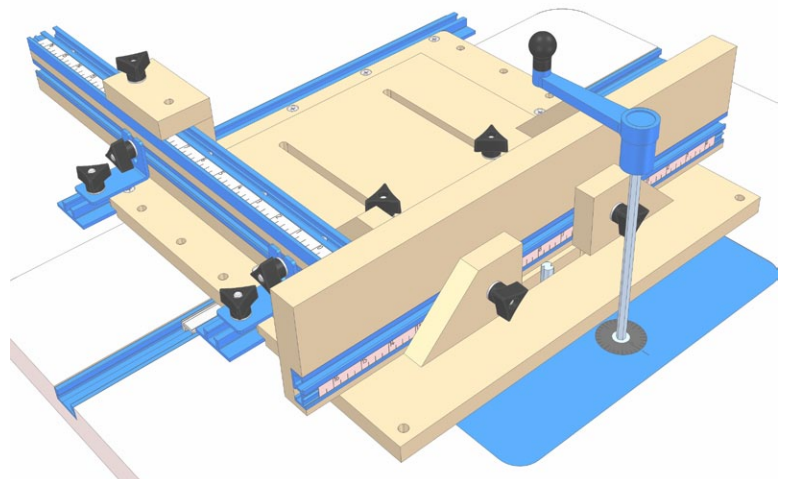




INCRA Build-It

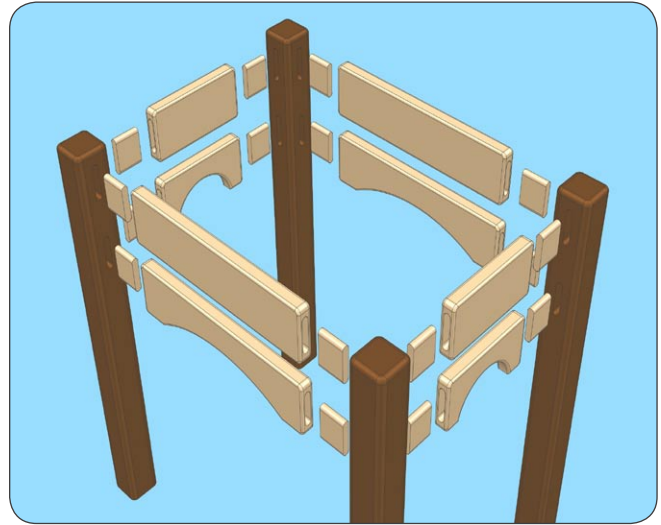
STS MORTISER MANUAL

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Loose Tenon Joinery

Mortise and tenon joinery as shown in **Fig. 1** produces some of the strongest connections between two pieces of wood but the setups can be tedious. The mortises are difficult to place accurately at the router table and the tenons, while easy enough with the right jig, still require two sets of cuts to produce. First the shoulders are cut using a miter gauge followed by the cheeks, which are cut using a tenoning jig. And all of this to produce what amounts to a square peg for a round hole. The tenons need to be rounded or the mortises squared for the final assembly. We probably don't need to mention the additional challenge of making cuts at the table saw that fit well into cuts made at the router table. ■



Loose tenon joinery on the other hand provides all of the strength benefits without the tedious setups. In loose tenon joinery all of the pieces to be joined receive an identical mortise, while the tenon itself is simply a short cutoff from a long piece of stock, thickness planed, ripped and rounded over to fit the mortise, **Fig. 2**. And, while locating the mortises at a router table is still a problem using conventional methods, you'll find perfectly located slots easy with this new slot-mortising jig, **Fig. 3**. This jig takes advantage of the ease of vertical router adjustment provided by the wave

of router lifts on the market today. If you own a router lift and a router table with a miter slot, you'll love the versatility and ease of use of this great jig. Just clamp your material in place and slide the jig back and forth between two stops as you slowly raise the cutter using the lift's crank handle. If you do not already own these two pieces of equipment, read on, since the acquisition of these tools is, in many cases, considerably less than the cost of slot mortising tools currently available on the market.

Fig. 1 Mortise and Tenon Joinery

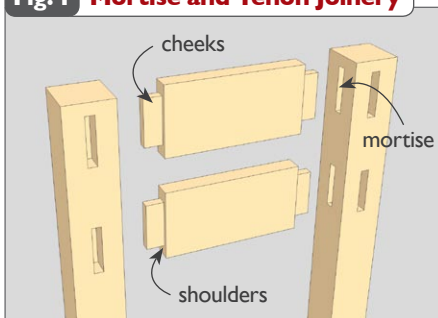


Fig. 2 Loose Tenon Joinery

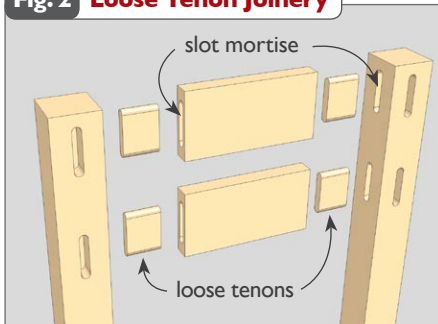
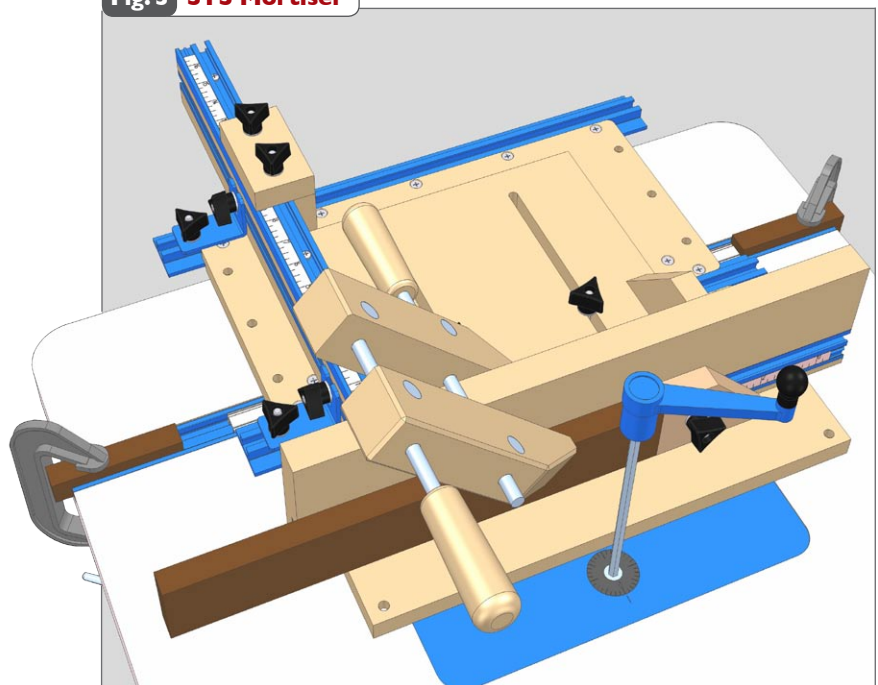


Fig. 3 STS Mortiser



Making the STS (Slot-Tenon-Slot) Mortiser

Build-It Platform

1. In typical router table cutting operations, router lifts are installed in the table with the crank handle located so that it is between the router bit and your router table's miter slot. In order to use your new STS Mortiser, you'll need to rotate the router lift in your table opening so that the router bit is between the miter slot and the crank handle, **Fig. 4**.

