Jacq3G™

An AVL Jacquard System

TABLE OF CONTENTS

TABLE OF CONTENTS

FIGURE INDEX

PREFACE

The two purposes of this assembly manual are:

1) To assist you, the loom owner, in assembling and getting to know your loom by providing complete and detailed instructions, photos, and illustrations.

2) To support you in the enjoyment of a well cared for and properly functioning loom for many years by providing a care and maintenance schedule.

HOW TO USE THIS MANUAL

This manual is made up of three parts: 1) the Assembly Section, 2) Introduction to the Loom Systems, and 3) the Weaving Section. It is extremely important that you read this manual thoroughly and familiarize yourself with all parts of this manual prior to weaving. Each Section has important information with regard to the operation of your Jacq3G of which you will need to be aware, in order to prevent damage to your equipment and provide for many years of production. Some of the information is quite basic; but, please do not skip any section, as there just may be important information contained in what otherwise may appear to be a very basic section.

Please refer to the Table of Contents and the Figure Index, in the event you need to refer back for any reason.

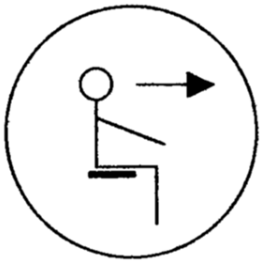
Here at AVL, we know that a picture is, indeed, worth a thousand words and have included many detailed images to help clarify our instructions. Since all of our parts are not numbered, you can use these drawings to help identify certain parts. You will find Figures 1A and 1B to be particularly useful and may wish to pin or tape it up in a handy place for easy reference. This drawing shows all the major parts of the loom and is valuable in determining the relative position of parts. You may also want to keep the Parts List following Figure 1B within easy reach as well.

You need only read the sections for the kind of loom or option(s) you have ordered.

LOOM ORIENTATION
(see Figures 1A and 1B)

The front of the loom is the side where the weaver will be positioned to operate the loom; the back of the loom then, is where the warp beam is. Everything in this Manual, unless otherwise specifically stated, is oriented as if you were sitting in the weaving position. The right side of the loom is to the right of the weaving position; and the left side of the loom then is to the left of the weaving position. A piece marked "bottom" would, of course, go toward the floor.

Figures 1A and 1B give a full picture of the loom and its respective parts. This can be referred to as often as necessary to obtain relative placements of assemblies. Following this is a Parts Number List. Since this list includes the names and part numbers of all parts and assemblies, you may need to refer back to it. Study all the images carefully and make certain that your assembly looks like the one in the drawings before continuing.



Where applicable and necessary on the images, we have included a "weaver symbol" to help clarify the directional aspect of the image. This symbol shows a weaver seated at the weaving bench. Remember, the symbol is included only to help clarify the orientation of the drawing. In the example shown, the weaver is sitting, looking toward the right of the page. That would indicate that the front of the loom is to the left of the page and the rear of the loom to the right. If the arrow were pointing left, then the rear of the loom is to the left.

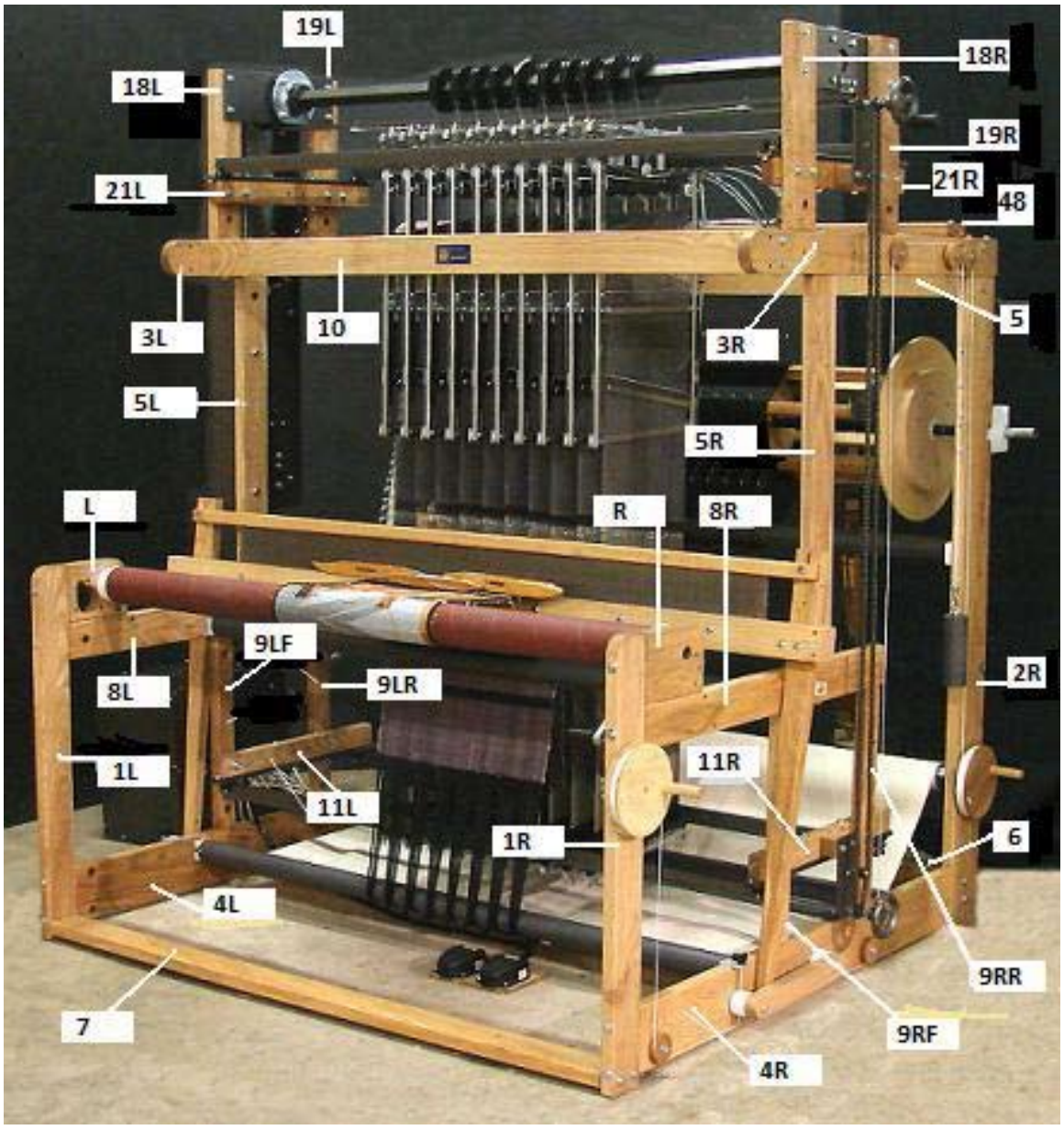


Figure 1A - Jacq3G - Full View

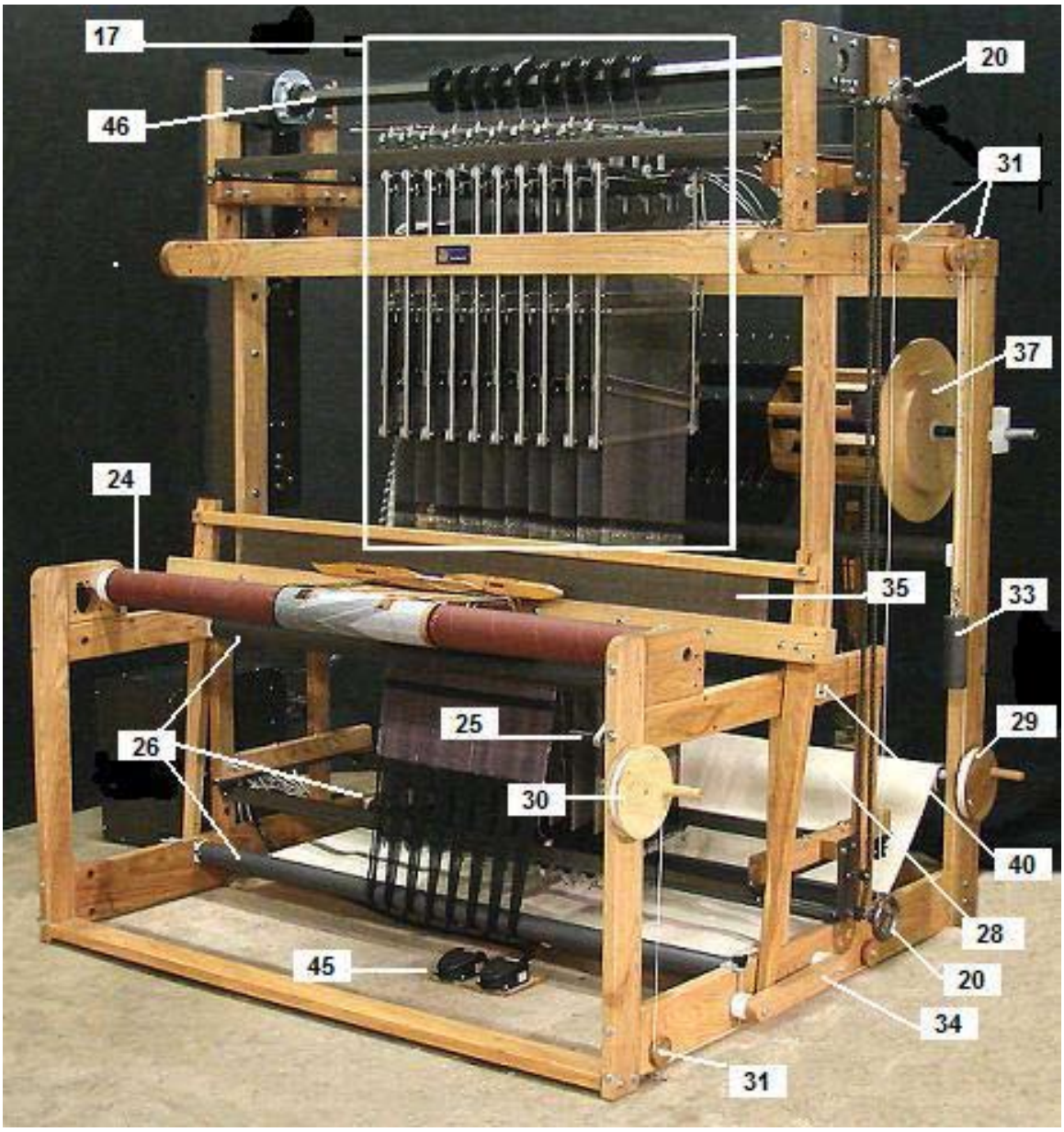


Figure 1B - Jacq3G - Full View

Jacq3G LOOM PARTS LIST (see Figures 1A and 1B on previous pages)

1R	Right Front Vertical Side Frame
2R	Right Rear Vertical Side Frame
1L	Left Front Vertical Side Frame
2L	Left Rear Vertical Side Frame *(not shown)*
3R	Right Top Horizontal
3L	Left Top Horizontal
4R	Right Lower Side
4L	Left Lower Side
5	Upper Back
6	Lower Back
7	Lower Front
8R	Right Lower Cloth Beam Support
R	Right Upper Cloth Beam Support
8L	Left Lower Cloth Beam Support
L	Left Upper Cloth Beam Support
5R	Right Castle
5L	Left Castle
9RR	Right Rear Vertical Support
9RF	Right Front Vertical Support - with bracket
9LR	Left Rear Vertical Support
9LF	Left Front Vertical Support - with bracket
10	Crossmember, Upper Front
11R&L	Channel Support, Lower
12R	Treadle Pulley Support Assembly (*optional - not shown, see Figure 6)*
13D	Treadles, two pieces *(optional - not shown, see Figure 6)*
16	Tension Arm Assembly, Standard *(not shown, see Figure 12)*
17	Modular Assembly
18R&L	Main Drive, Vertical Support, Front
19R&L	Main Drive, Vertical Support, Rear
20	Dial-A-Sett Assembly, Upper and Lower
21R&L	Channel Support, Upper
23	Warp Beam, Standard *(not shown, see Figure 8)*
24	Cloth Beam
25	Cloth Beam Ratchet Handle and Drum
26	Upper, Lower and Rear Cloth Rollers
28	Rear Cloth Storage Roller
29	Cloth Storage Drum
30	Cloth Take-Up Drum
31	Cloth Take-Up Pulleys
33	Weight
34	Beater Supports (*bottom swing*)

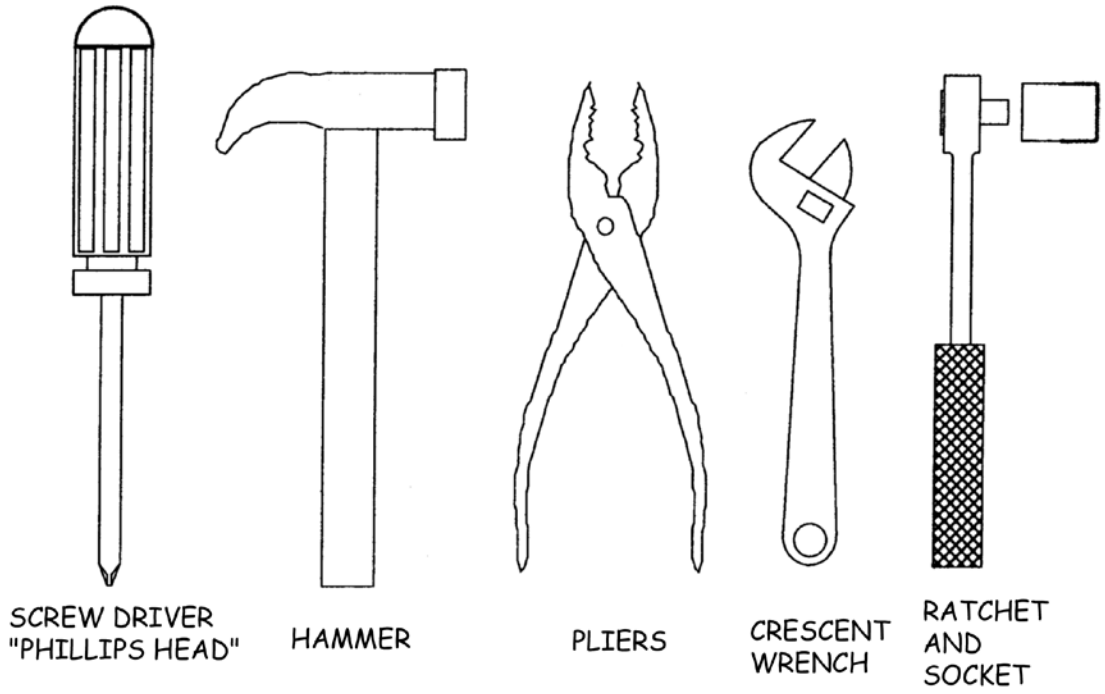
35 Beater Assembly
37 Second Warp Beam
38 Second Warp Beam Tension Arm *(not shown, see Figure 7)*
39 Warp Beam Separation Roller(s) *(not shown)*
40 Beater Bumpers (two)
41 Raddle *(not shown, see Figure ____)*
42 Warp Beam Handle *(not shown, see Figure 7)*
43 Flyshuttle Cord Supports *(not shown, see Figure 32)*
45 E-Lift Foot Pedal
46 Main Drive Axel
47 Separation Roller Support, Track and Mount Assembly *(not shown, see Figure 9)*
48 Data Cable Guide

TOOLS NEEDED FOR ASSEMBLY

There are a few tools you'll need before we can get started. These are:

- a Phillips head screwdriver
- a Flathead screwdriver
- a Light hammer (a fiber or rubber-headed hammer or mallet is best)
- Pliers (Standard and Needle-nose)
- Socket Wrench (Stubby type is best)
- Sockets: 7/16 inch, 1/2 inch, 9/16 inch
- Wrenches: 7/16 inch, 1/2 inch, 9/16 inch
- 4" or 6" crescent wrench

We recommend that you invest in a good set of tools that will be dedicated to your loom. Having the right tools available at the loom will ensure that over time you are more likely to maintain your loom. These same tools are also very helpful to and will speed up the assembly process.



TOOLS NEEDED FOR ASSEMBLY FIG. 2

UNPACKING

Please unpack your boxes being very careful not to throw any parts away with the packing paper. Most, but not all parts, are packed using wide red tape. Remove all strapping tape and bubble pack. Lay out all of the parts so that you will be able to identify each one as they are called for.

IDENTIFYING PARTS

1) Hardware – Identify and Count

There are several hardware bags you will be encountering as you progress through the assembly of your loom. Hardware contained in these bags may contain the following pieces:

- hex bolts
- carriage bolts
- washers
- hex nuts
- square nuts
- wing nuts
- allen wrenches
- machine screws

Now look at the Hardware Identification Chart (Figure 3) on the following page to familiarize yourself with the hardware.

BOLT AND NUT HINTS

A) If a bolt is a little tight going into a hole, give it a light, friendly tap with a hammer.

B) To start the threads on a square nut in a "nut access hole", it is often helpful to hold the nut in place with the end of a screwdriver or the tip of your finger.

C) Always have the larger "nut access hole" (see Figure 4) facing toward the inside of the loom unless otherwise specified.

D) Remember to put washers under the heads of the hex bolts and the exposed nuts (nuts that are not in access holes) to prevent damage to the wood.

E) Carriage bolts do not use a washer at the top (only at the end, with the nut) and usually require a tap or two from the hammer to seat the square part of the bolt's head into the wood.

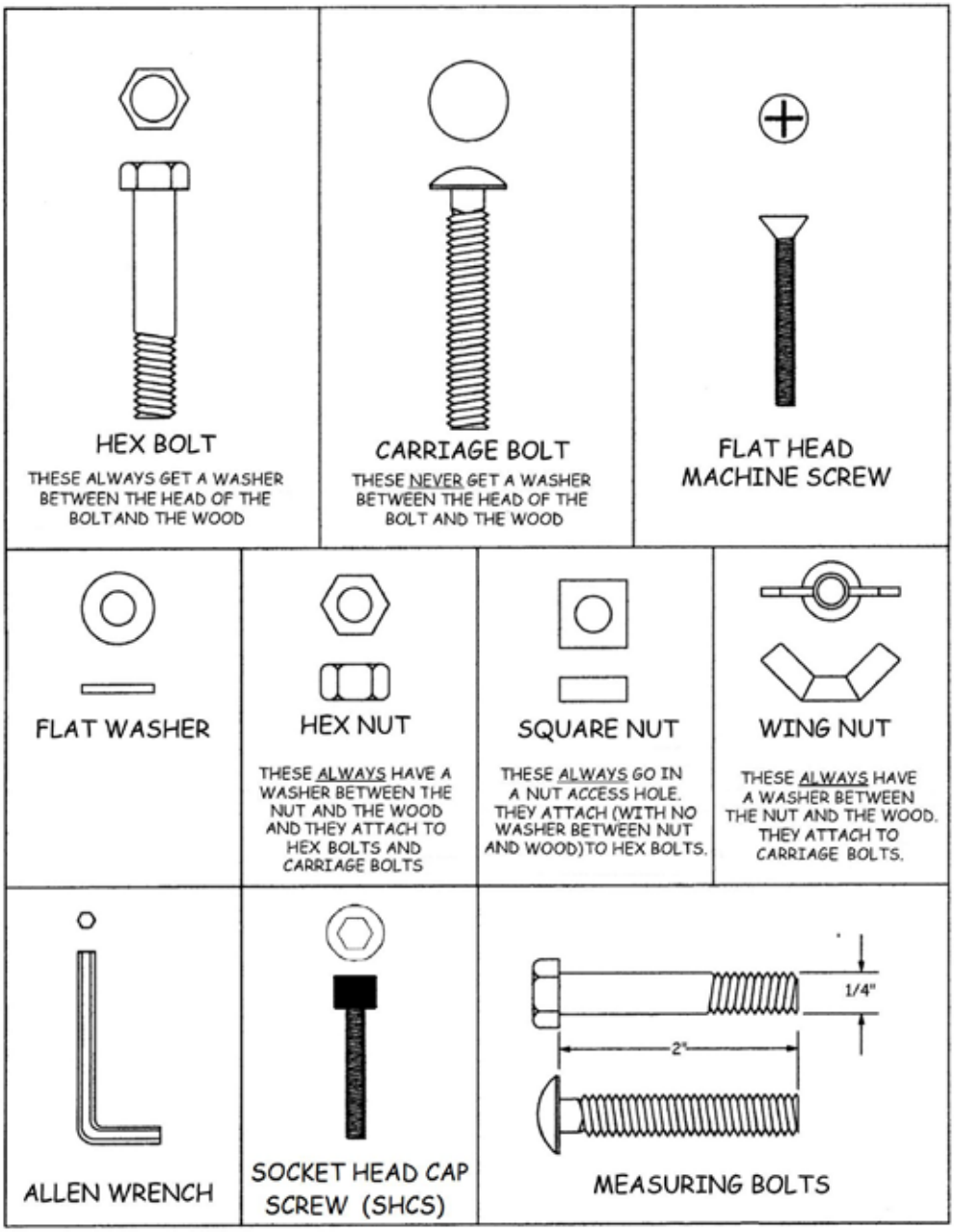


Figure 3 - Hardware Identification

Please Note: Do not completely tighten bolts and nuts at any place where horizontal and vertical frame members meet (at the frame corners). Once all components in this chapter are assembled, you will be directed to square the frame, and only then, to securely tighten the bolts in place.

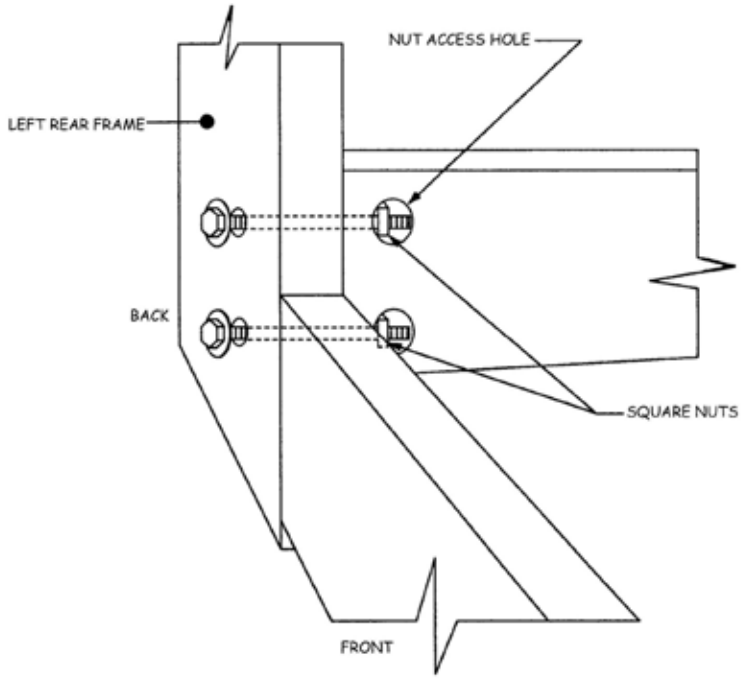


Figure 4 – Hardware Installation

As shown in Figure 4, assembly is made by inserting a bolt (with a washer on it to protect the wood) through the width of one member into the end of the adjoining member with a nut installed on the bolt in the nut access hole in the side of the adjoining member.

Jacq3G Wood Side Frame Hardware

Hardware (inc. standard washers, square nuts)	Location
2 - 5/16" x 5" Hex Bolts	Upper Cloth Beam Supports
8 - 5/16" x 7-1/2" Hex Bolts	Rear Verticals and Bottom Horizontal
30 - 5/16" x 5-1/2" Hex Bolts	All Others, Including the Castle
20 - 5/16" x 3-1/4" Hex Bolts	Most Cross Members to Frame
4 - 5/16 x 3-1/2" Hex Bolts	Upper Front Crossmember
2 - 5/16 x 5" Hex Bolts and lock washers	Data Cable Guide

2) Right Side Wood Frame Assembly (see Figure 6)

AVL Jacq3G Loom Side Frames are shipped disassembled. Use the following procedure to assemble them. The Side Frames must be assembled properly for the loom to operate. You will want to refer to Figures 1A and 1B periodically to insure the proper relationship of these parts.

IMPORTANT NOTE: Prior to beginning the assembly of your new Jacq3G Loom, mark the footprint of the loom and the placement of the Module Frame on the floor using masking tape or chalk. We advise assembly of the right and left wooden frames first, so they will be ready to attach to and stabilize the Module Frame when it is assembled and in position (please refer to Figure 5 for footprint measurements).

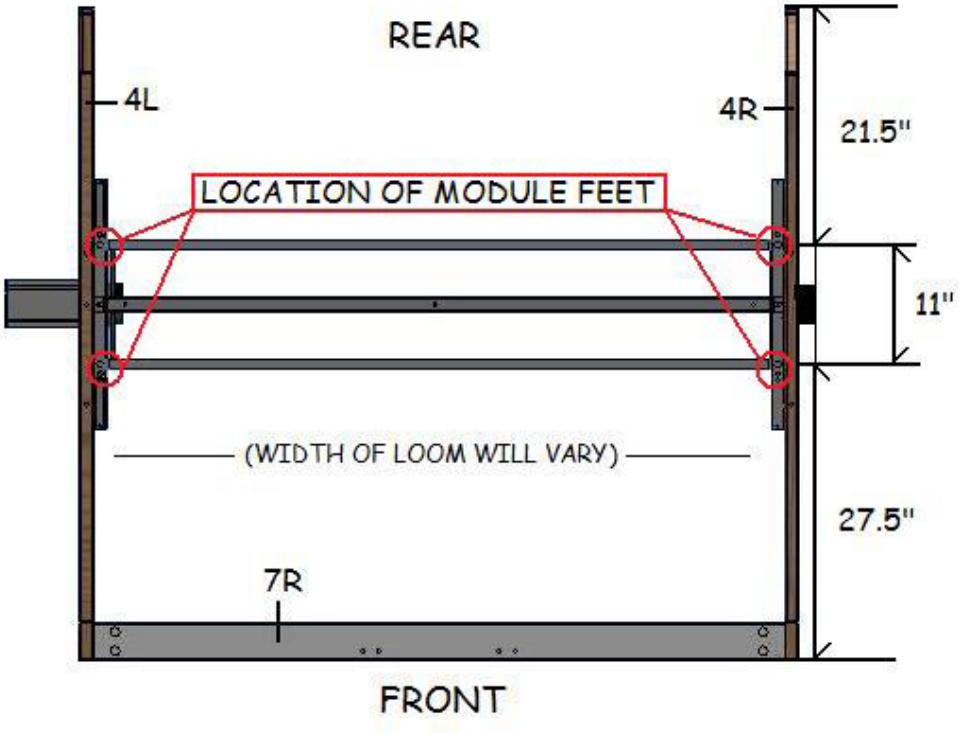


Figure 5 - Footprint of Wood Frame and Module Frame

A) Unpack Box #1 and lay the pieces out. Notice that each piece of frame has an identifying number stamped on it. Also, locate the Side Frame hardware package in which you will find twenty (20) 5/16" x 5" hex bolts, eight (8) 5/16" x 7-1/2" hex bolts, thirty (30) 5/16" x 5-1/2" Hex Bolts, twenty (20) 5/16" x 3-1/4" Hex Bolts, and two (2) 3/8 x 3-1/2" carriage bolts. All bolts will be furnished with washers and square nuts.

