through a declining center, it means that the cut will be roughly perpendicular to the pattern at the point of intersection. Cutting through the inclining center means that the cut will be roughly parallel to the pattern. Photos 5 and 6 will help you visualize the differences between declining and inclining patterns. This concept remains true regardless of whether you're cutting a 1st or 2nd generation board.

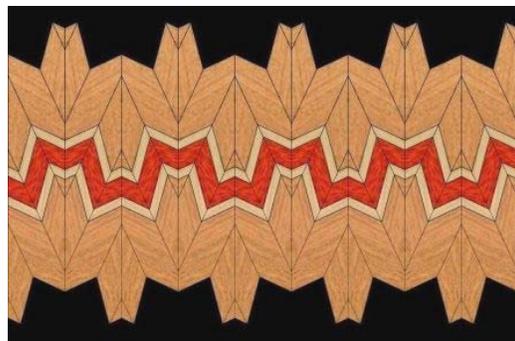
Now, it's off to the shop.



1. All three boards will start with the same 1" thick laminated board cut into 7/8" wide strips at 50°.



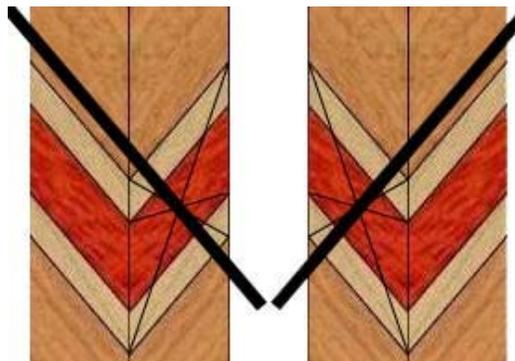
2. This 1st generation board can be cut at 25° to make the 2nd generation board shown in Photo 3.



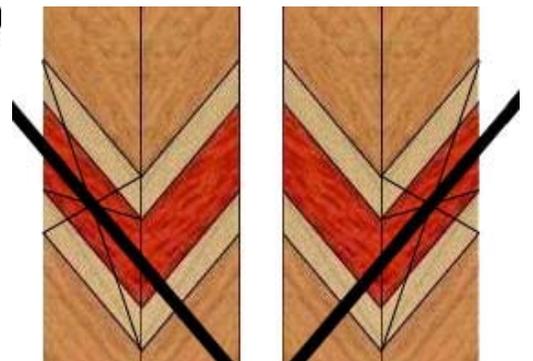
3. The 2nd generation board can be cut at 25° to make the 3rd generation board shown in the next picture.



4. Trio of cutting boards—all made from the same laminated board and cut using just two angles.



5. Both of these cuts are roughly perpendicular to the pattern at the point of intersection which means the cut is through a declining center. Depending on the configuration of your saw and miter, your cuts may be similar to either the left or right image.



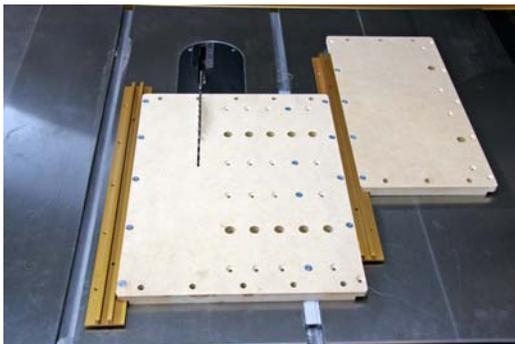
6. Both of these cuts are roughly parallel to the pattern, identifying them as a cut through inclining centers



7. The INCRA TS-LS Table Saw Fence is the safest and most accurate way of cutting thin strips.



8. Sand common strips on edge for consistent thicknesses.



9. This configuration of the Build-It system allows fences angled from 0° to 70°.



10. The saw blade must be exactly 90° to the table if the laminated pattern is to be accurate.

Stock Preparation

In creating the laminated board, great care must be taken to make the individual strips of wood consistent in width. This is always important if the alternate pieces are to be flipped left-to-right and mandatory if they are to be flopped top-to-bottom.