CAUTION:
ALWAYS RETURN THE LIFT TO THE ORIGINAL SETUP AFTER USING THE STS MORTISER.

Materials List:

To assemble the STS Mortiser you'll need:

(2) Small Build-It Panel	(2) 18" Incra T-Track Plus
(2) T-Slot Panel Connector	(1) 18" Incra T-Track Regular
(1) 18" Miter Slider	(1) 3/4" x 10" x 10" plywood
(1) Pair Build-It Brackets	(1) 3/4" x 2-1/4" x 28" hardwood
(1) Pkg. Build-It Knobs	(1) 1" x 4" x 18" hardwood
(1) Build-It Clamp	(1) 1-1/4" x 1-3/4" x 18" hardwood

2. Attach the Miter Slider and (2) T-Slot Panel Connectors to one of the Build-It Panels and place in your router table's miter slot as shown in, **Fig. 5**.

Adjust the Miter Slider for a smooth glide in the miter slot. Cut the remaining Build-It Panel at your table saw to fill the gap between the panel connector and your router lift's crank handle. Attach the panel.

Fig. 4 Router Table Configuration

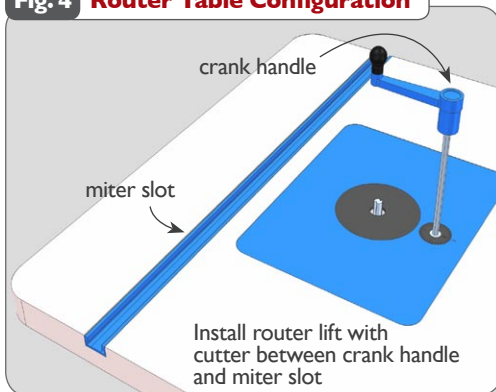
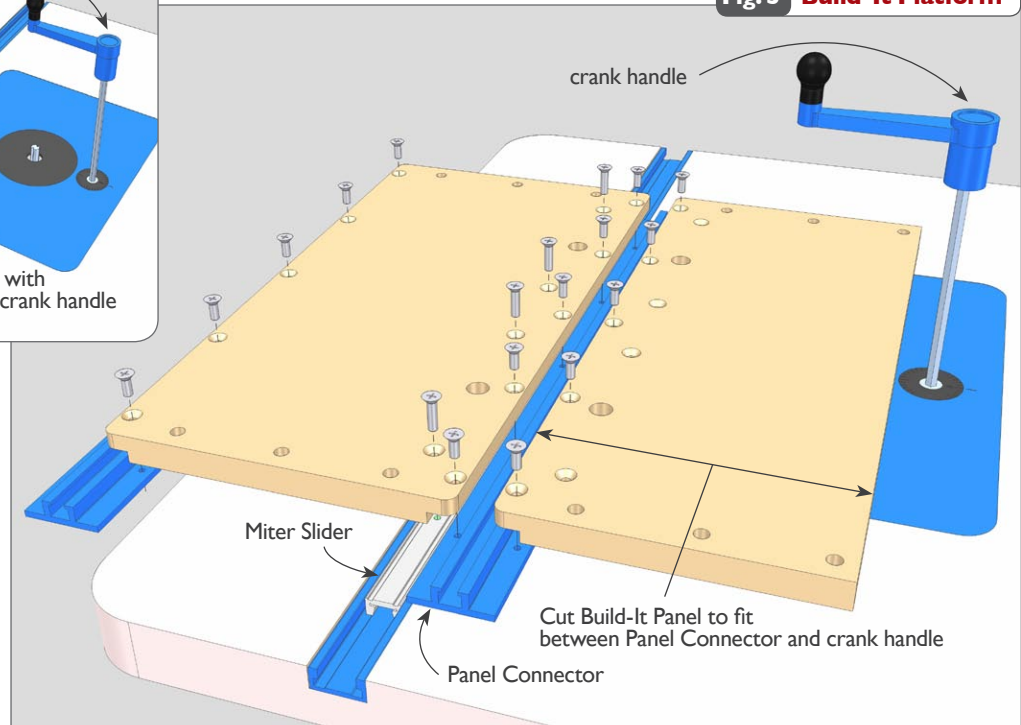


Fig. 5 Build-It Platform



Fence and Stop Positioner

3. Prepare a straight, flat piece of hardwood to the dimensions shown in **Fig. 6** and **Detail 6A**. Cut the groove shown and install the T-Track and T-Track Plus. Build the stop positioner as shown in **Fig. 8** using $\frac{3}{4}$ " hardwood.

4. Attach the stop positioner to the fence using $\frac{1}{4}$ "-20 x $1\frac{1}{2}$ " hex bolts with washers and clamping knobs, then attach the fence to the Build-It Platform using (2) Build-It Brackets with the included $\frac{1}{4}$ "-20 x 1" hex bolts, washers and clamping knobs. Square the fence to the "cut" edge of the Built-It Platform and tighten the clamping knobs, **Fig. 9**.

