



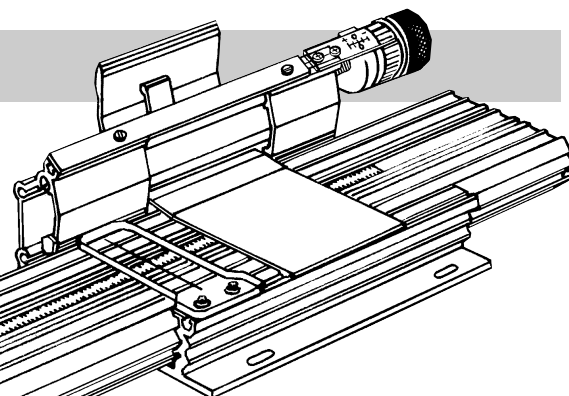
The **ULTIMATE** Precision Woodworking System

OWNER'S MANUAL

Please read this Owner's Manual before use and keep it at hand for reference.

In the few years since its first appearance in woodworking shops around the globe, INCRA JIG has quickly established itself as the finest and most versatile woodworking system available. At the top of its list of features has always been its unparalleled positioning accuracy. As a fence system, INCRA JIG's amazing precision allowed precise fence placement to within a few thousandths of an inch. As a joint making machine, these same positioning capabilities permitted an endless variety of box joints, half blind and through dovetails to be created. And with decorative joints like the exquisite INCRA Double Dovetail, INCRA JIG made the impossible quite possible.

Your new INCRA JIG ULTRA represents the next generation in the evolution of this remarkable tool, combining all of the considerable attributes of its forerunners, the Original INCRA JIG and the INCRA JIG PRO, with many exciting new features like integral micro adjusting, velvet smooth tracking and superior strength. INCRA JIG ULTRA is the ultimate in convenience and function for today's woodworker.



INCRA JIG ULTRA
(shown with available
INCRA PRO Fence)

Note: If you have purchased the ULTRA-TS Tablesaw Fence System it is only necessary to read pages 2, 3, 6 and 7 of this Owner's Manual.

CONTENTS

Safety 2

Be sure to read and follow these important safety instructions before using the INCRA JIG ULTRA.

System Description ... 3

A brief description of the various features and components. If you are already familiar with how to use an INCRA JIG, this section may be all you'll need to get your INCRA JIG ULTRA up and running.

Set Up 4

Covers attaching a plywood base and the INCRA Fence to the INCRA JIG ULTRA.

Operation 6

Describes how to use the carriage clamp and micro adjusting feature.

Applications 8

Shows how to set up and gives ideas for using INCRA JIG ULTRA on various stationary tools.

Router Table 8

Zeroing 8

Centering 9

Table Saw 10

Zeroing 10

Drill Press 11

Joint Making 12

A step-by-step approach to making box joints and half blind dovetails

Box Joints 12

Half Blind Dovetails 13

Trouble Shooting 16

We don't think you'll ever have to look at this section, but if you do, you'll find a quick answer to your question.

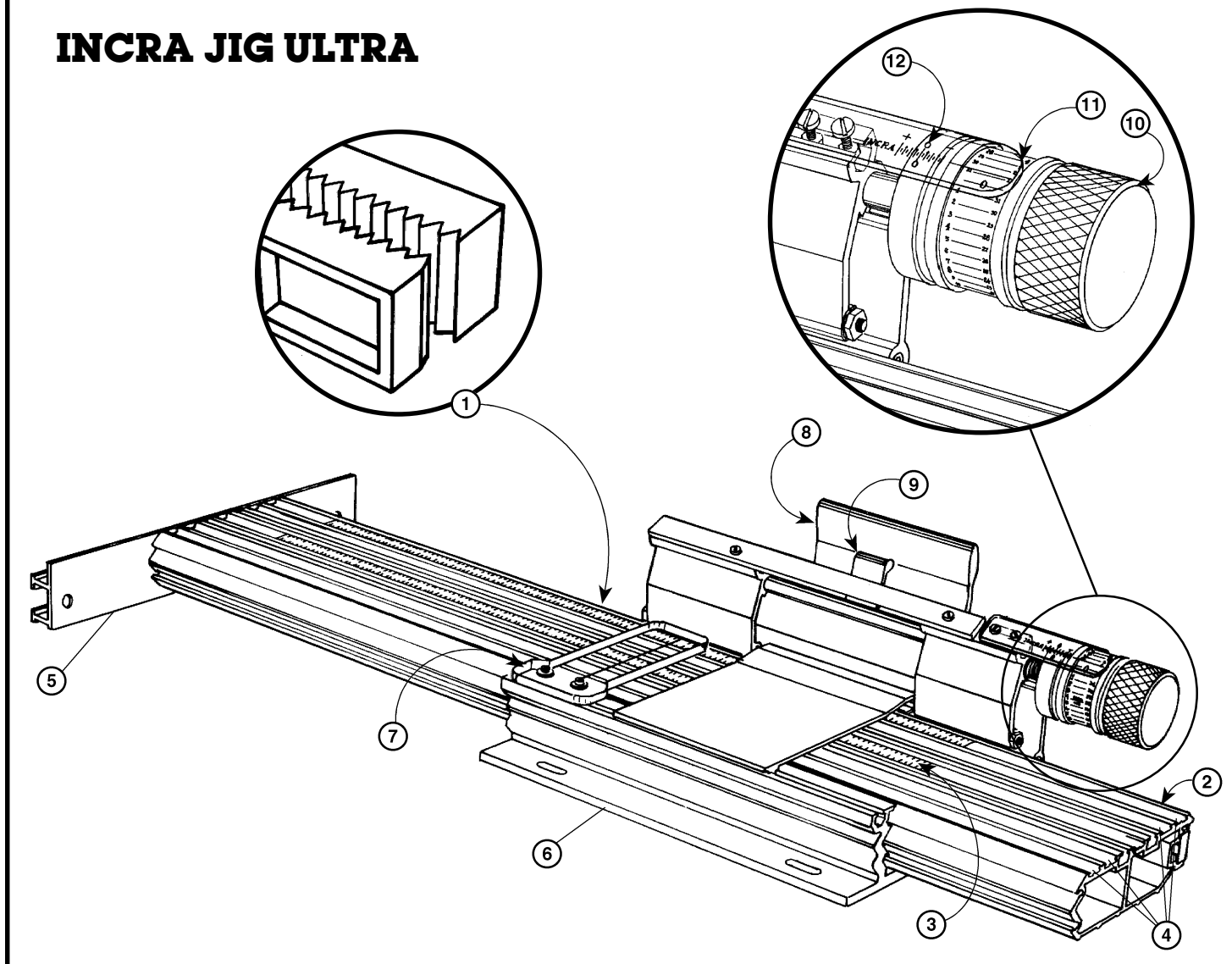
Adjustments 18

Instructions for customizing and fine tuning the ULTRA to suit your individual preferences.

Warranty 20

Spare Parts 20

INCRA JIG ULTRA



SAFETY

Important safety instructions for using the INCRA JIG ULTRA. Before using the INCRA JIG ULTRA, read and follow all of the instructions and safety information in this manual.

- When using INCRA JIG ULTRA in conjunction with any other tool, first read and follow all instructions and safety information in that tool's owner's manual.
- When INCRA JIG ULTRA is mounted to a wooden base or table surface, make sure that all six mounting screws are securely tightened and the INCRA JIG ULTRA is firmly held in place.
- When using the INCRA JIG ULTRA with a wooden base, always be sure that the base is securely clamped, screwed or otherwise fastened to the work surface before making a cut.
- Always turn off the power and make sure that the bit or blade is fully stationary before moving the INCRA JIG ULTRA to any new setting.
- Always keep both hands behind the fence when moving INCRA JIG ULTRA to a new setting.
- Before making a cut, always make sure that the carriage clamp is fully engaged and the jig is securely locked in place.
- When using INCRA JIG ULTRA with other tools, make sure that all safety guards and other safety equipment supplied by the manufacturer of that tool are securely in place and functional. Never let INCRA JIG ULTRA interfere with another tool's safety equipment.
- Use appropriate safety devices. Keep hands clear of the bit or blade. Always use a push stick, rubber soled push block, or other safety device to keep your hands safely away from the cutting tool.
- Wear safety glasses, hearing protection and follow all normal shop safety practices.
- DO NOT alter or modify the INCRA JIG ULTRA in an attempt to use it with non-INCRA accessories.
- The INCRA JIG ULTRA is designed to be used with genuine INCRA Fence Systems only. DO NOT attempt to use the ULTRA with other non-INCRA fence systems as this may present a safety hazard.

SYSTEM DESCRIPTION

① Positioning Control

INCRA JIG ULTRA obtains its great accuracy and repeatability from the precision cast saw-toothed positioning racks which position the jig in exact increments of $\frac{1}{32}$ ". Standard $\frac{1}{32}$ " (blue) racks are supplied with each INCRA JIG ULTRA. Metric (green) racks with a tooth spacing of one millimeter and a metric scale are available as an option. (See order information at the back of this manual.)

② Carriage

The reinforced square tube design of the carriage provides the ultimate in strength and support for your fence. The carriage rides on self-lubricating UHMW guide bearing surfaces in the base to provide a velvet smooth glide to your next INCRA JIG ULTRA setting.

③ Primary Sliding Scale

After setting up your INCRA JIG ULTRA, and "zeroing" (see pages 8 and 10) to the bit or blade, slide this scale to read 0" under the hairline cursor. Use this scale as the primary source for readout of fence to bit or blade distance.

④ Auxiliary Scale Slots

Four auxiliary scale slots are provided to allow additional setups and cutting operations to take place without altering the primary scale position. Simply slide the supplied $\frac{1}{32}$ " "floating" scale into position as needed for reference. These extra slots are great for advanced joinery requiring the use of the INCRA templates. You can even leave your most frequently used joinery templates from the optional *INCRA Master Reference Guide & Template Library* permanently installed.

⑤ Fence Mounting Bracket

This bracket provides a quick and easy means to attach the INCRA Pro Fence System.

⑥ Base

Screw the base to a user-supplied piece of $\frac{3}{4}$ " plywood and clamp to the stationary tool of your choice. The base provides strong support for the carriage and is the control center for most of the INCRA JIG ULTRA's features.

⑦ Hairline Cursor

The large hairline cursor provides a clear visual reference of the fence location and spans all five scale slots. The factory placement of the cursor can be shifted to the rear of the base for use on smaller router tables and table saws. (See Fig. 12 on page 8.)

⑧ Carriage Clamp

By pushing the carriage clamp down into the "unlocked" position, the carriage is free to glide effortlessly to the next setting. Pull the clamp handle up into the "locked" position and the carriage is locked solidly in place, ready for your next cut.

⑨ Micro Adjust Lever

After pushing the carriage clamp down to the "unlocked" position, push the micro adjust lever down to place the INCRA JIG ULTRA into the "micro adjust mode". After micro adjusting your fence position, simply reset the micro adjust lever and then pull the carriage clamp up into the "locked" position before making your next cut.

⑩ Micro Adjusting Knob

When in the "micro adjust mode", use this knob to fine-tune the position of your fence in one thousandth of an inch increments. A hairline cursor and easy-to-read scale give a clear readout of your fence movement. Turning the knob clockwise moves the fence closer to the bit or blade. Turn it counterclockwise and the fence moves away from the cutter. Each full turn of the knob moves the fence $\frac{1}{32}$ ". Micro adjust range is plus or minus $\frac{1}{4}$ ", for a full $\frac{1}{2}$ " of vernier travel.

⑪ Micro Adjust Scale With Zeroing Feature

Large easy-to-read numbers make fine-tuning your fence position a snap, and once you've micro adjusted and pulled the carriage clamp up into the "locked" position, you can re-zero the scale if you desire. Just rotate the scale (not the knob) gently with your fingers to return the zero on the scale to its original position under the cursor.

⑫ Micro Adjust Range Scale

Your INCRA JIG ULTRA has a micro adjustment range of plus or minus $\frac{1}{4}$ ". By sighting through this scale to the left end of the micro adjusting knob, this feature tells you how far you have micro adjusted away from the mid-range (0") position and which way you've gone. The scale is marked off in $\frac{1}{32}$ " increments.