As a safety measure, never cut strips that are less than 3/8" in width between the blade and the table saw fence. Rather, cut thin strips as cut-offs from boards that are 3" or wider. You can build or buy jigs made for this purpose that work reasonably well. The best results are achieved by using the TS-LS Table Saw Fence made by INCRA (Photo 7) which automatically indexes the fence in 1/32" increments when engaged. When the fence is zero-indexed to the saw blade, you simply move the fence toward the blade by the thickness of the saw blade and the desired strip width. The perfectly-dimensioned strip will fall safely away from the blade.

For pinpoint accuracy, you should also surface common strips using a drum sander or thickness planer. One or both of these tools are indispensable for working with laminations (Photo 8).

INCRA Build-It System Layout

The wonderful versatility of the Build-It System makes it perfect for working with laminations. For this project, you can use a single fence, anchored in T-slots on both sides of the saw blade so that it could be moved closer to or further from the blade, depending on the width of the board (Photo 9).

For this project, the fence is angled so the saw kerfs will match the images generated by Lamination PRO. Since the slider can be adjusted to perfectly fit your table saw slot, a single slider will suffice.

This project uses only two angles—50° and 25°. A single fence, flipped edge-for-edge for the two angles is all that is needed. Keep the fence as forward as possible so that the large panel will be mostly uncut.

Once the Build-It sled is constructed, saw into the sled, raise the blade as high as possible and use an accurate square to make sure the saw blade is 90° to the surface of the sled (Photo 10).

Cutting Laminated Boards

According to Lamination PRO, 28 lineal inches of the laminated board is needed to construct one 1st generation board, 38" for the 2nd generation board and 49" for the 3rd generation board. To make all three boards, four 36" boards is sufficient.

If this is your first attempt at working with laminations, you may wish to increase this amount somewhat to allow for experimenting and trial and error adjustments.

Since this project uses only two angles, a single fence is made with 50° on one side at 25° on the other. Use an angle guide to set the fence accurately (Photo 11). Add hold-down clamps to secure the board on the left side of the blade and the cutoff to the right of the blade. Finally, clamp a stop to the fence so that the sawn strips will be 7/8" wide.

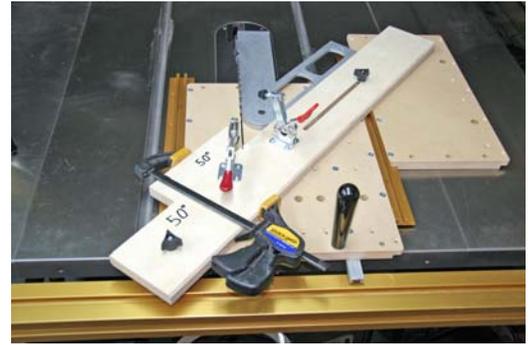
The laminated boards are now cut into strips (Photo 12). You'll notice the magnetic feather board (yellow) which has been positioned as a block to stop the forward movement of the sled.

Clamping Channel

When gluing multiple strips of wood simultaneously, there is a tendency for the strips to slip when clamped. This slippage can be eliminated by forming a channel which is exactly as wide as the strips are long and then clamping the strips from the ends. The Black and Decker Workmate 425 portable clamping station is a great solution for this purpose. By removing the center board and wrapping it with waxed paper, the strips will not stick to the table (Photo 13).

During the gluing process, coat each of the surfaces to be mated. It is best to keep the strips from touching until glue has been applied to each strip. This lets the strips slide into position during the clamping process.

To maintain accuracy, work with less than 20 strips at a time which allows you to complete the clamping while the glue is wet enough for the strips to slide into place. Before clamping from the ends, clamp a right-angle block to one fence to make sure that the strips are 90° to the edge (Photo 14). Do not over-clamp as bowing may occur.



