FLIP
RIGID HEDDLE LOOM
WARPING AND WEAVING INSTRUCTIONS

Flip Loom shown with optional accessories
Trestle Floor Stand and Flip Trap

Find out more at schachtspindle.com
Schacht Spindle Company 6101 Ben Place Boulder, CO 80301
p. 303.442.3212 f. 303.447.9273

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FLIP FOLDING LOOM

Your new loom has been crafted from the finest hardwood maple and each piece has been sanded and oiled by hand. Flip comes assembled. Install the apron rods and cords and you’re ready for warping and weaving.

UNFOLDING FLIP

- Loosen the black T-knobs on each side of the loom (Figure 2).
- Pull on the cloth and warp beams to unfold the loom.
- With the loom in the open position, insert the lock knobs on each side.
- Tighten lock knobs and black T-knobs.

Directions for folding Flip are on page 11.

ATTACH THE APRON RODS TO CLOTH AND WARP BEAMS

1. Attach the apron cords to the beams. Insert one end of the cord through the beam hole (Figure 3A). Slide the \( \frac{3}{16} \)" dowel through the second to last loop of the apron cord. Repeat for the remaining holes on the beams.

2. Create a loop for the apron rod. Fold the cord about 4" from the free end and insert the fold through the second loop at the free end of the cord (Figure 3B).

3. Place the apron rod in the cord loop. Slide the apron rod through the loop (Figure 3B) and pull tight (Figure 3C).

4. Repeat Steps 2 and 3 for each cord.

Three apron rods are included with your loom. The third rod is used for lashing onto the back apron rod in certain warping methods.

Visit youtube.com/user/schachtspindle to view our video on how to install apron cords.
Multiply the width of your planned weaving times the back beam. Finally, to figure how many yards you beat your weft. For a balanced weave (the same number of wefts per inch as warps per inch), you need additional warp length for tying onto the loom or remain unwoven.

**QUICK GUIDE TO WARP AND WEFT CALCULATIONS**

Let’s say you’re going to weave a table runner that is 16” wide and 40” long.

A. Calculate the length of your warp. The length of the finished piece is 40”, but you will also need additional warp length for tying onto the loom and other loom waste. The average loom waste is approximately 24”. You should also add another 10% (4”) for take-up, which is the amount of warp length “lost” during weaving. It is a good idea to add another 10% (4”) for possible shrinkage when washing the fabric after weaving. Add these four numbers to get the total length required for the warp:

\[
\begin{align*}
40” \text{ (length of piece)} \\
24” \text{ (loom waste)} \\
4” \text{ (take-up)} \\
4” \text{ (shrinkage)} \\
72” \text{ (total length)} 
\end{align*}
\]

B. Determine the ends per inch (e.p.i.). There is a rule of thumb which is quite useful: simply wind the yarn you want to use as warp around a ruler for 1” so that there are no spaces between wraps. Then count the number of wraps in this 1” and divide by 2 for the number of ends per inch. Choose the heddle which comes closest to this number. In our example, the warp yarn is set at 10 e.p.i.

C. Calculate the total number of warp ends. Multiply the width of your planned weaving times the e.p.i. to get the total number of warp ends. In our example: 10 e.p.i. x 16” weaving width = 160 total ends of warp yarn.

D. Calculate the total amount of warp (in yards) needed. Finally, to figure how many yards of warp you will need, multiply the 160 total ends by 2 (the length of each warp end in yards). In our example, you will need a total of 320 yards for warp. Here’s the simple formula (steps C and D above):

\[
\text{Total warp ends} \times \text{length of warp (in yards)} = \text{total yards of warp}
\]

E. Calculate the weft yarn. The amount of weft yarn you will need is determined by how firmly you beat your weft. For a balanced weave (the same number of wefts as warps per inch), you’ll need the same amount of weft and warp. For a weft-faced weave (where weft packs tightly and covers the warp), allow up to 5 times more weft than warp.