Fig. 6 T-Track Fence

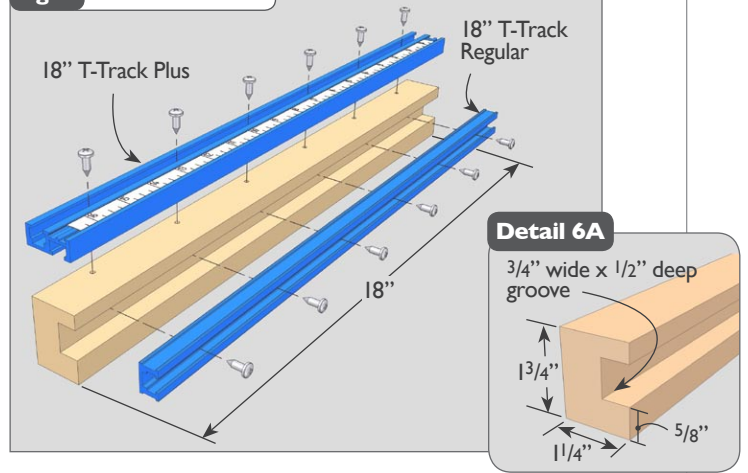


Fig.7 Fence and Stop Positioner

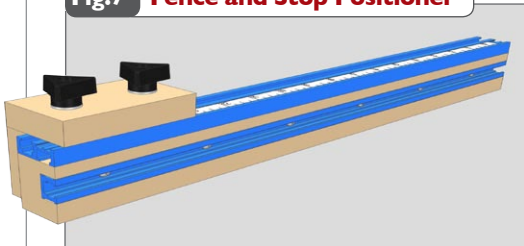


Fig.9 Add Fence and Stop to Build-It Platform

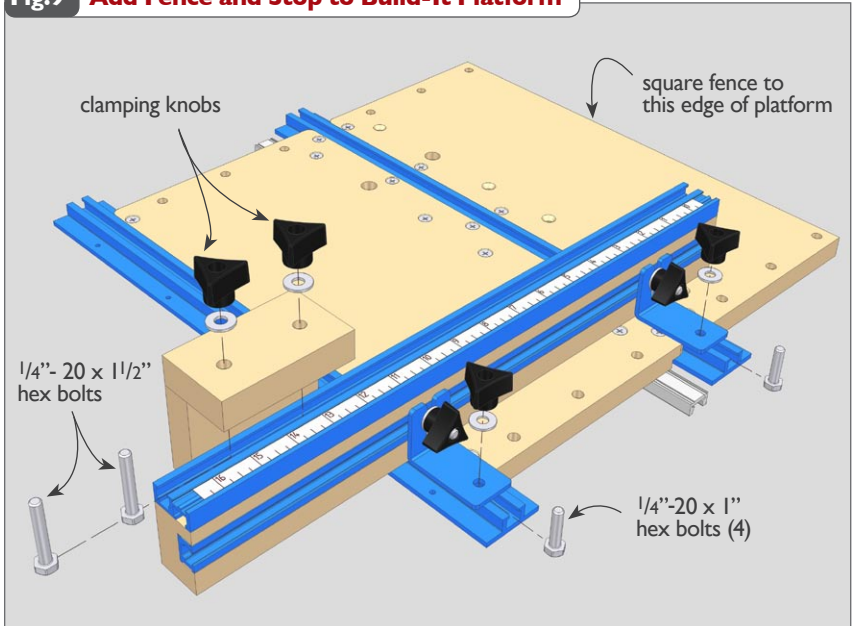
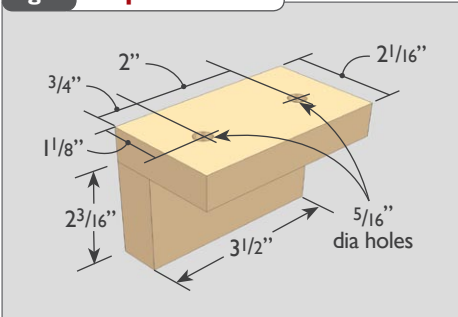


Fig.8 Stop Positioner



Right Angle Faceplate Assembly

5. Starting with a 10" x 10" piece of $\frac{3}{4}$ " plywood, cut $\frac{5}{16}$ " wide x 8" long slots through the material as shown in **Fig. 11**.

On a 4" x 18" piece of 1" thick hardwood, cut the groove as shown and inlay an 18" T-Track Plus.

Fasten with the #8 x $\frac{1}{2}$ " pan head Phillips screws.

Fig.10 Right Angle Faceplate Assembly

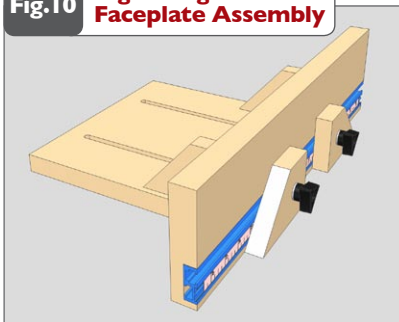
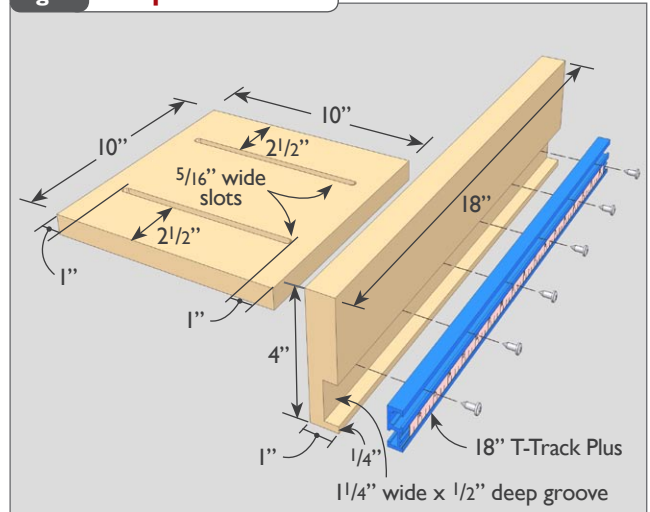


Fig.11 Faceplate and Base



6. Cut the right angle supports and faceplate stops to the dimensions shown in **Fig. 12**.

All (4) pieces have identical dimensions.

Drill a 5/16" diameter hole through (2) of the pieces and set aside for later use as faceplate stops.

Glue up the right angle faceplate assembly, placing the right angle supports about 1/4" away from the edge of the base, **Fig 13**.