INCRA JIG ULTRA Miscellaneous Hardware

Jig Mounting Hardware

4 ea. #10 x $\frac{7}{8}$ " phillips pan head wood screw
4 ea. #10 flat washer
2 ea. #10 x $\frac{3}{4}$ " phillips flat head wood screw

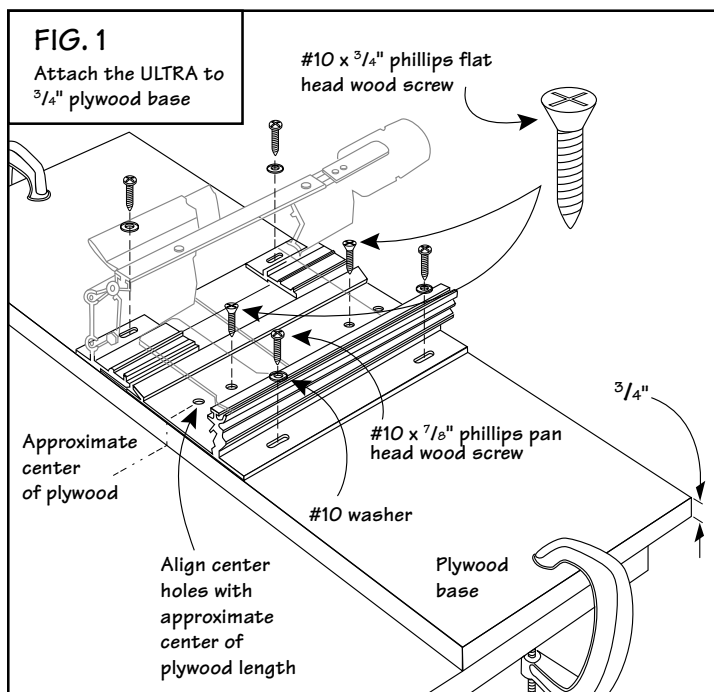
Fence Mounting Hardware

2 ea. #10-32 x 1 $\frac{1}{8}$ " phillips pan head screw
2 ea. $\frac{5}{8}$ " O.D. $\frac{1}{16}$ " thick flat washer (gold)
2 ea. $\frac{5}{8}$ " O.D. $\frac{1}{32}$ " thick flat washer (silver)
2 ea. #10-32 rectangular nut

Miscellaneous

3 ea. 6" x $\frac{7}{8}$ " x .005" clamping shim (clear)
1 ea. Owner's manual
1 ea. Warranty card

SET UP



TIP

Although the clamping pressure has been factory adjusted, you may wish to fine tune the pressure to suit your own individual preference. If so, refer to the instructions for adjusting the clamping pressure on page 18.

1 Attach INCRA JIG ULTRA to a 3/4" plywood base

Begin with a piece of 3/4" plywood (or hardwood) that is 9" wide. The length of the plywood should match the width of your table saw or router table. Clamp the plywood to a flat surface using (2) C-clamps. Push the carriage clamp down into the "unlocked" position and carefully slide the carriage out of the base. Align the center mounting holes in the base with the approximate center of the plywood as shown in Fig. 1.

NOTE: DO NOT alter the position of the carriage clamp or the micro adjust lever when carriage is slid out of the base.

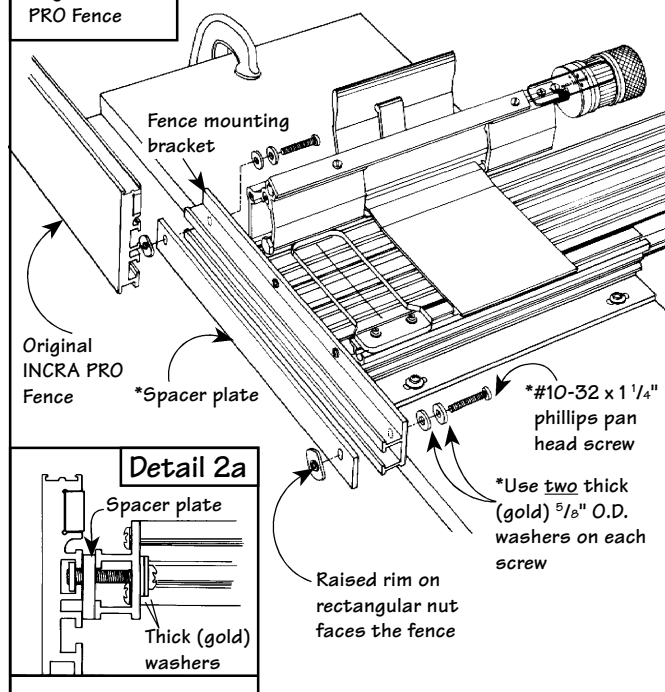
Align the front end of the base with the edge of the plywood as shown and secure in place through the four slotted holes using the supplied #10 x 7/8" phillips pan head wood screws and #10 washers. Use the (2) #10 x 3/4" phillips flat head screws through the two indicated center holes in the middle of the base. **DO NOT** use washers on these two screws. The flat head screws are required in order to provide adequate clearance between the screws and the ULTRA's carriage.

2 Attach the INCRA Pro Fence

Carefully slide the carriage **all the way into the base** and pull the carriage clamp up into the "locked" position. Before mounting your INCRA PRO Fence you'll need to determine which fence style you own. The original INCRA PRO Fence has through holes drilled in the face for mounting the INCRA racks. The new INCRA PRO Fence has no through holes, and instead uses a T-slot for mounting the racks. Now follow the instructions given below for the fence style you have.

FIG. 2

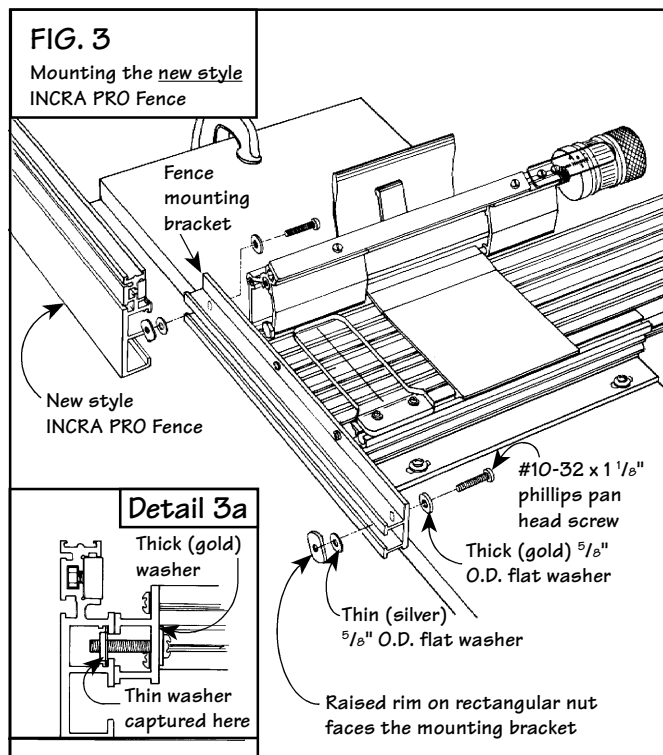
Mounting the original INCRA PRO Fence



Mounting the Original INCRA PRO Fence

Insert the #10-32 x 1 1/4" phillips pan head screws through the two thick (gold) washers then through the holes on the back of the fence mounting bracket and spacer plate. See Fig. 2. Loosely attach the two rectangular nuts. The raised rim on the rectangular nut should face the fence. Now slide the fence onto the rectangular nuts so that the nuts are captured in the T-slot on the back of the fence. See Detail 2a. Position the fence so that the carriage is approximately centered on the fence length and tighten the two mounting screws.

*** NOTE:** The spacer plate, #10-32 x 1 1/4" screws and the two extra gold washers are **NOT** included when the **new style** fence is packaged with the ULTRA.



Mounting to the new style INCRA PRO Fence

Insert the #10-32 x 1 $\frac{1}{8}$ " phillips pan head screws through the thick (gold) washers then through the holes on the back of the fence mounting bracket. Place a thin (silver) washer on each screw then loosely attach the rectangular nut. See Fig. 3. The raised rim on the rectangular nut should face the mounting bracket. Now slide the fence onto the thin washer and rectangular nut so that both are captured in the T-slot on the back of the fence. Make sure the washer is captured in the T-slot provided as shown in Detail 3a. Position the fence so that the carriage is approximately centered on the fence length and tighten the two mounting screws.

NOTE: The spacer plate shown in mounting the original INCRA Fence in Fig. 2 is not needed for mounting the new style fence.

TIP

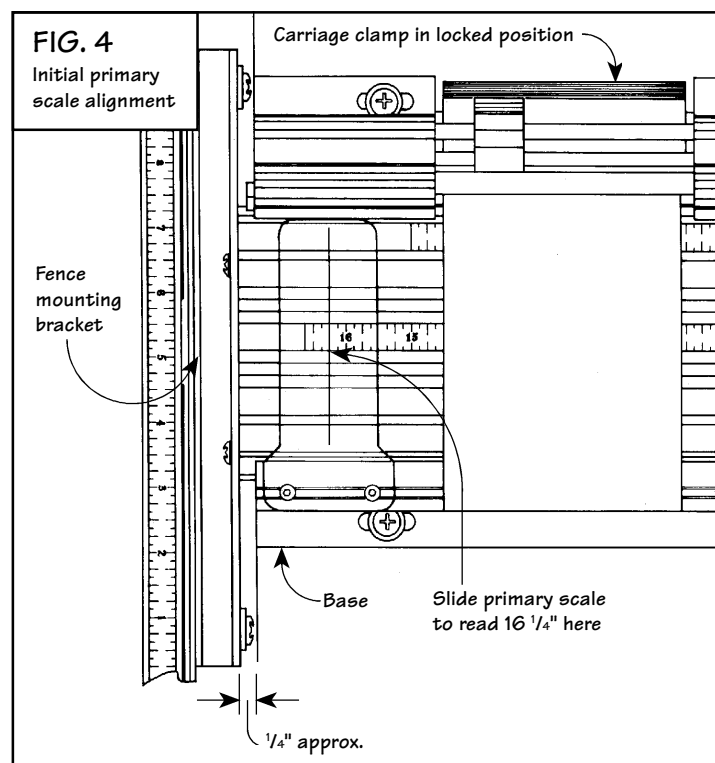
To achieve a silky smooth carriage motion, it is important that your table surface is flat and smooth, and that the carriage is installed parallel to it. If you find that your carriage tends to bind slightly during some portion of its travel, the following additional step should take care of it. Simply place 3 or 4 pieces of paper under the infeed end of the fence before tightening the screws in the final step of the fence mounting procedure described above, and then remove the paper. If the problem still persists, either add a few more pieces of paper, or place the paper under the other end of the fence before tightening.

3 Initial alignment for the primary scale

NOTE: Before installing or sliding a scale or template in any of the five scale slots on the carriage, the carriage clamp must be pulled up into the "locked" position.

Before continuing to the operations section of this owner's manual, it is a good idea to set a preliminary alignment between the primary or center scale and the hairline cursor. Your INCRA JIG ULTRA should still be in the closed position. (In the closed position, the fence mounting bracket should be about $\frac{1}{4}$ " from the front end of the base.) The carriage clamp should be pulled up into the "locked" position. Slide the primary scale in the center scale slot to position 16 $\frac{1}{4}$ " directly under the hairline cursor. (See Fig. 4) Your new INCRA JIG ULTRA is now ready for operation.

IMPORTANT: Whenever moving the INCRA JIG ULTRA's carriage and fence during cutting operations, always locate the carriage so that the mark on the scale or template is aligned directly under the hairline cursor before locking the carriage clamp in place.



OPERATION

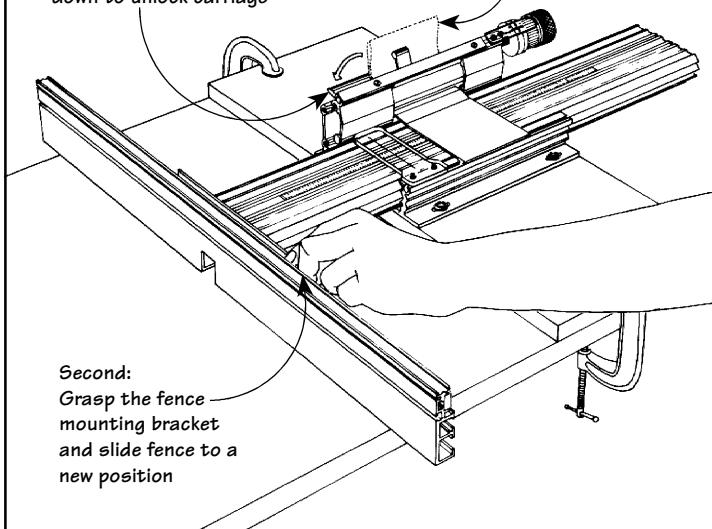
FIG. 5

Moving the fence to a new position

First:
Push carriage clamp down to unlock carriage

Third:
Pull carriage clamp up to lock carriage

Second:
Grasp the fence mounting bracket and slide fence to a new position



Moving to a New Scale Setting

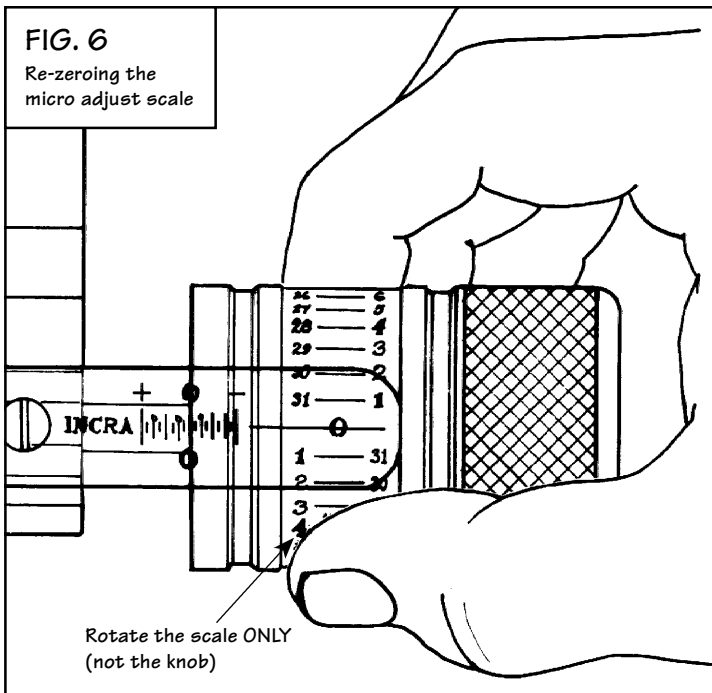
To use your INCRA JIG ULTRA, clamp the plywood base to the stationary tool of your choice. (See the **APPLICATIONS** section beginning on page 8 for specific setup recommendations for the router table, table saw, and drill press.) Moving the fence to any new position is simple. First, push the carriage clamp down to “unlock”, then grasp the fence mounting bracket as shown in Fig. 5 and slide the fence to the new position. Remember, whenever moving the INCRA JIG ULTRA’s carriage and fence to any new position, always align the mark on the scale or template directly under the hairline cursor **before** locking the carriage clamp in place. To secure the carriage at the new scale location, simply pull the carriage clamp handle up into the “locked” position. When moving the carriage, take care not to accidentally slide the scale in its slot.