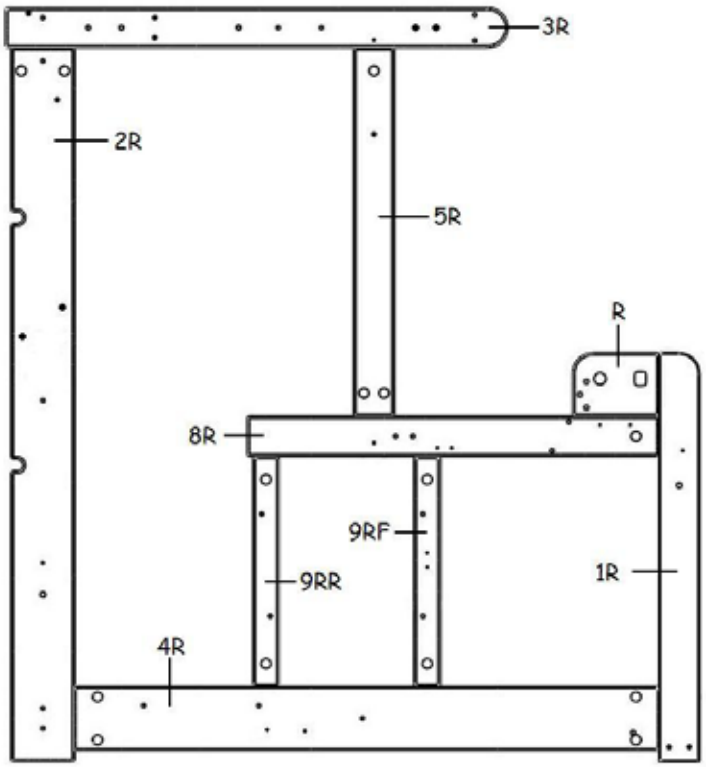


Figure 6 - Right Side Frame Assembly, inside view (holes will differ on Left Side Frame)

B) Locate the Right Bottom Horizontal (4R). Notice the four large nut access holes drilled in one side. On all parts, these nut access holes will go to the inside of the loom. Using two 5-1/2" hex bolts, assemble the Right Front Vertical (1R) to the front end (**the end with the number stamp**) of the Right Bottom Horizontal (4R), making sure that the nut access holes on both parts are to the same side.

C) Assemble the Right Rear Vertical (2R) to the rear end of the Right Bottom Horizontal (4R) using the same procedure with two 7-1/2" long hex bolts.

D) Position the Right Front Side Support (9RF) to the Right Bottom Horizontal (4R) at the hole toward the front of the loom. Position the Right Rear Side Support (9RR) in the hole toward the Rear Vertical. Make sure the number stamps on the Right Side Supports (9RF, 9RR) are facing down and toward the Right Bottom Horizontal (4R) and the nut access holes and bracket are to the inside. Assemble the two Right Side Supports (9R) to the Right Bottom Horizontal (4R) using two 7-1/2" long bolts.

E) Assemble the Lower Right Cloth Beam Support (8R) into the Right Side frame. It attaches with one 5-1/2" hex bolt through the Right Front Vertical (1R) and with one 5-1/2" hex bolt in each of the Right Side Supports (9R). Again, be sure to keep the nut access holes to the inside. (Please note: If you have ordered treadles for your loom, the left side piece (8L) will have a small block mounted to one side. Be sure that, upon assembly of the left side, this small block is facing into the loom.)

F) Assemble the Upper Right Cloth Beam Support (R) into the right side frame. It mounts on top of the Right Lower Cloth Beam Support (8R) and attaches with one 5/16" x 5" bolt through the Right Front Vertical (1R).

G) Assemble the Right Castle (5R) into the Right Side Frame. It attaches with two 5-1/2" hex bolts through the Right Lower Cloth Beam Support.

H) Position the Right Top Horizontal (3R) to the top of the Right Rear Vertical (2R) and the top of the Right Castle (5R), with the number stamp facing down. This will allow the several small holes on the top of the Right Top Horizontal (3R) to be on top. Secure the Right Top Horizontal (3R) to the Right Rear Vertical (2R) with two 5-1/2" hex bolts and to the top of the Right Castle (5R) with one 5-1/2" bolt.

3) Left Side Wood Frame Assembly

Repeat Steps A) through H), above, for the Left Side Frame. Please note the difference for 8L, on a Treadle Loom, in Step E), above.

4) Preparing the Treadle Assembly (see Figure 7)

If you have ordered M-Lift with your loom, that is, if you intend to use treadles, it is best to install the treadles onto #7 at this time. Once the Module Assembly is in place, #7 should be ready for connection to the wooden side frames.

For treadles, part #7 will be equipped with a rod with two spacers and blocks attached to the top face. For ease at installation the nut access holes are on the top face. Position the Assembly (#7R) so that the rod and blocks are on top and closer to the front of the loom (as shown in Figure 6), not positioned to the inside. The treadles will hinge on this rod and it is critical that the rod be as close to the front/outside of the loom as possible. Please take care in the positioning of this part.

A) Locate the two treadles, with hardware installed at one end. They are of equal length. Orient them so that the horizontal hole (at the end without the hardware) is resting at the rod and blocks mounted on the Lower Front Crossmember (#7R). The treadles will lie across the Crossmember, running into the loom.

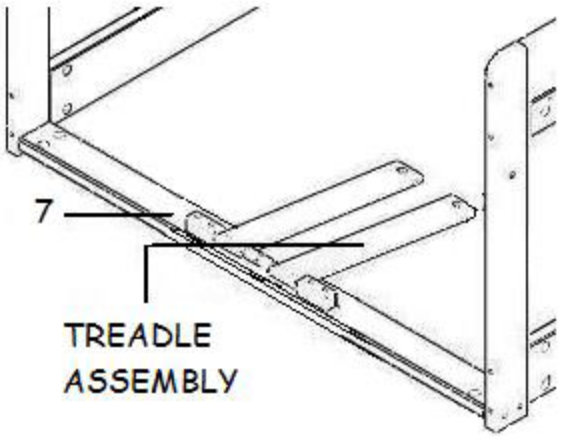


Figure 7 - Treadle Assembly (installed)

Remove the bolts that hold the left hand block in place. This will allow you to remove the rod and both spacers from the right hand block. Slip the rod through the horizontal hole on the right side of the Right Treadle, add both spacers, and the Left Treadle. Now slip the end of the Treadle Rod back into the right hand block. Slip the left hand block back onto the end of the rod. The order of parts in the assembly now should be as follows (from left to right):

- left mounting block
- left treadle
- two spacers
- right treadle
- right mounting block

You can now bolt the Left Treadle Block back into place. Check the Treadle Assembly as shown in Chapter 13 (M-Lift Installation), to be certain you've done it correctly. Set this Assembly aside, as you Assembly the Module Frame.

Now that the two Side Frames are assembled, they can be set aside until the Module Frame is assembled and in place.

5) Assembly of the Module Frame (see Figures 8 through 11)

A) Locate the Module Frame hardware and check that the contents include the following:

Jacq3G Module Frame Hardware

Hardware (with washers and nuts)	Location
8 - 3/8-16 x 1-1/2" Socket Head	Side Frame Bars to Upper and Lower Assemblies Cap Screws (SHCS)
8 - 5/16" x 7-1/2" Hex Bolts	RHS and LHS Wooden Frames to Mod. Frame
8 - Black Plastic Spacers	Standoffs between Wood and Modular Frames

B) Locate the Lower/D-A-S Assembly. Position this assembly (as shown in Figure 8), so that the four rubber feet are pointing up, the circular DAS handle will be at the right side, and the bar upon which is it resting is about 6" in front of the foremost position line for the Module Frame.

C) Locate the Upper/Drive Axle Assembly. This large and very heavy Assembly will be comprised of the sprocket, main drive axle with large pulleys, support bracket, vertical supports, and upper channel supports. It can rest safely on its horizontal supports for now, with the axle on top (as shown in Figure 8). Position this Assembly perpendicular to #7R and about one foot in front of the Lower Assembly; oriented so that the large sprocket gear is to the left and the smaller circular DAS handle is to the right.

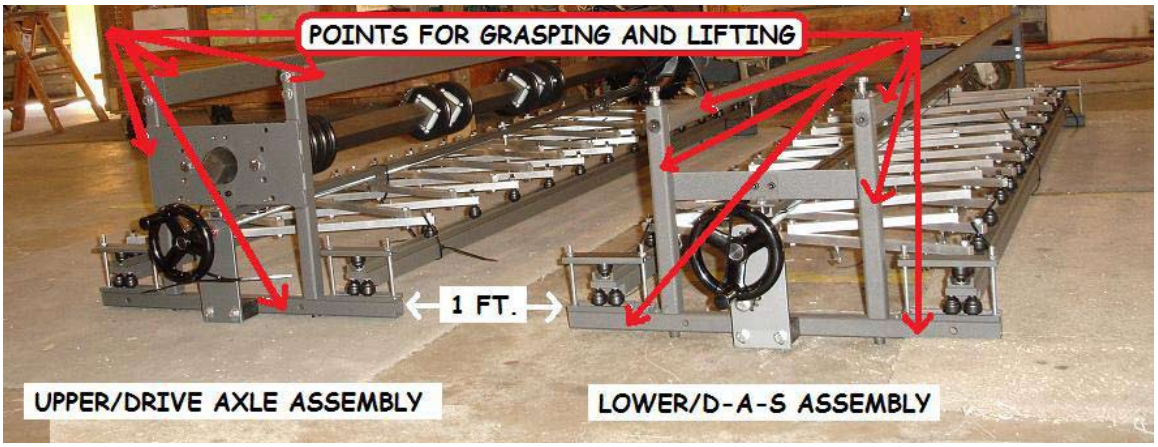


Figure 8 - Initial Assembly Layout

IMPORTANT SAFETY NOTE: It is important to have at least two sets of strong arms and backs to assemble and lift this heavy Frame Assembly into Place. (The Top Assembly weighs about 280 Lbs.) DO NOT ATTEMPT TO LIFT THESE ASSEMBLIES BY THE DAS SUPPORTS! SEE FIGURE 7 FOR SAFE POINTS FOR LIFTING AND MANUEVERING.

D) Locate the four wooden blocks that were packed with these two assemblies. Note that each block, standing on its shortest end, will fit neatly at the side of the assembly vertical supports. Place one at each outer corner of this layout (see Figure 9).

E) Carefully tip the Upper Assembly onto its side, with the Axle/Pulley Assembly pointing away from the loom, and slip a wooden block underneath the corners (as shown in Figure 9).

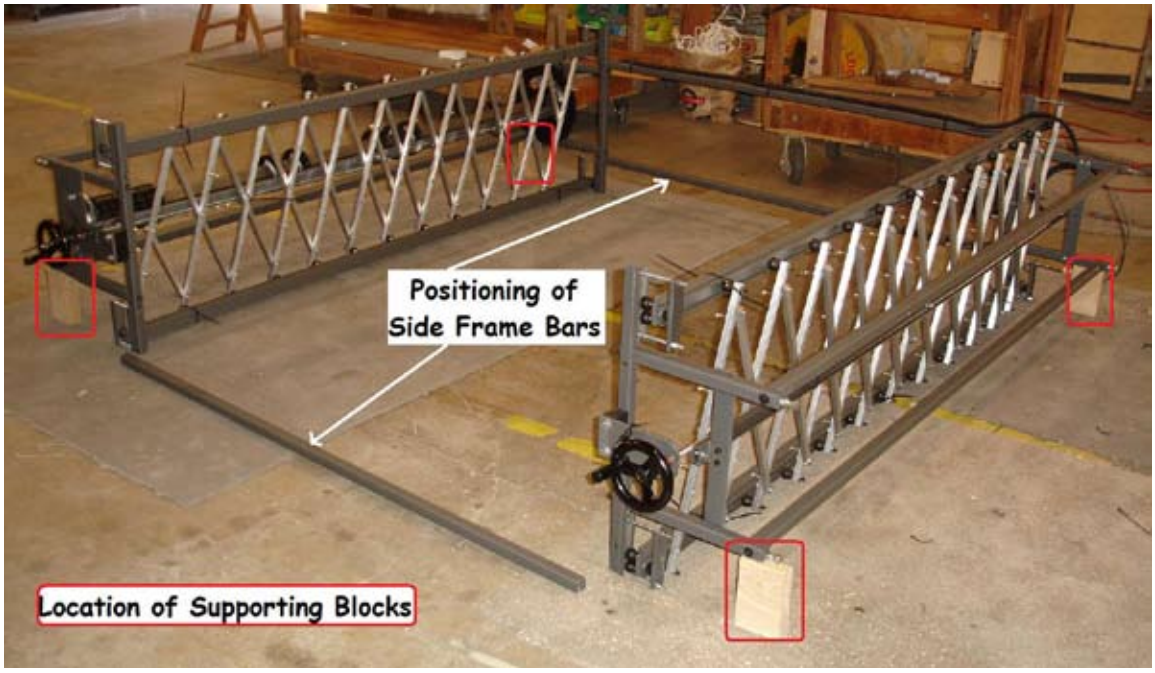


Figure 9a - Arrangement of Module Frame Pieces for Assembly

F) Carefully tip the Lower Assembly away from the Upper Assembly (as shown in Figure 9), so the feet are pointing towards the rear of the loom outline and supported by the wood block.

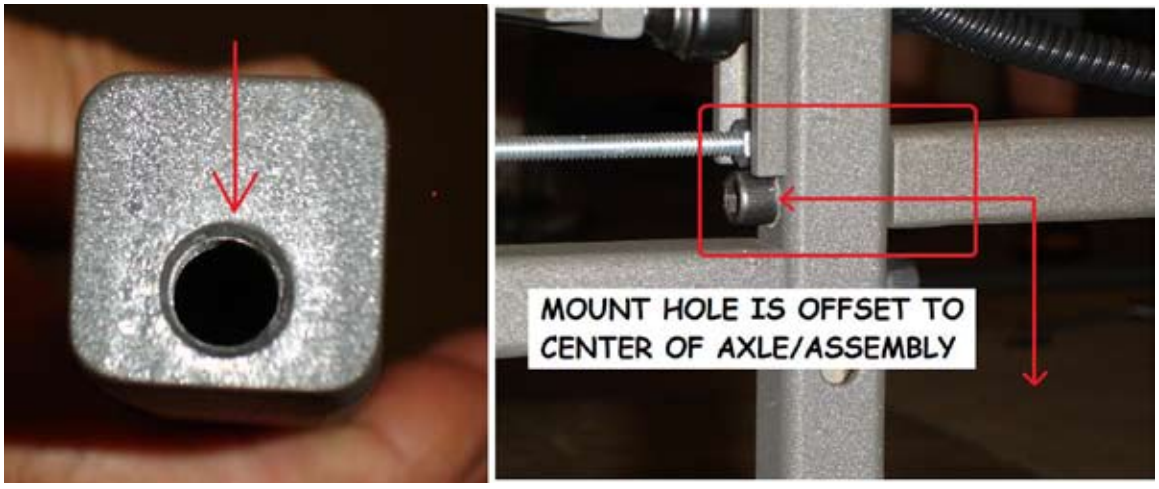


Figure 9b - Orientation of Side Frame to Upper and Lower Assemblies

G) Locate the four Side Frame Bars and install two at either side, connecting the Top and Lower Assemblies (as shown in Figures 9b and 9c). Note that the mounting holes in the end of each bar are offset to one side. Orient the bars so that the side with the mounting hole is closest to the axle or assembly center, and the side is flush with the side of the Assembly Frame. Install each using one 3/8-16 x 1-1/2" SHCS at either end.

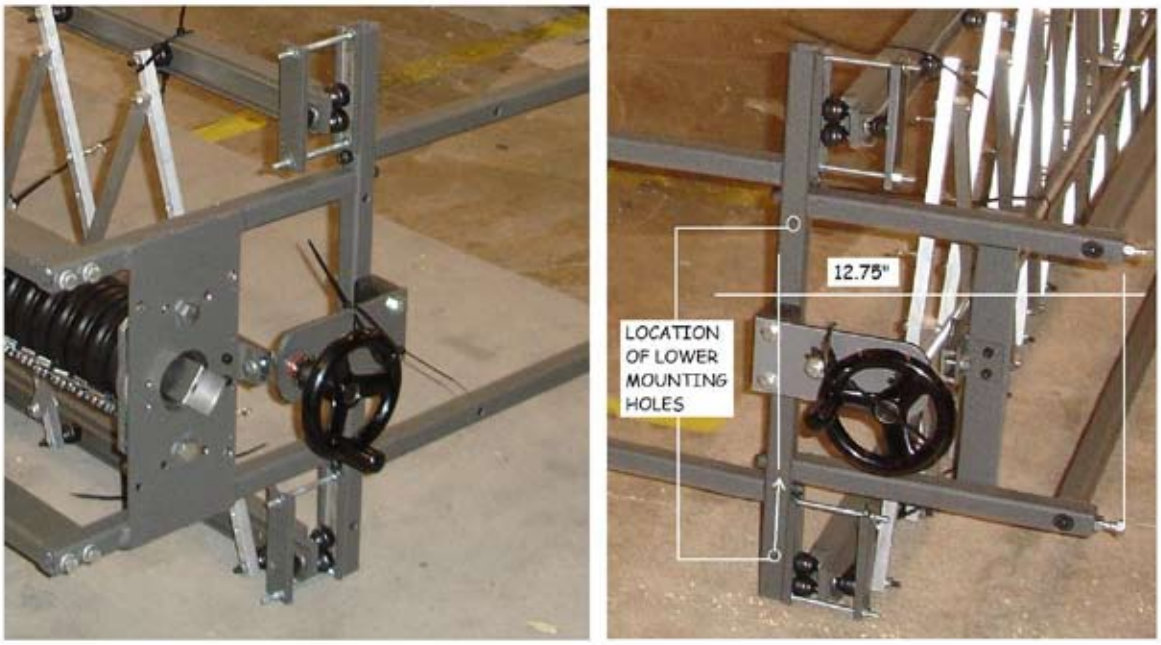


Figure 9c - Orientation of Side Frame Bars at Upper and Lower Assemblies

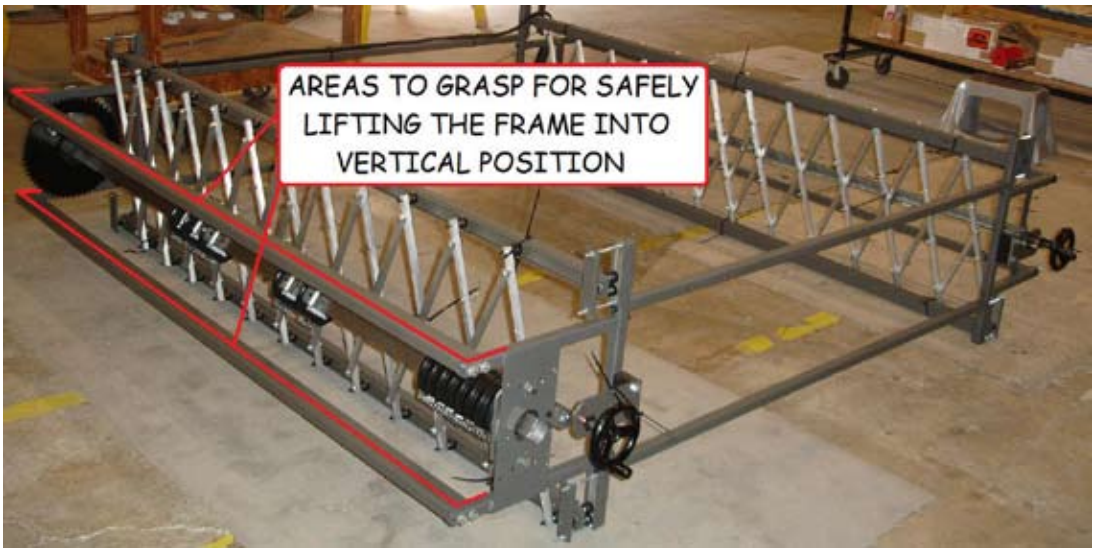


Figure 10 - Areas for Grasping the Module Frame During the Lift

H) Prior to lifting this frame into its vertical position, check to see that the feet are adjusted to the correct height. From the mid-line of the first horizontal to the bottom of the feet should measure 12-3/4". This will allow proper alignment with the corresponding holes in the wood frame. (If the loom is to be positioned on a carpeted surface, the wood frame may sit slightly higher, and this should be taken into consideration. While adjustment to the feet can be made when the Module Frame is vertically positioned, it is quite heavy and this would be similar to adjusting feet on a refrigerator.)

I) At least two people will be needed to lift the completed frame. Grasping the top cross members of the frame (as shown in Figure 10), lift the Top Assembly up, allowing the Lower Assembly to come to rest on its four feet.

6) Assembly of the Wooden Side Frames and Connection of the Wood Frame to the Module Frame (see Figure 11)

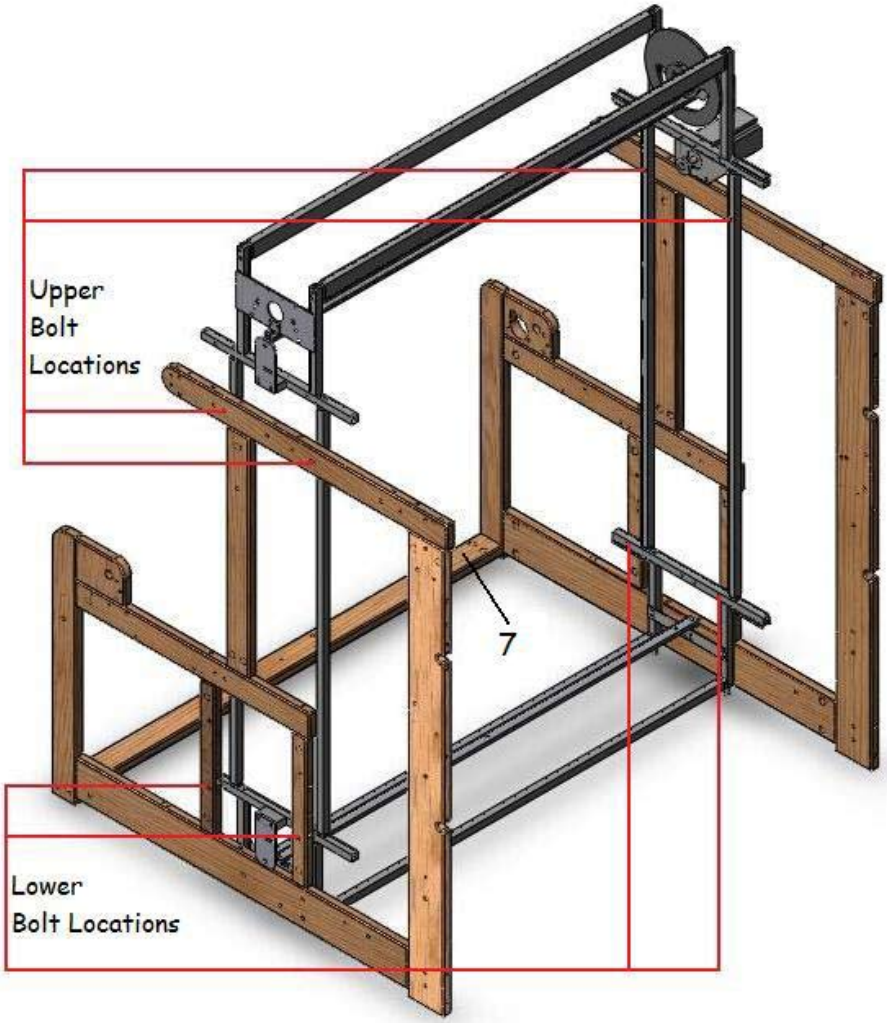


Figure 11 - Wood and Module Frames with Connecting Bolts
(DAS Assemblies not shown)

A) Attach the wood frame sides to the Module Frame (as shown in Figure 11, below). Check that the holes in the two frames align. Secure each side in place with four (4) 5/16 x 3-1/4" hex bolts with washers, at each side. Insert each hex bolt, with washer, from the exterior of the wood frame. Once the tip of the bolt is between the wood and Module Frames slip a black plastic spacer onto the bolt. Push the bolt through the matching hole in the Module Frame and secure with lock washer and hex nut.

B) Locate the Lower Front Assembly (#7). If you will be using treadles, you will already have installed the Treadle Assembly onto #7, in Step 4, of this Chapter.

C) Position the Lower Front Assembly (#7) between the two wooden sides (as shown in Figure 11). The nut access holes in #7 will face to the floor, so prop this Assembly up slightly, to allow enough hand room. From the outside of the loom, insert the two 5/16" x 3-1/4" hex bolts into the holes at each Side Frame, where the Lower Front will be attached. Secure each with a square nut in the access hole.

7) Completing the Wood Frame (see Figures 5 and 12)

A) Rest the Data Cable Guide across the back of the loom, with each end supported by the Right and Left Top Horizontals (3R and 3L). Align the holes drilled at each end of the Data Cable Guide with the third hole from the back, on the top edge of Parts 3R and 3L. Hold it in place with two (2) 5/16 x 5" hex bolts with flat washers, inserted from the under side of the Top Horizontals. Secure each with a second flat washer, a lock washer and 3/8" hex nut. Again, wait to tighten all of the frame bolts until all of the frame parts

B) Using four (4) 5/16" x 3-1/4" hex bolts, with washers, attach the Lower Back (#6) between the side frames (see Figure 12). Remember, the nut access holes face the inside of the loom. Seat the nuts on the bolts, but don't tighten them all the way just yet.

IN ORDER TO ALLOW HEADROOM DURING THE INSTALLATION OF THE MODULES, IT IS RECOMMENDED THAT YOU PROCEED TO CHAPTER 3 – MODULE INSTALLATION, AT THIS TIME. ONCE INSTALLATION OF THE MODULES IS COMPLETE, RETURN TO THIS SECTION FOR FINAL PLACEMENT OF THE REMAINING FRAME MEMBERS AND SQUARING THE FRAME.

C) Welcome Back! Now locate the Upper Front Crossmember (#10). This piece will have a small AVL plaque with the Serial Number of your loom engraved upon it. Please refer to this number whenever you are discussing your loom with us or ordering parts.

Locate the two holes at each side, on the Upper Horizontals (3R and 3L), located near the rounded, front tip of these pieces. Align the Crossmember between these holes, with the plaque facing outward. Secure in place with four 5/16 x 3-1/2" hex bolts with washers and secure in the access hole on the backside with a square bolt.