Fig.12 Right Angle Supports and Faceplate Stops

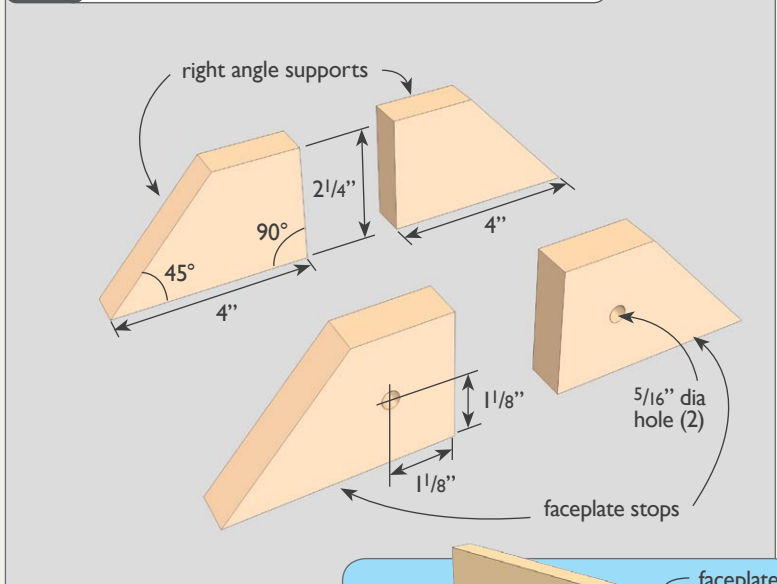


Fig.14 Attach Faceplate Assembly to Build-It Platform

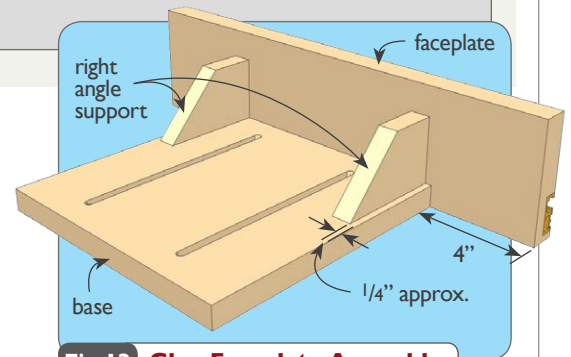
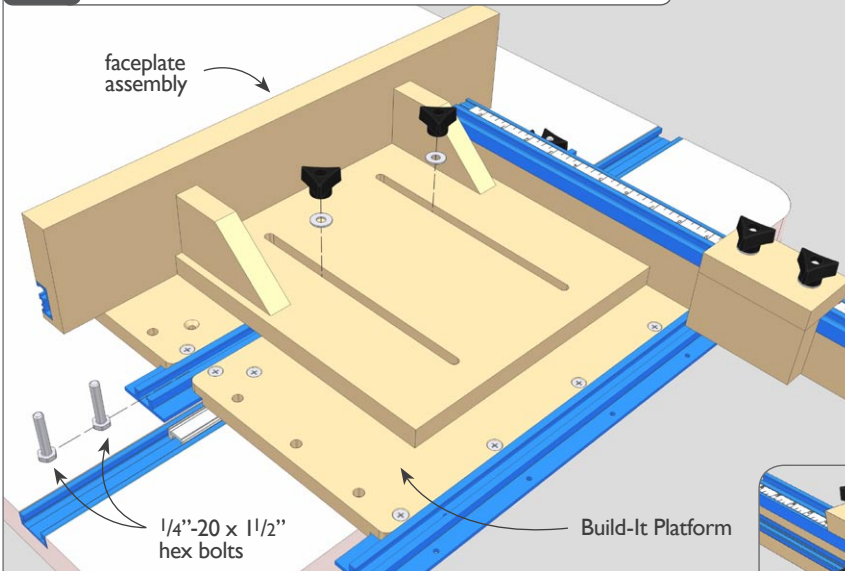
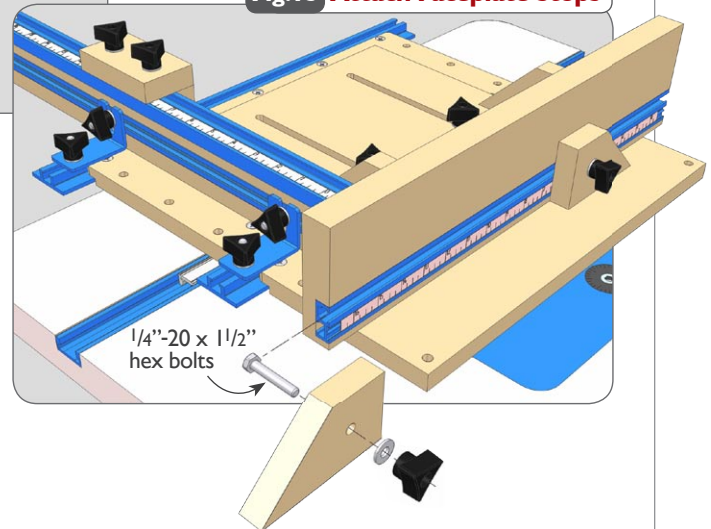


Fig.13 Glue Faceplate Assembly

7. Secure the right angle faceplate assembly to your Build-It Platform using (2) 1/4-20 x 1-1/2" hex bolts with washers and clamping knobs as shown in **Fig. 14**.

Slide the slotted base of the faceplate assembly up to the T-Track Fence and tighten the clamping knobs. Attach the (2) faceplate stops to the assembly using (2) 1/4-20 x 1-1/2" hex bolts with washers and clamping knobs, **Fig 15**.

Fig.15 Attach Faceplate Stops



Operation

For your first mortise, you'll cut a slot about 4" long through the "throat plate" Build-It Panel that overlaps the cutter at your router table. Since most loose tenon applications in 3/4" stock work well with a 3/8" tenon, we'll cut the slot with a 3/8" straight bit. (The longer the cutter length, the deeper you'll be able to cut your slot mortises later on.) Install the cutter and lower the bit below your tabletop. Place the STS Mortiser on your router table and center it on the length of your miter slot. Now clamp a 3/4" x 3/4" x 3" block of wood into the infeed and outfeed ends of the miter slot 2" from the ends of the Miter Slider, **Fig. 16**.

Slide the right angle faceplate assembly and T-Track fence away from the area directly above the cutter and turn the router on. Use your router lift crank handle to raise the cutter 1/16" per pass as you slide the jig back and forth between the two stop blocks clamped to the table.

CAUTION: ALWAYS START AND STOP ANY SLOT CUTTING OPERATION WITH THE JIG POSITIONED AGAINST THE OUTFEED STOP BLOCK.

When you have cut through the throat plate, turn off the router. The throat plate provides support for your work piece and zero clearance for tear out control. If you choose to cut mortises with a larger or smaller diameter cutter, additional throat plates can be produced. Your new STS Mortiser is now ready to use.

For typical slot mortising there are four steps to locating a slot on your work piece.

Step 1 Set Length of Slot

To set the length of your slot, raise the cutter through the slotted hole in the throat plate panel and slide the faceplate assembly up to (but not touching) the cutter. Before tightening the faceplate assembly clamping knobs, make sure that it is pressed securely against the T-Track fence. Slide a faceplate stop into each end of the T-Track on the faceplate. In setting the stops, you will always use the 8" mark on the faceplate scale to represent the "center" of your slot length. To set up for a 2" long slot, set the outfeed faceplate stop to 7" and the infeed stop to 9". In other words, the distance between the two stops is equal to your slot length, **Fig. 18**.

Fig. 17 Slot Length

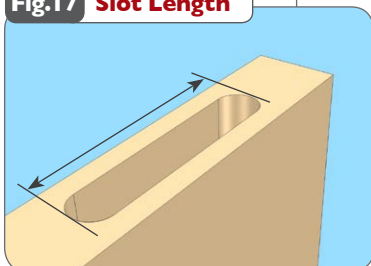


Fig. 18 Setting Slot Length

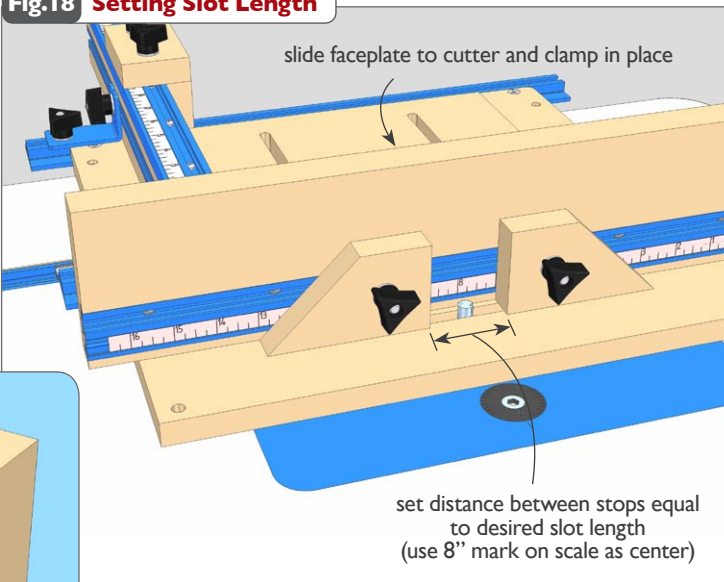
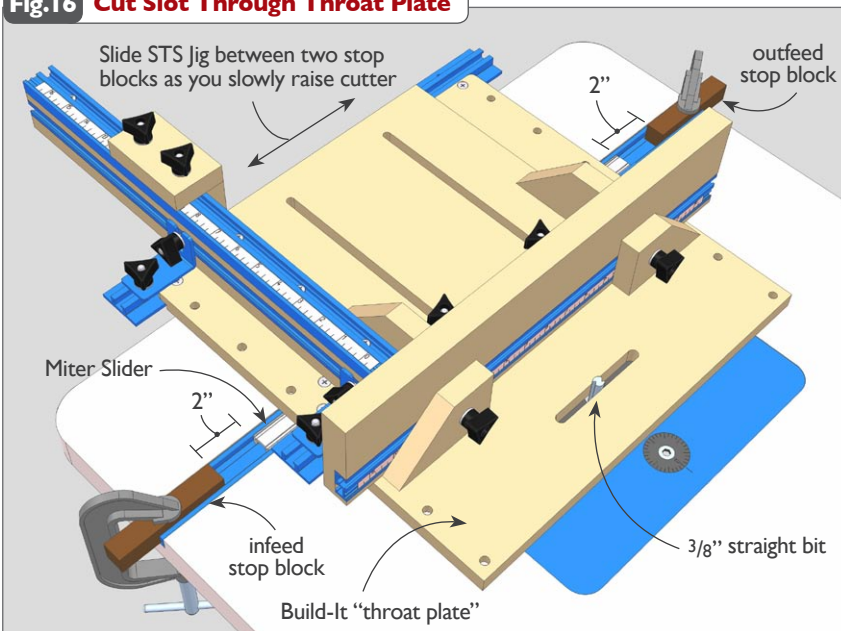