CAUTION: For your safety, keep both hands behind the fence when moving to any new scale position.

FIG. 6

Re-zeroing the micro adjust scale

Rotate the scale ONLY
(not the knob)



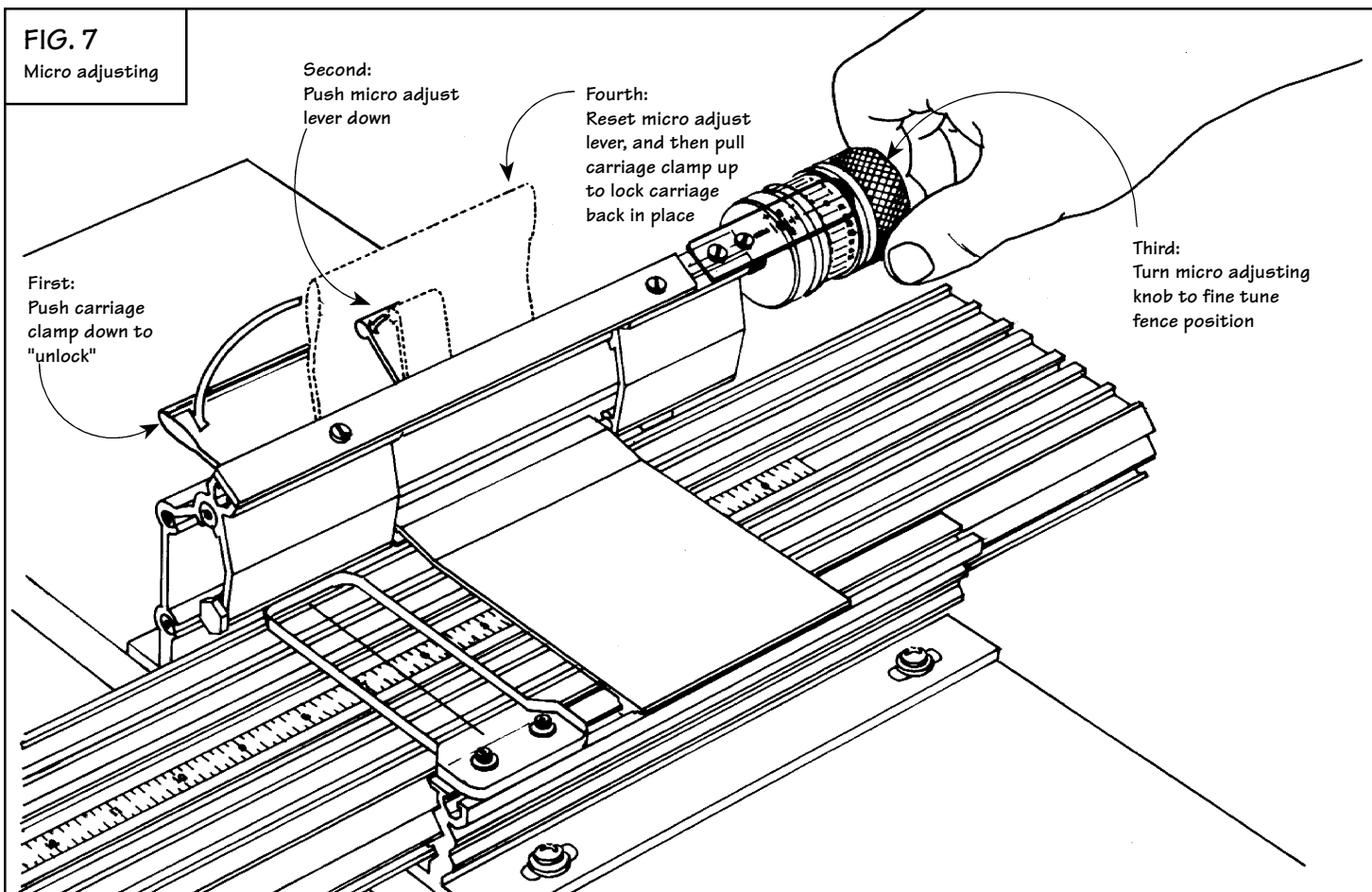
Micro Adjusting

The micro adjust feature of your new INCRA JIG ULTRA allows for precise positioning of the fence to any location between the $\frac{1}{32}$ " tooth spacing of the INCRA racks. You'll find this feature extremely handy the next time you want to widen a mortise by a few thousandths of an inch at the router table or for shaving a “hair” off the width of a tenon cut at the table saw for a great fitting mortise and tenon joint. Use the micro adjuster when cutting grooves to accept inlay strips for a flawless fit, or to loosen up a tight fitting box joint cut with an undersized bit. You'll find it extremely useful when “zeroing” the fence to the bit or blade or for “centering” the cutter on your workpiece when setting up for joinery operations. Let's use a “hands on” step-by-step approach to getting acquainted with and using the various components of this important feature.

NOTE: Before you micro adjust your fence position, you will usually want to make sure that the micro adjust scale reads “0” under the cursor. To adjust, simply rotate the scale (not the knob) with your fingers. See Fig. 6. Now let's micro adjust the fence forward $\frac{1}{64}$ ". See Fig. 7 as you follow the steps.

FIG. 7

Micro adjusting

**1 "Unlock" the carriage clamp**

Push the carriage clamp handle down to "unlock" the carriage.

2 Engage the micro adjust lever

Push the micro adjust lever down to place the INCRA JIG ULTRA into the micro adjust mode.

3 Micro adjust the fence position

Turn the micro adjust knob clockwise $\frac{1}{2}$ turn until you see the $\frac{1}{64}$ " mark appear under the hairline cursor.

4 "Lock" the carriage clamp

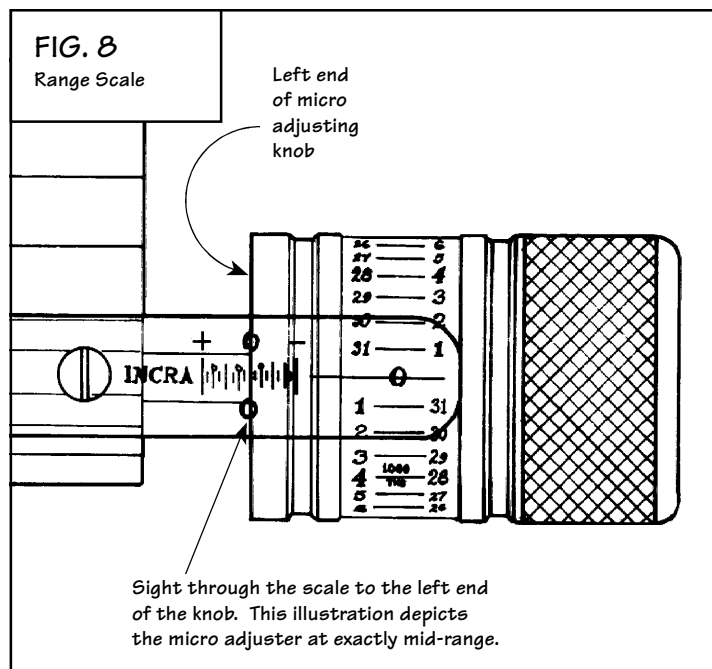
Reset the micro adjust lever, and then pull the carriage clamp handle up to lock the carriage back in place.

You have successfully moved the fence forward $\frac{1}{64}$ ". By turning the micro adjusting knob counterclockwise in **Step 3**, you can move the fence backward and the range scale on the cursor lets you know at a glance which way you've just moved. Simply sight through the range scale to the left end of the micro adjusting knob. See Fig. 8. When the knob aligns with the "0" on the scale, you are at mid-range. From this position, you can micro adjust a full $\frac{1}{4}$ " in either direction. The scale is marked in $\frac{1}{32}$ " increments.

IMPORTANT: Do not turn the micro adjusting knob with the carriage clamp in the "locked" position. The carriage clamp must always be "unlocked" and the micro adjust lever pushed down before micro adjusting the fence position.

FIG. 8

Range Scale

**TIP**

At the end of each day, you might want to micro adjust back to mid-range on the range scale. This ensures that you'll have plenty of micro adjusting range the next time you begin a project.

APPLICATIONS

FIG. 9

INCRA JIG ULTRA
on the router table

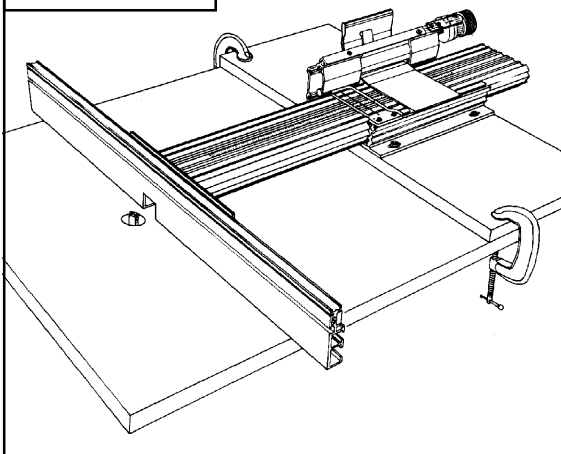


FIG. 10

Router table top
(suggested dimensions)

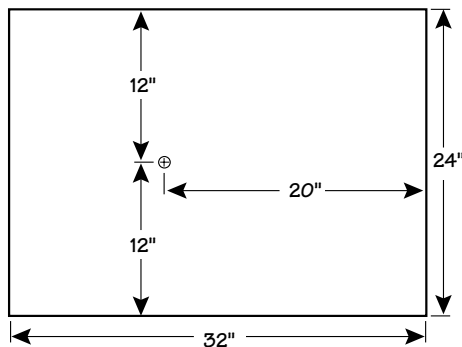
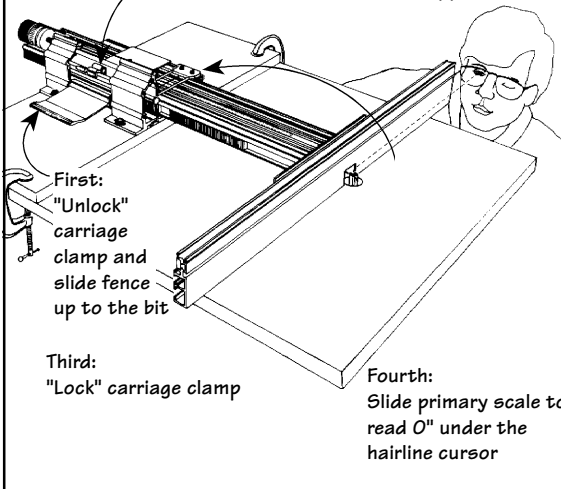


FIG. 11

"Zeroing" the bit
to your fence

Second:
Press micro adjust lever down
and turn micro adjusting knob
until the gap between the
fence and bit disappears



INCRA JIG ULTRA on the Router Table

INCRA JIG ULTRA is unsurpassed for making dovetails on the router table. Just about any dovetail is possible - sliding, half blind, or through - both equally spaced and variably spaced. Even imaginative joints like the INCRA Double Dovetail can be made. But INCRA JIG ULTRA is much more than a dovetail jig. You can also make perfect box joints with any pin spacing imaginable. And with INCRA JIG ULTRA's precise positioning capabilities, geometric patterns for such things as trivets or decorative panels are both easy and fun. If you are interested in making precise, intricate models, you'll find that INCRA JIG ULTRA is just what you have been looking for. In general, any operation on the router table requiring a fence will be accomplished with much greater accuracy, speed, and ease using INCRA JIG ULTRA.