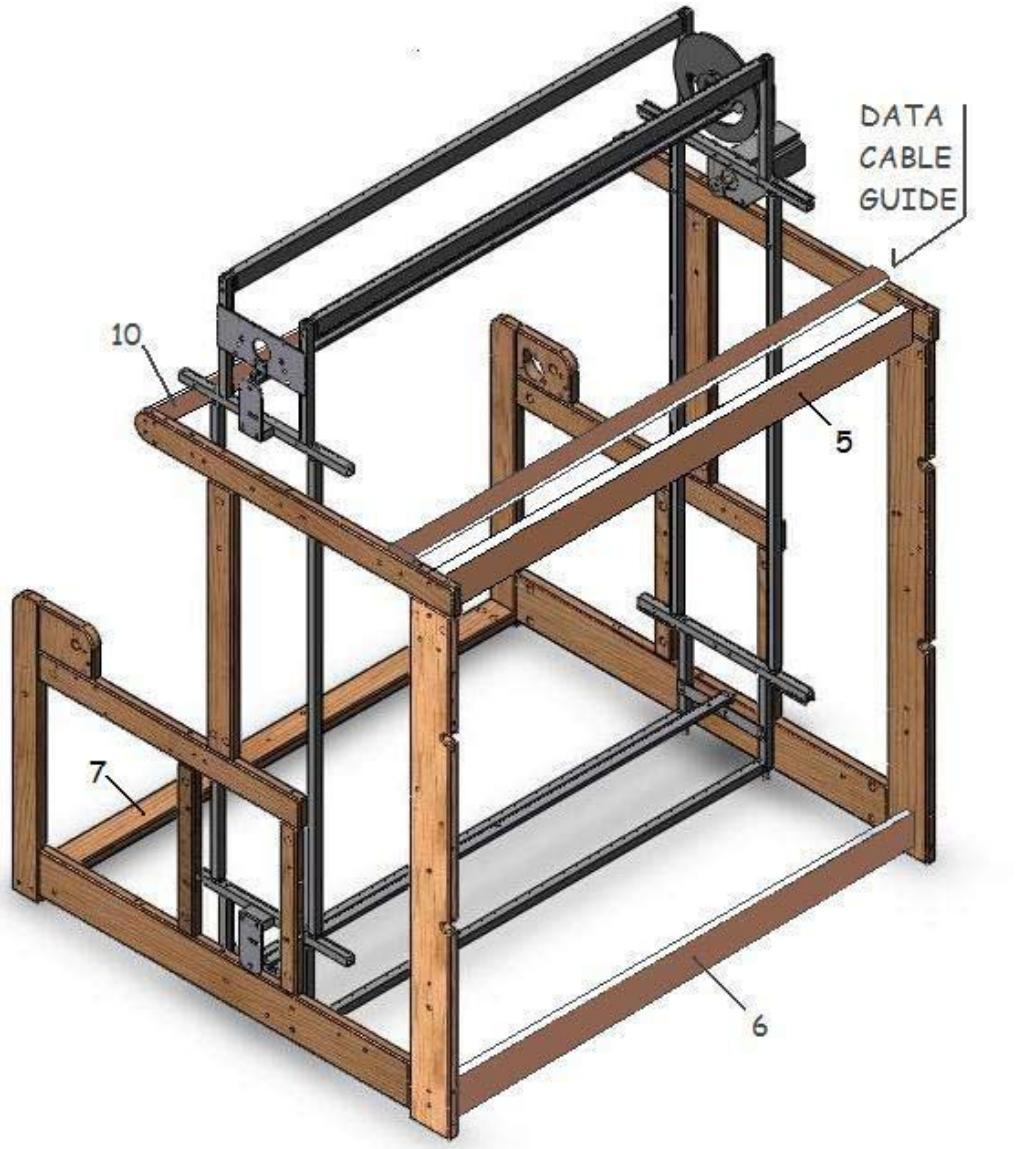


Figure 12 - Completed Module and Wood Frames

D) Now install the Upper Back (#5) using four 5/16" x 3-1/4" hex bolts, washers, and square nuts (as shown in Figure 12). Again, do not tighten all the way, as this will be completed during the process for Squaring the Loom, in the next (and final!) step of this chapter.

8) Squaring the Completed Frame

Now that you have completely assembled the Loom Frame, it is time to assure that the frame is square and level. Please make a note of this process, as it is an important part of the maintenance of your loom. The many features of this loom will perform better and give more years of service if this process becomes a part of your regular loom maintenance.

A) Using a tape measure, note these measurements:

a) The distance from the inside corner of the Rear Left Vertical (2L) to the inside corner of the Front Right Vertical (1R).

b) The distance from the inside corner of the Rear Right Vertical (2R) to the inside corner of the Front Left Vertical (1L).

B) These two measurements should match. If they do not you will need to adjust the frame slightly until they do match. The frame will then be square.

C) Now, using a level, check the verticals at the corners and the cross pieces at bottom and top. Depending on the flooring, you may need to use shims under the four corner verticals in order to achieve level.

D) Once the loom is square and level, then you must check and tighten all bolts and nuts that connect the frame pieces.

E) Due to the shaking and movement the loom experiences during use, over time these connections will shake loose and will require periodic checking and tightening.

Your frame is now complete. If you have, as advised, already completed Chapter 3, please proceed to Chapter 4 for Installation of the Beams and Rollers. If you finished this chapter prior to Installing the Modules (Chapter 3), watch your head!

Please Note: It is best to start hanging the modules from one side of the loom and work your way across rather than trying to work from the center out. Also, when installing the modules. make sure the electrical and data cord connections go towards the back of the loom (see Figure 45).

1) Rotate the Main Drive Axle towards the back of the loom, so the Drive Shaft Stop is resting at the Rear Adjustable Stop Bracket. Secure it in this position with a strap or tie-down. Make sure that it is secure and will not rotate before you hang the modules (see Figure 44). If you have Air-Drive it will hold in this position without need of restraint.

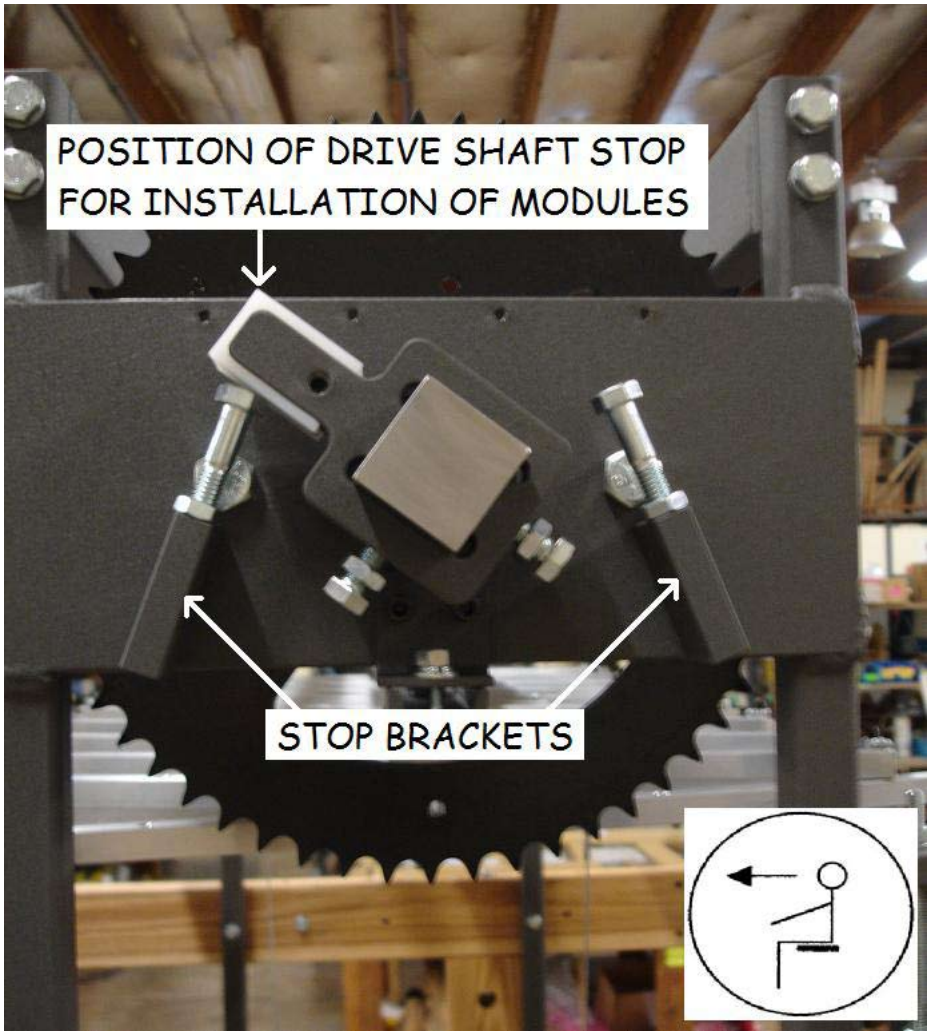


Figure 44 - Position for Securing Axle prior to Module Installation

2) Loosen the two (2) button head cap screws found on the Upper Module Frame, at the base of each of the small uprights.

3) At the left hand side of the loom (based on the position of the Weaver at the Reed during production), and beginning with the #1 Module, position the Module so that the Power and Data outlets mounted on the green Driver Board are pointing out the back of the loom. Bolt the first Module Uprights to the first Top Density Adjuster, making sure not to cross thread the bolts. Verify that the Module is hanging square.

4) Tighten the button head cap screws that were loosened in Step 2.

5) Align the first Drive Pulley (located on the Top Drive Axle) directly above Pulleys #2 and #4, found at the top middle of the module.

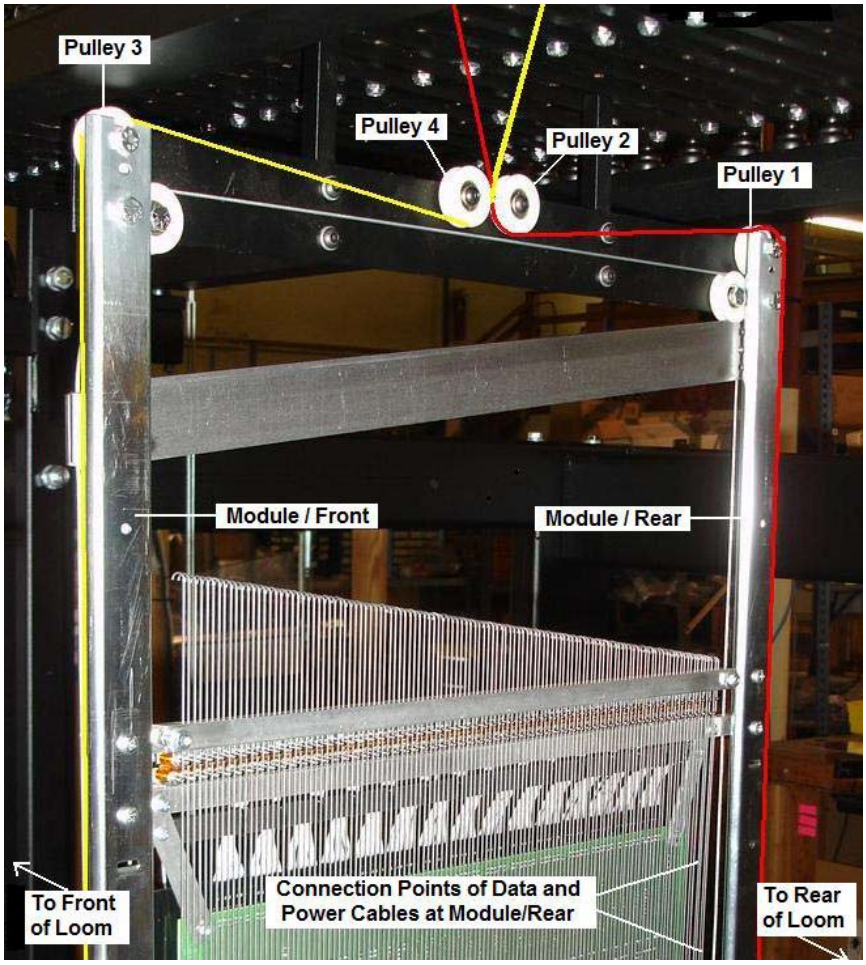


Figure 45 - Routing the Module Cables

6) Please Note: During this next step, it is critical that the cables be mounted in the order described here (see Figure 45). Route the plastic coated cable, located at the rear of the Module (shown as red in Figure 45), up over Pulley #1 at the top rear of the Module and towards the front of the loom. Then wrap it under pulley #2, at the top middle of the module. From there bring the cable towards the front of the loom, up and over the Drive Pulley. Route the cable between the front hex nuts/washers assembly at the top of the Drive Pulley. Verify that the cable is between the washers. Pull the cable taunt, making sure the Slide Bars come together in the middle of the Module. Tighten down the hex nut on the Drive Pulley.

7) Next, route the plastic coated cable located at the front of the Module up and over Pulley #3, at the top front of the Module (shown as yellow in Figure 45), towards the rear of the loom. Then wrap it under Pulley #4, at the top middle of the Module. From there bring the cable towards the back of the loom, up and over the Drive Pulley. Route the cable between the rear hex nut/washers assembly at the top of the Drive Pulley. Verify that the cable is between the washers. Pull the cable taunt and tighten down the hex nut on the Drive Pulley.

8) Connect all the Heddle Springs to the Module Hooks. It is best if all the small black connecting hooks open, uniformly, toward the front of the loom. Be sure that the Module Hooks are not crossed, the black hooks are hanging straight, and that the springs are in matching order with the Module Hooks and not twisted or hanging up on each other.

9) Repeat Steps 2-8 for all modules.

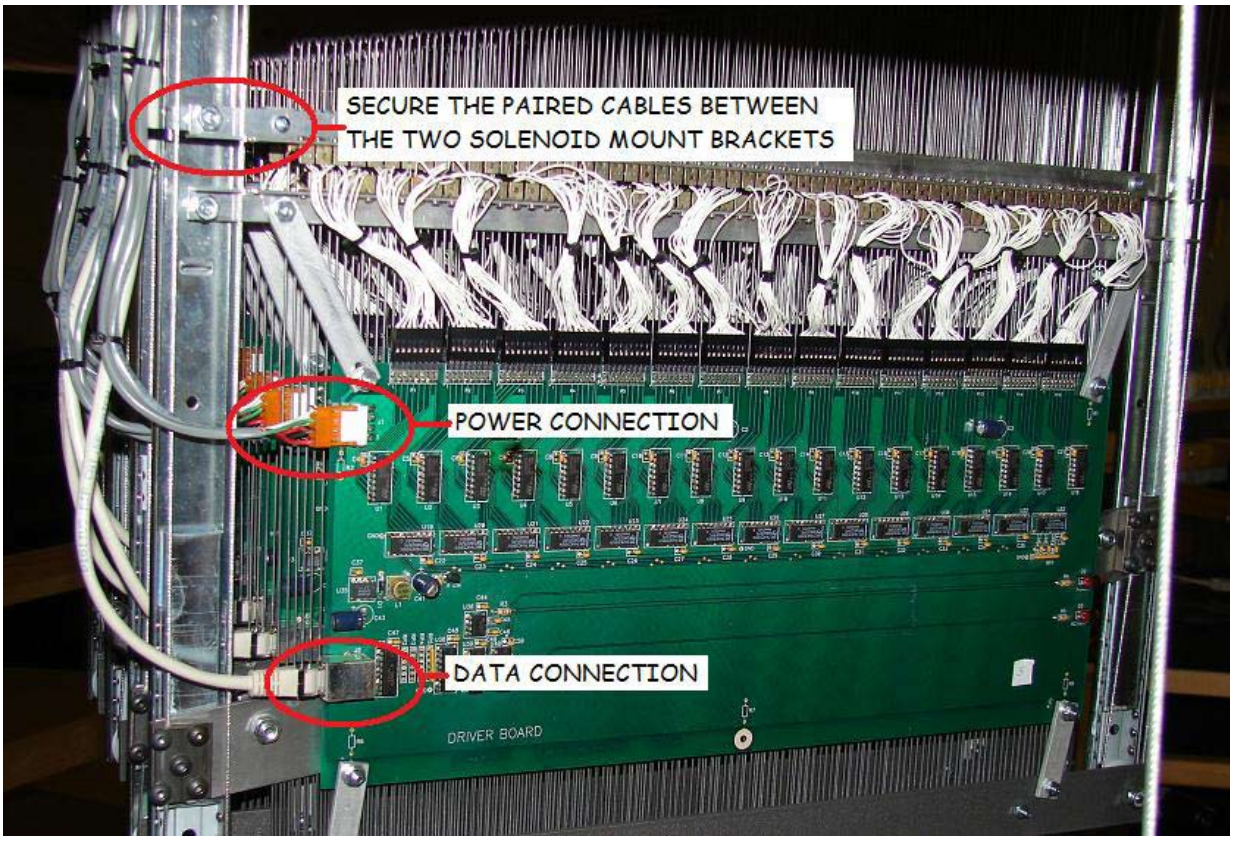


Figure 46 - Connection of Cables and Securing them to the Module Frame

10) Connection of Data and Power Cables including securing.

A) Connect the Data and Power Cables to each Module/ Green Board (as shown in Figure 46).

B) Lead each bound pair of cables up the rear edge of the Module and fasten them to the Module Frame between the Solenoid Mount Brackets, using a tie strap.

a) Be sure the closure strap is outside and behind the Module Frame and …

b) be sure that between this tie strap and the connections to the Green Board, there is enough ease to allow the Data and Power Cables to be clear of the Module Cable, in order to avoid any rubbing.

C) All of the pairs of Data and Power Cables have been enclosed in a Flexible Cable Housing. Orient this housing to the Data Cable Support so that the end of the Housing, releasing the paired cables, is centered on the Support and the end that will connect to the Control Box feeds off the left side of the loom. Secure it in position with tie straps, through the holes in the Support.

11) Now, please return to Chapter 2, Section 7.C, for completion of the wooden frame, before proceeding to Chapter 4.

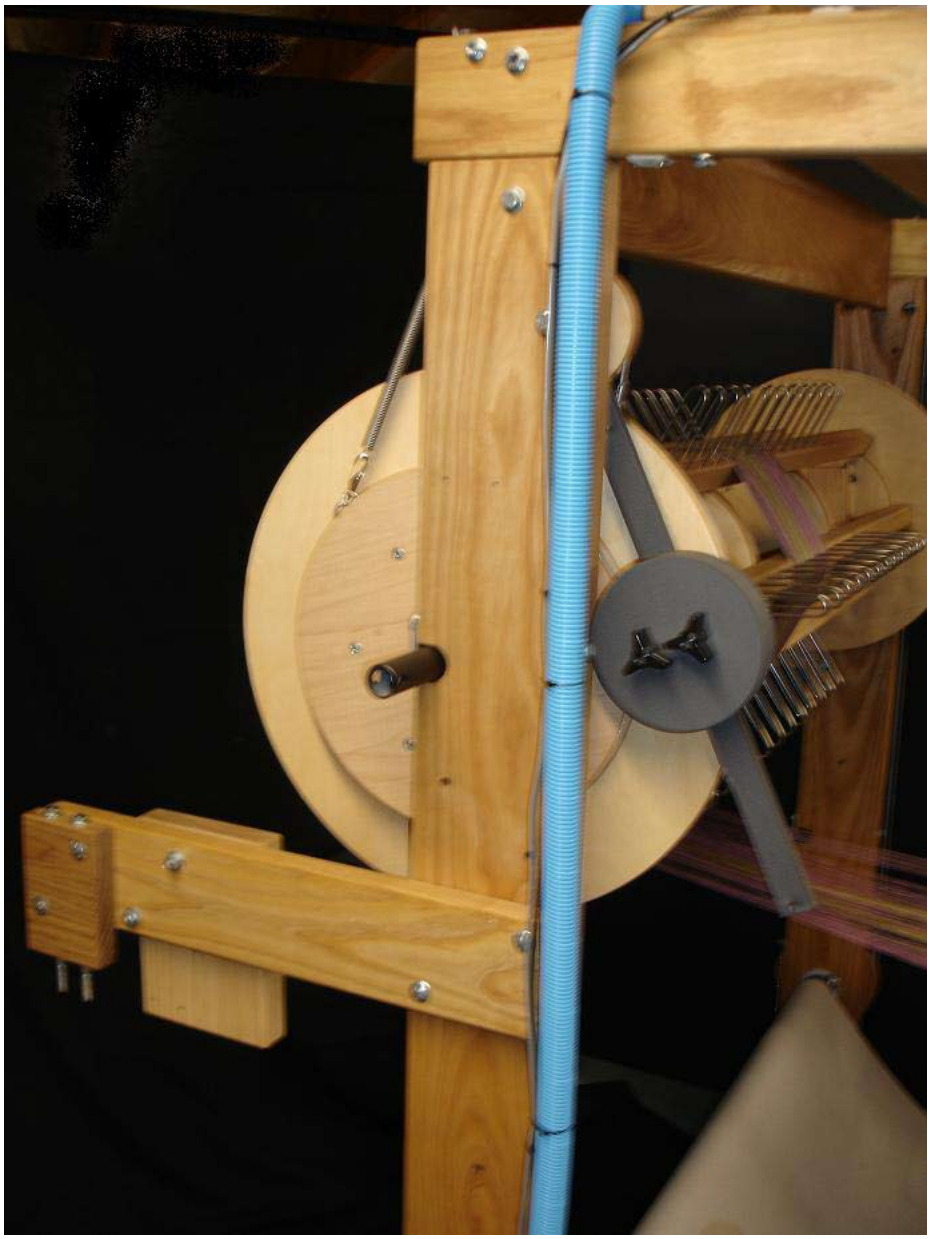


Figure 7 - Position of One-Yard Sectional Warp Beam and Brake (in Upper Position)

1) **Installing the Standard "Plain" Warp Beam (#23) or 1/2 Yard Sectional Warp Beam - Lower Position (default position)** - The Standard Plain Warp Beam will be installed in the lower two slots in the back edge of the Rear Verticals (see Figures 7 and 8). See Chapter 6 for Installation of the Tension Arm.

(**Please Note**: If you wish to install either of these Warp Beams in the Upper Position, you will need to order the appropriate Cable (#38P) and follow the instructions in Step 5.)

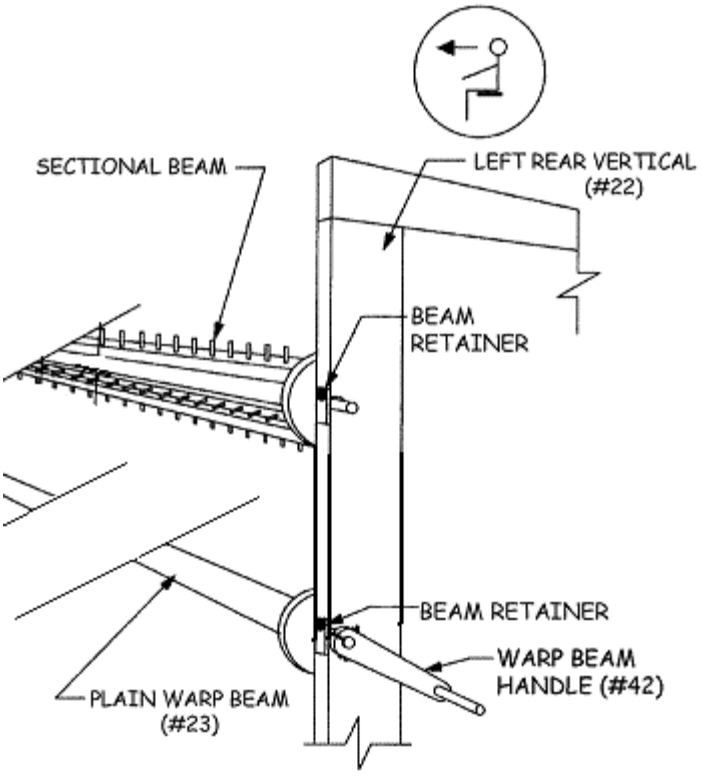


Figure 8 - Installation of Warp Beams (blocks not shown)

A) **Install and Open the Beam Retainers** - The Axle of the Warp Beam will be locked in place by the small, flat Beam Retainers. These small plates and mounting bolts are included in your hardware bag, one pair for each Beam. These Retainer plates can now be secured lightly into the threaded inserts directly above each warp beam slot. Swivel the plates up, positioning them horizontally above the slot and tighten the small bolt just enough to hold the plate in that position.

B) **Position and Install the Plain or 1/2 Yard Sectional Beam** - Position the Brake Drum (the large round wooden drum located outside the wide Beam Flange) at 2L. Raise the Beam into place, in the lower slot in the Left Rear Vertical Support (2L) and the other Beam Axle into the same slot in the Right Rear Vertical Support (2R). While leaning against the Beam, to hold it in position, loosen the small bolts enough to allow the Retainers to swivel and close the openings. Now tighten the Small bolts down, securing the Retainers and the Beam. See Step 7 for installation of the Beam Handle.

2) **Installing the Second Warp Beam** (#37, optional equipment, upper position) – (see Figures 7 and 8) Please Note: if you have ordered a Three-Beam System, please proceed to Step 5, below.

A) Install the Second Warp Beam (#37) in the upper two slots located at the back edge of the Rear Verticals (see Figure 8). The axle of the Warp Beam will be locked in place by the Beam Retainers (described in Step 1A).

B) Position the Brake Drum (the large round wooden drum located at one end, outside the wide Beam Flange) at the Left Rear Vertical (2L). Raise the beam into place, in the upper slot in the Left Rear Vertical Support (2L) and the other beam axle into the same slot in RL. While leaning against the beam, to hold it in position, loosen the small bolts enough to allow the latches to swivel and close the openings. Now tighten the bolts down, securing the retainers and the beam (see Step 7 for installation of the Beam Handle).

3) **Installing the One-Yard Sectional Beam (optional equipment, upper position)** - (see Figures 7 and 8)

Please Note: If you wish to install a One-Yard Sectional Beam in the Lower Position, you will need to order the Extension Bustle for the Lower Position and the appropriate cable (#38L). If you have ordered a three-Beam System, please proceed to Section 5, below.

A) The Sectional Beam will be installed in the upper slots on the outside, rear edge of the Rear Verticals (as shown in Figure 8). Locate the Beam Retainers as described in Step 1A, above. Loosen the small bolts enough so that the retainers can be swung off to the side. Tighten the small bolts just enough to hold the retainers in this horizontal position.

B) Position the beam at the back of the loom with the Brake Drum (the large round wooden drum, located on one end, outside the wide Beam Flange), at the Left Rear Vertical (2L). Now lift the Sectional Beam up to the back of the loom. While leaning against the beam, to hold it in position, loosen the small bolts enough to allow the latches to swivel and close the openings. Now tighten the small bolts down, securing the latches and the beam (see Step 7 for installation of the Beam Handle).

4) Installing a Three-Beam System – (see Figure 7a) The Second and Third Beams will be mounted to the upper half of the Left and Right Rear Vertical Supports (2L and 2R) with the use of Mounting Blocks.