11. To cut the laminated board, use a guide to set the 50° angle, add a stop block at 7/8" and hold-down clamps to the left and right of the blade.



12. The hold-down clamps and handle that has been added to the sled make this a very safe process.

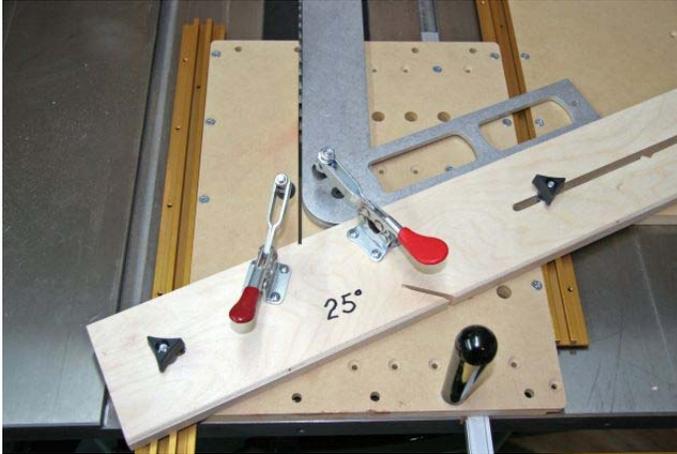


13. A Workmate 425 can form a channel that will align the strips.



14. Tighten the clamps, alternating between the channel vise and the horizontal clamp.

2nd & 3rd Generations



15. To cut strips for the 2nd generation board, the fence has now been flipped edge-for-edge and set at a 25° angle. The hold-down clamps are close to the blade but could never be in contact with it.



16. The center of the declining pattern is easy to find by drawing multiple lines between similar points.



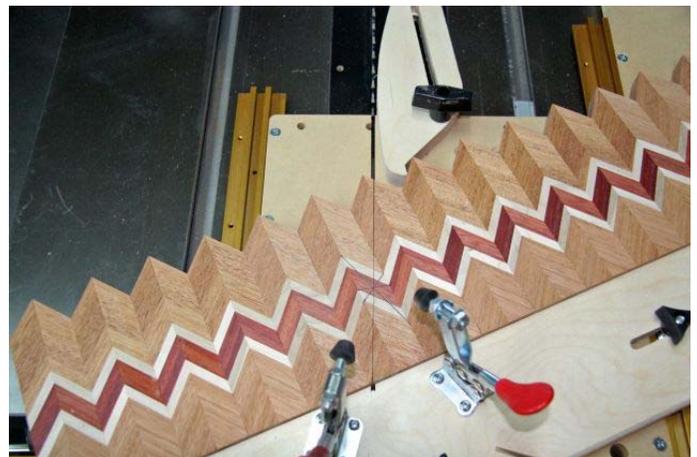
17. Use an angle protractor to draw a line indicating where the next cut will be made. This line will help in the positioning of the board.

A dedicated fence for cutting the 2nd and 3rd generation boards at 25° is added to the sled. A hold-down clamp is installed to the left and right of the blade (Photo 15).

According to the Lamination PRO plan, cutting the first generation board is to be done through the center of the strips with the 'declining' patterns. As discussed earlier, a cut through a declining strip means the cut is mostly perpendicular where it intersects the pattern.

To locate the position of this cut, select any strip with a declining pattern relative to the cut and mark the exact center of the pattern (Photo 16).

With a variable angle finder, draw a 25° line through the center mark which extends to both edges of the board (Photo 17). As you can see, the line drawn is nearly perpendicular to where it crosses the pattern, indicating that it is cutting through a declining pattern (Photo 18). Place this marked board on the sled and slide it against the fence until the line is in the center of the saw kerf in the sled. Clamp the board in this location, but do not cut the board at this time.