To use INCRA JIG ULTRA on your router table, position the $\frac{3}{4}$ " plywood base on your router table top as shown in Fig. 9. The fence should always be on the right hand side of the router bit as seen from the operator's side of the table. If you do not yet own a router table top, the dimensions shown in Fig. 10 will produce a comfortable table size which allows enough room to use the full range of your INCRA JIG ULTRA.

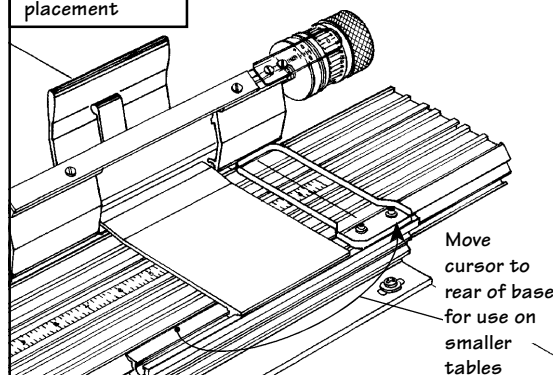
"Zeroing" the bit to your fence

If you wish to set the fence to bit distance equal to zero, release the carriage clamp and slide the fence as close as possible to the router bit. Place the INCRA JIG ULTRA in the micro adjust mode as described on page 7, **Steps 1 and 2**. With the router turned off and unplugged, sight down the fence as shown in Fig. 11 and turn the micro adjusting knob. As you turn the knob, the gap between the fence and the cutting wing of the bit will get smaller. Continue turning the knob until the gap of light disappears. When this happens, the bit will be "zero" distance from the fence. **Check to make sure that the bit is safely centered on the fence notch.** Return the carriage clamp to the "locked" position and slide the primary scale to position the 0" mark directly under the cursor.* You have now positioned your fence so that all of your cuts will be made relative to the **edge** of your stock. (**Example:** By setting your INCRA JIG ULTRA to a scale reading of 1" and making a cut, you will produce a groove 1" from the **edge** of your stock.) If you wish, you can return the micro adjust scale to a "0" reading by rotating the **scale** (not the knob) to position the "0" mark under the micro adjust cursor. (See Fig. 6, page 6.)

* On some smaller router tables you may find that the 0" mark on the scale does not reach the cursor. To remedy this, simply move the hairline cursor to the rear of the base as shown in Fig. 12. This allows the 0" mark on the scale to easily reach the hairline cursor.

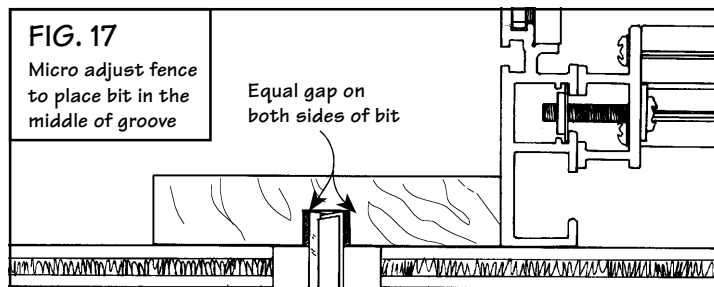
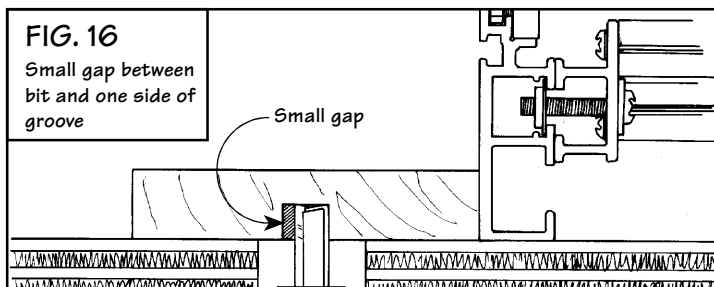
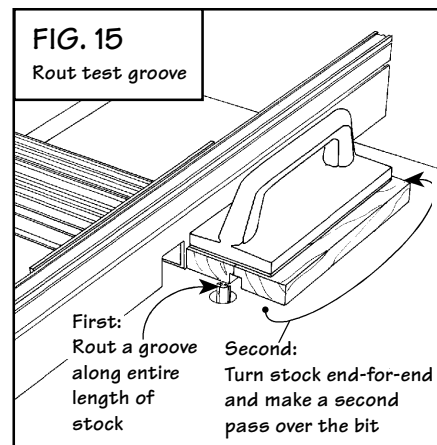
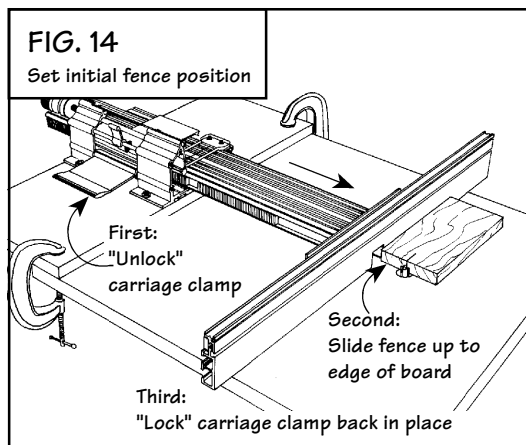
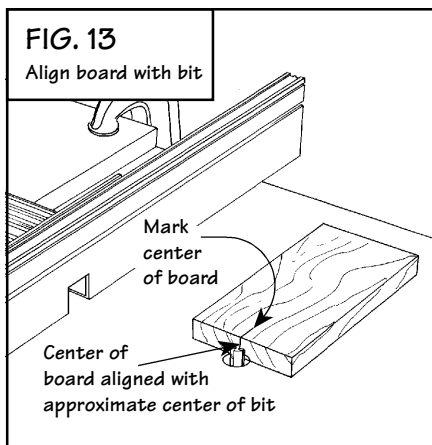
FIG. 12

Alternate cursor
placement



TIP

In addition to the manual "centering" method described on pg. 9, you can automatically center your work using the INCRA Auto-Center (available from your INCRA Dealer). It instantly centers ANY board up to 16" in width.



“Centering” the bit on your workpiece

Making a series of cuts relative to the center **rather** than the edge of the workpiece is often quite useful when producing symmetrical pieces. “Centering” is **always** used when setting up your INCRA JIG ULTRA for joint making. Let’s use a hands on step-by-step approach to understanding this important setup technique. Follow along and you’ll learn how to “center” a $\frac{3}{8}$ " straight bit on a piece of stock $3\frac{3}{4}$ " wide.

Begin by cutting a piece of $\frac{3}{4}$ " thick stock to $3\frac{3}{4}$ " wide by 6" long. Install a $\frac{3}{8}$ " straight bit and set the depth of cut to $\frac{3}{8}$ ".

1 Align board with bit

Mark the center of the board’s width on one end and place the board face down on the router table with the center of the board aligned with the approximate center of the bit. See Fig. 13.

2 Set initial fence position

“Unlock” the carriage clamp and slide the fence up to the edge of the board then “lock” the carriage clamp back in place. See Fig. 14. Make sure the center mark on the board is still aligned with the approximate center of the bit.

3 Rout the test groove

Turn on the router and, **using a good rubber soled push block**, cut a groove along the entire length of the board. See Fig. 15. Now turn the stock end-for-end with the groove still face down, and make a second pass over the bit. This second pass should widen the groove slightly (unless you are already perfectly centered!) Make sure you have turned the stock end for end before making the second pass. (This places the center mark at the **back** of the board.)

4 Fine tune the fence position

With the router unplugged, turn the bit to its widest cut angle when viewed from the infeed side of the table. Place the board against the fence with the bit just inside the

groove cut in **Step 3**. There should be a small gap between the edge of the bit and **one** side of the groove. See Fig. 16.

Now all that is needed is to micro adjust the fence position so that with the board against the fence, the bit is in the center of the groove. To do this, simply “unlock” the carriage clamp and press the micro adjust lever down, then turn the micro adjusting knob until there appears to be an equal gap on **both** sides of the bit. See Fig. 17. “Lock” the carriage clamp back in place. You have now successfully found the center of the $3\frac{3}{4}$ " wide board with your router bit. If you were setting up for joint making on this width of stock, you would now slide a joinery template from the optional Master Template Library into one of the auxiliary scale slots. By positioning the template to place the preselected “center cut” mark directly under the hairline cursor, you would be ready to cut a perfectly centered joint. In fact, if you’ll turn now to page 12, you’ll learn how to use the center you’ve just found to produce a box joint and a half blind dovetail on $3\frac{3}{4}$ " wide stock.



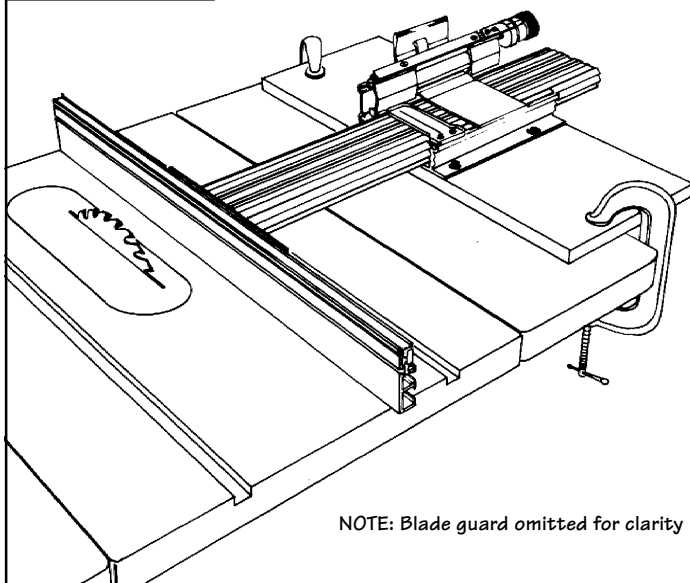
After centering on the $3\frac{3}{4}$ " wide board as described above, slide the extra $\frac{1}{32}$ " “floating” scale to position the $1\frac{7}{8}$ " mark directly under the hairline cursor.* Now the center of any board can be found quickly by using this scale.

Example: If you want to locate the bit in the center of a 4" wide board, simply “unlock” the carriage clamp and move the carriage to position the 2" mark on this scale directly under the hairline cursor ($4 \div 2 = 2$). Now lock the carriage in place. You might still want to make the test cuts described in **Step 3** above since your actual stock width might be slightly more or less than a true 4" measurement.

*On some smaller router tables you may find the $1\frac{7}{8}$ " mark will not reach the hairline cursor. To remedy this, simply move the hairline cursor to the rear of the base. See Fig. 12 on page 8.

FIG. 18

INCRA JIG ULTRA
on the table saw



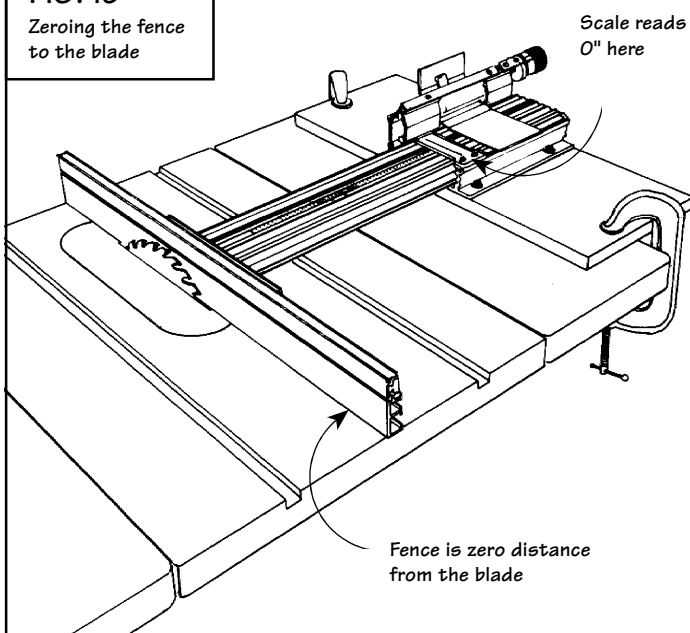
INCRA JIG ULTRA on the Table Saw

Another way of making box joints is to use INCRA JIG ULTRA as an incremental fence or stop block on the table saw. Its usefulness on this machine is also evident in its ability to cut uniform thin strips off the outside edge of the board. Or, if you ever need to cut a precisely spaced series of grooves, INCRA JIG ULTRA at the table saw will handle it with ease. Have you ever tried to exactly duplicate a cut after moving your old fence system? With INCRA JIG ULTRA on your table saw, duplication becomes effortless. No more trial and error cuts. In fact, you'll not find a more accurate table saw fence on the market today.