Fig. 16 Cut Slot Through Throat Plate



Slide the STS Mortiser forward until the cutting wing on the cutter contacts the infeed faceplate stop. Now clamp a block of 3/4" scrap wood into the miter slot against the outfeed end of the Miter Slider, **Fig. 19**. This will set the forward or outfeed travel limit. Now pull the jig back until the cutter contacts the outfeed faceplate stop and clamp a block of 3/4" scrap wood into the miter slot against the infeed end of the Miter Slider, **Fig 20**. This sets the rearward or infeed travel limit.

Fig.19 Set Forward Travel Limit

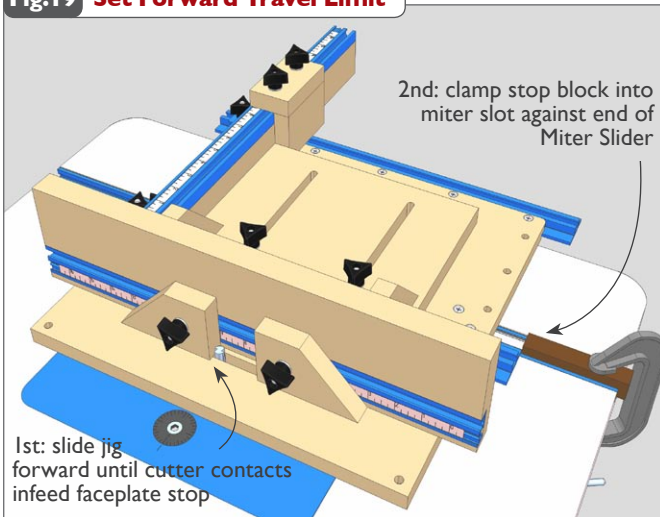
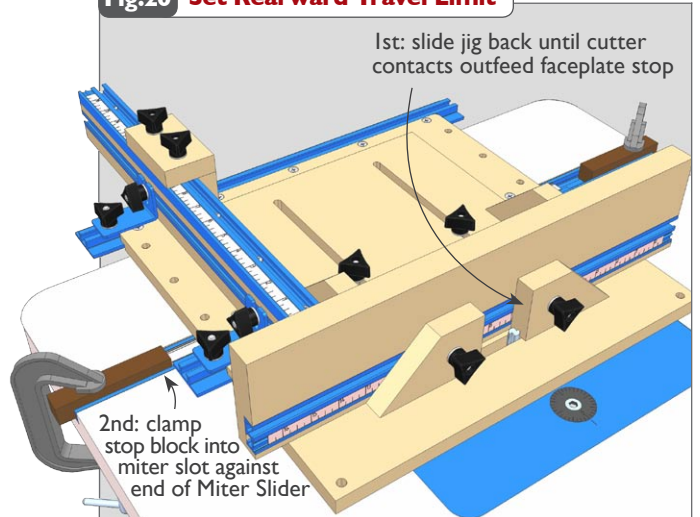


Fig.20 Set Rearward Travel Limit



Step 2 Set Distance from End of Slot to End of Workpiece

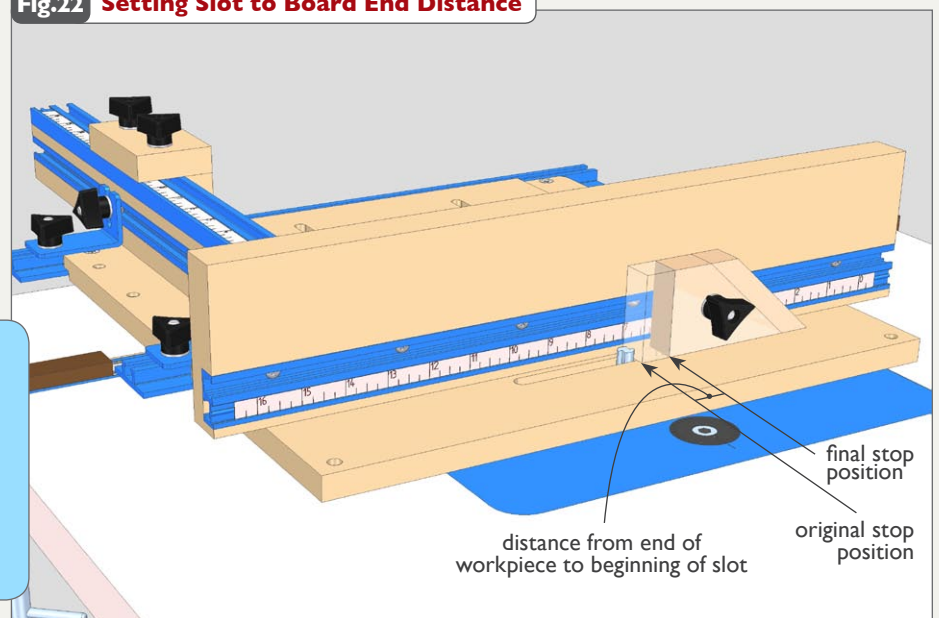
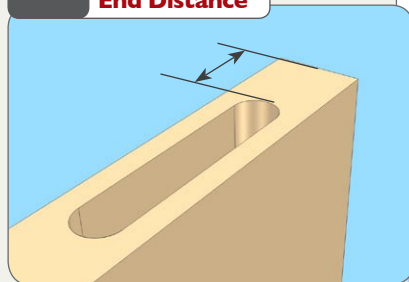
Now, we need to locate the slot on your workpiece. To begin we'll set the distance from the end of the slot to the end of your board. Simply slide either the infeed or outfeed faceplate stop away from its current position the distance you choose. For instance if you wanted to start the slot 1"

from the end of your workpiece (after setting a 2" length of slot), slide the outfeed faceplate stop to read 6" and tighten the clamping knob, **Fig. 22**.