18. The board has been positioned so that the line is centered in the saw kerf of the sled.

Registration System for Repeatable Cuts

Cutting the laminated board into strips was easy because you simply set a stop and cut the boards into identical strips. You cannot set a stop for cutting 1st or 2nd generation boards, though. If your stop is just 1/32" off for the first cut, it will be 2/32" off for the next cut and the error magnifies throughout the cutting of the board. Instead, you must find the correct center spot and make all cuts relative to that spot. The following describes a technique that makes this easy and repeatable.

Trim one end of the strips to be square but leave the 'ears' on the other end. These ears can be used with a registration block to make every cut repeatable.

Photo 19 shows a stop block that has been added to the sled that can be used for registration. With the board positioned correctly, set the block so that it is placed firmly against an ear. By repositioning the board so that the block is touching any ear, the saw cut will always be in the same relative position to the point you marked earlier. In Photo 20, the board is repositioned so that the first cut of the board can be made.



19. Move the registration block so that it is in firm contact with the ear that is closest to the blade. This provides the point of registration which will be used to reposition the board for repeatable cuts.

Make the first cut at this location and use the cutoff to see if the resulting pattern is uniform (Photo 21). If it is necessary to reposition the registration stop block, do so carefully and then clamp it down securely. Any movement of the stop block during the cutting process will make the pattern non-symmetric.



20. Lift the board and reposition it so that the first cut can be made. Save this cutoff for use in the next step.



21. Use the cutoff to check the pattern it makes. If the pattern is not symmetric, make minor changes to the registration point.

Continue cutting strips from this board until the last ear has been reached. Before making a cut at this location, use a pencil to draw around two edges of an ear (Photo 22). This will let you manually position the board to make the final two cuts. There is a possibility of inaccuracy with this manual location process, so make sure the cutoff strips are identical in width to the ones cut with the registration block.

When you have made the last possible cut, there will still be part of the board remaining. If you think you may run short of strips for the next generation, take this remaining piece and glue it to the front of the next board to be cut. This will let you continue without waste.

Continue cutting all the 1st generation boards and then use the clamping channel as before to glue the strips together into a 2nd generation pattern. As you can see from Photo 23, the 2nd generation pattern is nearly perfect.

To make a 3rd generation board, repeat the prior steps exactly, cutting the 2nd generation board through declining centers.

As discussed earlier, the fence was designed to be reversible so that it can be used to make 50° cuts when facing up and 25° cuts when facing down. The remaining cuts for the 2nd and third generation will use this configuration. Mount the hold-down clamps as shown (Photo 24).

Square both the bottom and the top of the 2nd generation board so that it will fit on the sled with the registration block in place. If you completely remove the ears from the bottom (as shown), you will reduce the usable area below the pattern in the next generation so consider leaving a portion of the bottom ears.

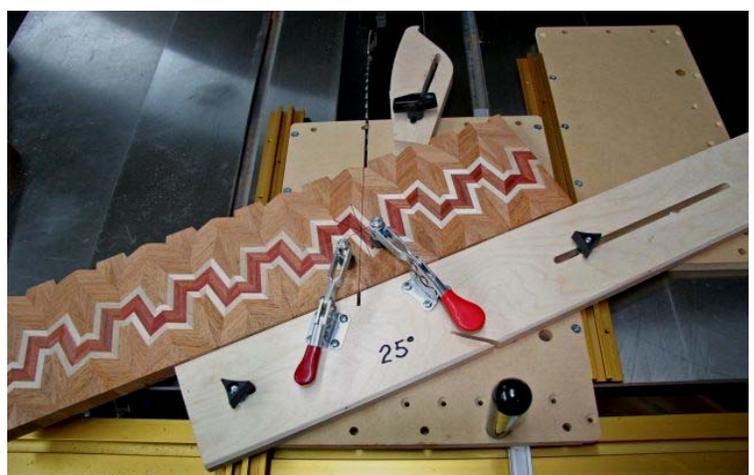
Place the board on the sled in a position that has the line centered over the saw kerf made in the Build-It sled.



22. When the last ear is at the registration point, draw a profile of an ear for manual positioning.



23. Assemble the strips, flipping alternates edge-for-edge and use the clamping channel to slide the strips into position before gluing.