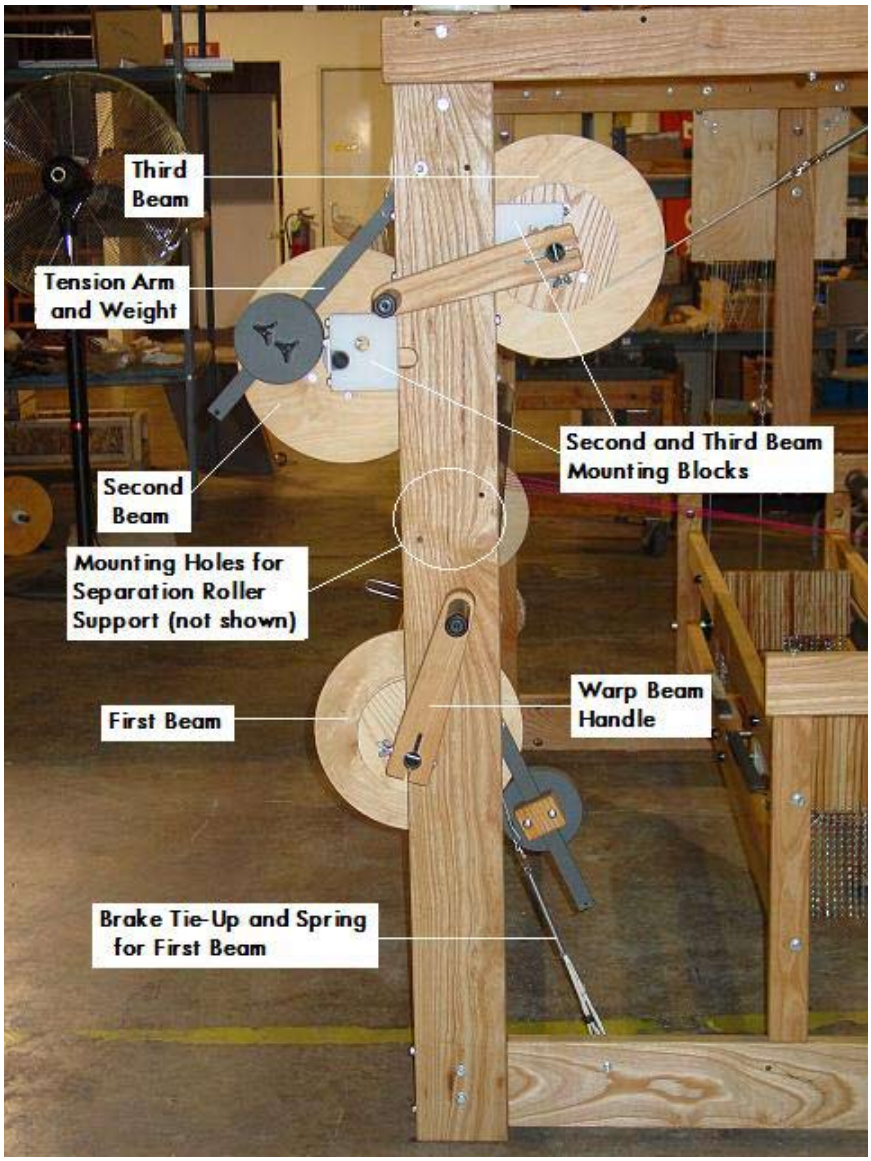


Figure 7a - Beam Positions for a Three-Beam System with Support Blocks

A) Mount the Support Blocks to the Vertical Supports - (see Figure 7) Locate the four large, square, white Mounting Blocks.

1) Second Beam Mounting Blocks – Locate the second set of slots, a little more than half-way up, on the rear-most surface of the Left and Right Rear Vertical Supports. Position two of the blocks to center over the slots, lining the pre-drilled holes in the blocks with the holes in the verticals. Make sure that the flat retainers are hanging down, to cover the slot in the block. Insert two 5/16 x 9-3/4" all-thread bolts, from the rear of the loom, through the block and vertical. Secure with a washers and jam nuts.

2) Third Beam Mounting Blocks – Locate the first set of slots, on the front-most surface of the Left and Right Rear Vertical Supports, about one foot below where the Right and Left Top Horizontals (3R and 3L) cross the top of the Rear Verticals. Position the remaining two blocks to center over the slots, lining the pre-drilled holes in the blocks with the holes in the verticals. Make sure that the flat Beam Retainers are hanging down, to cover the slot in the block. Insert two 5/16 x 9-3/4" all-thread bolts, from the front side of the loom, through the block and vertical. Secure with a washers and jam nuts.

B) Installing the Second and Third Warp Beams - (see Figure 7a)

1) Second Warp Beam (#37) – Now install the Second Warp Beam in the upper two Mounting Blocks that you just installed in Step 4A,1., above. The axle of the Warp Beam will be locked in place by the Beam Retainers, described in Step 1A, but which are now mounted onto the Mounting Blocks.

Position the Brake Drum (the large round wooden drum located on one end, outside the wide Beam Flange) at 2L, the Left Rear Vertical. Now, loosen the small bolts enough so that the Beam Retainers, located on the Mounting Blocks can be swung off to the side. Tighten the small bolts just enough to hold the latches in a horizontal position. Raise the beam into place, in the upper slot in the Left Rear Vertical Support (2L) and the other beam axle into the same slot in the Right Rear Vertical Support (2R). While leaning against the beam, to hold it in position, loosen the small bolts enough to allow the retainers to swivel and close. Now tighten the small bolts, securing the retainers and the beam (see Step 7 for installation of the Beam Handle).

2) **Third Warp Beam (#37)** – Now install the Third Warp Beam in the upper two Mounting Blocks that you just installed in Step 4A,B , above, on the front-most edge of the Rear Verticals (see Figure 7a). The axle of the Warp Beam will be locked in place by the flat Beam Retainers, as described in Step 1.

Position the beam inside the loom, at the back, so that the axles are resting on the Right and Left Lower Horizontals (4R and 4L) and the axle with the Brake Drum (the large round wooden drum, located on one end, outside the wide Beam Flange) is resting at the left side of the loom, on 4L. Now, loosen the small bolts enough so that the retainers, located on the Mounting Blocks, can be swung off to the side. Tighten the small bolts just enough to hold the latches temporarily in a horizontal position. Raise the beam into place, resting in the bracket slots. While leaning against the beam, to hold it in position, loosen the small bolts enough to allow the retainers to swivel and close the openings. Now tighten the small bolts, securing the retainers and the beam (see Step 7 for installation of the Beam Handle).

5) **Installing the Separation Roller Supports** - (see Figure 9) Locate the two Separation Roller Support Arm Assemblies. They will be marked as right (R) and left (L). There are two blocks on each arm. One of these blocks has three white brackets attached. Once installed, the arms will project out from the back of the loom and these brackets will face toward each other.

A) About half-way up on the interior face of the Right and Left Rear Vertical Supports (2R and 2L) you will find two diagonally spaced, deep-sunk holes. Position the Support Arm on the outside of the Vertical Support and align the holes with the longer, bracketed blocks pointing down. Using four 5/16" x 2-1/4" Carriage Bolts, inserted from inside the frame, mount the Support Arm Assemblies. Secure each bolt with a washer, a split lock washer and a hex bolt.

NOTE: If you have only ordered one Warp Beam, please proceed to Step 6 for installation of your Separation Roller.

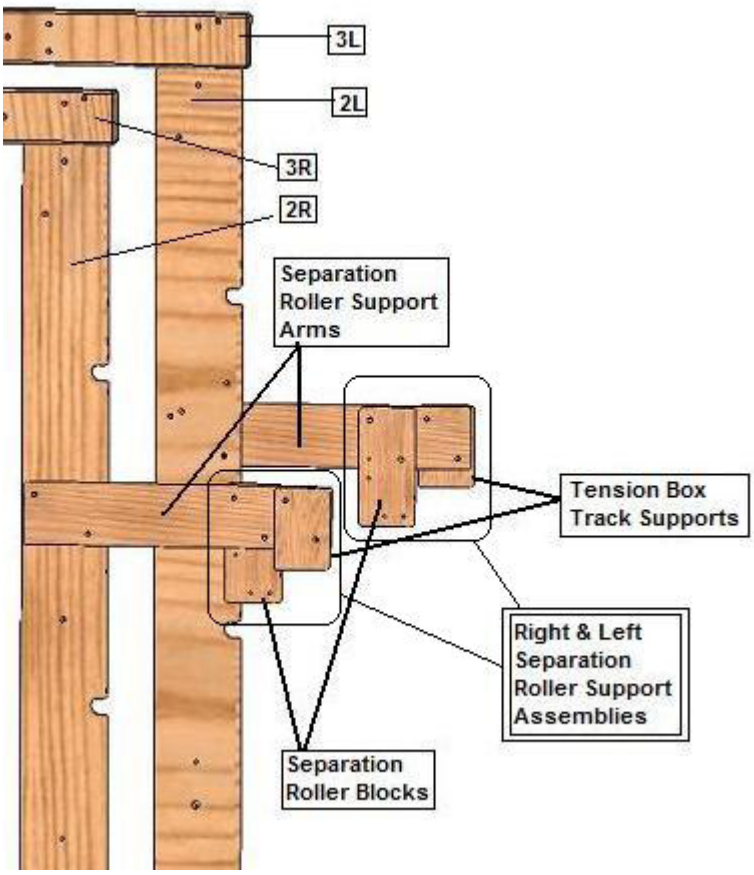


Figure 9 - Installation of the Separation Roller Supports

6) **Installing the Separation Roller(s) (#39)** - (see Figures 10a and 10b) If you have ordered two beams, you will have received two Separation Rollers and you will install one in the center and one in the lower position.

One Beam - Lower Position: You will have received one Lower Separation Roller (#39). If that Beam is a Plain Beam or a Half-Yard Sectional Beam, the Separation Roller will go in the lower position (as shown in Figure 10). Drop the Separation Roller into the lower-most mounted brackets on the Separation Roller Supports and secure it at both ends with pins and cotters.

One-Yard Sectional Beam - Upper Position: The Separation (#39) Roller will go in the middle position. Because this beam will fit horizontally into the bracket, make sure there is a pin and cotter secured in one of the center-mounted brackets on the Separation Roller Supports. Slip one end of the roller into the pre-pinned slot.

Pull the pin out of the other bracket, push the roller into place, and replace the Pin and secure with Cotter.

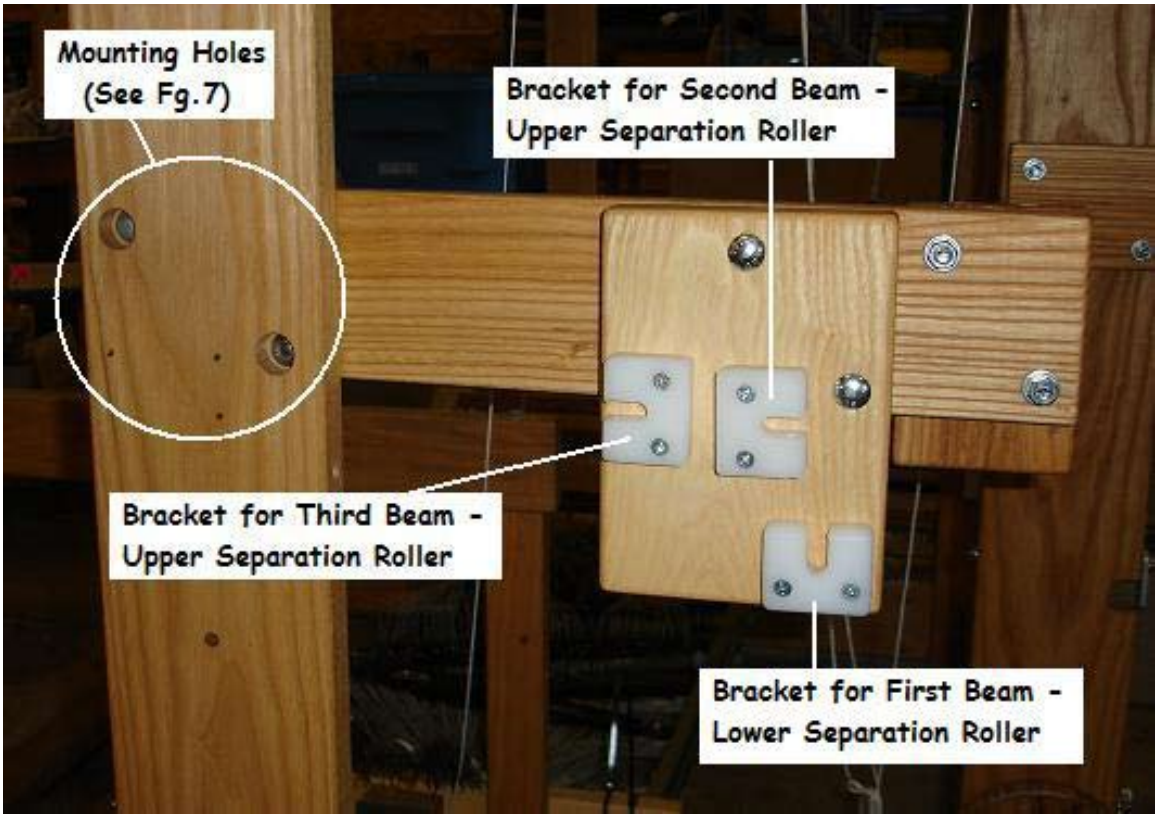


Figure 10a - Location of Separation Roller Support Mount Holes and Brackets (interior view)

Third Beam - Top Position: The second Roller will be slipped into the front-most Bracket on the Separation Roller Support. Use the Pins and Cotters in the same way as with the Second Beam Bracket.

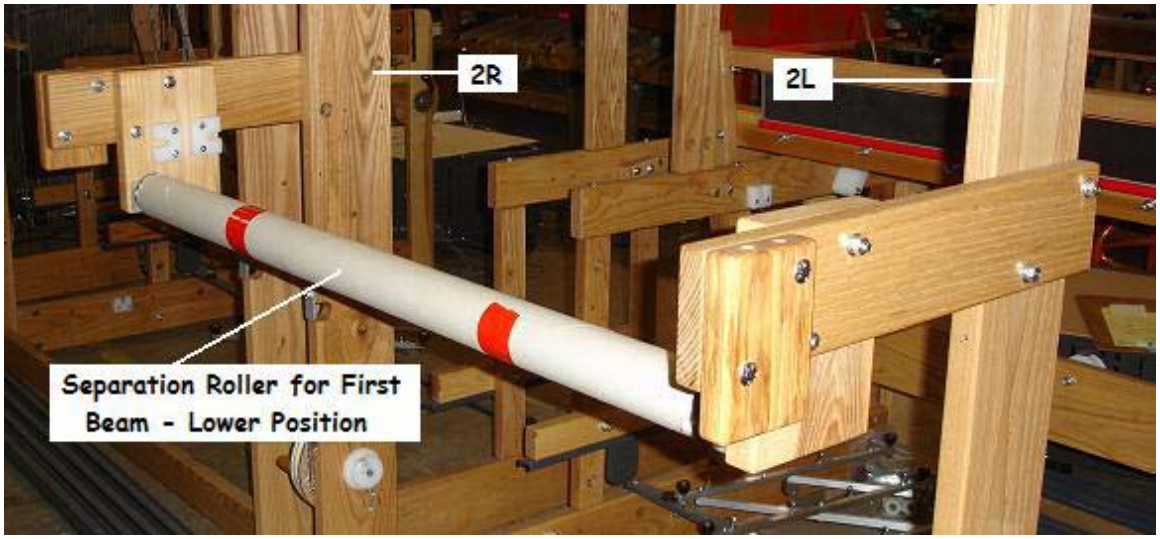


Figure 10b - Separation Roller Supports (full view)

7) Warp Beam Handle (#42) - (see Figures 7 and 8)

Locate your Warp Beam Handle (#42). Remove the wing nut, washer, and bolt from the end of the Handle. Place the large hole in the handle over the end of the Warp Beam Axle that carries the Brake Drum (making sure the handle faces away from the loom). Line up the small hole on the side of the handle with the small hole in the axle and push the carriage bolt through. Add the washer and wing nut onto the bolt and tighten.

8) Installing the Cloth Beam - (see Figure 41)

A) Removing the Cloth Beam Support - The Cloth Beam can be taken in and out of the loom simply and easily by removing the Upper Left Cloth Beam Support (see Figure 41). Using your crescent wrench (or socket), turn the upper bolt (shown clearly in the drawing) counterclockwise until the nut in the access hole disengages. Pull the bolt up until the Upper Cloth Beam Support can be lifted out, off the stabilizing Pin located on the top edge of 8L.

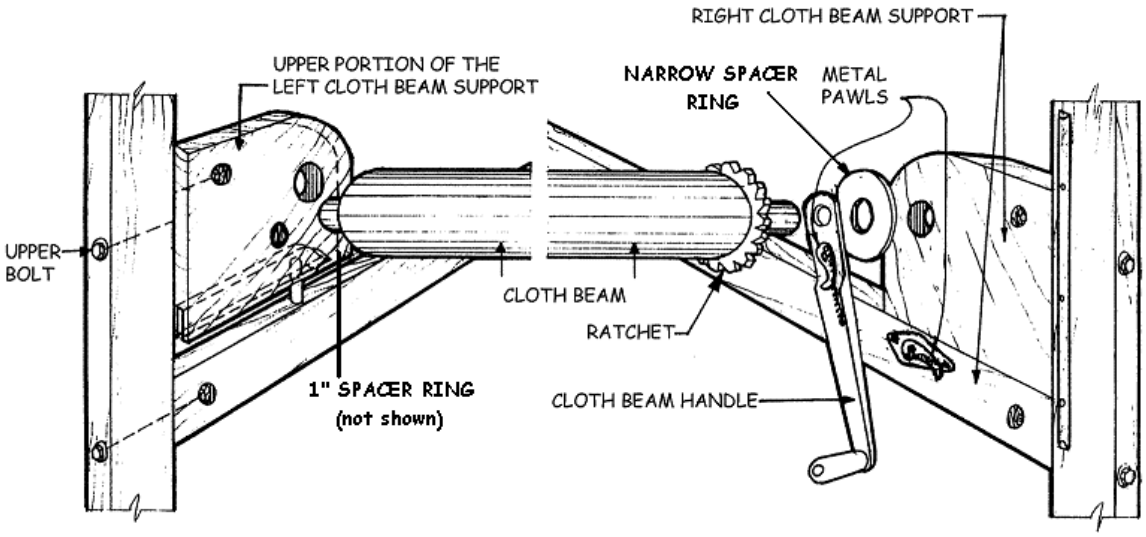


Figure 41 - Cloth Beam Assembly

B) Positioning the Pawls for Installation of the Cloth Beam

Before installing the Cloth Beam to the loom, make certain that both of the metal pawls, located on the handle and the Right Lower Cloth Beam Support (8R), are in the "off" position, so that the tips are pointing toward the front of the loom and down, toward your feet.

C) Assembling the Cloth Beam Handle

Locate the Cloth Beam. It is the beam with the abrasive covering and a ratchet on one end (as shown in Figure 41). Note: It will be much easier if you have a second pair of hands to help with this assembly. Position the end of the Cloth Beam with the ratchet at the right side of the loom.

Now locate your Cloth Beam Ratchet Handle (#25) and Narrow Spacer Ring. Position the handle on the end of the Cloth Beam Axle which has the ratchet, with the wooden knob of the handle facing the inside of the loom. Next, mount the Narrow Spacer Ring onto the Axle. Insert the other end of the Cloth Beam Axle into the large hole in the Upper Left Cloth Beam Support that was removed in Step A.

NOTE: It will be much easier if you have a second pair of hands to help with this assembly.

Now locate your Cloth Beam Ratchet Handle (#25) and Narrow Spacer Ring. Position the handle on the end of the Cloth Beam Axle which has the ratchet, with the wooden knob of the handle facing the inside of the loom. Next, mount the narrow spacer ring onto the axle. Insert the other end of the Cloth Beam into the large hole in the Upper Left Cloth Beam Support that was removed in Step A.

D) Assembling the Cloth Beam

Slip the end of the Cloth Beam with the Ratchet, Handle, and Narrow Spacer Ring into the corresponding hole in the Right Upper Cloth Beam Support that is still on the loom. Now bring down the left end of this Beam Assembly down into place, fitting the Pin (lodged in the Lower Left Cloth Beam Support) into the slot in the Upper Support. Reinstall the bolt, from the front, and tighten the square nut securely into place.

E) Reposition the Pawls for Use of the Cloth Beam

Having completed the installation of the Cloth Beam to the loom, remember to reposition both of the metal pawls, located on the handle and the Right Lower Cloth Beam Support, to ensure they are in the "on" position, so that the tips are pointing into the loom and upward, upward to engage the ratchet.

9) Installation of the Pressure Roller - The Pressure Roller adds increased capacity to the Cloth Storage System, because it extends the contact of the woven cloth with the Sticky Beam well beyond the point where it would otherwise leave the beam and move on to the Cloth Storage System. Another advantage is that you can cut off your work at any time without losing warp tension.

A) **The Pressure Roller Assembly** consists of:

a. two (2) support brackets with spacers

b. one (1) pressure roller

c. one (1) hardware pack including:

- four (4) 5/16" x 3-1/2" carriage bolts
- four (4) washers
- four (4) hex/jamb nuts

B) **Mounting the Pressure Roller Mount Brackets** - (see Figure 42)

Locate the two diagonally spaced holes that are located in the Lower Cloth Beam Support, below and slightly behind the Upper Cloth Beam Support.

Insert the carriage bolts, from the outside, through the Support and Bracket. You will need to use a hammer to seat the carriage bolts in place. Tap on the head of the carriage bolt until the square part of the bolt is pressed into the wood.

Mount the oblong Spacer (without the claw) on the two bolts and then mount the Support Bracket onto the bolts, so that the claw-like end is up and opens away from the Cloth Beam. Place one washer and one hex/jamb nut on the end of each bolt, in that order and tighten securely in place. Repeat for the Bracket on the opposite side.

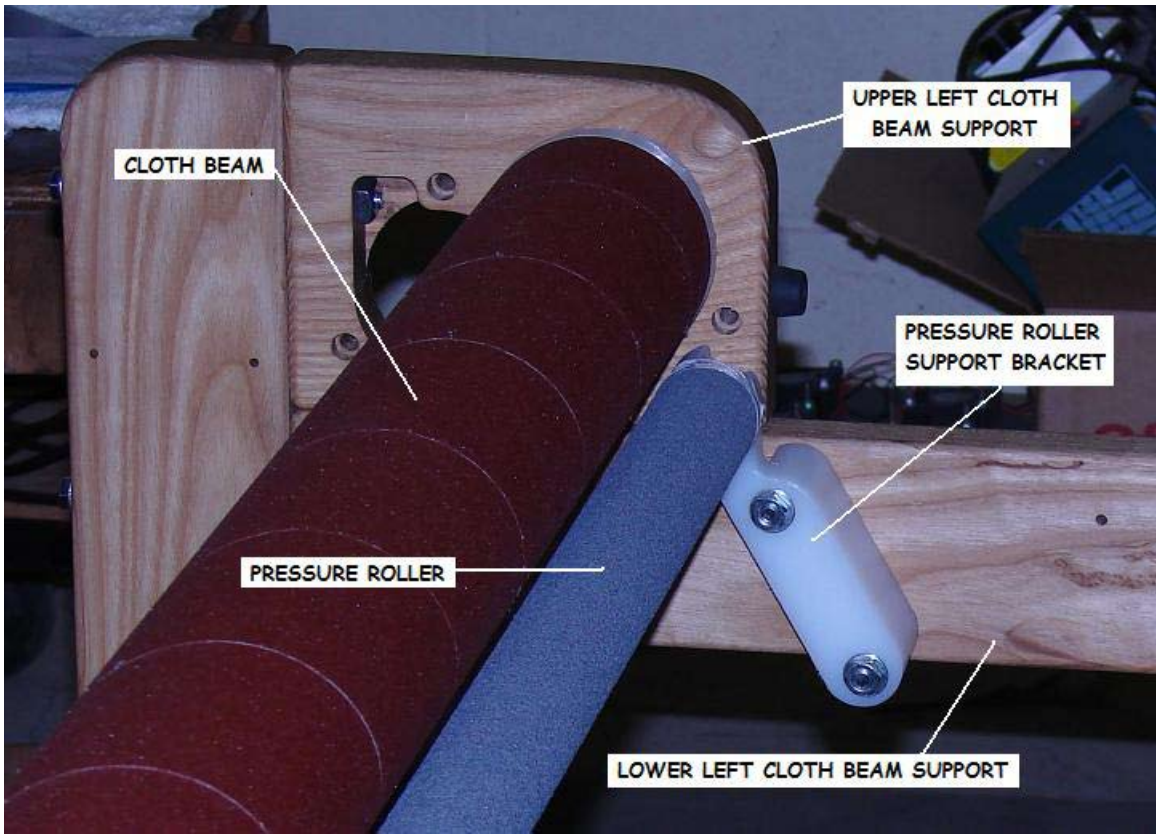


Figure 42 - Location of Pressure Roller Bracket - Left Side

C) Installation of the Pressure Roller

Locate the Pressure Roller. Position it along the back of the Cloth Beam, aligning the pins at each end with the openings in the Mount Bracket "claws". Drop the Pressure Roller into place.

10) Installation of the Cloth Storage System Rollers

A) Upper, Lower, and Rear Rollers

Locate the three rollers (#26). They all bear the same part number, are identical, and may be installed inter-changeably (see Figures 1A and 1B for placement).

Slip one end of the Upper Roller (#26) into one of the white, slotted brackets located on the inside face of the Left and Right Lower Cloth Beam Supports (8L and 8R, respectively). Pull the pin out of the other bracket, drop the roller in and replace the pin. Repeat this for the Lower Roller (also #26). Its brackets are located directly below the brackets for the Upper Roller. The third roller will be installed in its brackets, located behind the Lower Dial-A-Sett Assembly, on the inside face of 4R and 4L.

At this point, you should have one roller left (#28). It is a bit longer than the others and the open end of the roller has a small notch in it. This roller will be installed later when we complete the Cloth Storage System (Chapter 5).

The installations of your Warp Beams, Separation and Storage Rollers, Cloth Beam, and Pressure Roller are now complete. Please proceed to Chapter 5 for Installation of the Cloth Storage System.

1) Installation of the Cloth Take-Up Handle and Storage Drum

A) Cloth Take-up Handle Assembly (#30) - (see Figure 11) - Locate the Cloth Take-Up Drum Assembly (#30). There is a metal ratchet and shaft attached to it. Using your allen wrench, loosen the set screw inside the ratchet and remove the ratchet and one washer. From the outside of the loom, insert the shaft that is coming out from the center of the drum, into the hole in the right front vertical side frame member (see Figure 10 for relative position). Slide the washer, then the ratchet, back onto the shaft. The ratchet should be facing so that the large flat face is toward the loom. Now tighten the set screw and flip the wooden ratchet dog (that is already mounted on the loom for you) around to intersect with the ratchet teeth.