To use INCRA JIG ULTRA on your table saw, position the $\frac{3}{4}$ " plywood base on your tabletop as shown in Fig. 18 and follow the instructions below for zeroing the fence to the blade. If you wish to cover the notch on your INCRA fence, mount a wooden auxiliary fence as described on page 7 of your INCRA PRO Fence System Owner's Manual. Or, if you prefer, a notchless version of the INCRA PRO Fence is available. (See order information at the back of this manual.)

FIG. 19

Zeroing the fence
to the blade



"Zeroing" the fence to the blade

With the motor unplugged, raise your table saw blade to about 2". Loosen the C-clamps that secure the wooden base to your table saw. "Unlock" the carriage clamp and slide the fence up to the blade then "lock" the carriage clamp back in place. Carefully position the entire assembly so that the fence is centered on the tabletop and "kissing" the blade. See Fig. 19. Be gentle when positioning the fence adjacent to the blade so that you don't deflect the blade. Clamp the plywood base to the tabletop with the (2) C-clamps, being careful not to shift the base. Now slide the middle "primary" scale to position the 0" mark directly under the cursor. You have now positioned the fence parallel to the blade and set the fence to blade distance at zero.

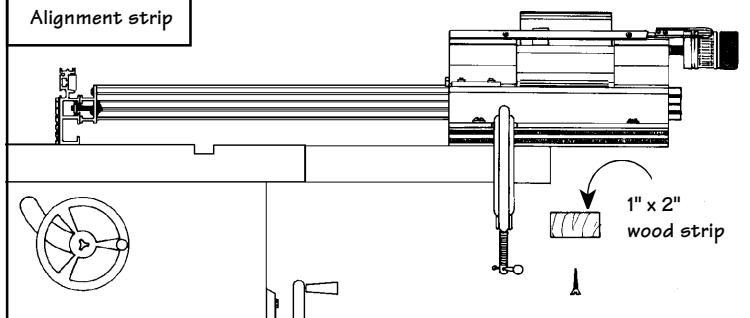
On some table saws you may find the 0" mark will not reach the hairline cursor. To remedy this, simply move the hairline cursor to the rear of the base. See Fig. 12 on page 8.

TIP

Once you have "zeroed" the INCRA JIG ULTRA on your table saw, glue and screw a 1" x 2" piece of hardwood to the underside of the plywood base adjacent to the right edge of the table saw. See Fig. 20. The 1" x 2" should be about as long as the plywood base. Make sure it is butted up against the right edge of the table saw before screwing in place. Now, should you need to remove the INCRA JIG ULTRA from the table saw, you can quickly reinstall it in the exact position as before by butting the 1" x 2" against the right edge of the saw and clamping the plywood base in place.

FIG. 20

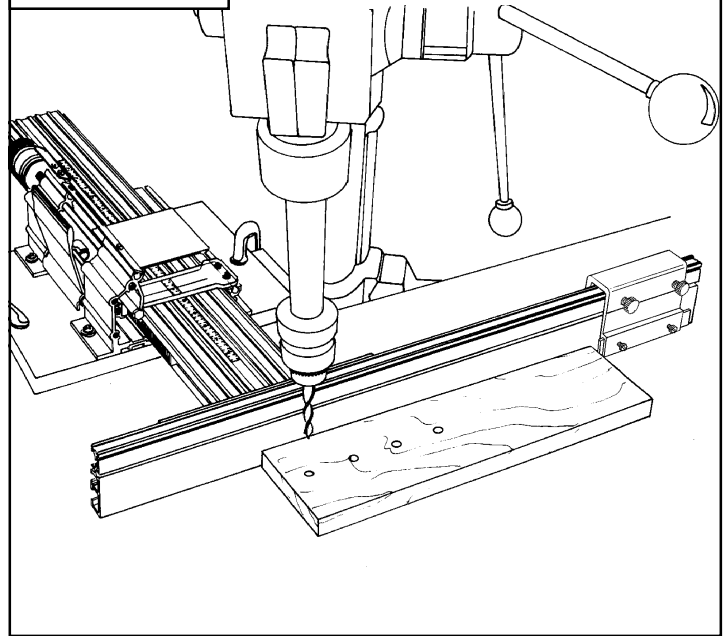
Alignment strip



INCRA JIG ULTRA on the Drill Press

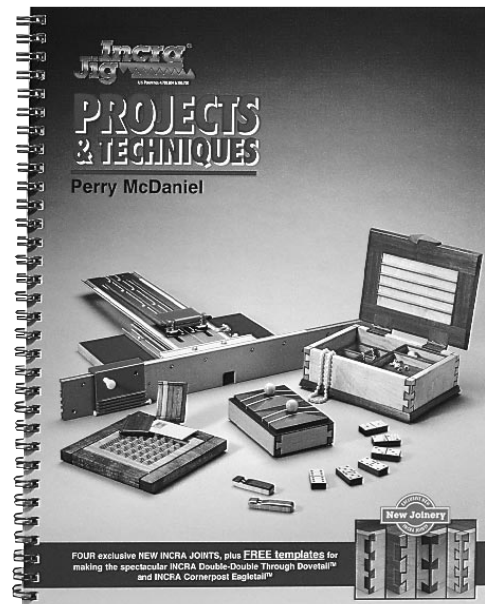
Another common tool that is greatly enhanced by INCRA JIG ULTRA is the drill press. Used as a variable stop block, it gives you precise, single axis positioning control. When INCRA JIG ULTRA is used in conjunction with the INCRA Pro Fence and INCRA Stop you have an ultra-accurate x-y positioner. See Fig. 21. You can quickly, easily and accurately locate and drill any 2-dimensional array of holes by simply moving the INCRA JIG ULTRA and the INCRA Stop to the desired settings. A cribbage board is a good example of a project that requires this ability. And since you can locate any hole to within a few thousandths of an inch, INCRA JIG ULTRA on the drill press is great for making perfect dowel joints.

FIG. 21
INCRA JIG ULTRA
on the drill press



TIP

For more information on using INCRA tools on the router table, table saw and drill press, pick up the new book, **INCRA JIG Projects and Techniques**, available from your local INCRA dealer.



JOINT MAKING

FIG. 22

Equally spaced $\frac{3}{8}$ " box joint

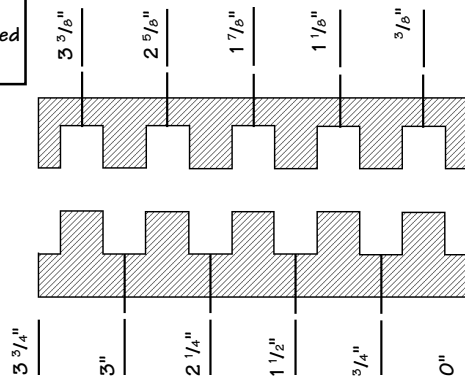


FIG. 23

Make the cuts on the top half of Fig. 22

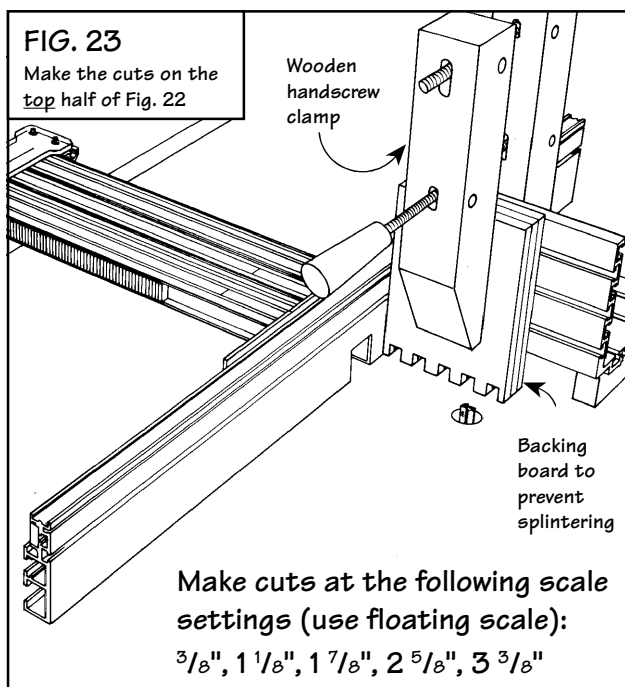
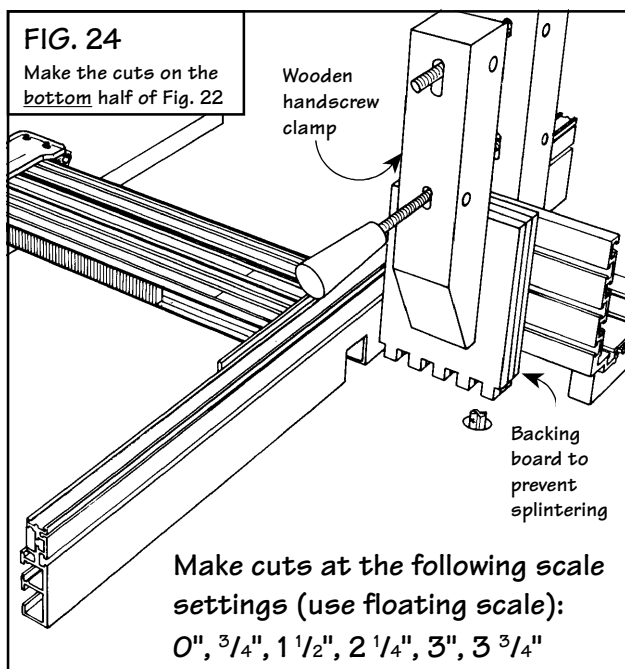


FIG. 24

Make the cuts on the bottom half of Fig. 22



NOTE: If you have purchased the **INCRA Master Reference Guide & Template Library**, it is not necessary to read this section on joint making. You'll find the **Reference Guide** covers this topic completely.

Three important operations take place when using your INCRA JIG ULTRA for joinery at your router table:

1. **Setting the router bit depth of cut**
2. **"Centering" the bit on your workpiece**
3. **Cutting the joint**

Again we will use a step-by-step approach to make using and understanding these operations easy. Let's start with a box joint.

Box Joints

You'll want to begin this exercise by cutting your stock to length and width. Use $\frac{3}{8}$ " thick stock and cut (4) boards to $3\frac{3}{4}$ " wide x 6" long. The joint you will be making is an equally spaced $\frac{3}{8}$ " box joint so you'll also need a $\frac{3}{8}$ " straight bit.

1 Set the depth of cut

Install the $\frac{3}{8}$ " straight bit in your router table and set the depth of cut to slightly greater than the thickness of your stock.

2 "Center" the bit on your stock width

Use the "centering" method described on page 9 to find the center of the board. After you have found the center, slide the extra $\frac{1}{32}$ " floating scale to position the $1\frac{7}{8}$ " mark directly under the hairline cursor. On some smaller router tables you may find the $1\frac{7}{8}$ " mark will not reach the hairline cursor. To remedy this, simply move the hairline cursor to the rear of the base. See Fig. 12 on page 8.

3 Cut the joint

Clamp two of your boards to the INCRA Right Angle Fixture with a backing board as shown in Fig. 23. The backing board is used to prevent splintering as the bit exits the cut. Make cuts at the scale locations shown on the top half of the drawing in Fig. 22. Make sure you are using the floating scale in Step 2. After completing the cuts, flip the boards end-for-end and repeat the same cuts. Now clamp the remaining two boards with a backing board to the INCRA Right Angle Fixture as shown in Fig. 24 and make cuts at the scale locations shown on the bottom half of the drawing in Fig. 22. "Sneak up" to the first cut (0 ") in several light side-by-side passes to avoid splintering the edge of the stock. (This is just good router table technique.) When you have completed the cuts, flip the boards over and repeat the same cuts.

You have just completed your first INCRA box joint. With a little practice, it's really quite easy. You'll notice in **Steps 2** and **3**, we installed and used the $\frac{1}{32}$ " scale to locate the various cuts. When you later begin using the joinery templates from the optional **INCRA Master Reference Guide & Template Library**, they will be used in the same way. In fact, the INCRA joinery templates are simply "scales" which have had all the marks you don't need left off. Just find the center of your stock, slide the suggested "center cut" on the template under the hairline cursor, then make "A" cuts on two of the boards and "B" cuts on the remaining two.

Too tight or too loose?

Check the fit of the pieces. If the joint is too tight or too loose, the problem is the bit, not the INCRA JIG. An oversized bit will create a loose fit. An undersized bit will create a tight fit. The best fit will be found by using a straight bit that is just slightly oversized, which is the way that most good bits are manufactured. To loosen a tight fitting joint, you can micro adjust the fence backward about five thousandths and then re-cut one of the series of cuts. **CAUTION:** Remember, whenever cutting with a straight bit, that the bit manufacturers recommend that you cut no deeper than the diameter of the bit in a single pass.