24. Mark the center of a declining pattern and position the board as before. Firmly set the registration block against an ear.



25. The pattern is not symmetric so an adjustment to the stop is needed. 26. The board is now ready to cut into strips for the 3rd generation.

Once you have placed the registration stop block firmly against an ear, move the board to the starting position and make the first cut.

This cut was deliberately undercut to show how to correct for a registration block that has not been set correctly (Photo 25). Make the correction by releasing the registration block and shifting it slightly to the left. Re-cut the board and check the symmetry of the pattern (Photo 26). When you make this adjustment, take into consideration that the additional wood you just removed would have been added to the cutoff piece.

Repeat the clamping and gluing process, flipping alternate strips left-to-right resulting in a 3rd generation board. As you can see from the pictures, the channel clamp system has aligned the strips to create a 3rd generation board with very fine results (Photo 27).



27. The completed 3rd generation board in the clamping channel. The channel has done its job nicely as the pattern is nearly perfect.

Finishing the Cutting Board

There are many ways you can choose to put the finishing touches on your cutting boards. The most simple way is to square the four edges and leave it as it is. A word of caution, though—due to the lamination process, the edges of the board have a number of fairly small pieces and routing a rounded edge could cause small pieces to break.

Adding a couple hardwood strips to the long edges of the board is both simple and will improve its final appearance. Better yet, a Maple border for the lamination and framed with Jatoba adds more professional finish. To do this, glue Maple strips to the long edges and then trim flush (Photo 28). Then glue the Maple and Jatoba to the ends. Once dry, make the ends flush and add the Jatoba strips to the long edges. A hole is both convenient as a finger hole and allows the board to be hung.



28. You can use the clamping channel to add the Maple border to the long edges.



29. Once flush, add the Maple border to the short edges along with the Jatoba ends. Finally, add the Jatoba to the long edges (not shown).

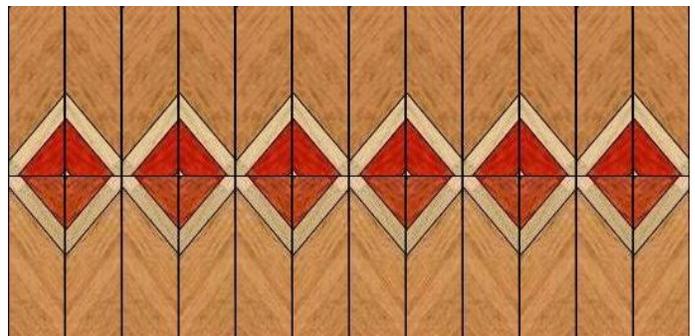
Closing Thoughts and Variations

You may have been reluctant to work with laminations because the process appeared to be complicated. Hopefully, this project has shown that there is nothing difficult or overly time consuming about making a 1st, 2nd or 3rd generation pattern. Whoever receives one of these boards will tell you that it was worth the effort.

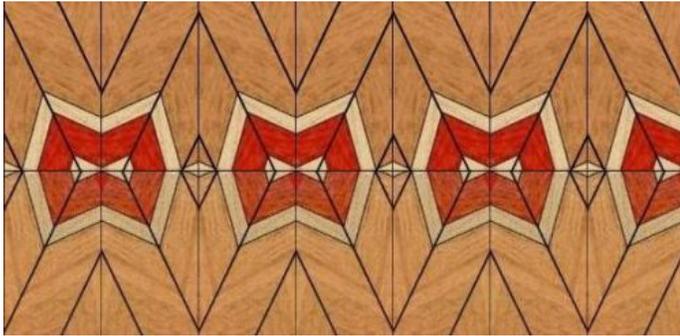
An easy variation that can be done as a final step to any 1st generation boards is to cut through the horizontal center of the board and slide the top half over the bottom half. Lamination PRO lets you see what this will look like (Photos 30, 31 and 32).