**GLOSSARY OF WEAVING TERMS**

- **Balanced weave**: Fabric in which the number of warp ends per inch (see e.p.i.) equals the number of weft ends, or picks, per inch (see p.p.i.).
- **Beat**: To push the weft threads into place with the rigid heddle.
- **Cross**: The figure 8 made at one end of the warp when measuring on a warping board. It keeps the warp ends in order and helps prevent tangles.
- **End**: One warp yarn or thread.
- **E.p.i.**: Ends per inch. The number of warp threads, or ends, per inch, determined by the number of slots and holes per inch on the rigid heddle. Also called sett.
- **Heddle block**: The notched area on the inner face of the loom sides.
- **Loom waste**: The ends of the warp threads that are not usable because they are knotted onto the loom or remain unwoven.
- **Pick**: One pass of the weft thread through the shed.
- **P.p.i.**: Picks per inch. The number of rows of weft threads. Also called tabby.
- **Plain weave**: The most basic weave in which the weft is woven over and under, over and under warp threads. Also called tabby.
- **Rigid heddle**: The loom part made up of alternating slots and holes. It creates sheds and is used to beat the weft.
- **Selvedge**: The edge threads on a piece of woven fabric.
- **Shed**: The space between raised and lowered warp threads through which the weft passes.
- **Shuttle**: A tool for holding and carrying weft.
- **Take-up**: The amount of warp length “lost” during weaving. The warp, instead of going in a straight line, actually curves over and under the weft, and therefore extra warp yarn is required.
- **Warp**: As a noun, the set of threads held taut by the loom. As a verb, the process of threading the warp onto the loom.
- **Weft**: The threads or yarn interlaced with the warp threads.

**CHOSE YOUR WARPING METHOD**

There are 2 warping methods, the **direct method** using a warping peg and the **indirect method** using a warping board.

The direct method, developed by Rowena Hart, allows you to measure your warp and thread the slots in the rigid heddle in one step. It is best for short warps, single-color warps, or stripes involving even numbers of warp ends. The indirect method is more versatile: it can accommodate longer warps, multiple colors, and any order color. The warp is measured on a warping board, then brought to the loom for threading.

This method is introduced starting on page 7.

If you have never woven on a rigid heddle loom before, the direct method is a quick and easy way to begin.

**DIRECT WARPIING USING A WARPIING PEG**

**Thread the slots**

1. Calculate the length of your warp, warp width, and number of warp ends. See “Quick Guide to Warp and Weft Calculations” on page 4.

2. Insert the metal part of the clamps into the holes in the legs (Figure 4) and clamp the loom to a table (the loom will hang over the edge of the table). The back of the loom includes the heddle block and two fixed beams (Figure 1, page 2).

   Clamp the warping peg as far away from the back apron rod as your desired warp length (Figure 6).

   **Note for 30” looms: When warping the full width (or close to it), use 2 warping pegs. Divide the width of the warp in half and use a warping peg for each half. This will help keep the length of your warp ends more even.**

3. Place your ball or cone of yarn on the floor below the back of your loom (Figure 5). Place the heddle in the second slot from the front of the loom (labeled 1st heddle neutral in Figure 1, page 2). Find the center of the heddle and then measure out to one side half the width of your warp. For example, if your warp is 10” wide, measure out 5” and begin threading at this point. The figures in this booklet show threading from right to left; you can thread left to right if you prefer.
4. Bring the apron rod up over the back beam toward the heddle. Make sure you've gone over the back beam, not under it, or you will not be able to weave. Tie the end of the warp yarn to the apron rod at one edge of your weaving (Figure 4).

5. Using the heddle hook, pull a loop of yarn over the apron bar and through a slot in the heddle (Figure 5). Make sure to use a slot, not a hole, in the heddle. Place the loop of yarn on the warping peg (Figure 6). You have now measured and threaded 2 warp ends through a single slot.

6. Continuing along the apron rod to the left, pull another loop of yarn under the apron rod (to encircle the rod) and through the next slot in the rigid heddle. Place the loop over the warping peg (Figure 7).

   Continue pulling the loops over and under the apron rod until all the warp ends have been measured. Each loop on the warping peg equals 2 warp ends.

7. Cut off the yarn from the ball or cone and tie this end to the back apron rod.

Wind the warp onto the warp beam

8. Remove the yarn from the warping peg. Hold it tightly in your hand and use scissors to cut the end of the loops. Tie the bundle of warp threads into a loose overhand knot (Figure 8) and set aside.

9. Wind the warp onto the warp beam by turning the warp beam crank handle clockwise. When the warp has been rolled around the beam once, insert heavy paper between the layers of warp threads to separate them. As you wind the warp on the beam, insert more paper to maintain separate layers.