FIG. 25

Set initial depth of cut

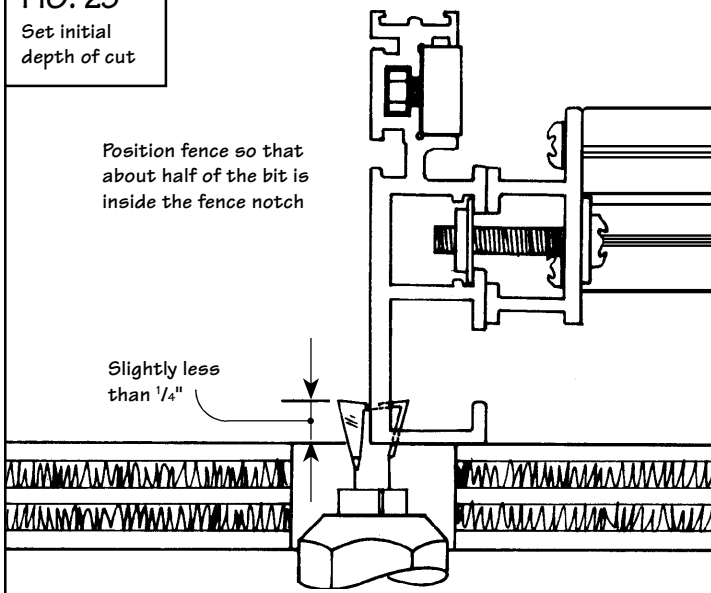
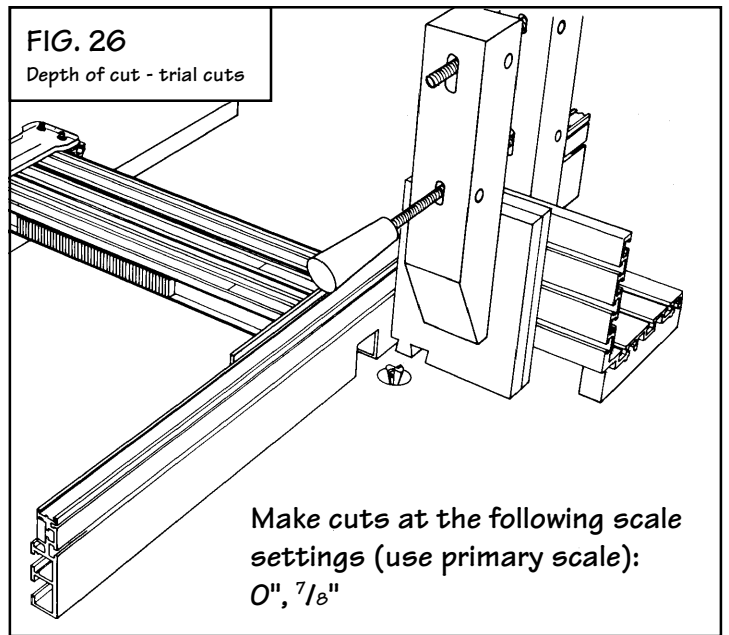


FIG. 26

Depth of cut - trial cuts



Half Blind Dovetails

You'll want to begin this exercise by cutting some stock to length and width. Use $\frac{1}{2}$ " thick stock and cut (6) boards $3\frac{3}{4}$ " wide x 6" long. You will be making an equally spaced half blind dovetail requiring a $\frac{1}{2}$ " 14° dovetail bit.

1 Set the depth of cut

Install the $\frac{1}{2}$ " 14° dovetail bit in your router table and set the initial depth of cut to slightly less than $\frac{1}{4}$ ". Position the fence as shown in Fig. 25 so that about half of the bit is inside the fence notch. Slide the middle "primary" scale to read 0" under the cursor. (On some smaller router tables you may find the 0" mark will not reach the hairline cursor. To remedy this, simply move the hairline cursor to the rear of the base. See Fig. 12 on page 8.)

Clamp two of your boards to the INCRA Right Angle Fixture as shown in Fig. 26 and make cuts at scale readings of 0" and $\frac{7}{8}$ ". Make sure you are reading the middle "primary" scale set above.

Unclamp the two boards and test the fit by joining them as shown in Fig. 27. As with any half blind dovetail jig, a little trial and error is necessary to achieve a snug fitting joint. The fit can be fine-tuned by adjusting the dovetail bit's depth of cut. To tighten the fit, raise the bit up slightly. To loosen the fit, lower the bit slightly. Just remember this phrase: **Heighten to tighten, lower to loosen**. After adjusting the bit height, make a new set of trial cuts (two cuts $\frac{7}{8}$ " apart) on the opposite end of the boards. After a few adjustments and trial cuts, you'll have a perfect fit. If you mark the good fitting cuts on one of the boards, you can save this piece to use as a depth gauge the next time you set up your $\frac{1}{2}$ " dovetail bit for joinery.

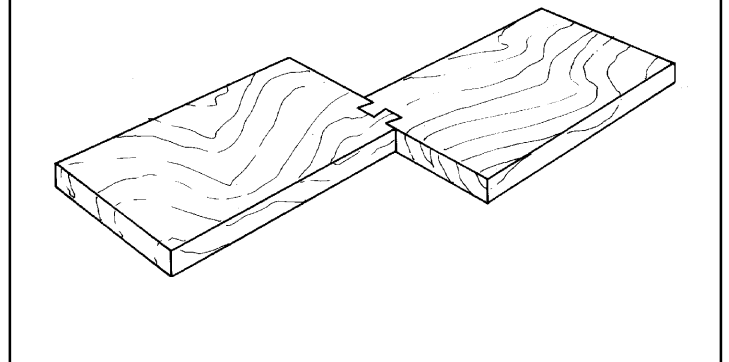
2 "Center" the bit on your stock width

Use the "centering" method described on page 9 to find the center of the $3\frac{3}{4}$ " wide board with your dovetail bit. After you have found the center, slide the extra $\frac{1}{32}$ " floating scale to position the $1\frac{7}{8}$ " mark directly under the hairline cursor.

3 Cut the joint

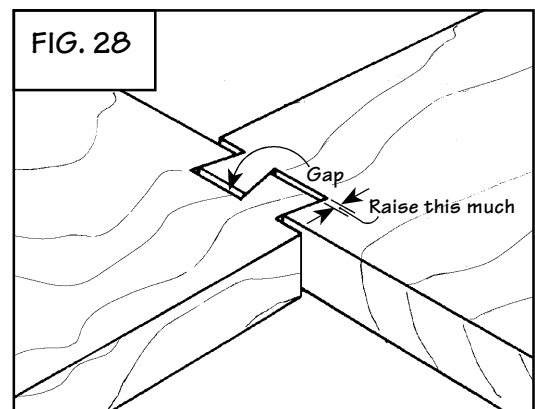
FIG. 27

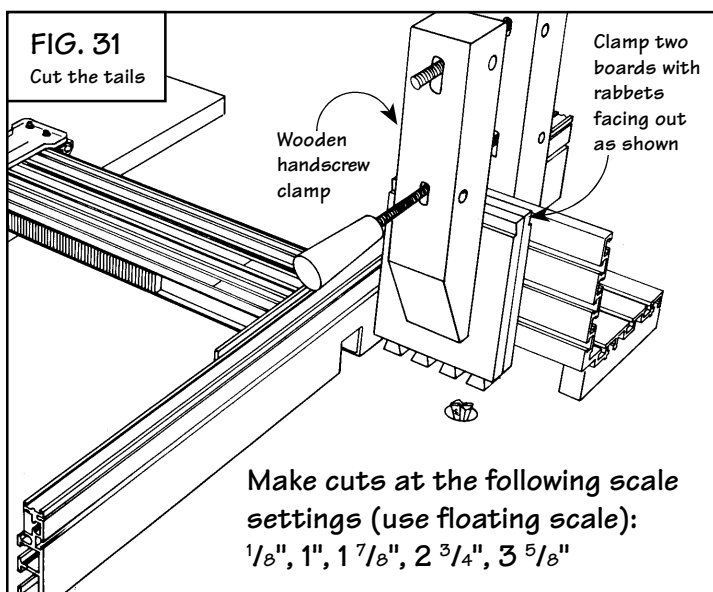
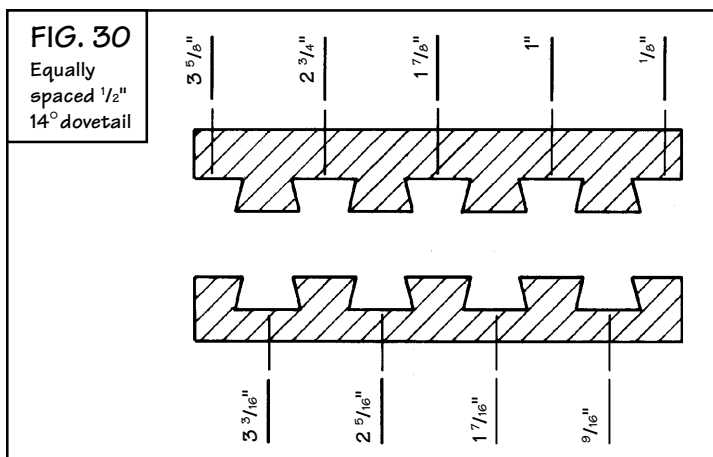
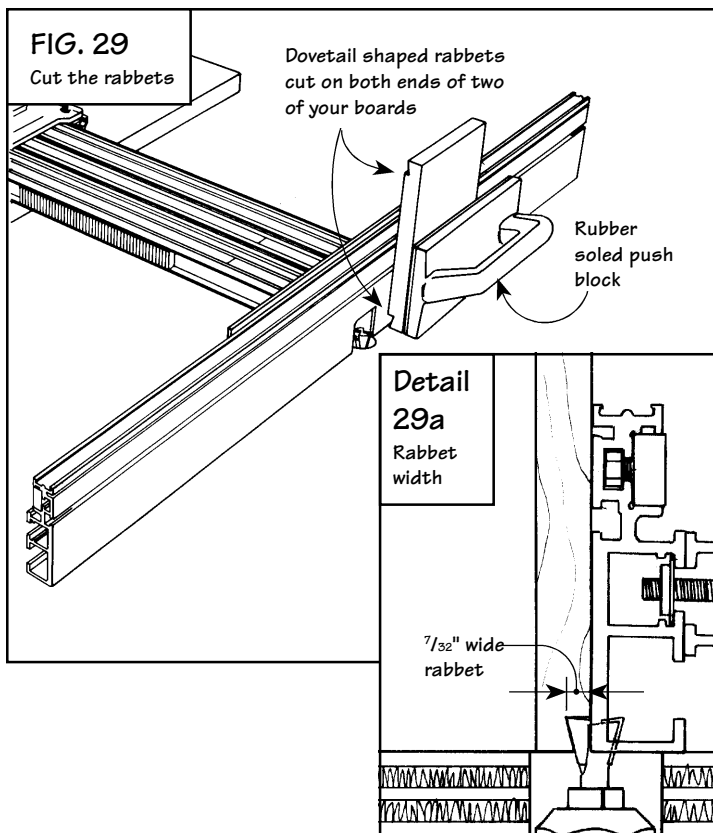
Test the fit



TIP When the fit is too **loose**, the trial cuts provide a gauge to let you know how much to raise the bit. Just join the trial pieces end to end and gently pull the two boards to wedge the dovetails together. The gap that appears is the distance you need to raise your dovetail bit to achieve a tight fit.

FIG. 28





Tail Cuts

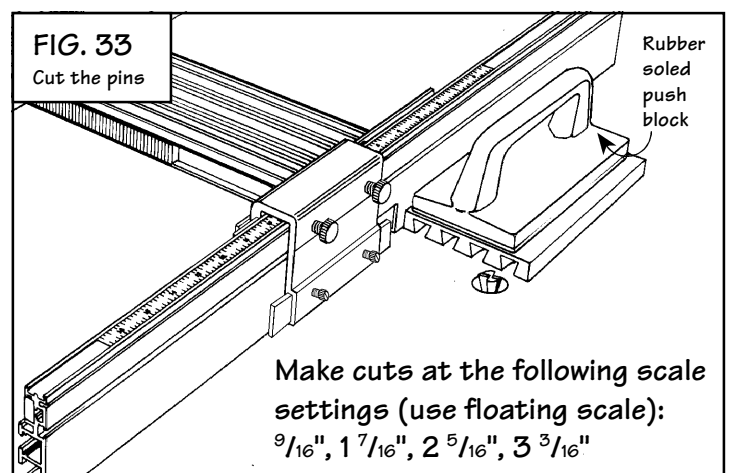
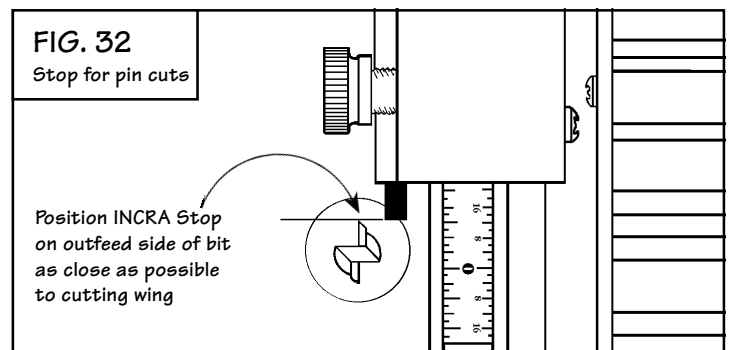
To create the tails, start by cutting a dovetail shaped rabbet on both ends of **two** of your boards. See Fig. 29. The rabbet needs to be $\frac{7}{32}$ " wide. See Detail 29a. **DO NOT** cut the full width of the rabbet in **one** pass. Instead use 3 or 4 light side by side passes.