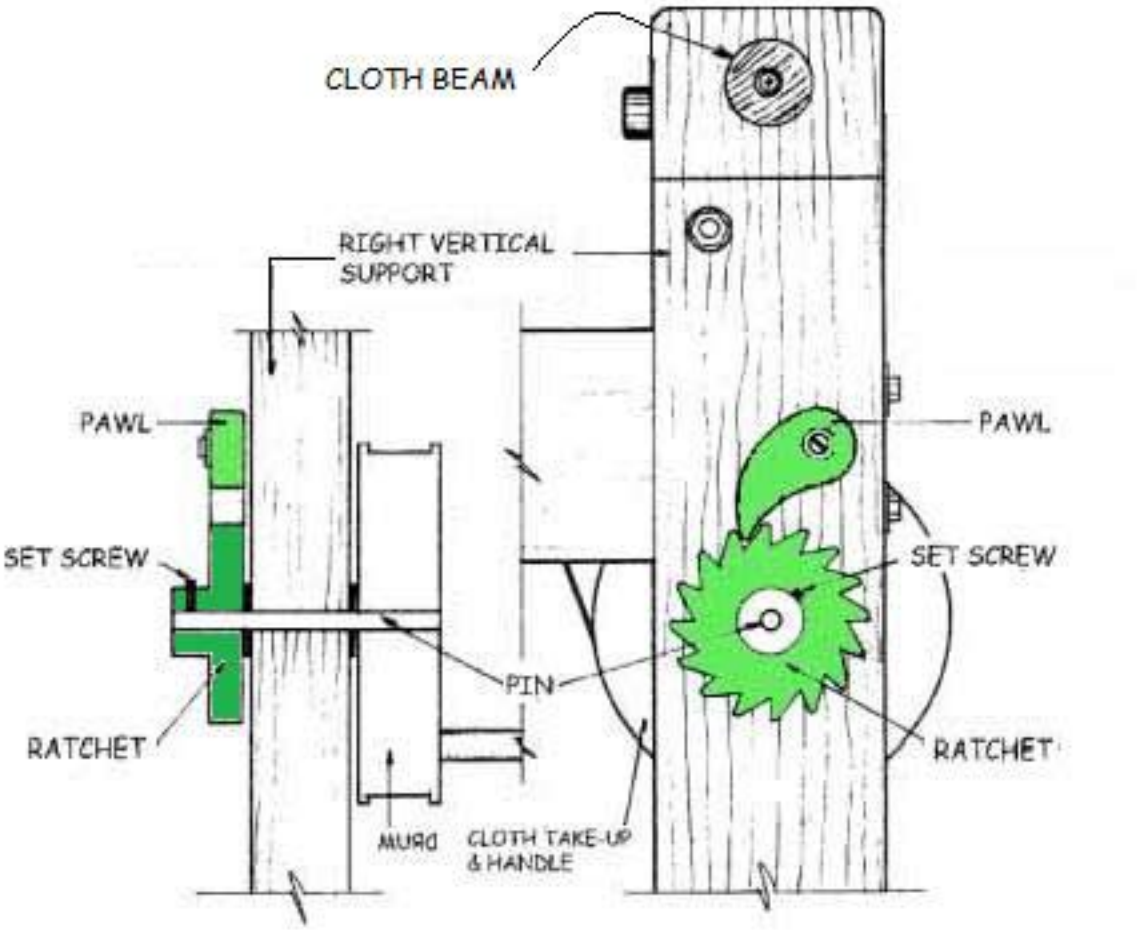


Figure 5-1 - Take-Up Drum Assembly

B) Cloth Storage Drum Assembly (#29) - (see Figure 11) - Locate the Cloth Storage Drum Assembly (#29). It will be mounted at the bottom of the right rear vertical. Again, using your allen wrench, loosen (you do not have to back it all the way out) the set screw in the plastic hub. Remove the hub and one washer from the shaft. Inset the shaft through the rear vertical, from the outside. Replace the washer and the tube support. Tighten the set screw.

2) Routing of the Cloth Storage System (see Figure 11)

A) Routing the Cloth Storage Take-Up Cord - (see Figure 11) - The path of the cord from the Cloth Storage Drum to the Cloth Take-Up Drum is illustrated in Figure CSS-1. Unwind about six (6) yards of cord from the Cloth Storage Drum. Insert the cord through the pulley of the metal Counter Weight Pulley and leave it hanging between the first two pulleys on the upper frame. (Do not thread the cord through the loop on the pulley because that is reserved for hanging the weight.) Continue routing the cord toward the front of the loom, over the last pulley next to the Dobby Back. Then route the cord straight down to the pulley mounted directly below then left, toward the front of the loom, under and around the last pulley on the side. The cord then goes directly up to the Cloth Take-Up Drum.

B) Attaching the cord to the Take-Up Drum - Thread the end of the cord through the small hole in the track (the narrow, concave side of the drum) and out the side of the drum. Tie an overhand knot at the end to secure it and turn the drum *counter-clockwise* to wind the balance of slack remaining onto the Take-Up Drum.

NOTE: Do not continue to wind on cord and do not attempt to hang the Weight at this time!

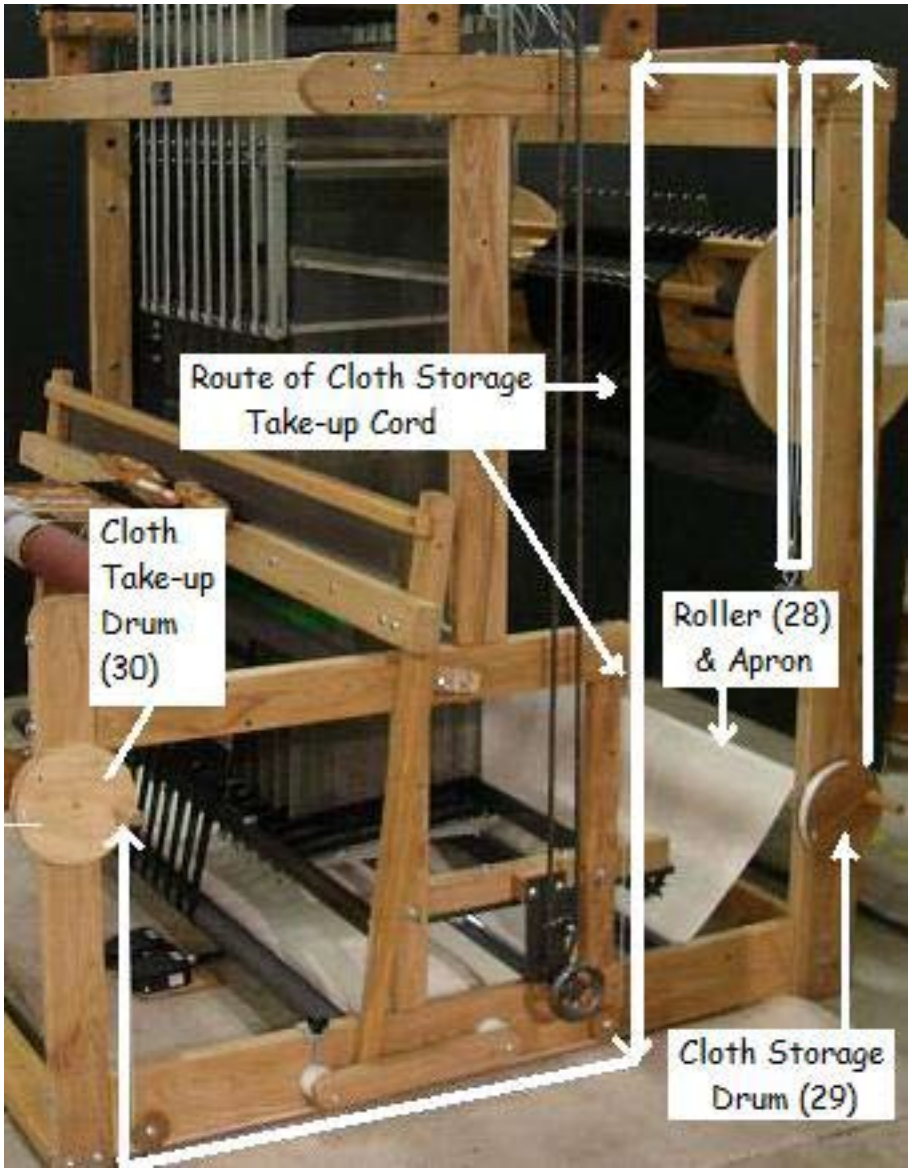


Figure 5-2 - Routing of the Cloth Storage Cord

B) (*continued*) There will continue to be slack on the cord until you have put on a warp, tied it onto the Cloth Storage Apron, hung the weight from the pulley, and pulled the pin from the drum (see C) below).

There is a Stop Pin affixed to the rear vertical. Insert it through the hole in the Cloth Storage Drum. Continue to push gently on the pin and turn the drum until the pin aligns with the hole in the rear vertical and goes further into the vertical, stabilizing the position of the drum.

3) Installing the Rear Cloth Storage Roller (#28)

A) Installation of the Apron on the Cloth Storage Roller - Find the apron and the Cloth Storage Roller (#28). Position the Cloth Storage Roller at the rear of the loom, between the two Rear Vertical Supports so that the slotted end is to your left. When the roller is installed, this slot will be the means of connecting the Cloth Storage Roller to the Cloth Storage Drum Ratchet mounted on the inside of the Right Rear Vertical Support (which is now to your left). Layout the apron so that its velcro strip is facing up and the balance of the apron is towards you. Line up the velcro strip on the Cloth Storage Roller with the velcro at the end of the apron and press them firmly together. Turn the roller towards you until the apron has been wound around the roller twice.

B) Installation of the Cloth Storage Roller - Remove the pull pin from the Cloth Storage Drum Hub. Align the slotted end of the roller with the unlined hole in the ratchet and reinsert the pull pin/set screw. Do not attempt to use the second hole in the hub, in which can be seen a brass, threaded insert. Slip the other end of the roller into the bracket to your right. Secure this end in the bracket with the pin and cotter pin.

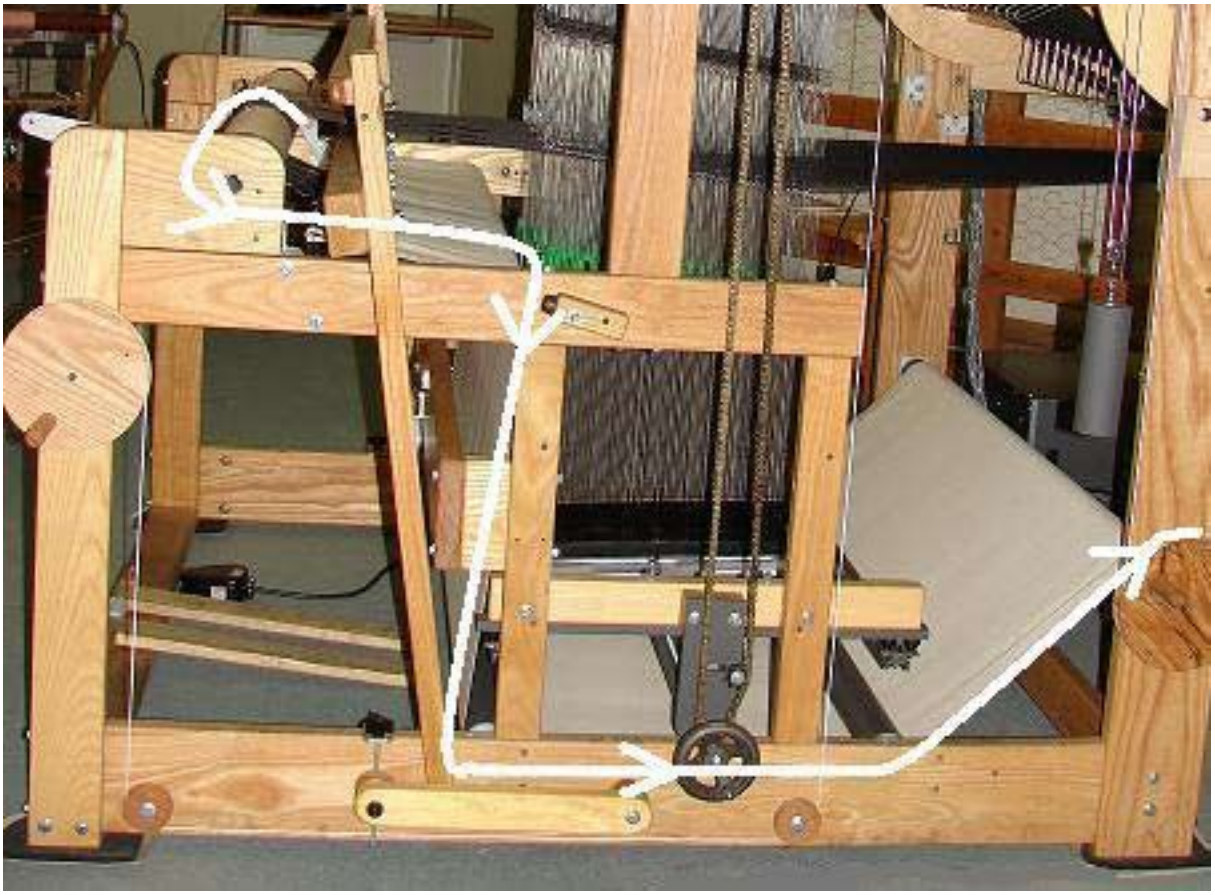


Figure 5-3 - Routing for the Apron

C) Routing of the Apron Through the Loom - Bring the looped end of the apron up over the top of the roller and into the middle of the loom. The apron will now feed over the Treadle Pulley Support Assembly and under the Lower Dial-A-Sett Assembly, guided by the two rollers. Then simply route the apron under the Lower Front Cloth Roller and up over the Front Upper Cloth Roller. From there it will come to the front of the loom, from underneath the Cloth Beam, up over it, to drape a few inches on the inside of the Cloth Beam. Insert the metal apron bar through the apron loops.

The installation of your Cloth Storage System is now complete. Please proceed to Chapter 6 for Installation of the Tension Arm System.

The standard location for mounting your Plain Warp Beam or ½-Yard Sectional Beam is the Lower Position. The Tension Arm Assembly for the Lower Position (#16P) is included. Please begin with Step 1, below. If you wish to mount either of these beams in the Upper Position, you will need to order the appropriate cable (#38P or #38S), and follow the instructions in Step 2), below.

The standard location for mounting your One-Yard Sectional Beam is the Upper Position. The Tension Arm Assembly for the Upper Position (#38S) is included. Please proceed to Step 2), below. If you wish to mount this beam in the Lower Position, you will need to order the Lower Position Extension Brackets, or Bustle, and the appropriate cable (#38L). After you have installed the Bustle, you may proceed to Step 1), below.

1) Tension Arm Installation (Lower Position) - (see Figure 12)

A) Installation - Locate the hole for mounting the Tension Arm in the center of the Left Rear Vertical and above the Warp Beam, previously installed in the lower position (see Chapter 4, Installing Warp Beams and Rollers). Orient the Arm so that the Pulley will lie against the inside of the Left Rear Vertical and the Arm will be on the inside of the loom, pointing towards the front. (As shown in Figure 12).

Remove the nut and two washers and withdraw the long bolt from the pulley end of the Tension Arm. Keep one washer on the bolt, and, from the outside, push the bolt through the lower hole in the Left Rear Vertical. Now put one washer on and slip the pulley and Tension Arm, with its metal bushing, onto the bolt. Add the second washer and the hex nut and tighten it down. After tightening, check to make sure the arm swings freely.

B) Attach the Brake Cable - The Tension Arm comes without the cable attached. Locate the Brake Cable (16P). Attach this cable to the Tension Arm by removing the shoulder bolt (the bolt centered on the arm length and near the pulley), using a 5/32" allen wrench, and place this bolt through the looped end of the cable. Replace the bolt into the Tension Arm.

C) Complete the Cable Tie-Up - (referring to Figure 12) - The cord comes away from the bolt in the Tension Arm, over the top of the pulley and down to meet the groove on the front side of the Warp Beam Drum. Now, leading under and toward the outside of the loom, wrap the cable around the Warp Beam Drum three times.

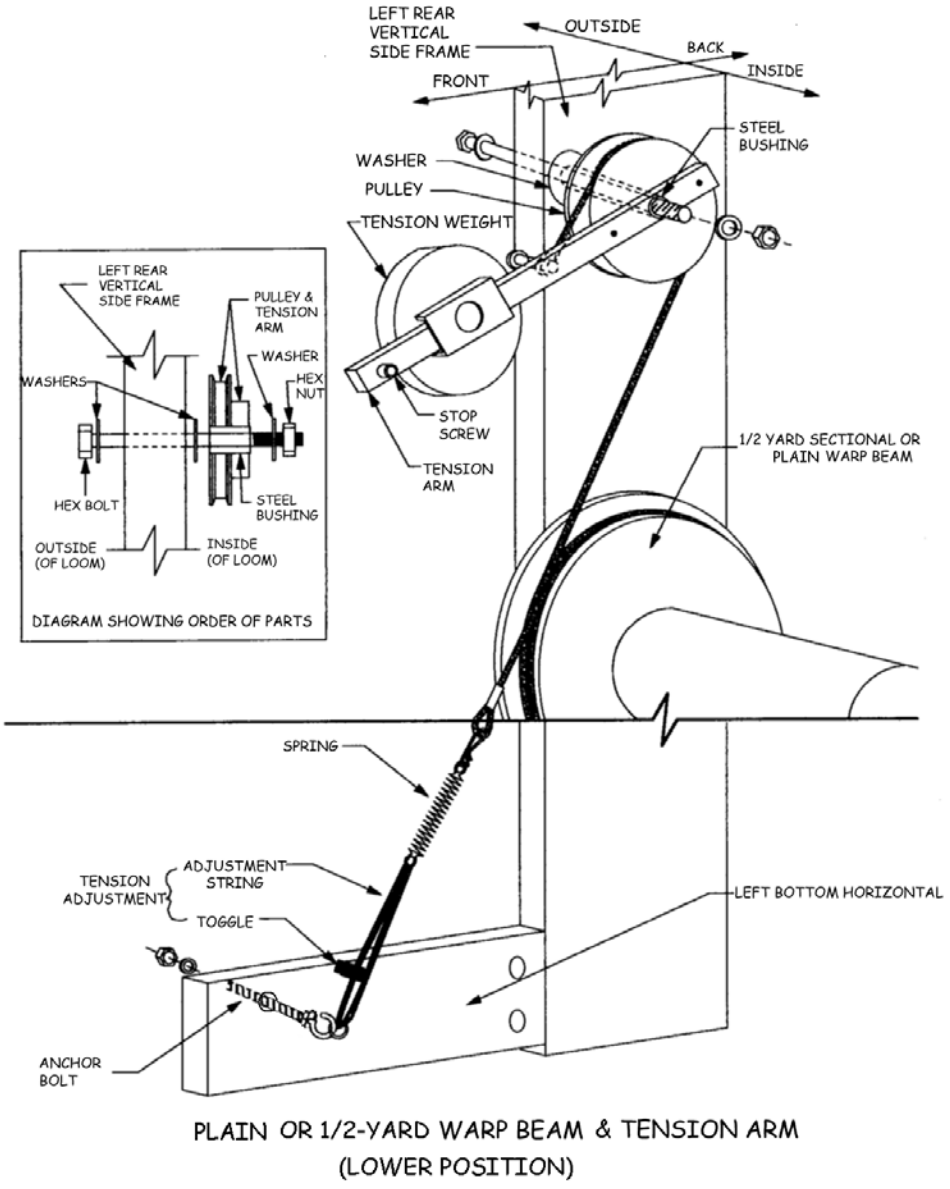


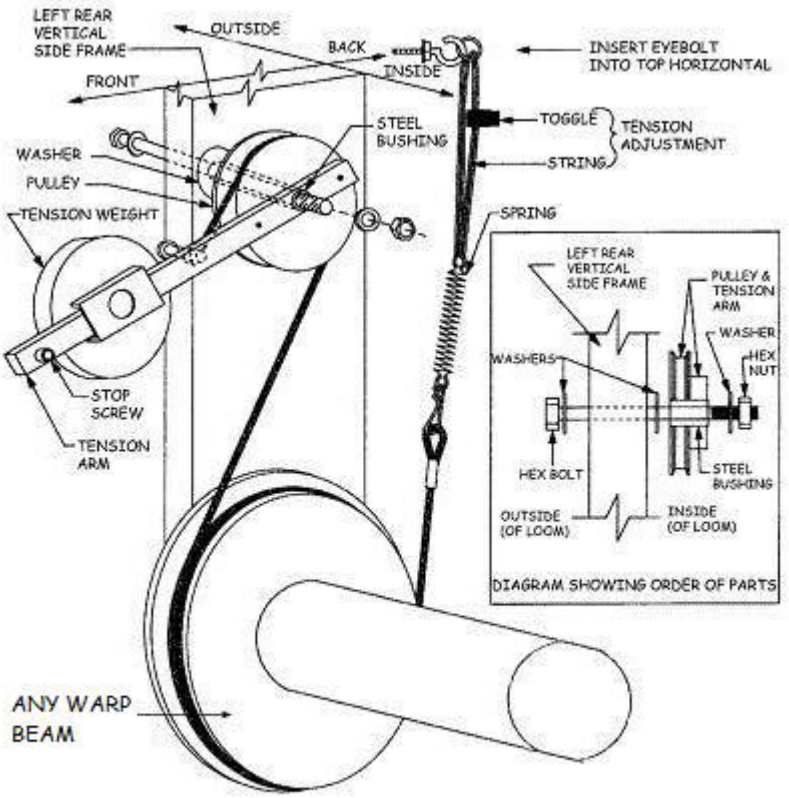
Figure 12 - Plain Warp Beam, Lower Position

At the very end of this cord assembly is an eyebolt. Remove the first hex nut and washer from the eyebolt. Insert it from the inside of the loom through the hole located in the Left Bottom Horizontal, near the upper rear edge.

Push it through the Horizontal Beam only as far as it needs to go in order to replace the washer and hex nut. With the washer and hex nut in place, turn your attention to the other end of the bolt, with the eye-loop. Move the washer up against the Bottom Horizontal and then move the nut down the threads to meet the washer. Now, hold the outer bolt fast and tighten the inner bolt into the washer and beam.

D) **Mount the Tension Arm Weight** - This weight is a thick, heavy black disk with a wooden bracket on one side of it, held in place with two bolts and knobs. To attach the weight to the arm, you will need to remove the stop screw from the end of the Tension Arm using a 3/16" allen wrench. Loosen the knobs to permit the arm through the bracket, oriented so the weight is facing out of the loom. Secure the weight by tightening the knobs. It will stay anywhere on the Tension Arm that you place it as long as you securely tighten the knobs. Be certain that you replace the stop screw at the end of the Tension Arm. This stop screw is a safety measure to keep the weight from accidentally slipping off. Proper adjustment of the Tension Arm will be covered later in the Weaving Section of the manual.

2) Tension Arm Installation (upper position) - (see Figure 13)



PLAIN, 1/2-YARD & 1-YARD SECTIONAL BEAMS WITH TENSION ARM (UPPER POSITION)

Figure 13 - Tension Arm in Upper Position (for all beams)

A) Installation - Locate the hole for mounting the Tension Arm in the Left Rear Vertical, above the Warp Beam that was previously installed in the Upper Position (see Chapter 3, Installing Warp Beams and Rollers). Orient the arm so that the pulley will lie against the inside of the Left Rear Vertical and the arm will be inside the loom and pointing toward the front (as shown in Figure 13).

Remove the nut and two washers and withdraw the long bolt from the pulley end of the Tension Arm. Keep one washer on the bolt, and push the bolt from the outside, through the hole. Now put one washer on and slip the Pulley and Tension Arm, with its metal bushing, onto the bolt. Add the second washer and the hex nut and tighten it down. After tightening, check to make sure the arm swings freely.

B) **Attach the Brake Cable** - The Tension Arm comes without the cable attached. Locate the Brake Cable (38P for a Half-Yard Sectional Beam/Plain Beam or 38S for a One-Yard Sectional Beam). Attach this cable to the Tension Arm by removing the shoulder bolt (the bolt centered on the arm length and near the pulley), using a 5/32" allen wrench, and place this bolt through the looped end of the cable. Replace the bolt into the Tension Arm.

C) **Complete the Cable Tie-Up** (referring to Figure 13) - The cable comes away from the bolt in the Tension Arm, over the top of the pulley, and down to meet the groove on the front side of the Warp Beam Drum. Now, leading under and toward the outside of the loom, wrap the cable around the Warp Beam Drum three times.

At the very end of this cord assembly is an eyebolt. Remove the first hex nut and washer from the eyebolt. Insert it from the inside of the loom through the hole located in the Top Left Horizontal, near the upper rear edge. Push it through the Horizontal Beam only as far as it needs to go in order to replace the washer and hex nut. Turn your attention to the other end of the bolt, with the eye-loop. Move the washer mounted on the bolt over, next to the Top Horizontal and then move the jamb nut down the threads to meet the washer. Now, hold the outer nut fast and tighten the inner jamb nut into the washer and beam.

D) **Mount the Tension Arm Weight** - This weight is a thick, heavy black disk with a wooden bracket on one side of it, held in place with two bolts and knobs. To attach the weight to the arm, you will need to remove the stop screw from the end of the Tension Arm using a 3/16" allen wrench. Loosen the knobs to permit the arm through the bracket, oriented so the weight is facing out of the loom. Secure the weight by tightening the knobs. It will stay anywhere on the Tension Arm that you place it as long as you securely tighten the knobs. Be certain that you replace the stop screw at the end of the Tension Arm. This stop screw is a safety measure to keep the weight from accidentally slipping off. Proper adjustment of the Tension Arm will be covered later in the Weaving Section of the manual.

During the purchase of your loom, if you selected an Overhead-style Beater, please proceed to the following chapters for your particular OVERHEAD BEATER ASSEMBLY.

NOTE: Since the beater system uses a lot of carriage bolts, the following information may be helpful. There is a square shape below the head of each carriage bolt. This square portion does not fit easily into the pre-drilled holes. You will find it necessary to tap these bolts into place to properly seat the bolts. This will cause the bolt to "bite" into the wood and stay in place while you tighten the nut.

1A) Beater Bumpers (#40)

Locate the beater bumpers (40) (see Figures 1 and 14). The left is stamped "L" and the right one is stamped "R". They are each mounted to the outside of the respective cloth beam supports (8R and 8L) with 5/16" x 3" carriage bolts, washers, and hex nuts. Orient these beater bumpers so that the bumper faces the front of the loom and the stamp faces the cloth beam support to which it will be mounted. It is best to situate the carriage bolts so that the washers and nuts are to the outside of the loom leaving the smooth head of the carriage bolt on the inside of the loom frame.