Starting with a board that is non-symmetric, such as having the top strip Jatoba and the bottom strip Walnut, lets you create amazing designs by flipping the alternate strips end-to-end as well as side-to-side.

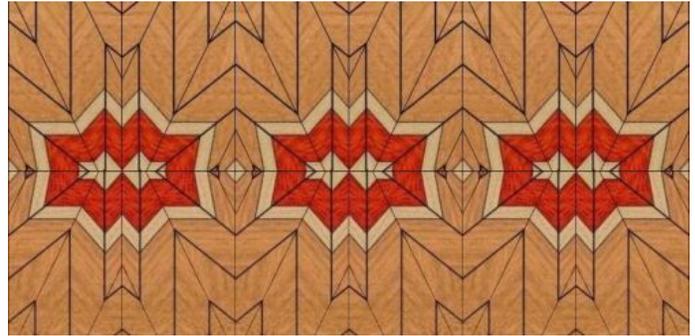
With Lamination PRO and a single laminated board, there are more than one million design possibilities from a single laminated board.



30. Cutting a 1st generation chevron pattern and then sliding the top over the bottom always yields a diamond pattern.



31. This pattern results from cutting and sliding the 2nd generation board.



32. The 3rd generation board after cutting and sliding.

Many thanks to Perry McDaniel and INCRA Precision Tools for their generous sponsorship of this project. You can fabricate your own sled for this project, but in less than 10 minutes, you can have a modular system that can be configured as shown in this project or dozens of different configurations for either temporary or permanent purposes. To learn more about INCRA products, please visit their website at www.incra.com.

I hope you make your own cutting board and if you do, please send a picture of it to Woodturner PRO. You can send it or any questions or comments about this project to loyd@woodturnerpro.com.

Thanks, and please work safely.
Lloyd Johnson

About the Artist and Woodturner PRO

Lloyd Johnson, a founder and executive for software companies, has been a hobbyist wood worker for over 30 years. Segmented vessels got him interested in woodturning in 2000 and he has been an avid woodturner ever since. Lloyd is active in several woodturning and woodworking clubs in his home town of Portland, Oregon and has toured the country conducting training sessions, demonstrations and workshops.

In 2001, when it was evident that there was little or no software available to assist woodturners in the design of segmented vessels, with his long-time business partner, Tom Denny, he formed Woodturner PRO, LLC, to create software for that purpose. So far, this has resulted in three pieces of software: 3D Design PRO, a simple program that lets you create wall profiles in two dimensions and then see what it will look like in three dimensions; Woodturner PRO, a program that lets you construct segmented vessels from such ring types as flat, compound, stave, veneer and solid discs, and Lamination PRO, the software used to create the Sweetheart Clock project.

The software has been critically acclaimed and is currently being used in over sixty countries around the world.

Lloyd and Tom are committed to writing useful and easy-to-use software at inexpensive prices. In fact, the entire suite of software is only \$99.

You're invited to visit our site at www.woodturnerpro.com and download the trial versions of all three software titles. Also, if you belong to a club that would like a workshop or a guest speaker to discuss technology in woodworking and woodturning, let us know about that as well.

Greetings Woodworkers!

Thanks to a sponsorship from INCRA Precision Tools, we are pleased to give you this complete project for building a trio of Cutting Boards. All built from the same laminated stock, the boards let you start with a simple 1st generation board (a chevron pattern) and then progress to a 2nd and a 3rd generation design. The entire project is built with a minimum of tools—a planer or drum sander, a table saw, and a sled such as one you can build with the Build-It System Starter Kit from INCRA.

I hope you enjoy the project and I have just two requests—email me a photo of your finished cutting board and most important— WORK SAFELY!

Best regards,
Lloyd Johnson
Woodturner PRO, LLC
www.woodturnerpro.com
info@woodturnerpro.com

**FREE WOODWORKING
PROJECT INSIDE!**



Woodturner PRO, LLC

14699 NE Prairie View Ct.
Aurora, OR 97002