Now clamp the boards to your INCRA Right Angle Fixture as shown in Fig. 31 and make cuts at the scale locations shown on the top half of the drawing in Fig. 30. Make sure you are reading from the floating scale set in **Step 2** on page 13. As always, with good router table technique, "sneak up" to the first cut ($\frac{1}{8}$ " in several light side by side passes to avoid splintering the edge of the stock. After completing the cuts, flip the boards over and repeat the same cuts. Your two tail boards are now complete.

Pin Cuts

Set your INCRA JIG ULTRA to the first scale setting shown on the **BOTTOM** half of the drawing in Fig. 30 ($\frac{9}{16}$ " in). Position an INCRA Stop on the fence with the plastic stop strip as close as possible to the dovetail bit and clamp in place. (The plastic stop strip should **not** be touching the router bit.) See Fig. 32. The INCRA Stop is used to limit the **length** of the pin cuts.

Place one of the remaining two boards face down on the router table as shown in Fig. 33 and make cuts at the scale locations shown on the **BOTTOM** half of the drawing in Fig. 30. Be sure to use a good rubber soled push block as shown. Make the cuts on only one end of the board for now. After making the four cuts, check the fit between this pin board and one of your tail boards. If the tails don't fit all the way into the pins simply lengthen the pin cuts by moving the INCRA Stop away from the bit. Recut the pin board and again check the fit. Once you have a flush fit, make the pin cuts on the opposite end of the board and on both ends of the remaining board.



You have just completed your first INCRA half blind dovetail. You'll notice in the first step you set the depth of cut by making two cuts $\frac{7}{8}$ " apart. This spacing works well with a $\frac{1}{2}$ " 14° dovetail bit, but larger or smaller diameter bits will require a different spacing between these two cuts. To help you determine the proper spacing you'll find a chart on page 3 of the **INCRA Master Reference Guide & Template Library**. The chart will give you the proper spacing for the router bit and template pattern you have selected. You'll also find the proper spacing listed as "Distance to set depth of cut" under each template pattern diagram in the back of the **INCRA Master Reference Guide & Template Library**. Since different diameter router bits will also require different rabbet widths, the **INCRA Master Reference Guide & Template Library** also gives this information with each joint pattern.

In **Steps 2 and 3**, you positioned and used a $\frac{1}{32}$ " scale to locate the various cuts for the tail and pin boards. When you later begin using the joinery templates from the optional **INCRA Master Reference Guide & Template Library**, they will be used in the same way. In fact, you can think of the joinery templates as "scales" that have had all the marks you don't need erased. Just find the center of the stock width you are using with the router bit, then slide the suggested "center cut" on the template under the hairline cursor. Each template has two series of marks, "A" cuts and "B" cuts. Just use one series for your tail board cuts and the other series for your pins.

Pins or Tails?

Looking at an assembled dovetail, it is often difficult at first glance to tell which boards are the pins and which boards are the tails. They each have dovetail shaped cuts in them, so what makes them different and where is each used in a case construction?

To answer the last question, dovetails are most often used for one of two different reasons-beauty or strength. When used to decorate a piece, most woodworkers prefer to put the tail boards on the side of the construction most visible to the viewer. When used for strength, the tail boards are placed in the construction so that they are parallel to the direction of the force being applied. In drawer constructions, for instance, the tail boards are always placed on the sides parallel to the pull and push motions involved in opening and closing. This places the pin boards on the front and back. Wall hung cabinets should always be built with the tail boards on the sides, since once the cabinet is loaded with weight, the force is downward. This places the pin boards on the top and bottom. Once you've determined which sides of your construction will be pins and which will be tails, use the illustration and the information in Fig. 35 to ensure the proper cuts are made on each.

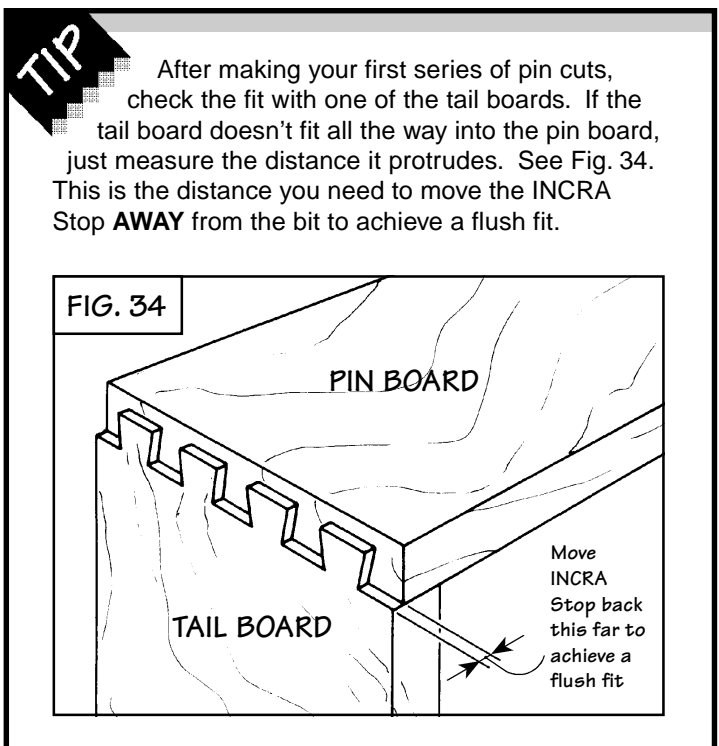
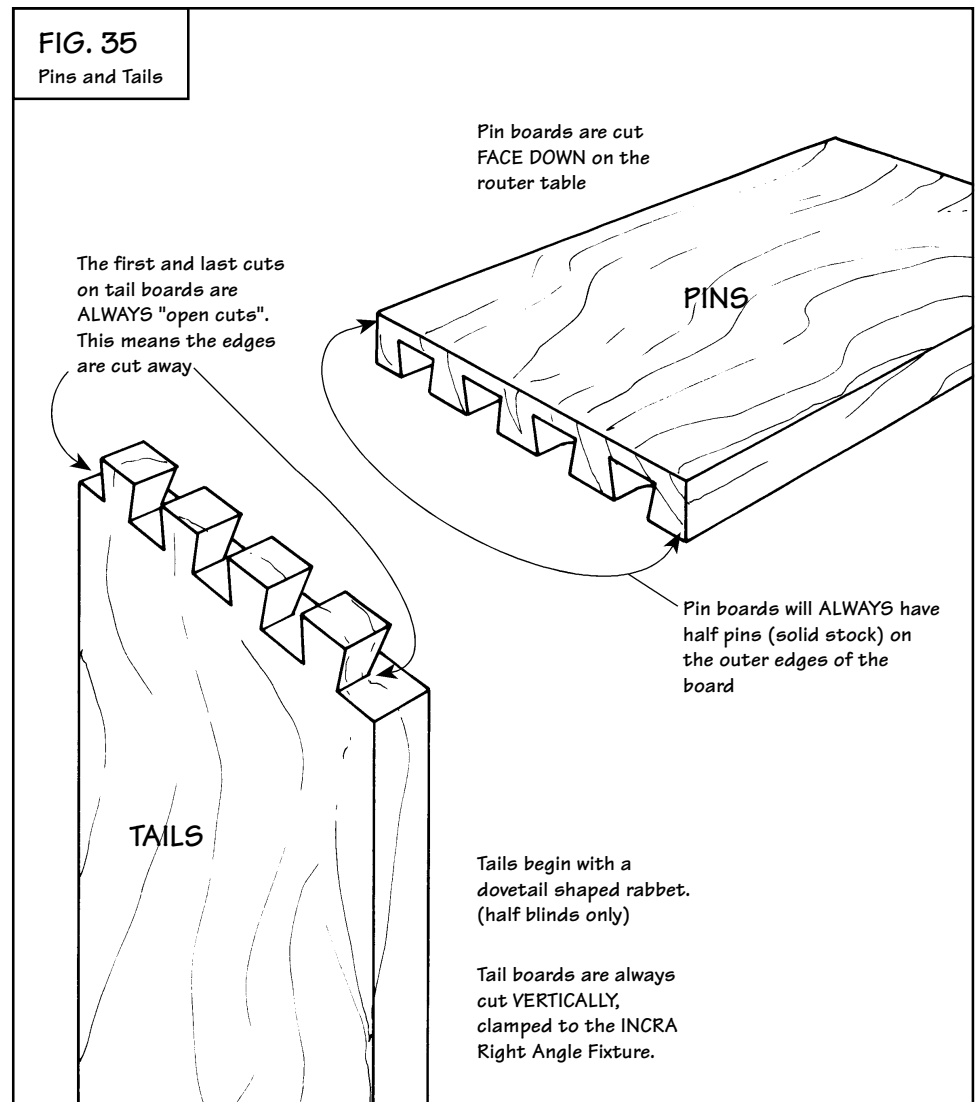


FIG. 35

Pins and Tails



TROUBLE SHOOTING GUIDE

We don't think you'll ever have to look at this section, but if you do you'll find a quick answer to your question.

| SYMPTOM | PROBABLE CAUSE | SOLUTION |
|---|--|--|
| Carriage clamping pressure is too tight or too loose. | Carriage clamp not adjusted properly. | Adjust clamping pressure (see page 18). |
| LEXAN™ scale is difficult to slide | Scale slot has become dirty. | Remove the scale and clean the slot thoroughly with paste wax or, preferably, Top-Cote (available from your INCRA dealer). Then slide the scale back into the slot. CAUTION: DO NOT allow wet Top-Cote to come into contact with LEXAN scale or Templates, or any other plastic material. |
| Racks do not mesh properly when engaging the carriage clamp. | Sawdust on racks. | Remove all debris from the racks' teeth with a stiff brush, such as a toothbrush. (DO NOT attempt to clean the racks with solvents of any kind as this may damage them.) |
| | Scale mark is not aligned directly under the hairline cursor. | Set the jig to mid-position and lock the carriage clamp. Then position the scale so that the 8" mark is directly under the hairline. When setting the jig to any new position, always make sure that the scale mark is aligned directly under the hairline cursor BEFORE locking the carriage clamp. |
| | Carriage racks are improperly aligned. | Realign the carriage racks as described on page 19. |
| When the jig is moved to a new position the carriage does not glide easily. | Fence is improperly mounted on the fence bracket. | If the fence is mounted too high or too low on the bracket, it can cause resistance when moving from one position to another. If this is the case, loosen the screws holding the fence and realign. See page 4, Step 2. |
| | Surface of table is not flat. | Bumps or dips on the table surface can force the carriage into non-parallel alignment with the base. Check your table surface for flatness. This is also important from a woodworking standpoint because errors in the surface of the table will translate directly into errors in your finished work. |
| Fence is not square to the table surface at all jig positions. | Fence is improperly mounted on the fence bracket. | If the fence is mounted either too high or too low on the fence mounting bracket, it can change the angle of the fence relative to the table when it is moved from one position to another. If this is the case, loosen the screws holding the fence to the bracket and realign. See page 4, Step 2. |
| | There are several possible causes: Jig mounting board is not flat, table is not flat, sawdust between table and mounting board, or sawdust between the mounting board and the jig. | If you identify any of these, take steps to correct the problem. You can also use shims to bring the fence into perfect squareness as per the instructions on page 5 of your INCRA PRO Fence System owner's manual. |

| SYMPTOM | PROBABLE CAUSE | SOLUTION |
|--|---|---|
| Micro adjusting knob will not rotate or is difficult to rotate. | Carriage clamp is not "unlocked" | Carriage clamp must be pushed down to the "unlock" position and the micro adjust lever must be pressed down to place the jig in the micro adjust mode. See page 7, Steps 1- 4. |
| | Jig is micro adjusted to end of the forward travel range. | Micro adjust back to mid-range position as indicated by the micro adjust range scale. (Turn knob counter-clockwise until "0" on the scale is aligned with the left end of the micro adjusting knob.) |
| Micro adjusting knob rotates but no movement of the carriage or fence. | Micro adjust lever not engaged. | After "unlocking" the carriage clamp the micro adjust lever must be pushed down to place the jig in micro adjust mode. See page 7, Steps 1- 4. |
| | Jig micro adjusted to end of backward travel range. | Micro adjust jig forward to mid-range as indicated by the micro adjust range scale. (Turn knob clockwise until "0" on the range scale is aligned with the left end of the micro adjust knob. |
| After placing jig in micro adjust mode, the micro adjusting knob will not turn even though the range scale indicates travel range available. | Micro adjust range scale not properly aligned. | Realign micro adjust range scale. See page 18. |
| Carriage clamp squeaks when clamping or unclamping | Carriage clamp pivot pin needs lubrication | Remove the carriage from the base, then remove the (6) phillips head wood screws that secure the ULTRA base to your plywood subbase. Turn the ULTRA's base upside down and you'll see where the carriage clamp pivot pin passes through the clamp handle. Apply a thin coat of light grease to the pivot pin using a small cotton swab then remount the ULTRA base to your plywood. See page 4, Fig. 1. |
| | 1/8" thick carriage clamp pad needs lubrication. | Apply a thin coat of light grease to the carriage clamp pad. |