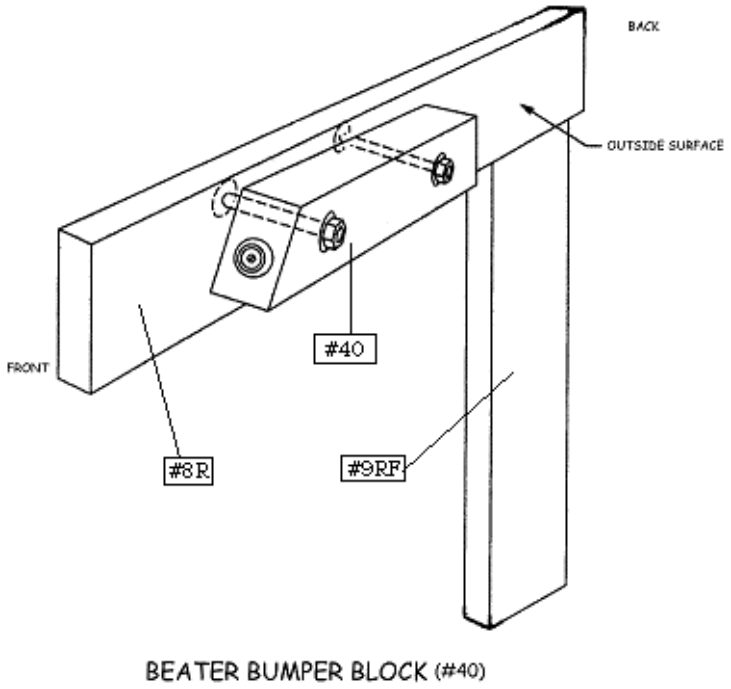


Figure 14 - Beater Bumper Block

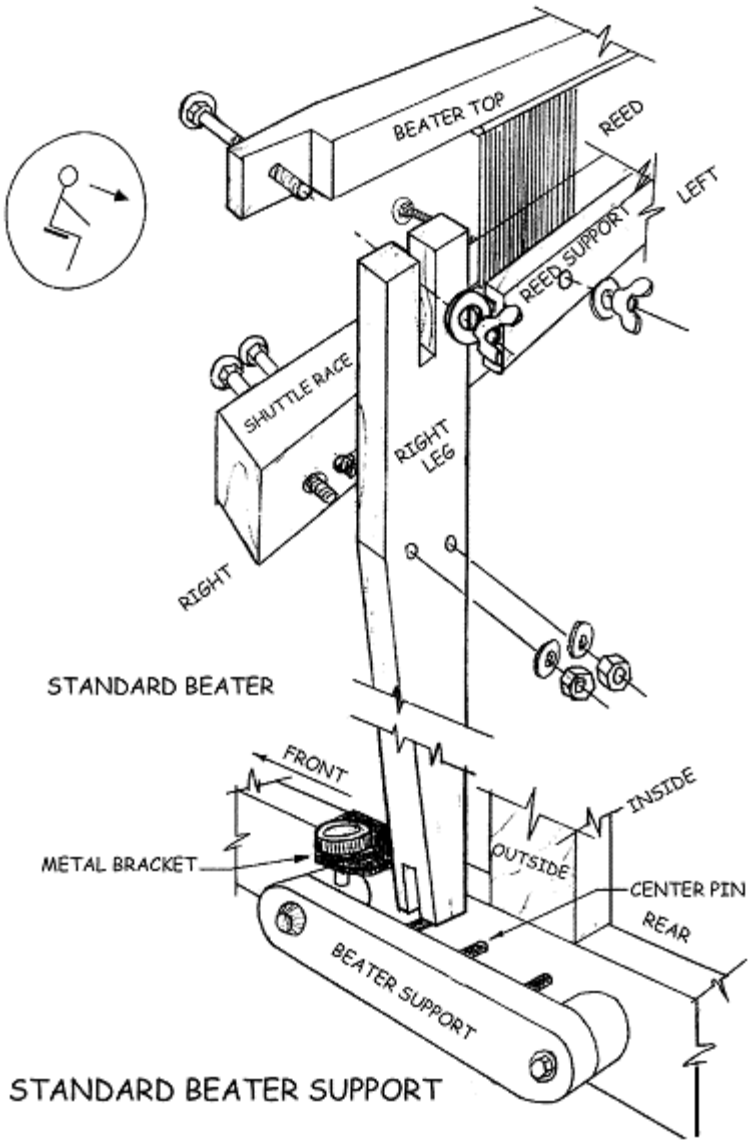


Figure 15 - Standard Beater and Beater Support

1B) Installing the Beater Supports (#34)

A) The beater supports can now be bolted to the loom. First locate your beater supports (34). There's one for each side of the loom (please refer to Figure 15 for correct placement). We will begin with the Right Side Support.

Orient the support so that the round spacers and metal pins are facing into the loom and the spacer with the threaded rod and metal bracket is toward the front of the loom. Align the round spaces with the two holes in the Right Lower Side (4R), just below the Right Front Vertical Support (9RF).

Remove the hex nut and washer from the rear spacer and insert the bolt through the right lower horizontal; slip the washer and nut back on and tighten the nut just to the point where is almost cinches the two parts together. You want to leave it a little bit loose so that the Beater Supports can pivot during adjustment of the beater height. Since the nut is a locknut, it will not loosen. Now locate two 1-1/2" long screws located in the Beater Hardware Pack. Position the metal bracket that is attached to the front of the Beater Support over the two holes in 4R and insert the screws. Tighten them down. Repeat this process for the left side.

2) Installation of the Standard Beater (#35) - If you have ordered a Bottom Swing Single-Box Flyshuttle Beater, proceed to Step 3) - Single-Box Flyshuttle Beater Installation (optional equipment).

NOTE: Do not completely tighten bolts and nuts at any place where horizontal and vertical members meet (at the corners). Once all components in this chapter are assembled, you will be directed to square the Beater, and only then, to securely tighten all bolts in place.

A) Locate the following (see Figure 15):

- shuttle race
- beater top
- two legs
- reed
- reed support
- hardware
- fly-box assemblies

B) Position the Shuttle Race - Select the Shuttle Race and orient it so that the lengthwise groove is facing up and toward the rear of the loom. Position it in the loom so that it is resting across the Lower Cloth Beam Supports (8R and 8L), and between the Cloth Beam (24) and the harnesses.

C) Attach the Beater Legs - Now locate the Beater Legs. Notice that they have been marked to designate left and right. Orient each leg so that, with the bottom slot riding in the center pin on the Beater Support, the tapered side of each leg faces away from the loom.

From your hardware bag, select four 5/16" x 3-1/4" carriage bolts with washers and hex nuts. Notice that, on each side of the Beater Legs, there are two horizontally aligned holes. Insert the bolts, from the front of the race, through the race, and into the corresponding holes in the Beater Leg. Attach the washers and nuts and *tighten only slightly*. Repeat this procedure for the other side of the loom making sure that the tapered side of the leg is again facing away from the loom and loosely attach the washers and nuts.

D) **Attach the Reed Support** (see Figure 15) - From your hardware package, locate either six, seven, or nine (depending upon the width of your loom) 5/16" x 3" carriage bolts with washers and wing nuts attached. Remove the washers and wing nuts. Push the carriage bolts through the race so that their heads sit flat on the front of the Beater Race (don't be afraid to use a hammer to tap these bolts in place). Now carefully slide the Reed Support onto these bolts so that the lengthwise groove on the wedge of the support faces the groove in the race. Leave enough room so that you can fit the reed between the race and the Reed Support. Once the reed is in and centered, the washers and wing nuts can be fitted onto the carriage bolts and tightened.

E) **Attach the Beater Top** (see Figure 15) - Now orient your Beater Top so that the long groove is facing down and the cut outs at either end are facing toward the rear of the loom. Position the Beater Top on the top of the reed, over the race. Insert 1/4" x 2-1/4" carriage bolts into the holes located at each end, from front to back. Slip the bolts into the slots at the top of the beater legs and once the reed is securely inside the groove in the Beater Top, attach the washers and wing nuts and *only slightly tighten them*.

F) Center and Square the Beater Assembly - At this point you should:

- center the beater assembly in the loom to insure that the legs are parallel and will not rub against the loom frame;
- check that the Beater Top rests evenly against the Beater Bumpers previously mounted on the Lower Cloth Beam Supports (8R).
- NOW, you may tighten all of the Beater Assembly bolts, taking care not to change the alignment you have created. Move the beater back and forth a few times to check the alignment.

3) Single-Box Flyshuttle Beater (optional equipment) - (see Figure 16, below)

NOTE: The single-box flyshuttle beater system now incorporates removable shuttle boxes. This allows the weaver to completely remove the boxes and flystring tie-up from the loom any time that an extensive amount of handshuttle weaving becomes necessary. It also makes it much easier to convert any other AVL beater system to a single-box flyshuttle beater.

A) Locate the following (see Figure 16):

- shuttle race
- beater top
- two legs
- hardware
- cord tie-up
- reed
- reed support
- fly-box assemblies

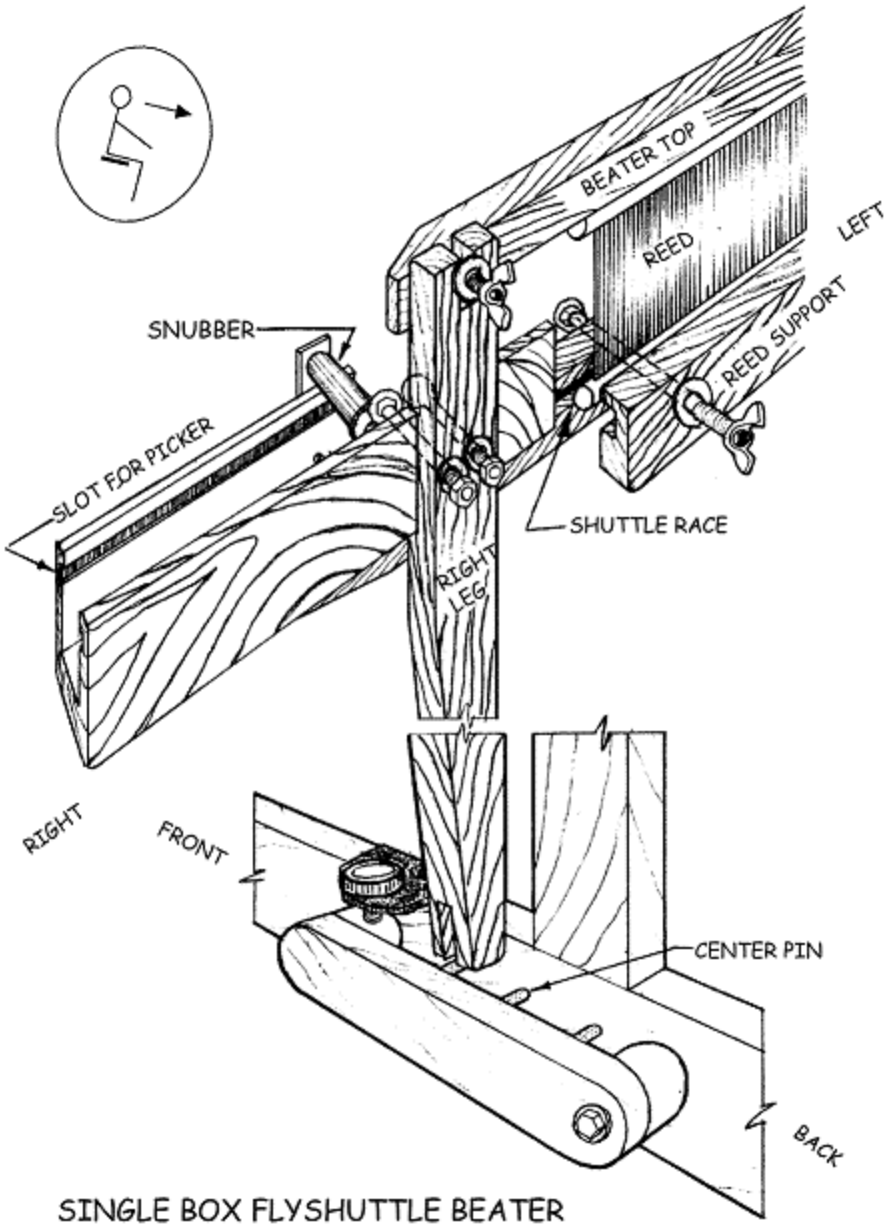


Figure 16 - Single Box Flyshuttle Beater and Beater Support

B) **Position the Shuttle Race** - Select the Shuttle Race and orient it so that the lengthwise groove is facing up and toward the rear of the loom and the shorter sides of the Flyshuttle Box are towards the front. Position it in the loom so that it is resting across the Lower Cloth Beam Supports (8R and 8L), and between the Cloth Beam (24) and the Harnesses.

C) **Attach the Beater Legs** - Now locate the Beater Legs. Notice that they have been marked to designate left and right. Orient each leg so that the cut out section faces the front of the loom and the tapered side of the leg is to the outside. You will also notice a wide cut-out, located on the front face of each leg.

D) **Attach the Reed Support** - From your hardware pack, locate either six, seven, or nine 5/16" x 3" carriage bolts (depending upon the width of your loom) with washers and wing nuts attached. Remove the washers and wing nuts. Push the carriage bolts through the race so that their heads sit flat on the front of the beater race (don't be afraid to use a hammer to tap these bolts in place). Now carefully slide the Reed Support onto these bolts so that the lengthwise groove in it faces the groove in the race. Leave enough room so that you can fit the reed between the race and the Reed Support. Once the reed is in and centered, the washers and wing nuts can be fitted onto the carriage bolts.

E) **Attach the Beater Top** - Now orient your Beater Top so that the long groove is facing down and the cut outs at either end are facing toward the rear of the loom. Position the Beater Top on the top of the reed, over the race. Insert 1/4" x 2-1/4" carriage bolts into the holes located at each end, from front to back. Slip the bolts into the slots at the top of the Beater Legs and once the reed is securely inside the groove in the Beater Top, attach the washers and wing nuts and only slightly tighten them.

F) **Center and Square the Beater Assembly** - At this point you should:

- Center the beater assembly in the loom to insure that the legs are parallel and will not rub against the loom frame;
- Ensure that the Beater Top rests evenly against the Beater Bumpers previously mounted on the Lower Cloth Beam Supports (8R).
- NOW, you may tighten all of the Beater Assembly bolts, taking care not to change the alignment you have created. Move the beater back and forth a few times to check the alignment.

NOTE: Due to the shaking and movement the loom experiences during use, over time these connections will shake loose and will require periodic checking and adjustment.

G) **Mounting the String Tie-Up** - (for an illustrated example of the String Tie-Up in place, see Figure 23, in the following chapter on the Overhead Single-Box Flyshuttle Beater.) In the beater hardware pack, find the small screw-eye. Install this screw-eye into the small, center hole located on the underside of the Front Harness Pulley Support. Be sure it is all the way in and no screw threads are showing. Take the String Tie-up and handle from its bag. As you can see, there are three screw-eyes coming out of the handle: one at the top and on either side. Hold the handle up by the clip that is connected by string to the top of the handle. Attach this clip to the screw-eye now located on the underside of the Front Harness Pulley Support.

H) **Mounting the Pickers** - At the end of the other two strings (attached to the handle) are small squares of wood to which are attached a leather loops. These are the pickers. Take one of these and orient it so that the leather loop is pointing down and positioned toward the outside of the loom. Now take it to the very outside of the race on the right side. Slide the picker with the leather loop down and toward the outside into the slot between the box sides. Repeat for the other side making sure that the left picker loop is down and toward the outside, as well.

I) Mounting the Flyshuttle Cord Supports - Now locate the Flyshuttle Cord Supports (43) in the Flyshuttle Cord Tie-Up and Handle bag. These are two small, wooden bars, each of which has two holes, and a screw-eye at one end. These Flyshuttle Cord Supports will be attached to the inside face of each Top Horizontal Side Frame member (3R and 3L) directly above the Beater Assembly. Insert two 5/16" x 2-1/4" carriage bolts, from the outside, into the two holes on each top horizontal. Position the Cord Supports so that the screw-eyes are at the bottom. Insert the bolts all the way through the supports and secure them in place with washers and hex nuts.

J) Completing the Flyshuttle Cord Installation - There is another cord (actually a continuation of the Flyshuttle Cord, from the handle) coming from each picker with a clip on the end. Now notice that there is a snubber attached to the front of the box on each side of the race (the snubbers are the small, round, wooden pieces above the entrance to each shuttle box). The cord should go over each snubber and attach with the clip to the screw-eye on the left and right Flyshuttle Cord Supports that you just installed.

4) **Double-Box Flyshuttle Beater** (optional equipment) (see Figures 15, 16a, -b,-c, below)

A) Locate the following (see Figure #16):

- shuttle race
- beater top
- two legs
- hardware
- cord tie-up
- reed
- reed support
- fly-box assemblies

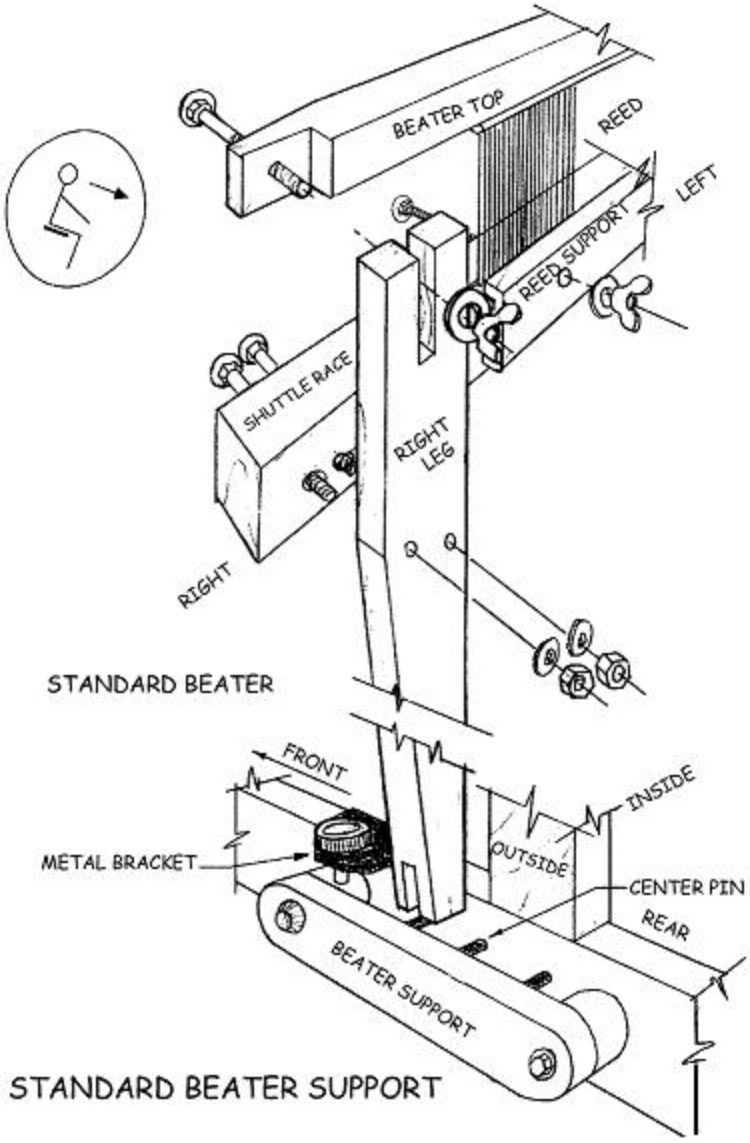


Figure 15 –Flyshuttle Beater and Beater Support

B) Position the Shuttle Race - Select the Shuttle Race and orient it so that it is resting across the Lower Cloth Beam Supports (8R and 8L) and between the Cloth Beam (24) and the harnesses. The lengthwise groove will face the rear of the loom.

C) Attach the Beater Legs - Now locate the Beater Legs. Notice that they have been marked to designate left and right. Orient each leg so that the cut out section faces the front of the loom and the tapered side of the leg is to the outside. You will also notice a wide cut-out, located on the front face of each leg. Settle the assembled beater legs onto matching pins in the Beater Supports at either side.

D) Attach the Reed Support - From your hardware package, locate either six, seven, or nine 5/16" x 3" carriage bolts (depending upon the width of your loom) with washers and wing nuts attached. Remove the washers and wing nuts. Push the carriage bolts through the race so that their heads sit flat on the front of the beater race (don't be afraid to use a hammer to tap these bolts in place). Now carefully slide the Reed Support onto these bolts so that the lengthwise groove in it faces the groove in the race. Leave enough room so that you can fit the reed between the Race and the Reed Support. Once the reed is in place and centered, the washers and wing nuts can be fitted onto the carriage bolts and securely tightened.

E) Attach the Beater Top - Now orient your Beater Top so that the long groove is facing down and the cut outs at either end are facing toward the rear of the loom. Position the Beater Top on the top of the reed, over the race. Insert 1/4" x 2-1/4" carriage bolts into the holes located at each end, from front to back. Slip the bolts into the slots at the top of the Beater Legs and once the reed is securely inside the groove in the Beater Top, attach the washers and wing nuts and only slightly tighten them.

F) Center and Square the Beater Assembly - At this point you should:

- Center the beater assembly in the loom to insure that the legs are parallel and will not rub against the loom frame.
- Ensure that the Beater Top rests evenly against the Beater Bumpers previously mounted on the Lower Cloth Beam Supports (8R).
- NOW, you may tighten all of the Beater Assembly bolts, taking care not to change the alignment you have created. Move the Beater back and forth a few times to check the alignment.
- Note: Due to the shaking and movement the loom experiences during use, over time these connections will shake loose and will require periodic checking and adjustment.

5) Installing the Drop Box Assemblies
(see Figures 16a and 27)

Locate your Left Drop Box Assembly (they are marked "L" and "R"). You will notice that there are two holes through the Back Plate in the lower right corner and one in the upper right corner with an intersecting hole coming from the right edge. Looking at the Left Upright, you will find a horizontal hole through the width of the upright just below the slot for the Beater Top. This hole should be offset to the front of the Shuttle Race side of the Upright. Position the Left Drop Box so that this hole aligns with the hole in the upper right corner of the Left Drop Box. The moveable boxes will face to the front of the loom. Take a 5/16" x 4-1/2" hex bolt with a washer on it, insert it through the hole in the leg from the inside, through the hole in the edge of the upper right corner of the Left Drop Box Assembly and thread it onto a square nut inserted in the nut access hole in the back plate. Do not tighten this yet. Your Drop Box Assembly should now be attached to the Leg with this one bolt.

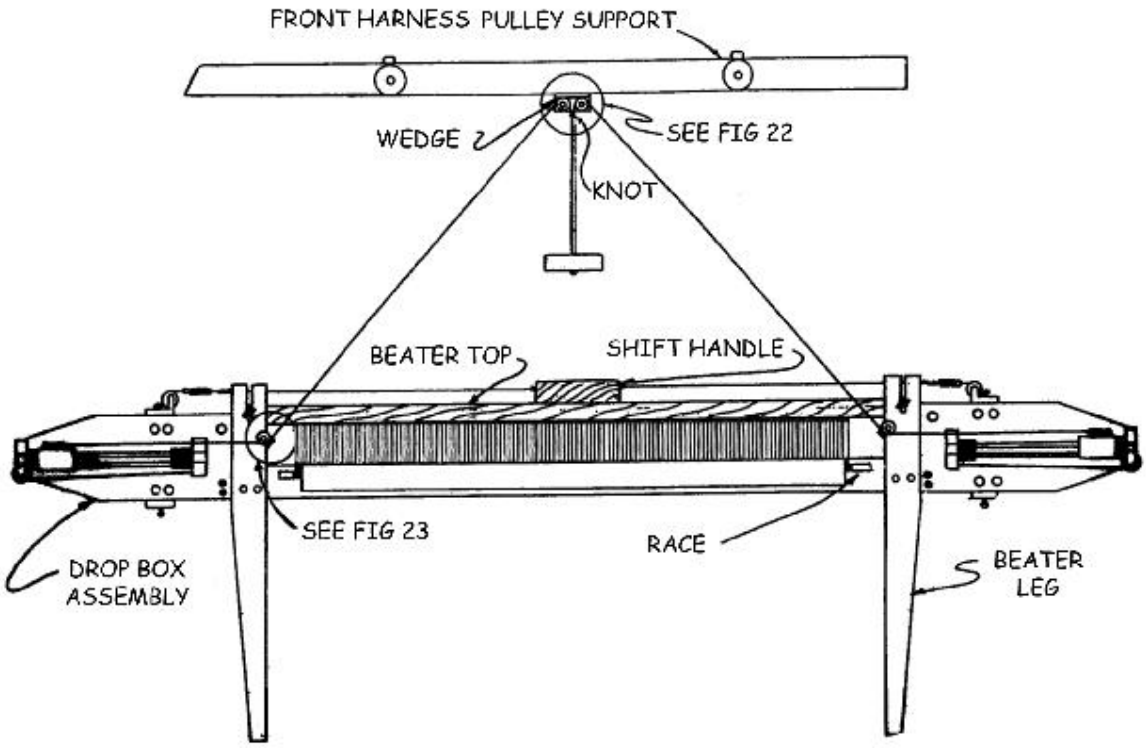


Figure 16a – Drop Box Assembly – Left Side, Rear View

Attach the Drop Box Assembly to the shuttle race with two 5/16" x 2-3/4" carriage bolts inserted from the front, with washers and hex nuts behind the back plate. Now tighten all bolts holding the Left Drop Box Assembly to the beater.

IMPORTANT: The face of the back plate must be precisely flush with the face of the upright. Check this alignment by laying a straight edge across the two surfaces.

6) Right Drop Box Assembly - Repeat this procedure for the Right Drop Box Assembly.

7) Installing the Vertical Pull Flystring Tie-Up – (see Figures 16a, 16b, and 16c) Locate the bag marked "multi-box tie-up" and remove its contents. This Tie-Up consists of a long dacron cord, two springs, two small washers and a handle.

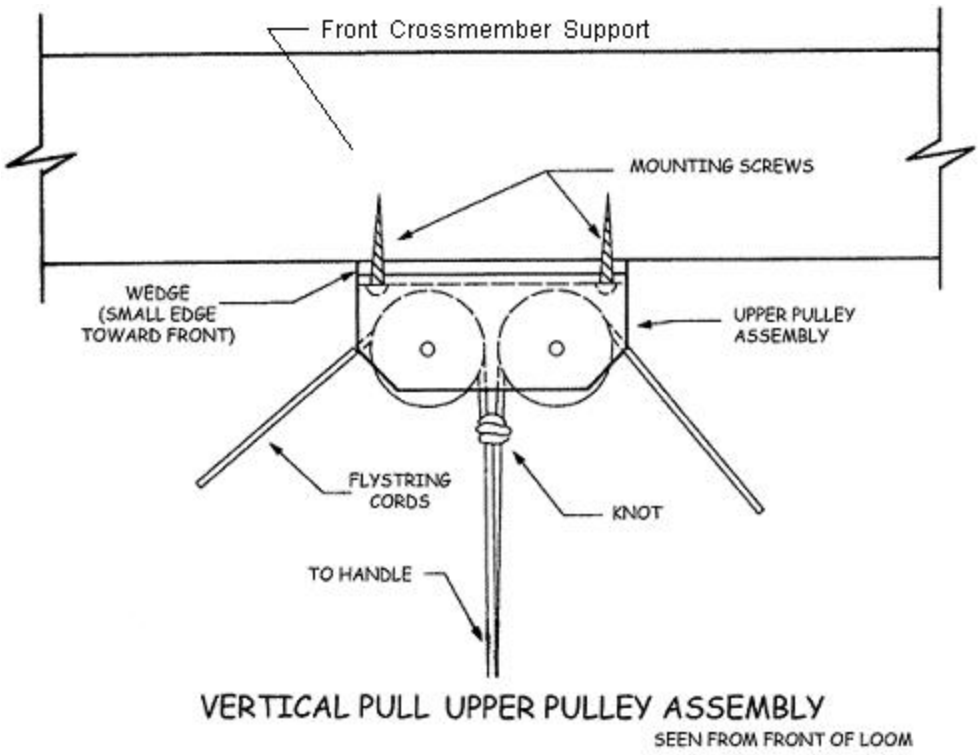


Figure 16b - Upper Pulley Assembly - Vertical Pull

Locate the center of the Flystring Tie-Up Cord, folding it in half. Take the center, looped end of the cord and thread it through the hole in the handle. Bring it back through the same hole, on the other side of the little pin that splits the hole. Draw the free ends of the cord through the loop, fixing the handle in the center of the cord. Pull the loose ends firmly, tightening the cord around the pin.

Feed both ends of the cord over either pulley in the Upper Assembly (as shown in Figure 16b). Draw one end of the cord over to the corresponding Picker Assembly, being sure to run the cord under the small pulley, mounted on the leg. The cord must be fed between the pulley and the little retainer that is attached to the pulley. The cord will then go straight across and under a second pulley located at the top of the Inner Picker Rod Support.