Remove the remaining faceplate stop.

Fig.22 Setting Slot to Board End Distance

Fig.21 Slot to Board End Distance



Step 3 Set Distance from Edge of Slot to Edge of Workpiece

You'll first want to zero the faceplate to the edge of the cutter. Loosen the clamping knobs that secure the faceplate assembly and slide it forward to contact the cutting wing of the bit. (You may need to rotate the cutter to find the "high spot" of the cutting wing.) Hold the faceplate assembly steady as you slide the T-Track fence stop positioner up to contact the back of the faceplate assembly's base and tighten the clamping knobs. Note the position of the stop on the scale in the top

of the T-Track fence. (We suggest you slide the scale to read at one of the whole inch numbers, or slide it to read at zero if you don't mind some of the scale hanging out of the end of the fence.)

To set the cutter-to-faceplate distance, simply move the T-Track stop positioner away from the back of the base using the scale on the top of the T-Track fence as a reference. Tighten the clamping knobs, then slide the faceplate assembly back to contact the stop and tighten the clamping knobs, **Fig. 24**. For example, if we start with the stop positioner set at 8" and then move it to 8-1/2" along with the faceplate assembly,

there should be 1/2" between the faceplate and cutter.

Fig.24 Setting Slot to Board Edge Distance

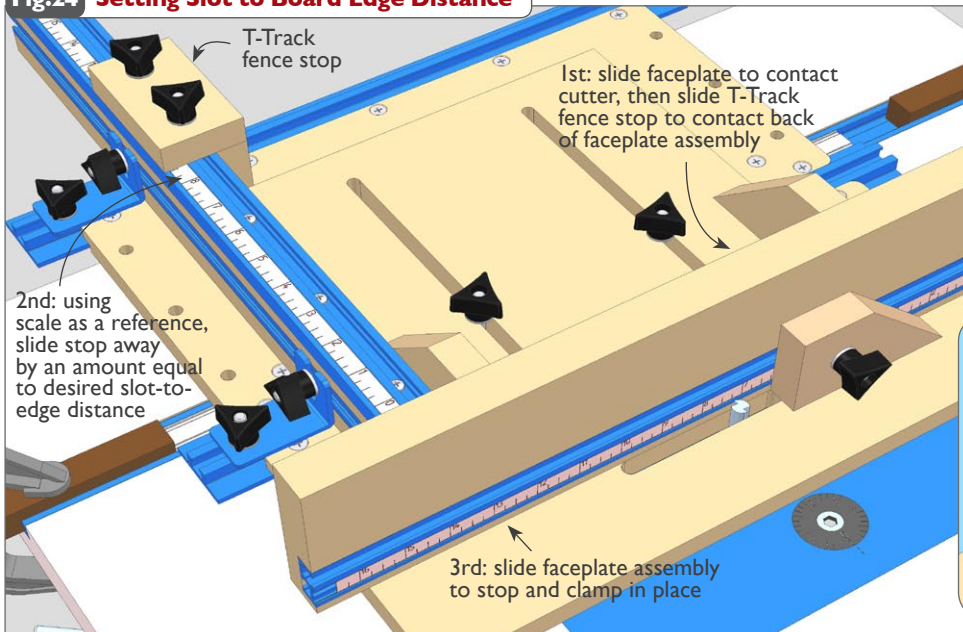
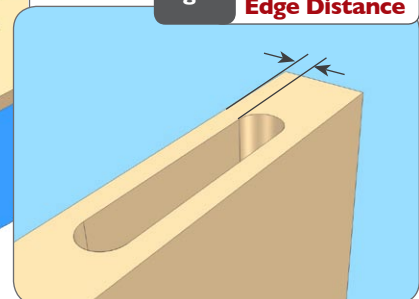


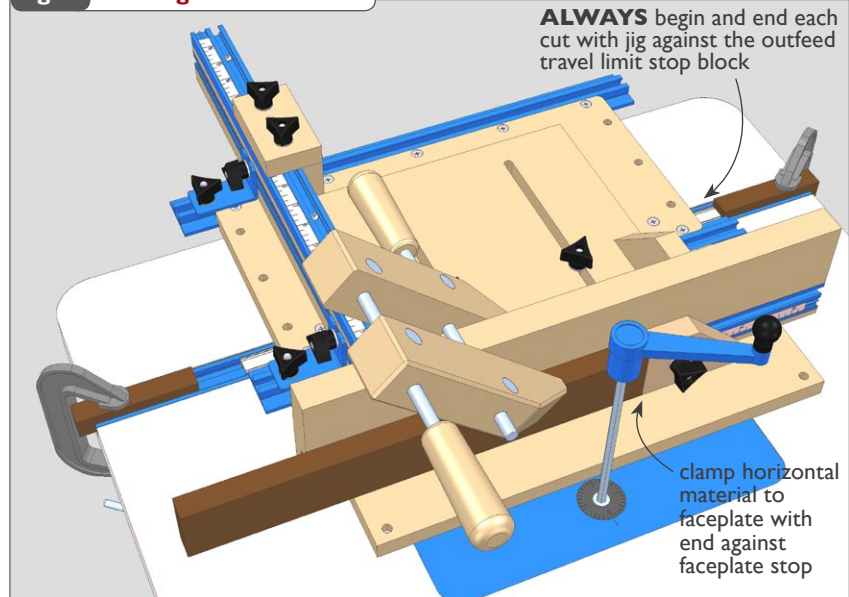
Fig.23 Slot to Board Edge Distance



Step 4 Cutting the Slot

Now you can clamp your workpiece in place and start the cutting process. Lower the cutter until it is just flush with the top of the Build-It throat plate. For horizontally oriented material, place the board end against the faceplate stop and clamp to the faceplate. **Always begin and end each cut with the jig against the outfeed travel limit block.** Turn on the router and, using your router lift's crank handle, raise the cutter 1/16" and slide the jig between the two limit stops, **Fig. 25**. After each cut cycle, raise the cutter 1/16" until you reach the desired depth. You'll have to count the crank handle rotations to keep up with how deep your cut is.

Fig.25 Cutting a Slot Mortise



Vertically held stock will often interfere with full rotations of the crank handle but your local hardware store has an easy solution.