10. Continue rolling the warp and paper onto the warp beam. Stop every so often to pull hard on the knotted end of the warp to tighten the paper and warp on the beam.

11. Stop winding when the front end of the warp is about 10" from the heddle.

Thread the holes

12. When you threaded the slots, you placed 2 warp ends in each slot. Now you'll take 1 end out of each slot and thread it through the adjacent hole using your heddle hook (Figure 9). Work from one edge of the weaving to the other until all holes have been threaded.

   Tie onto the front apron rod

13. Bring the front apron rod around and over the front beam so that it is about 6" from the heddle. Make sure you've gone over the front beam, not under it.

14. Select a group of threads about 1" wide at the center of the warp and bring them over the top of the apron rod, dividing them in half and tying together around the apron rod using a surgeon’s knot (Figure 10). It's like starting to tie your shoes, except the threads go around twice.

15. Alternate tying 1" groups to the right and left of center until all groups are tied.

16. Work back and forth across the warp, tightening all the groups. It’s best to start in the center and work outwards on each pass. Pat across the warp to check if all groups have equal tension. The tension should be even, but doesn't need to be very tight. (After the warp is evenly tensioned, you can increase the weaving tension as needed.)

17. Tie the ends of each group in a bow tie to secure them. You are now ready to weave.

INDIRECT WARPING USING A WARPING BOARD

Set up the warping board

1. Calculate the length of your warp, warp width, and number of warp ends. See “Quick Guide to Warp and Weft Calculations” on page 4.

2. For your guide string, choose a color of string or yarn that contrasts from your warp. Cut the guide string a few inches longer than your warp length.
3. Tie one end of the guide string to a peg on the warping board and work back and forth around the pegs, adjusting the starting point until the end of the guide string comes out even at the 2 cross pegs marked “X” in Figure 11. Tie the guide string around the cross peg farthest from the starting peg. (In this example, it’s the cross peg on the left.)

Measure the warp
4. Tie the end of the warp yarn to the starting peg. Follow the guide string until you reach the cross pegs. Wind a figure 8 around these pegs (Figure 12). This figure 8, called the cross, will keep the warp ends in order. Wind the warp yarn back to the starting peg, and continue winding from the starting peg to the cross pegs and back again until the total number of warp ends are measured. Every loop around the starting peg equals 2 warp ends.

Remove the warp from the warping board
5. Secure the cross by tying it loosely with contrasting yarn in 5 places using overhand knots (Figure 13). Now tie choke ties along the warp at about 18” inch intervals, tying them tightly with a bow tie. Choke ties keep the warp from tangling. After you’ve secured the warp with cross ties and choke ties, remove it from the warping board. Cut all the loops on the non-cross end and tie the end of the warp bundle in a loose overhand knot.

Thread the heddle
6. Wrap the warp around the front beam so that the cross end extends about 10” behind the heddle.
7. Place the heddle in the second slot from the front of the loom (1st heddle neutral in Figure 1, page 2). Find the center of the heddle and then measure out to one side half the width of your warp. For example, if your warp is 10” wide, measure out 5” from the center and begin threading at this point. Figures here show threading from right to left; you can thread left to right if you prefer.

8. Hold the cross in your non-dominant hand so that each section is separated (Figure 14), and then cut the loops at the end. Remove the 5 ties securing the cross, taking care not to cut the warp yarn. Notice that the threads stack up Lincoln-log style. Working from the back side of the rigid heddle, place the top warp end on your heddle hook and thread it through the slot from front to back at the outermost edge of your weaving. Take the next thread and thread it through the adjacent hole. Alternately thread slot, hole, slot, hole until all warp ends are threaded.

Wind the warp onto the warp beam
9. Tie groups of warp ends about 1” wide in overhand knots across the entire warp. Then tie each group around the back apron rod and secure this second knot by tightening it up to the first knot (Figure 15).

Woven onto the front apron rod
10. Wind the warp onto the warp beam as described in the direct warping method.
11. Tie onto the front apron rod as described in the direct warping method.

WEAVING
The first shed is made by resting the heddle on the heddle block in the 1st heddle up position (see Figure 1, page 2). This is called the up shed.