Slip the tip of the cord through the little 1/8" hole in the picker and out the other side, where the 3/8" hole allows for easy access to the cord. Now, thread one spring and one washer onto the cord and tie an overhand knot at the end of the cord. Do not over-tighten this knot, because you may want to shorten the cord once installation is completed and you have had a chance to try throwing the shuttle a few times.

Repeat this procedure for the cord on the opposite side.

The two new knots will determine the operating height of your Flystring Handle, so make sure that you are satisfied with the handle's position before tightening these knots. Do not trim the cords until you are certain that you are happy with the working height of your handle.

8) Adjusting the Flystring Assembly – (see Figure 28) Now try throwing the shuttle to see if the action is comfortable.

If you tie the knots very near to the end of the cord, the handle will be at its lowest possible position (if it went much lower, the flystring handle could collide with the shift handle or beater top when you reached the bottom of your pull). We suggest that you try this position first as a lower handle position will generally be less fatiguing. If the handle is too low, tie knots a little further in from the cord ends, in equal increments, until the handle is about 1" below its ideal height.

Now you are going to tie an overhand knot in the cords between the Upper Pulley Assembly and the handle (see Figure 28). To do this, make a small mark on the cord just below where it comes down from between the two pulleys. Pull it straight down a few inches to where you can tie a simple overhand knot, with the handle already in place. Once the knot is tied, release the cord and let it return to its resting position. If the knot was placed correctly, the pickers should still return to the end of the Picker Rod at each end of the boxes and the cord should stop before the Knot stops the cord from moving any farther up into the pulleys. If there is more than an inch or so of cord left, you may want to adjust the cords further, before snipping off any excess cord.

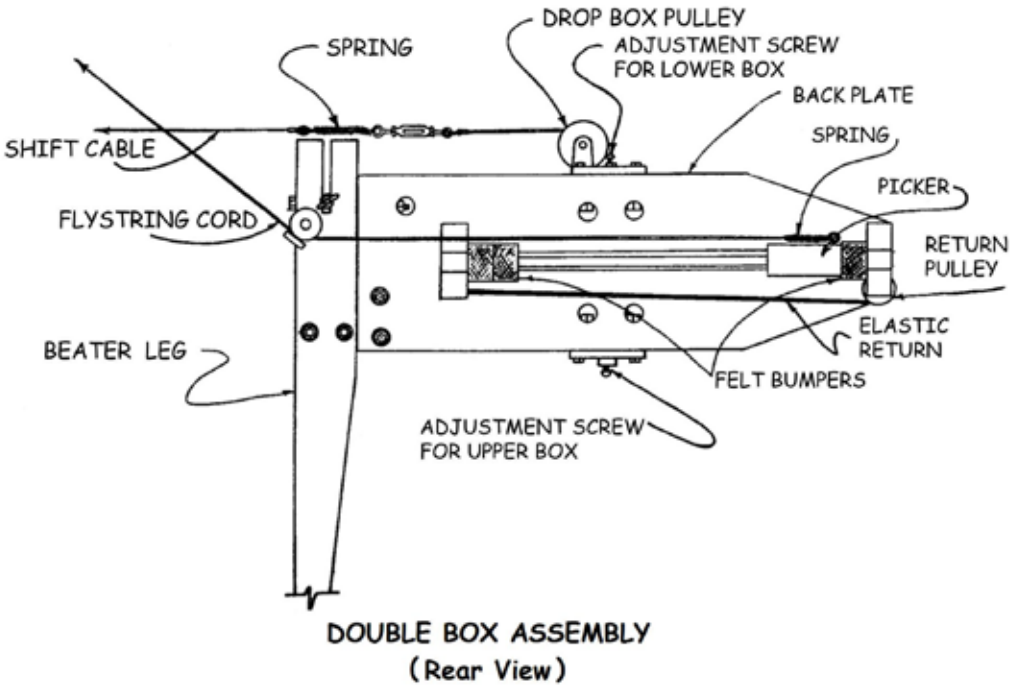


Figure 16c – Drop Box Assembly – Rear View

9) Attaching the Beater Return Spring Assembly – (see Figure 24) This assembly is the previously mentioned Spring/Cord/Eyebolt assembly that hangs from each Tilting Arm. To attach this assembly, simply remove one hex nut and washer from each eyebolt and place the eyebolt, from the outside, through the hole provided on each bottom horizontal of the side frame assembly, directly below the Tilting/Push Arm Hinge. Replace the washer and hex nut and tighten securely.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in the back position for long periods of time, as that is the purpose of the Beater Retainer.

The Beater Return Spring Assembly is adjustable. It is tightened by pulling on the ends of the white cord and loosened by pushing the button on the Mini Cord Lock, while moving the lock up and down on the cord. Whenever an adjustment is made on one side of the beater, a similar adjustment must be made on the other side as well. The amount of tension at which you set these Springs is strictly a matter of preference.

Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

10) Installing the Reed Support – (see Figure 25) The Reed Support is the long, thin, wooden part with seven holes and a slot similar to the one in the Shuttle Race. Position the support to the back of the Shuttle Race with the slot at the top and facing the race. Insert the seven 5/16" x 3" carriage bolts provided, from the front, with washers and wing nuts behind. Do not tighten the wing nuts yet.

11) Installing the Reed and Attaching the Beater Top – (see Figure 25) Set the bottom edge of your reed in the space created between the slotted edges of the Reed Support and the race, centering the reed between the two uprights. Slip the slot in the underneath side of the Beater Top onto the top of the reed. Align the holes at both ends of the Beater Top with the slots in the uprights. Insert the two 1/4" x 2-1/4" carriage bolts from front to back and mount the washer and wing nut on each bolt. Now, pushing down firmly on the Beater Top with one hand, tighten the wing nuts to hold the Beater Top securely to the uprights.

12) Testing the Picker System – Now that the reed is installed, your new Picker System should be ready to use. Try pulling on the handle a few times to see if everything is functioning properly. If all seems well, then put in a shuttle and see how it works.

13) Adjusting the Movement of the Drop Boxes – (see Figure 29) You will notice that the boxes slide up and down on a metal rod which is fixed at both ends to cast metal pieces. In each of these cast metal pieces, you will find a Brass Adjustment Screw with a lock nut. These Brass Screws provide a stop for the boxes at their upper and lower extremes of movement. Adjust the Top Screw so that when the boxes are all the way up, the Lower Box is in precise alignment with the Shuttle Race. Adjust the Bottom Screw so that when the Boxes are all the way down, the Upper Box is in precise alignment with the Shuttle Race. This adjustment is critical. Please make it carefully.

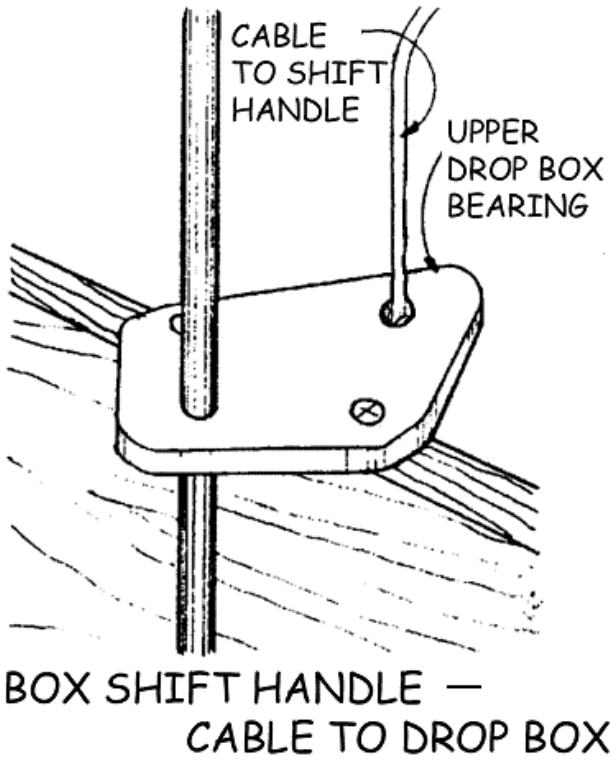


Figure 29 – Shift-Handle-to-Drop-Box Cable Attachment

It is wise to lay a straight edge across the Shuttle Race and Drop Box when doing this to assist you in getting the two perfectly aligned. When you have it properly adjusted, secure the lock nuts on the brass screws. Do these adjustments on both the Left and Right Drop Boxes. If your shuttle flight is erratic, re-check these adjustments. To make sure that the Adjustment Screws stay in place, you might want to purchase a small tube of a thread locking agent (such as Loc-tite) and apply a drop or two to each of these screws where the Screws go into the cast metal brackets.

14) Connect the Drop Boxes to the Shift Handle – (see Figures 27 and 30) At the top of each Drop Box Assembly there is a cable extending from the Drop Box Pulley, with an eyebolt on the end. This cable is routed over the top of the Drop Box Pulley, towards the center of the loom and the eyebolt threads into the turnbuckle on the end of the cable coming from the Shift Handle. Once you have both sides attached, they are adjusted as follows:

With the Shift Handle moved to its rightmost position, adjust the Left Drop Box Turnbuckle so that the Box is against its top stop and the spring at the Turnbuckle is slightly extended. Move the Shift Handle to the left and adjust the Right Turnbuckle in the same manner.

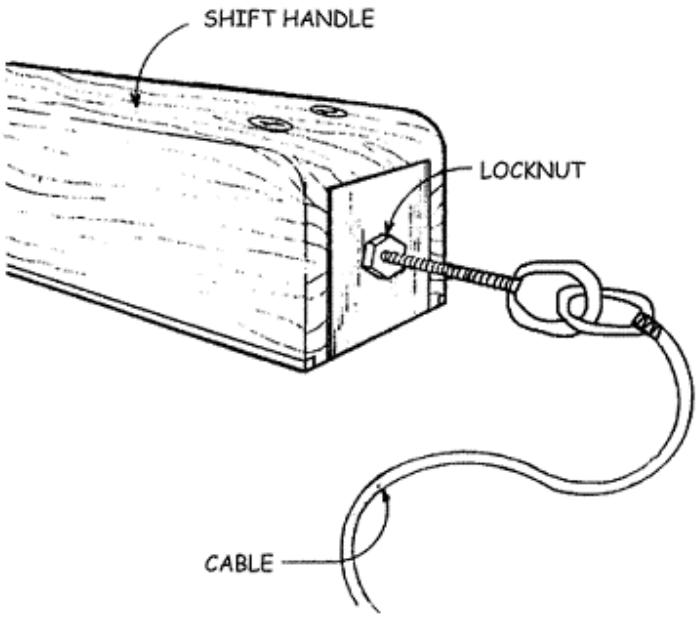


Figure 30 – Flyshuttle Beater Shift Handle

ATTENTION! When shifting, the leading end of the Handle must be raised first. If the trailing end of the handle is lifted first, the handle will lock up and not shift. Also, you want to make sure that the turnbuckles are not adjusted so tightly as to not allow the boxes to drop to their full down position. Once properly adjusted, tighten the lock nut of each turnbuckle to keep them from moving.

This completes the assembly of the Bottom Swing Beater and Flyshuttle Boxes. Please proceed to Chapter 12 for Assembly of your Bench.

NOTE: If you have ordered a Single-, Double- or Four-Box Overhead Beater Assembly, please proceed to the following chapter for your specific Beater Assembly.

OVERHEAD STANDARD BEATER ASSEMBLY

NOTE: Since the beater system uses a lot of carriage bolts, the following information may be helpful. There is a square shape below the head of each carriage bolt. This square portion does not fit easily into the pre-drilled holes. You will find it necessary to tap these bolts into place to properly seat the bolts. This will cause the bolt to "bite" into the wood and stay in place while you tighten the nut.

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly, referring to the illustrations included for help with terminology and locations.

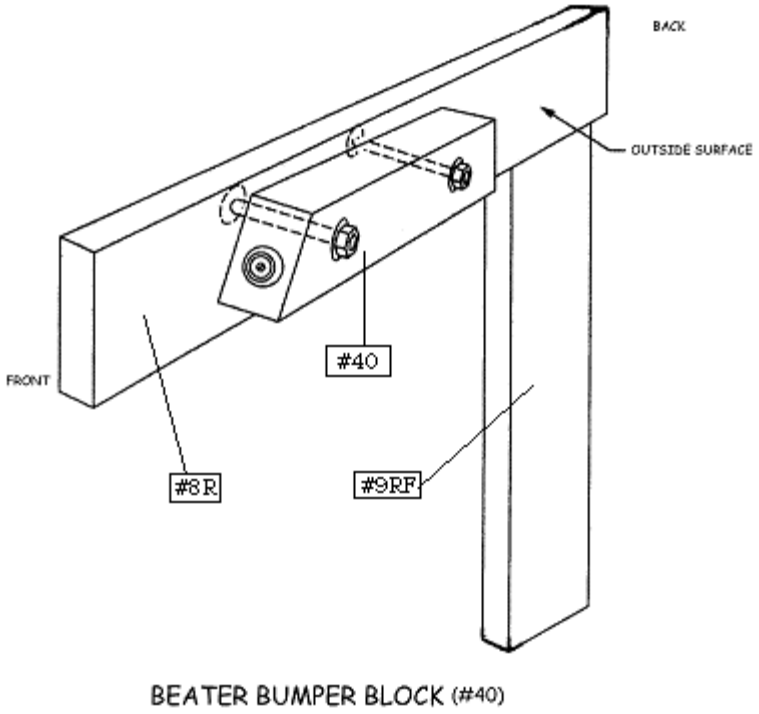


Figure 14 - Beater Bumper Block

1A) Beater Bumper Blocks (#40)

Locate the Beater Bumper Blocks (#40) (see Figure 14). The left is stamped "L" and the right one is stamped "R". They are each mounted to the outside of the respective cloth beam supports (8R and 8L) with 5/16" x 3" carriage bolts, washers, and hex nuts.

Orient these beater bumpers so that the bumper faces the front of the loom and the stamp faces the Cloth Beam Support to which it will be mounted. It is best to situate the carriage bolts so that the washers and nuts are to the outside of the loom leaving the smooth head of the carriage bolt on the inside of the loom frame.

1B) Mount the Beater Retainer - (see Figure 17) Locate the pre-drilled hole on the *inside face* of the Left Cloth Beam Support. Position the Beater Retainer at the hole and insert the #12 x 1-1/2" flat head wood screw through the Beater Retainer and into the pre-drilled hole. Leave the screw just loose enough so that the retainer is allowed to pivot around the screw.

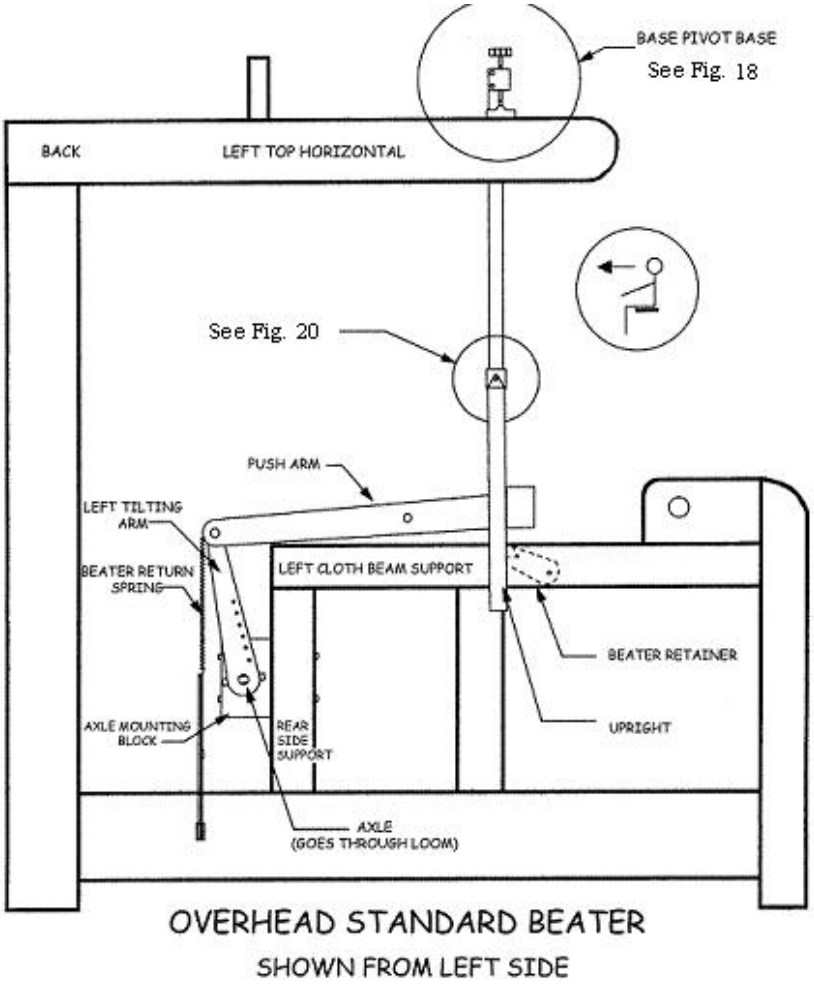


Figure 17 - Overhead Standard Beater

2) **Mount the Beater Adjustment Bases** - (see Figures 18 and 19) Locate two pre-drilled holes on the upper edge of each Top Horizontal (3R and 3L) on the assembled Side Frames of your loom. Attach these metal parts, flat face to the wood, using the four #8 x 3/4" pan head wood screws. Tighten the four screws securely.

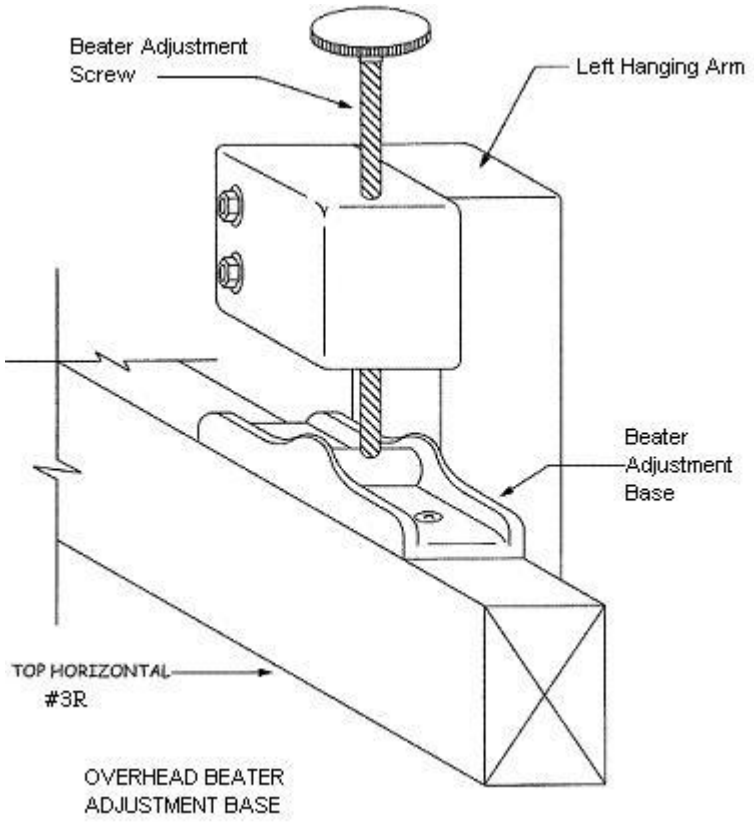


Figure 18 - Overhead Beater Pivot Base

3) **Assembling the Beater Frame** - (see Figures 19 and 20) Locate the Left and Right Uprights. Position the uprights on the floor spaced apart by a distance that is approximately equal to the width of your loom. The ends with the metal Pivot Brackets will be at the top of this assembly, and the metal rods will be pointing inward, toward each other.

Now locate the Shuttle Race. There is a groove cut along one side of the Shuttle Race which must be oriented to the top and back of the race which means that it should (for now) be facing down toward the floor. You will see that there are two holes on each end of the shuttle race that correspond with the two holes on either upright. For now, only the innermost hole on each end will be used. The outer holes take a different bolt and will be used later. Place it on top of the two uprights so that the race covers the two holes in the face of each upright (as shown in Figure 19). Once you have inserted the bolts, attach the washers and hex nuts to these carriage bolts, but do not tighten them just yet as you will be making some adjustments shortly.

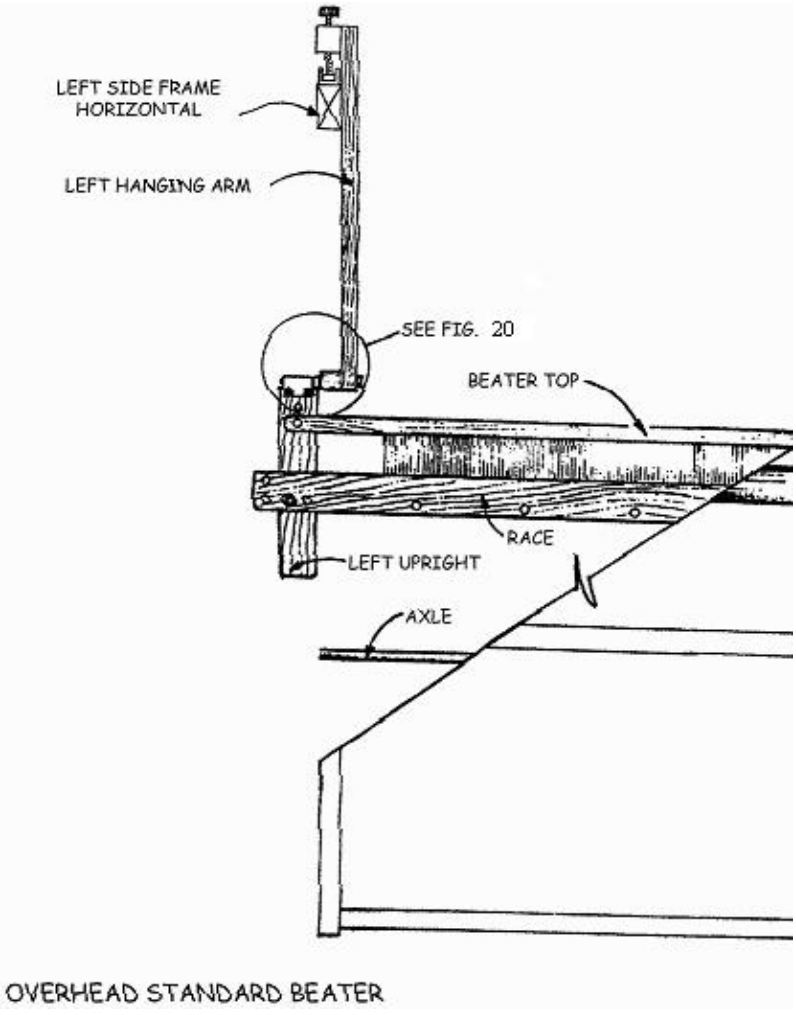


Figure 19 - Overhead Standard Beater - Front View

4) **Installing the Reed Support** - (see Figure 16, Chapter 6) The Reed Support is the long, thin, wooden part with seven holes and a slot similar to the one in the Shuttle Race. Position the support to the back of the Shuttle Race with the slot at the top and facing the race. Insert the seven 5/16" x 3" carriage bolts provided, from the front, with washers and wing nuts behind. Do not tighten the wing nuts yet. Later, after the beater is hanging in position, you will install your reed and square all parts (see Steps 10 and 11).

5) **Attach the Beater Top** - (see Figure 19) Locate the Beater Top and place it on the same side of the uprights as the Shuttle Race, with the long groove facing downward. Insert the two 1/4" x 2-1/4" carriage bolts through the holes near each end of the beater top and then through the slots that are located just below the metal bracket of each upright, adding the washers and wing nuts behind the uprights, adding the washers and wing nuts behind the uprights.

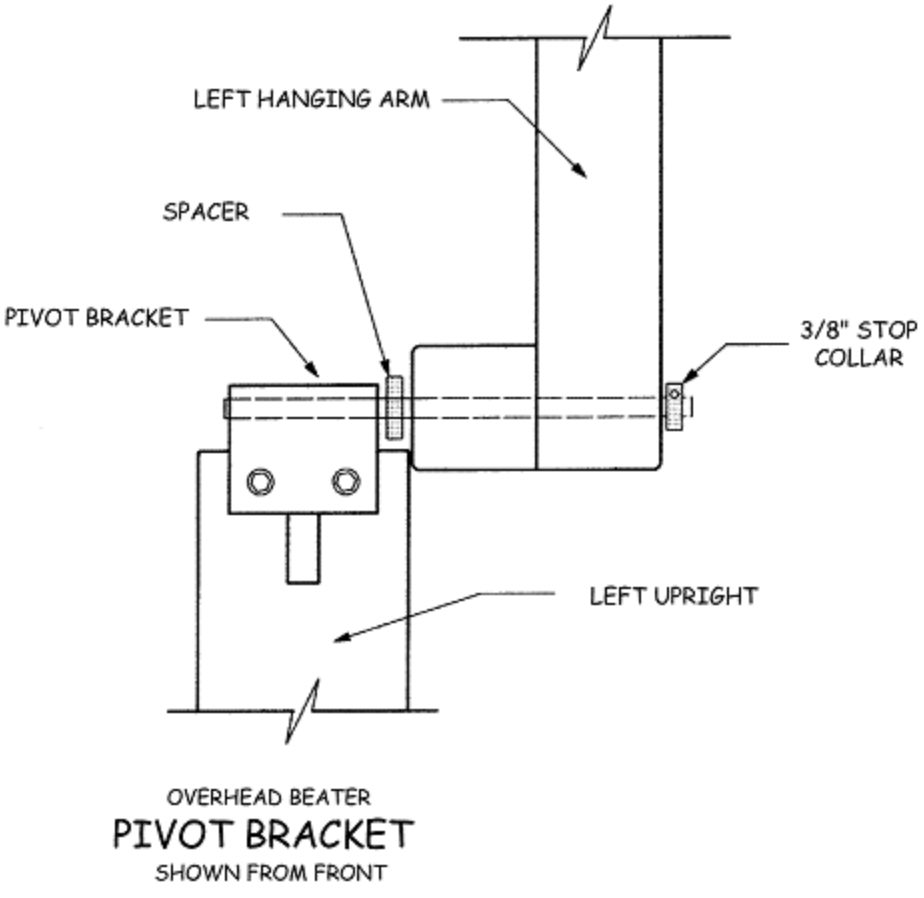


Figure 20 - Overhead Beater Pivot Bracket

6) Attach the Hanging Arms to the Uprights and Hanging the Beater Assembly - (see Figures 19 and 20) Locate the Left and Right Hanging Arms. Notice that there is a block of wood at one end of each Arm, through which the Beater Adjustment Screw is installed, and a single hole piercing the other end. Position each arm with the single hole at the upright and the Wood Block and Adjustment Screw furthest from the upright and facing to the outside of the loom.

Using a 1/8" allen wrench, remove the 3/8" stop collars from the metal shafts welded to the Pivot Brackets, at the top of each upright. Leaving the small spacer in place next to the Pivot Bracket, install the Hanging Arms onto these shafts making sure that the Right and Left Hanging Arms are in their proper positions (see Figure 19). Replace the stop collars and tighten, making sure to leave enough clearance for each upright to swing freely from its respective arm.

Lift the Beater Assembly into place, as shown in Figure 19, placing the foot at the bottom end of the Beater Adjustment Screw into the notch in the center of the Beater Pivot Base which you attached to the loom in Step 2) of this assembly.