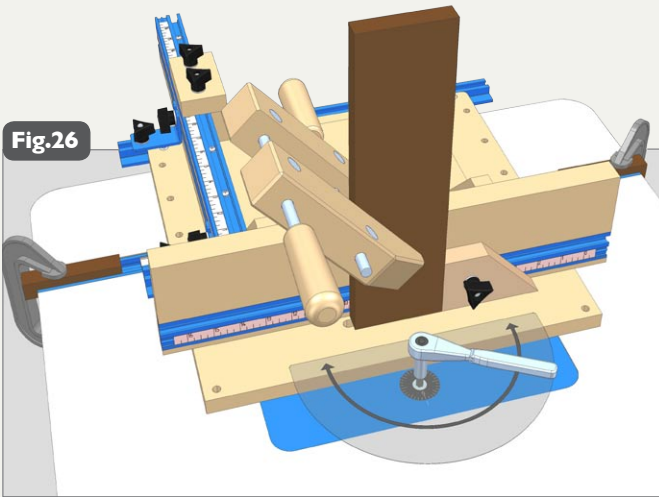
Just purchase a hex driver for your ratchet set as shown and use half rotations of the crank mechanism, **Figs. 26 & 26A.**

In many cases, a T-handle hex key will work as well, **Fig. 27 & 27A.**

Fig.26A A Hex Driver for Ratchet



Fig.26



To avoid interference when cutting vertical boards, use a ratchet along with a hex driver

Fig.27

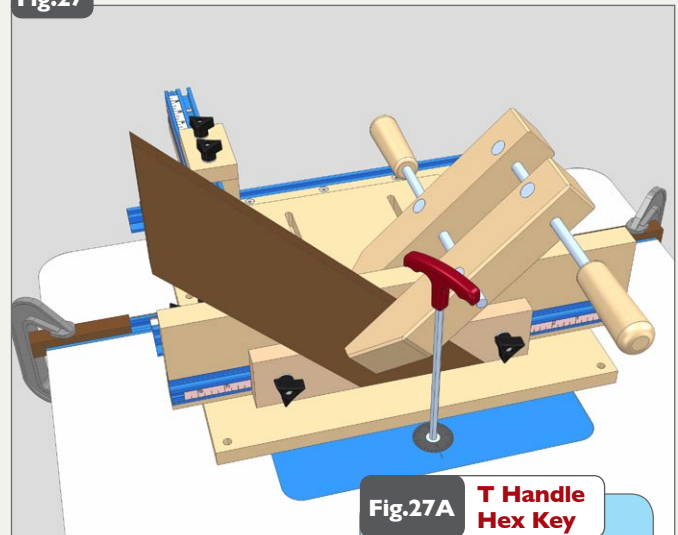


Fig.27A T Handle Hex Key



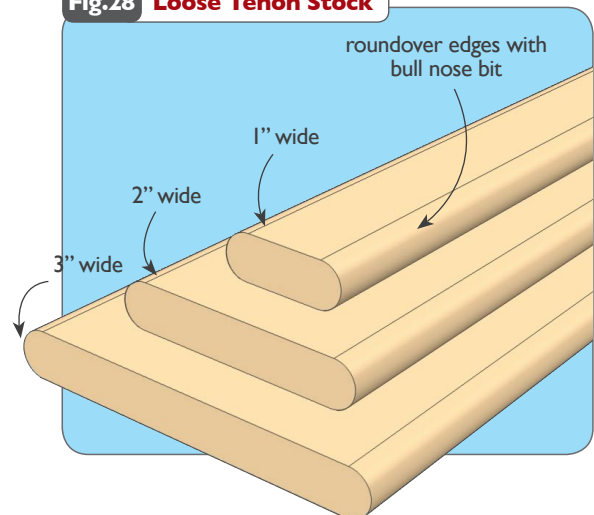
Faceplate stops can be installed in a variety of ways to support your workpiece

Making Loose Tenon Stock

Of course, slot mortises can be fun to cut with your new jig, but you'll need loose tenons to put it all together. When preparing loose tenon stock, it's a good idea to make several sizes of long stock all at once then cut to length later as needed.

For instance, you can thickness plane material to match your slot width then rip lengths of stock to 1", 2" and 3" wide. Roundover the edges with a bullnose bit that matches the slot cutter's diameter, **Fig. 28.**

Fig.28 Loose Tenon Stock

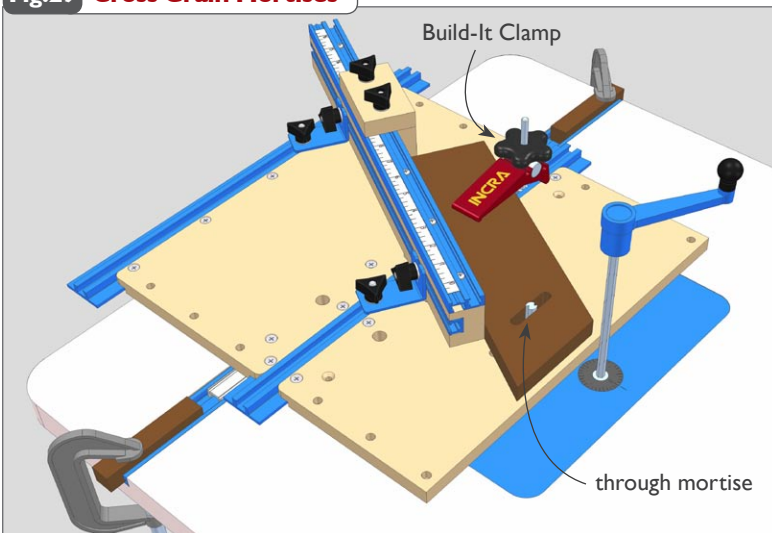


Tips

By removing the faceplate assembly and using the T-Track fence along with one of the Build-It hold down clamps, you can cut slot mortises and dados across the grain. And by angling the fence across the Build-It platform you can angle the mortises as well.

A stop positioner should always be clamped to the T-Track fence at the left end of your material and a Build-It Clamp should be used to prevent slippage during the cut, **Fig. 29**. And again, always start and stop each cut cycle with the jig against the outfeed travel limit stop block.

Fig.29 Cross Grain Mortises



Need to cut a mortise in the middle of a longer board? Just use a square to place a mark all the way up the faceplate and in line with the 8" mark on the faceplate scale, **Fig. 30**.

(Remember the 8" mark will always be used as the center of your slot length.) Now place a mark on your board at the center of the desired slot location.

The mark should be placed on the board edge opposite where the mortise will be cut.

Align this mark with the faceplate mark when clamping your material, **Fig. 31**.

Fig.30

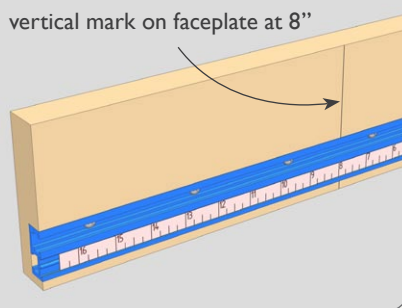
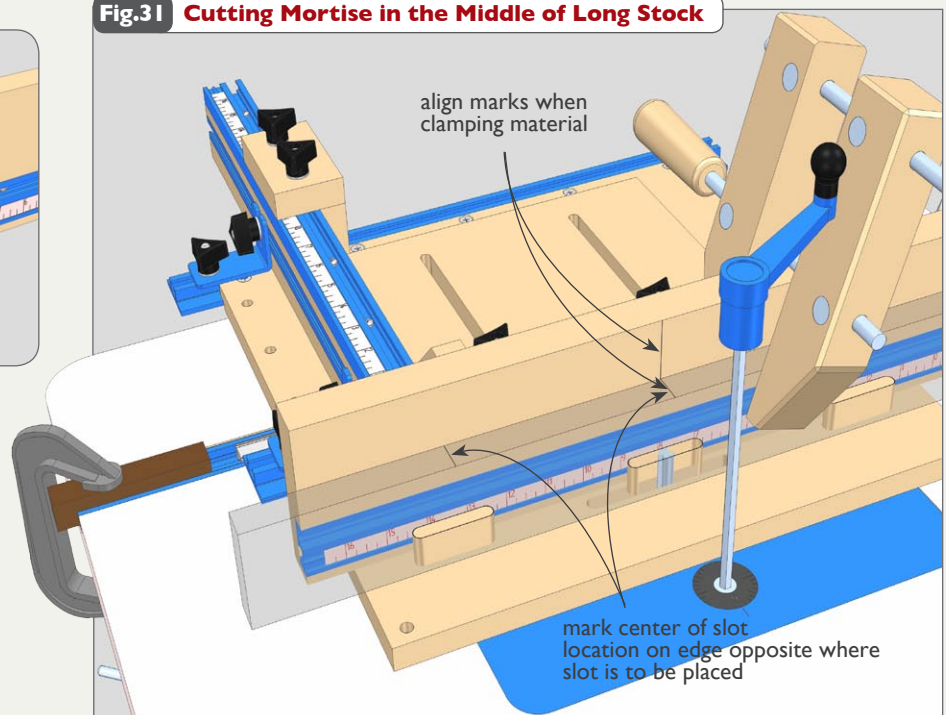