The down shed is made by bringing the heddle toward the front of the loom, then pushing down and sliding the bottom bar of the heddle underneath the front of the heddle block. There is no notch on the bottom for the down shed because tension on the warp holds the heddle in place. If the heddle will not stay in place, tighten your warp.

Weave a header
Before beginning your project, it is a good idea to weave a “header” with scrap yarn (Figure 16). This header will spread the warp out evenly so that your weaving project can begin on an even, uniform warp.
Use scrap yarn about the same size as your project yarn. Weave 3 rows without beating and then press these in place with the rigid heddle. Repeat if needed until the warp is evenly spread.

**Wind a shuttle**
You will need a shuttle for weaving. A stick shuttle about the same width as your warp works well on the rigid heddle loom. Wind the weft yarn around the shuttle in a figure 8. You can wind along one edge or both edges of the shuttle (Figure 17).

**Weave your project**
To weave fabric on your loom, you’ll alternate raising and lowering the rigid heddle as the weft yarn travels from right to left, then left to right. On the first pick, place the rigid heddle in up position and pass the shuttle through the up shed. On the second pick, place the rigid heddle in down position and pass the shuttle through the down shed. Repeat these picks to interlace warp and weft threads. As weft yarn comes off the shuttle, lay it at about a 30° angle so that it doesn’t draw in your selvedges. Your weft should be snug at the selvedge but should not pull in. Press the weft into place with the rigid heddle and then weave the opposite shed, returning the shuttle to the other side of the weaving.

**Advance the warp**
After you have woven a few inches, you will notice that you have less room for the shuttle. Disengage the rear pawl by turning the rear crank handle toward you and pulling up on the pawl (Figure 18). Loosen the warp 1 full turn, replace the pawl, and turn the crank handle toward you just enough to re-engage the pawl.

On 25” and 30” Flip looms, disengage the front pawl on one side and move the pawl away from the ratchet gear. Disengage the front pawl on the other side, loosen the warp 1 full turn, then replace both pawls on the ratchet gears.

1. If the loom has been warped, loosen the tension on the warp. Turn the crank handle on the front beam toward you while pulling up on the pawl (Figure 18). Loosen the warp 1 full turn, replace the pawl, and turn the crank handle toward you just enough to re-engage the pawl.

2. Remove the rigid heddle from the heddle block and lay it flat toward the back of the loom (Figure 19), with the bottom edge of the rigid heddle in the 2nd neutral slot (third slot from the front of the loom).

3. Loosen the T-knobs (Figure 20). Loosen the lock knobs enough to allow the loom to fold.

4. Pull up on the T-knobs to fold the loom (Figure 21). Tighten the T-knobs to keep the loom in the folded position.

5. Adjust the tension on the warp if needed to keep it in place.

**Remove your project from the loom**
When you can’t weave any farther or have finished your project, weave a few rows with waste yarn and cut the warp off from the back of the loom. Unwind the fabric from around the cloth beam and untie or cut off the warp from the front apron rod. Be careful not to cut the apron cords.

For finishing techniques, see the references listed at the end of this manual.

**FOLDING FLIP**
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THREADING TWO HEDDLES

1. Measure the warp on a warping board. We don’t recommend using warping pegs with 2 heddles.

2. Secure the warp chain to the front beam for threading front to back.

3. With the front of the loom toward you, place a heddle in the 1st heddle neutral slot.

4. Thread across the heddle in this way: 1 thread in a hole, 3 threads in a slot, all the way across (Figure 22).

5. After you’ve completely threaded this heddle, wind the warp onto the back beam.

6. Move the threaded heddle to the 2nd heddle threading slot (the one closest to the back of the loom. It’s now heddle II. Place another heddle in the 1st heddle neutral slot—it’s now heddle I.

7. As you thread heddle I, think in terms of 4-end groups. Take the ends from the first hole and slot—4 total ends—of heddle II. Find the corresponding hole in heddle I and place the hole end and one of the slot ends in the slot to the right of the corresponding hole. Thread one of the remaining ends in the hole and the other end in the slot to the left (Figures 23 and 24). Thread the next 4 ends in the same way: coming from the back heddle, there will always be 1 end in a hole and 3 in a slot. Check your work as you go. Any thread going through a hole can only go through the hole in one heddle; it must go through a slot on the other heddle.

8. After the front heddle has been threaded, tie on to the front beam.

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