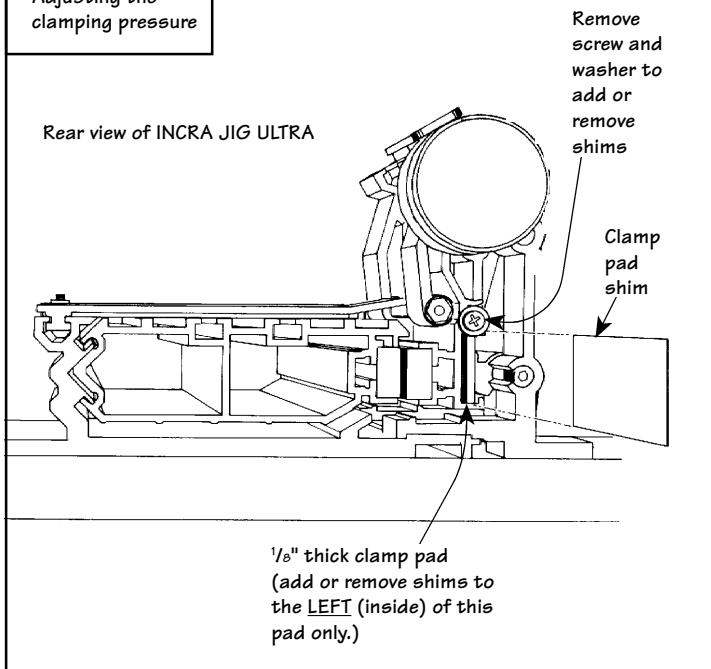
MAINTENANCE

In general, just keeping your INCRA JIG clean is all you need to do to keep the tool in tip top shape. Occasionally, remove the carriage from the base and brush or blow out any sawdust or debris that may have accumulated on the base and the UHMW guide bearing strips. Use a toothbrush to clean the teeth on the INCRA racks on both the carriage clamp and on the carriage.

ADJUSTMENTS

FIG. 36

Adjusting the clamping pressure



All of the components and features of your new INCRA JIG ULTRA have been factory set and should require no further adjustment. If, however, you wish to adjust or recalibrate these components the following information is provided to assist in performing the adjustments.

Adjusting the Clamping Pressure

NOTE: The ULTRA MUST be attached to the $\frac{3}{4}$ " plywood base with ALL SIX mounting screws (see Fig. 1, page 4) BEFORE adjusting the clamping pressure.

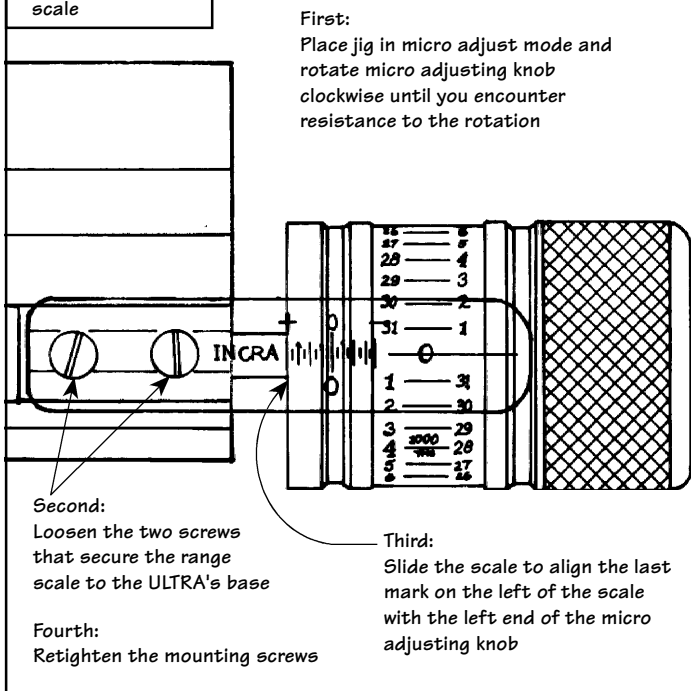
The INCRA JIG ULTRA carriage clamp was designed to make it easy for the operator to adjust the clamping pressure to his own individual preference using the supplied clamp pad shims. Here's how:

"Unlock" the carriage clamp, slide the carriage so that its end is about 1" forward of the rear end of the base and press the micro adjust lever down. Remove the phillips head screw that caps the end of the clamping pad slot. Your hardware pack for the ULTRA includes three 6" x $\frac{7}{8}$ " x .005" clamp pad shims. If you want to increase the clamping pressure add one of these shims, check the clamping pressure, and adjust further as necessary. **The shim should be placed to the left (inside) of the $\frac{1}{8}$ " thick clamp pad shown in Fig. 36.** To decrease the clamping pressure simply remove one of the existing thin shims. When you are satisfied with the clamping pressure replace the phillips head screw and washer.

CAUTION: If you have reduced clamping pressure by removing a shim, be certain that adequate pressure remains to hold the carriage rigidly in place when clamped in the fully extended position. If not, increase clamping pressure by adding shims as described above.

FIG. 37

Recalibrating the micro adjust range scale



Realigning the Micro Adjust Range Scale

If you wish to verify the mid-range location of the micro adjust range scale use the following procedure:

"Unlock" the carriage clamp and press the micro adjust lever down to place the INCRA JIG ULTRA into the micro adjust mode. Turn the micro adjusting knob clockwise until there is noticeable resistance to the rotation of the knob. **DO NOT** force the knob. Loosen the screws that secure the micro adjust range scale and align the last mark on the left end of the scale with the left end of the micro adjusting knob. See Fig. 37. Retighten the mounting screws then turn the micro adjusting knob counter-clockwise to return to a mid-range reading of "0". "Lock" the carriage clamp back in place.

Realigning the Carriage Racks

Remove the carriage from the base and loosen the screws which hold the racks to the carriage so that they slide easily along the mounting track.

NOTE: DO NOT alter the position of the carriage clamp or the micro adjust lever when the carriage is slid out of the base.

Align the end of rack #1 flush with the rear end of the carriage and tighten the mounting screws. Position the other racks on the mounting track with their ends approximately 1 1/2" apart. See Fig. 38. **DO NOT** tighten the screws for racks #2 and #3 yet.

Carefully slide the carriage back into the base, taking care not to change the position of the loose racks. Position the carriage so that the base is centered approximately between the ends of racks #1 and #2. See Fig. 39. With the carriage properly located you should be able to see one of the mounting screws for each of the two racks. Pull the carriage clamp up into the "locked" position and the rack on the clamp will automatically align rack #2 with rack #1. Tighten the accessible mounting screw on rack #2. Unlock the carriage clamp and move the carriage forward to tighten the other mounting screw on rack #2. Now locate the carriage so that the base is centered approximately between the ends of racks #2 and #3. Again, "lock" the carriage clamp to bridge the two racks and tighten the accessible mounting screws on rack #3. Then "unlock" the carriage clamp and move the carriage forward to tighten the remaining screw on rack #3.

NOTE: If you have the longer 24" range INCRA JIG ULTRA, there will be an additional rack #4. If so, use the same procedure for aligning and tightening these racks that you used for racks #2 and #3 described above.

FIG. 38

Realigning the carriage racks

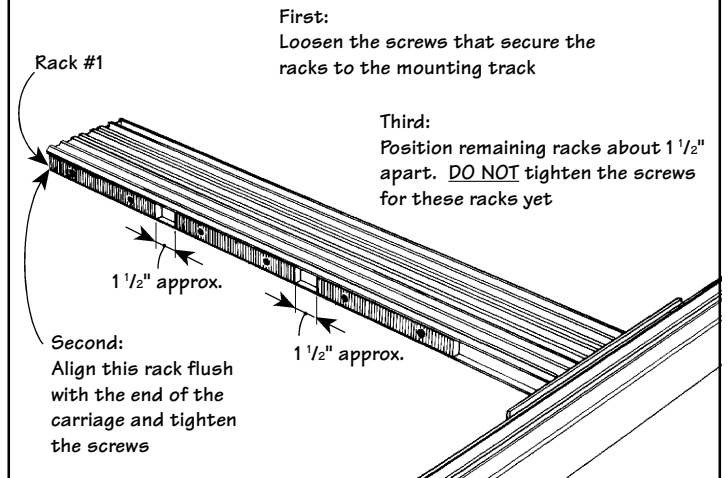
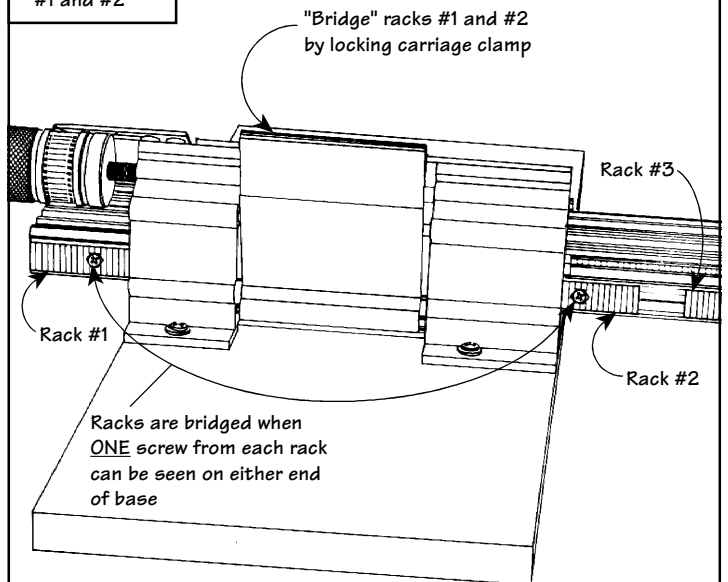


FIG. 39

"Bridge" racks #1 and #2



SPARE PARTS ORDER LIST

| Part # | Part Description | Price |
|---------------|---|---------|
| IJU-MACCURSOR | Micro adjust cursor (with mounting hardware) | \$ 4.95 |
| IJU-HLCURSOR | Primary hairline cursor (with mounting hardware) | \$ 6.95 |
| IJU-MMRACK | Metric racks - set of 5 racks with 16" long metric scale and mounting hardware | \$ 6.95 |
| IJU-MMSCALE | 16" long metric scale | \$ 2.95 |
| IJU-32SCALE | 16" long 1/32" scale (set of 2) | \$ 3.95 |
| IJU-NLFENCE | "Notchless" INCRA PRO Fence (28" long) | \$44.95 |
| IJU-UHMW | UHMW bearing strips (for base) set of 3 | \$ 1.95 |
| IJU-SHIM | UHMW carriage clamp pad and shims pack Includes: 1 ea. 1/8" thick UHMW clamp pad 1 ea. .005" thick shim 2 ea. .010" thick shims 2 ea. .020" thick shims | \$ 1.95 |
| IJU-24CARR | 24" range carriage (only), includes racks, scales and fence mounting bracket. | \$79.95 |

TO ORDER:

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WARRANTY

Taylor Design Group, Inc. warrants this product for one year from the date of purchase. We will repair, without charge, any defects due to faulty material or workmanship, or at our option, replace the product free. Please return the failing part only, transportation prepaid, along with a description of the problem to the address below. This warranty does not apply to parts which have been subjected to improper use, alteration, or abuse.

LIFETIME WARRANTY ON POSITIONING RACKS

If an INCRA positioning rack in this tool becomes damaged for **ANY** reason, Taylor Design Group will replace it free of charge for as long as you own the tool. Return the damaged rack, transportation prepaid, and allow 1 to 2 weeks for delivery.

NOTE: Replacements cannot be sent unless damaged racks have been received by Taylor Design.

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