Fig.31 Cutting Mortise in the Middle of Long Stock

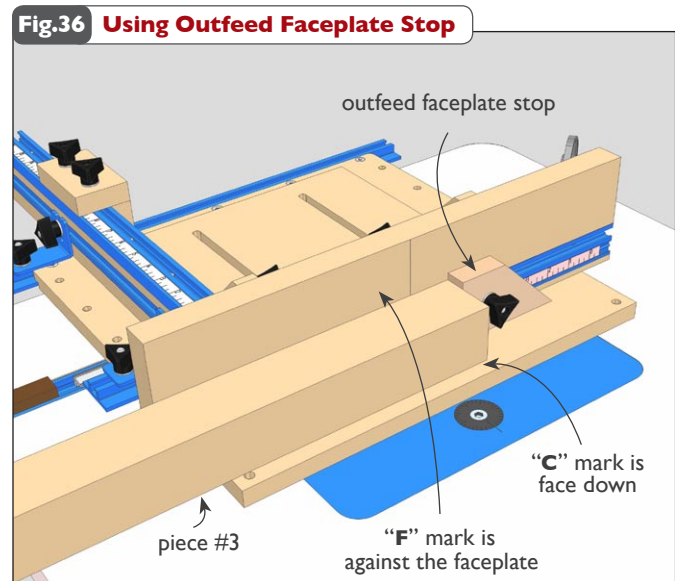
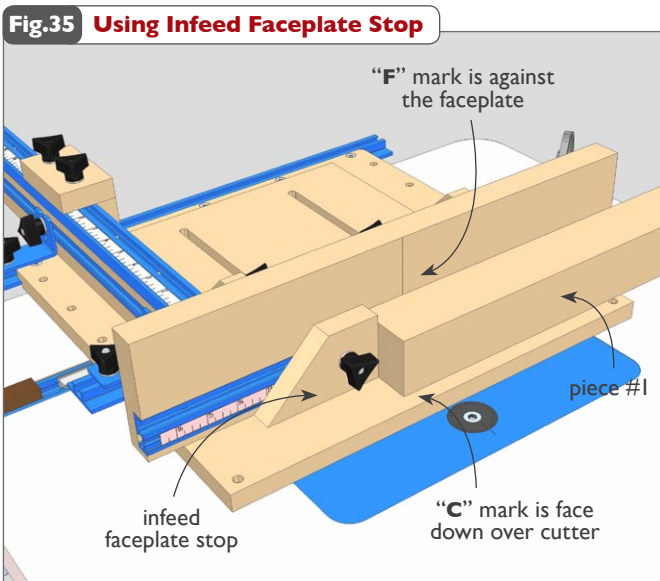
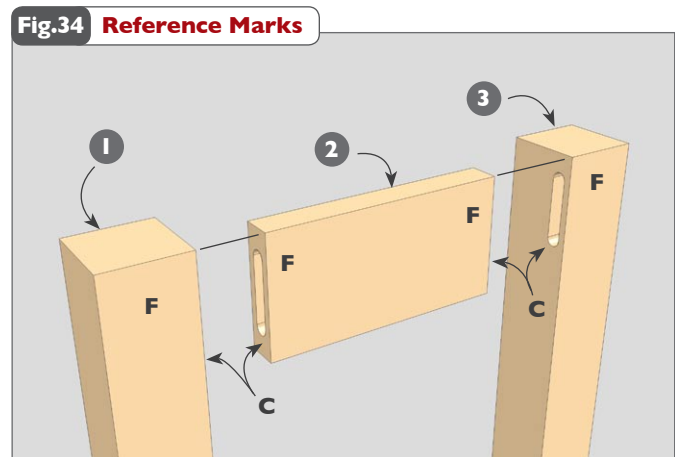
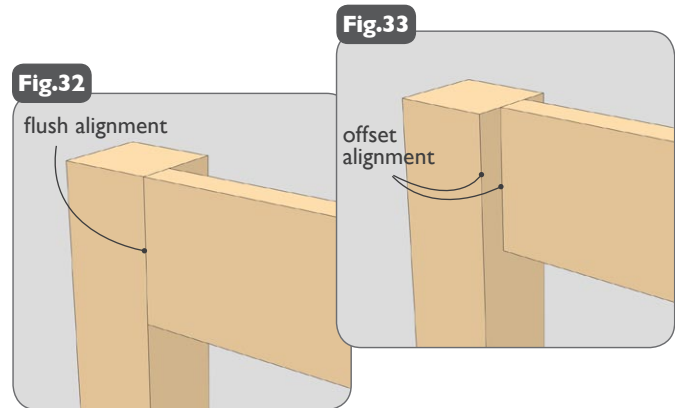


As in most woodworking projects, the alignment between parts is an important part of the finished look of the construction. Sometimes, you'll want a flush alignment as shown in **Fig. 32**, while other projects may require offset alignments, **Fig. 33**. Either way, you'll want to be able to control and maintain the alignment selected. This is often accomplished through the use of reference marks placed on the individual parts. These marks are then used to ensure the correct face or edge of the material is placed against the fence when setting up for a cutting operation. Work piece reference marks used with your STS Mortiser will also help in determining whether you will need an infeed or outfeed faceplate stop when setting the slot to end of board distance.

For example, in order to keep the flush alignments shown in **Fig. 34**, you'll mark the surfaces that you want aligned and the surfaces that will receive a cut. We have used the letter "F" to designate the surface that will be placed against the faceplate, and the letter "C" to represent the surface that will receive the cut. The pieces are numbered 1, 2 & 3. When cutting the #1 piece, it would be necessary to use an infeed faceplate stop in order to position surface "F" against the faceplate, with surface "C" face down over the cutter, **Fig. 35**.

When cutting the same mortise on the #3 piece, however, the setup would require the use of an outfeed stop in order to position the material with the "F" surface against

the faceplate and the "C" surface face down, **Fig. 36**. The procedure is the same for offset alignments, except that the edge-to-cutter distance is changed when setting up for the cuts on piece #2.



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