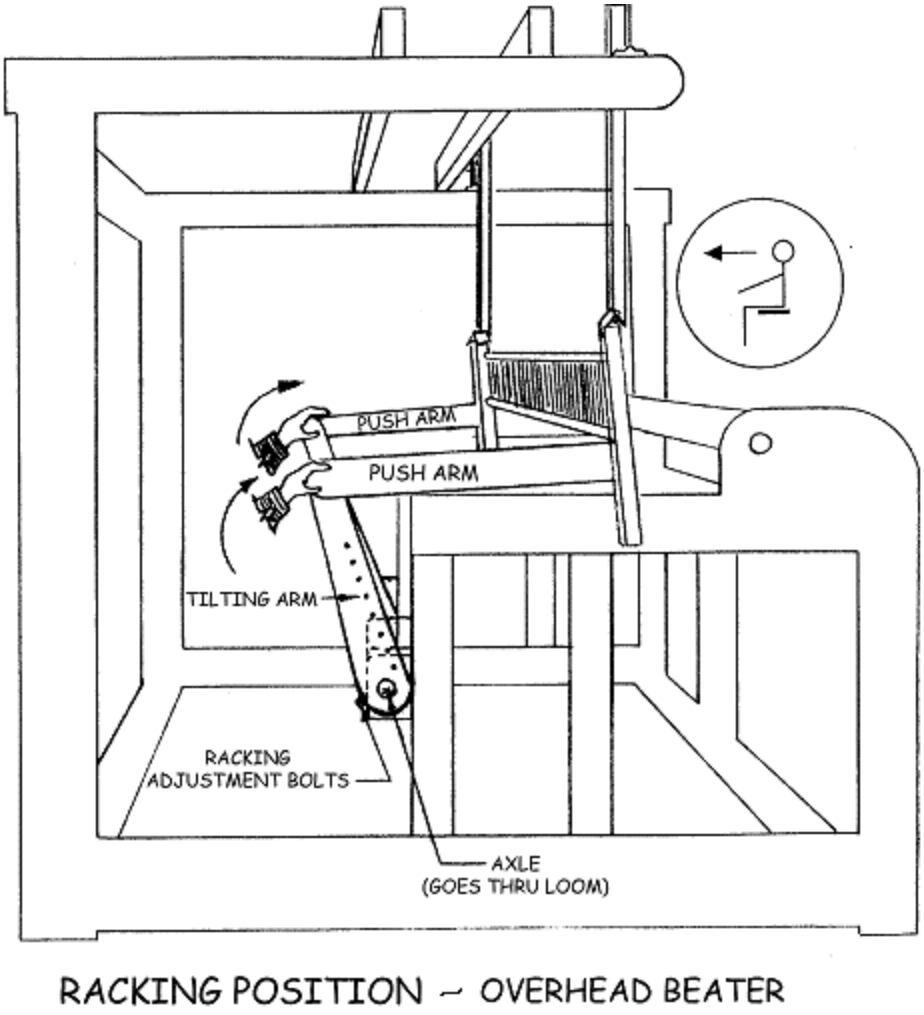


Figure 21 - Overhead Beater - Racking Position

7) **Install the Beater Axle** - (see Figure 21) Locate the Beater Axle (a long, black pipe with holes at each end). There is no particular right or left orientation for this axle as it is the same on both ends. Insert each end of the axle through a hole in the axle Mounting Blocks, located at the rear of 9R and 9L (see Figure 21). The axle now goes all of the way through the loom, from side to side. Now you can center the axle in the loom and place an axle spacer (a round, wooden piece) on each exposed end of the axle.

8) **Installing the Tilting Arm Assemblies** - (see Figure 21) The Tilting Arm Assemblies are comprised of a Tilt Arm and a Push Arm, joined together at an elbow. These assemblies are stamped "L" and "R" and are to be mounted on the outside of the loom, at each end of the Beater Axle. It is important to mount each assembly correctly (as shown in Figures 20.b and 24), with the Push Arms to the outside and the Tilting Arms to the inside, next to the Axle Mounting Blocks. The Tilting Arms are attached to the ends of the axle with 5/16" x 2-3/4" hex bolts with washers and hex nuts provided. These are the Racking Adjustment Bolts. Do not tighten these bolts yet. They will be part of a critical adjustment coming up shortly. You will see a Spring/Cord/Eyebolt assembly hanging from each Tilting Arm. Just let them hang for now. They will be attached later.

9) **Connecting the Push Arms to the Uprights** - (see Figure 21) Mount each Push Arm to the back face of each upright using two 5/16" x 4-1/2" hex bolts, washers, and square nuts. These bolts go through the Shuttle Race and Uprights and end with a square nut in the nut access hole of each Push Arm. As before, do not yet tighten these bolts.

10) **Installing the Reed** - (see Figure 16, Chapter 6) Loosen the bolts holding the Beater Top in place. Set the bottom edge of your reed in the space created between the slotted edges of the Reed Support and the race, centering the reed between the two uprights. Slip the top of the reed into the slot in the underneath side of the Beater Top. Tighten the wing nuts securing the Beater Support to the Beater Race, only enough to secure the reed. Push the Beater Top down on the reed and tighten the wing nuts just enough to hold the Beater Top to the uprights. Further tightening will occur next (see Step 11).

11) **Racking the Beater** - (see Figure 21) Before tightening all of the bolts installed thus far, during your beater assembly, you want to ensure that the Beater is centered in the loom and square in its position to the fell line. We know that, after completion of the frame, the loom is level and square. Now check that the two Beater Adjustment Screws are extended equally and that the Beater Top is level.

Obviously, at this time you have no fell line, so the next best way to check square is to align the beater by pushing the beater against the Front **or** the Rear Bumpers. Once the beater is touching both the left and the right bumpers at the same time, tighten the three bolts in the Right and Left Uprights.

The last bolts to tighten are the Racking Adjustment Bolts that you installed in Step 8), connecting the Tilting Arms to the axle. These bolts should be tightened while the entire beater is being held firmly against the Front Beater Bumpers (as shown in Figure 21). Push on the upper end of each Tilting Arm and, while the beater is in contact with the bumpers at either side, securely tighten the "Racking Adjustment Bolts". If you do not have a second pair of hands to help at this time, you can tie the Beater Race to the Cloth Beam with cord, at each side.

If the beater should come "out of square" in the future, if it should hit one bumper before the other, you will need to repeat Step 11) in its entirety, loosening the bolts before you start and tightening them securely after.

12) Attaching the Beater Return Spring Assembly - (see Figure 17) This is the previously mentioned Spring/Cord/Eyebolt assembly that hangs from each Tilting Arm. To attach this assembly, simply remove one hex nut and washer from each eyebolt and place the eyebolt, from the outside, through the hole provided on each bottom horizontal of the side frame assembly, directly below the Tilting/Push Arm Hinge. Replace the washer and hex nut and tighten securely.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in the back position for long periods of time, as that is the purpose of the Beater Retainer.

The Beater Return Spring Assembly is adjustable. It is tightened by pulling on the ends of the white cord and loosened by pushing the button on the Mini Cord Lock, while moving the lock up and down on the cord. Whenever an adjustment is made on one side of the beater, a similar adjustment must be made on the other side as well. The amount of tension at which you set these springs is strictly a matter of preference. Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

This completes the installation of your Standard Overhead Beater. Please proceed to Chapter 12, for Assembly of your Bench.

NOTES: The Single-Box Flyshuttle System now incorporates removable shuttle boxes. This allows the weaver to completely remove the boxes and flystring tie-up from the loom any time that handshuttle weaving becomes necessary. It also makes it much easier to convert any other AVL beater system to a Single-Box Flyshuttle Beater.

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly. Please refer to the illustrations for help with terminology and locations.

ASSEMBLY NOTE: Since the beater system uses a lot of carriage bolts, the following information may be helpful. There is a square shape below the head of each carriage bolt. This square portion does not fit easily into the pre-drilled holes. You will find it necessary to tap these bolts into place to properly seat the bolts. This will cause the bolt to "bite" into the wood and stay in place while you tighten the nut.

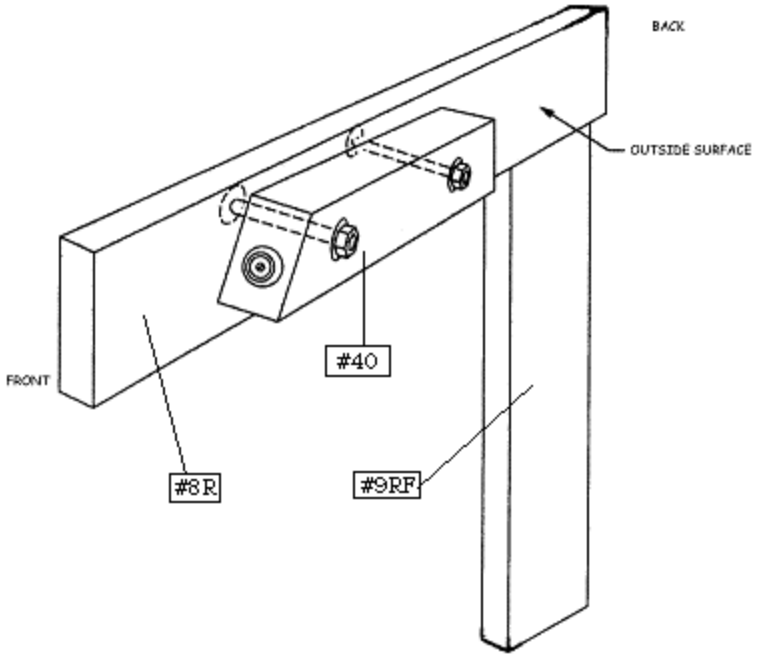


Figure 14 - Beater Bumper Block

1A) Beater Bumper Blocks (#40)

Locate the Beater Bumper Blocks (#40) (See Figures 1 & 14) The left is stamped "L" and the right one is stamped "R". They are each mounted to the outside of the respective cloth beam supports (#8R and #8L) with 5/16" x 3" carriage bolts, washers, and hex

nuts. Orient these beater bumpers so that the bumper faces the front of the loom and the stamp faces the cloth beam support to which it will be mounted. It is best to situate the carriage bolts so that the washers and nuts are to the outside of the loom leaving the smooth head of the carriage bolt on the inside of the loom frame.

1B) Mount the Beater Retainer - (see Figure 22) Locate the pre-drilled hole on the inside face of the Left Cloth Beam Support. Position the Beater Retainer at the hole and insert the #12 x 1-1/2" flat head wood screw through the Beater Retainer and into the pre-drilled hole. Leave the screw just loose enough so that the retainer is allowed to pivot around the screw.

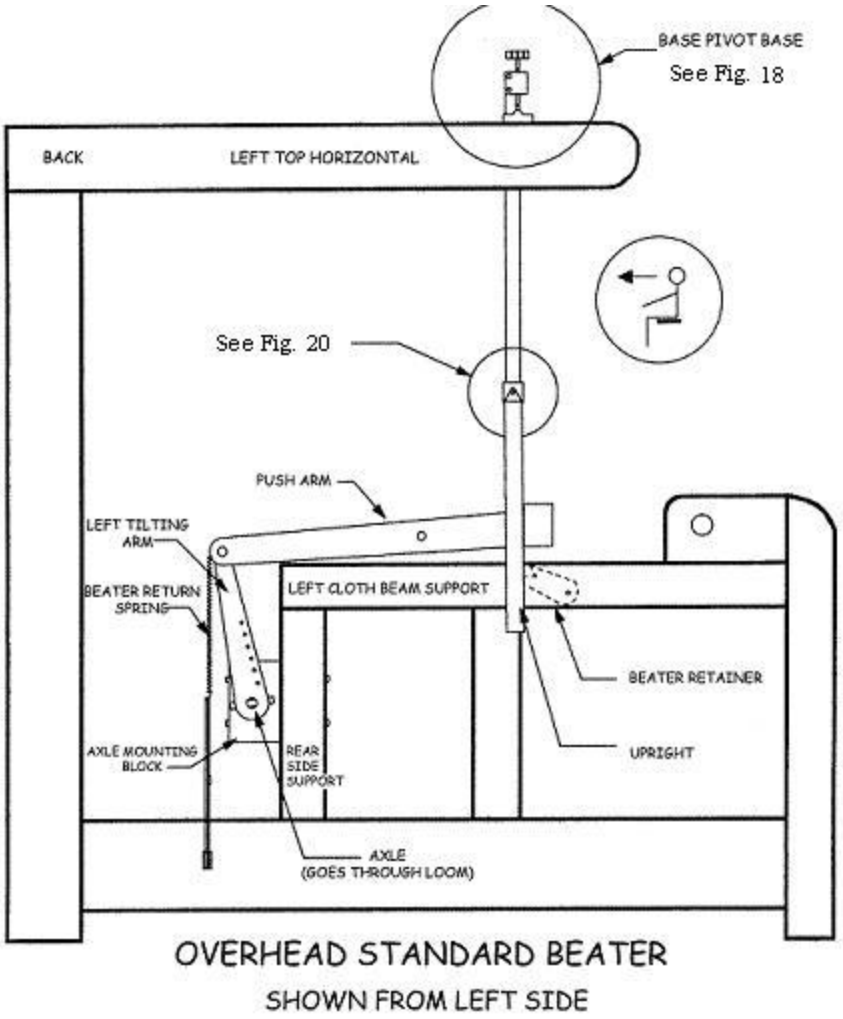


Figure 17 - Overhead Beater- Left Side View

2) **Mount the Beater Adjustment Bases** - (see Figures 17 and 18) Locate two pre-drilled holes on the upper edge of each Top Horizontal (3R and 3L) on the assembled Side Frames of your loom. Attach these metal parts, flat face to the wood, using the four #8 x 3/4" pan head wood screws. Tighten the four screws securely.

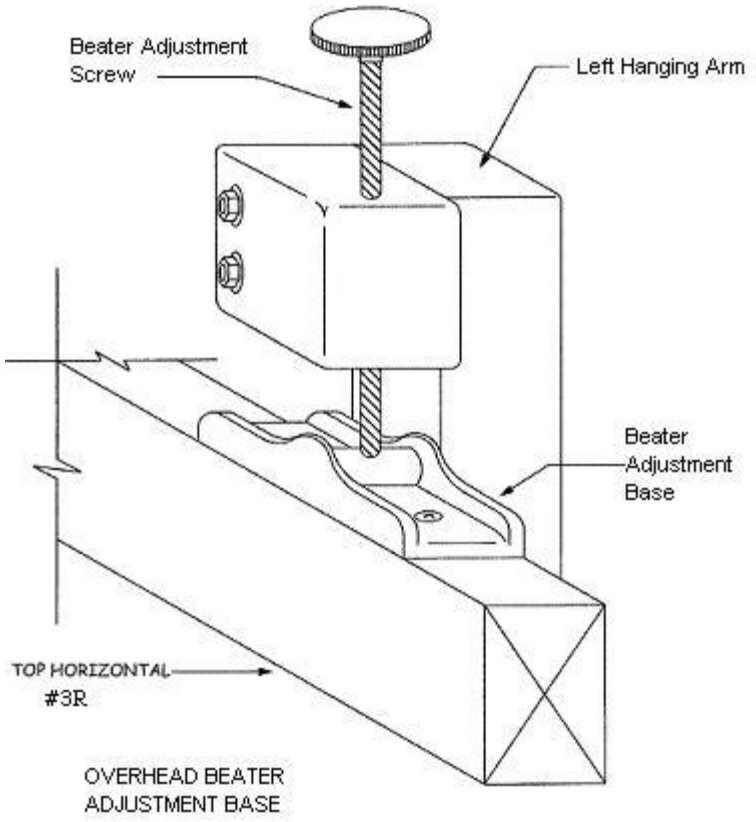


Figure 18 - Overhead Beater Adjustment Base

3) **Assembling the Beater Frame** - (see Figures 20 and 23) Locate the Left and Right Uprights. Position the uprights on the floor spaced apart by a distance that is approximately equal to the width of your loom. The ends with the metal Pivot Brackets will be at the top of this assembly, and the metal rods will be pointing inward, toward each other.

Locate the Shuttle Race Assembly and observe that there is a groove cut in one side of the Shuttle Race which must be oriented to the top and back of the Race which means that it should (for now) be facing the floor. Position the Assembly on top of the two Uprights so that it covers the two holes in the face of each Upright as shown in Figure #23. The two rear plywood Box Sides

should fit into the notches on the front face of each upright. You will see that there are two holes a foot or so from each end of the shuttle race that correspond with the two holes on either upright. For now, only the innermost hole on each side will be used. The outer holes take a different bolt and will be used later. Secure the Shuttle Race to the uprights with two 5/16" x 3-1/4" carriage bolts (one on each side), inserting them from front to back. Attach the washers and hex nuts to these carriage bolts, but do not tighten them just yet, as you will be making some adjustments later in this beater installation.

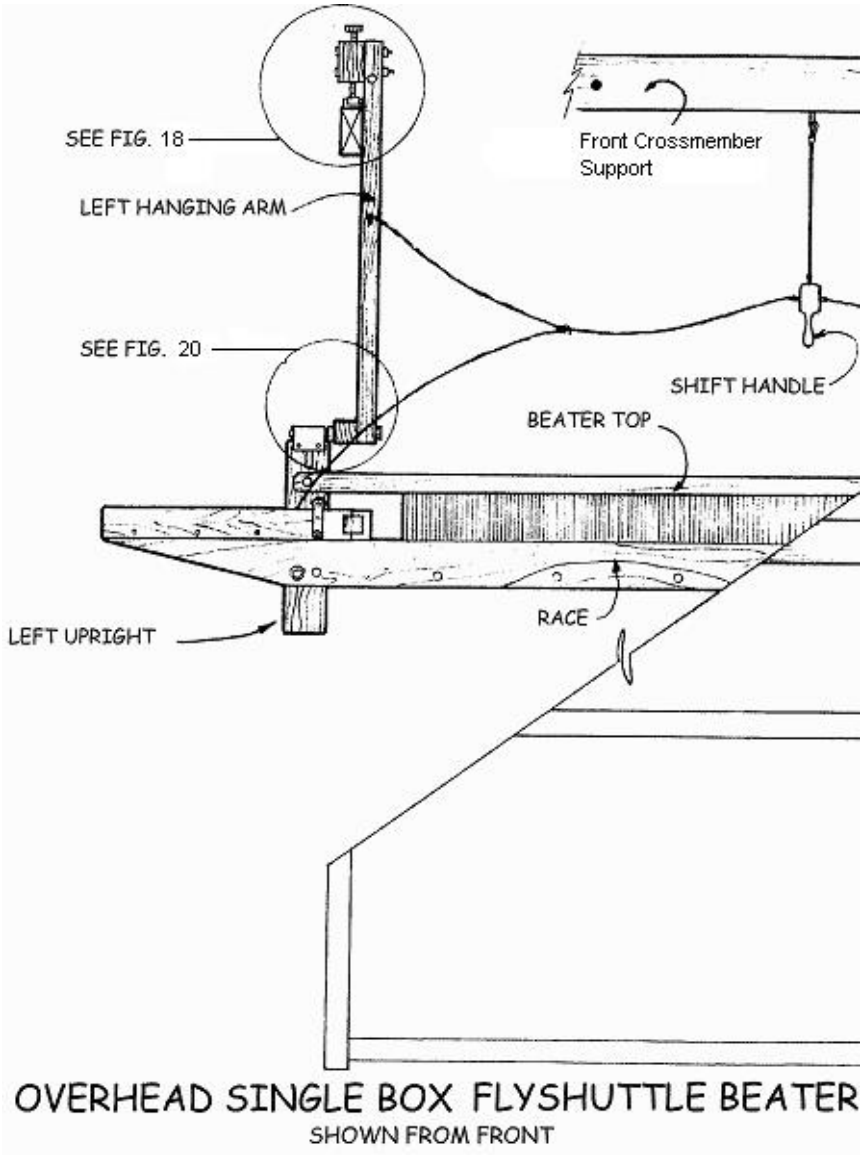


Figure 23 - Overhead Single Box Flyshuttle Beater

4) **Installing the Reed Support** - (see Figure 16, Chapter 6) The Reed Support is the long, thin, wooden part with seven holes and a slot similar to the one in the Shuttle Race. Position the support to the back of the Shuttle Race with the slot at the top and facing the race. Insert the seven 5/16" x 3" carriage bolts provided, from the front, with washers and wing nuts behind. Do not tighten the wing nuts yet. Later, after the beater is hanging in position, you will install your reed and square all parts (see Steps 11 and 12).

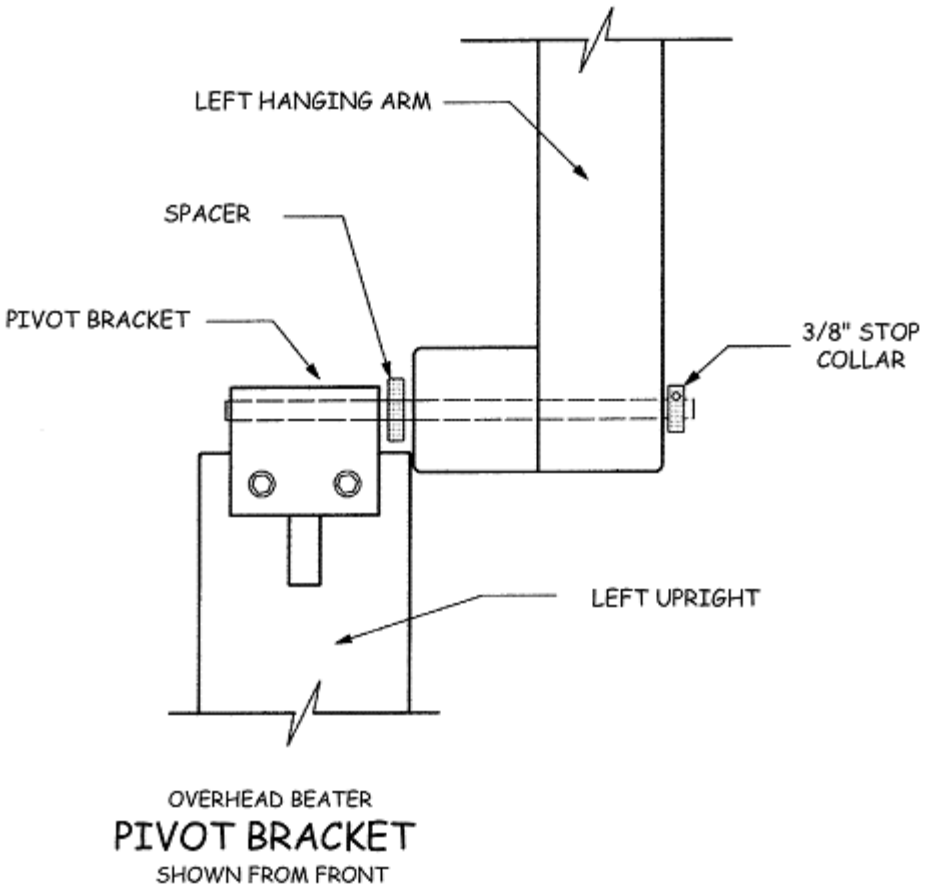


Figure 20 - Overhead Beater Pivot Bracket

5) **Attach the Beater Top** - (see Figure 23) Locate the Beater Top and position it to the same side of the uprights as the Shuttle Race, with the long groove facing downward. Attach the Beater Top to the uprights, inserting the two 1/4" x 2-1/4" carriage bolts from the front, through the holes near each end of the Beater Top and then through the slots that are located just below the metal Pivot Brackets of each upright. Add the washers and wing nuts behind the uprights, but do not tighten them at this time.

6) Attach the Hanging Arms to the Uprights and Hang the Beater Assembly - (see Figures 20 and 23) The next step is to mount the Hanging Arms to the uprights on the Shuttle Race Assembly. Using an 1/8" allen wrench, remove the 3/8" stop collars from the metal shafts of the Pivot Bracket at the top of each upright. Notice that there is a block of wood at the other end of the Hanging Arm, through which the Beater Adjustment Screw is installed and there is a screweye that has been mounted near the middle of each hanging arm. The block of wood will point out of the loom and the screweyes will face the front of the loom. Keep the small spacer in place on the metal shaft and install the Hanging Arms onto these shafts, making sure that the right and left arms are in their proper positions. Replace and tighten the Stop Collars, making sure to leave enough clearance for this pivot point to swing freely. Now look at the other end (the top) of one of the hanging arms.

Lift the Beater Assembly into place (as shown in Figure 23), placing the foot at the bottom end of the Beater Adjustment Screw into the notch in the center of the Beater Pivot Base which you attached to the loom in Step 2) of this assembly.

7) Install the Axle Mounting Block - (see Figures 21 and 22) Locate the two Axle Mounting Blocks in your package and find the two pre-drilled holes in both Rear Side Supports (9R and 9L). Position the blocks at the holes so that the 1" hole is facing through the loom and the bolt holes are lined up. If the 1" hole is off-set from the center of the block, position the hole in the lower orientation. Insert two 1/4" x 5" carriage bolts, from the front side of 9R and 9L, through each block. Secure the bolt with washer and nut and fasten tight.

8) Install the Beater Axle - (see Figures 21 and 22) Locate the Beater Axle (a long, black pipe with holes at each end). There is no particular right or left orientation for this axle as it is the same on both ends. Insert each end of the axle through a hole in the Axle Mounting Blocks, located at the rear of 9R and 9L (see Figure 24). The axle now goes all of the way through the loom, from side to side. Now you can center the axle in the loom and place an Axle Spacer (a round, wooden piece) on each exposed end of the axle.

9) **Installing the Tilting Arm Assemblies** - (see Figures 21 and 22) The Tilting Arm Assemblies are comprised of a Tilt Arm and a Push Arm, joined together at an elbow. These assemblies are stamped "L" and "R" and are to be mounted on the outside of the loom, at each end of the Beater Axle. It is important to mount each assembly correctly (as shown in Figures 21 and 22), with the Push Arms to the outside and the Tilting Arms to the inside, next to the Axle Mounting Blocks. The Tilting Arms are attached to the ends of the axle with 5/16" x 2-3/4" hex bolts with washers and hex nuts provided. These are the Racking Adjustment Bolts. Do not tighten these bolts yet. They will be part of a critical adjustment coming up shortly. You will see a Spring/Cord/Eyebolt assembly hanging from each Tilting Arm. Just let them hang for now. They will be attached later.

10) **Connecting the Push Arms to the Uprights** - (see Figure 22) Mount each Push Arm to the back face of each upright (see Figure 21) using two 5/16" x 4-1/2" hex bolts, washers, and square nuts. These bolts go through the Shuttle Race and uprights and end with a square nut in the nut access hole of each Push Arm. As before, do not yet tighten these bolts.

11) **Installing the Reed** - (see Figures 23 and 16, Chapter 6) Loosen the bolts holding the Beater Top in place. Set the bottom edge of your reed in the space created between the slotted edges of the Reed Support and the race, centering the reed between the two uprights. Slip the top of the reed into the slot in the underneath side of the Beater Top. Tighten the wing nuts securing the Beater Support to the Beater Race, only enough to secure the reed. Push the Beater Top down on the reed and tighten the wing nuts just enough to hold the Beater Top to the uprights. Further tightening will occur next (see Step 12).

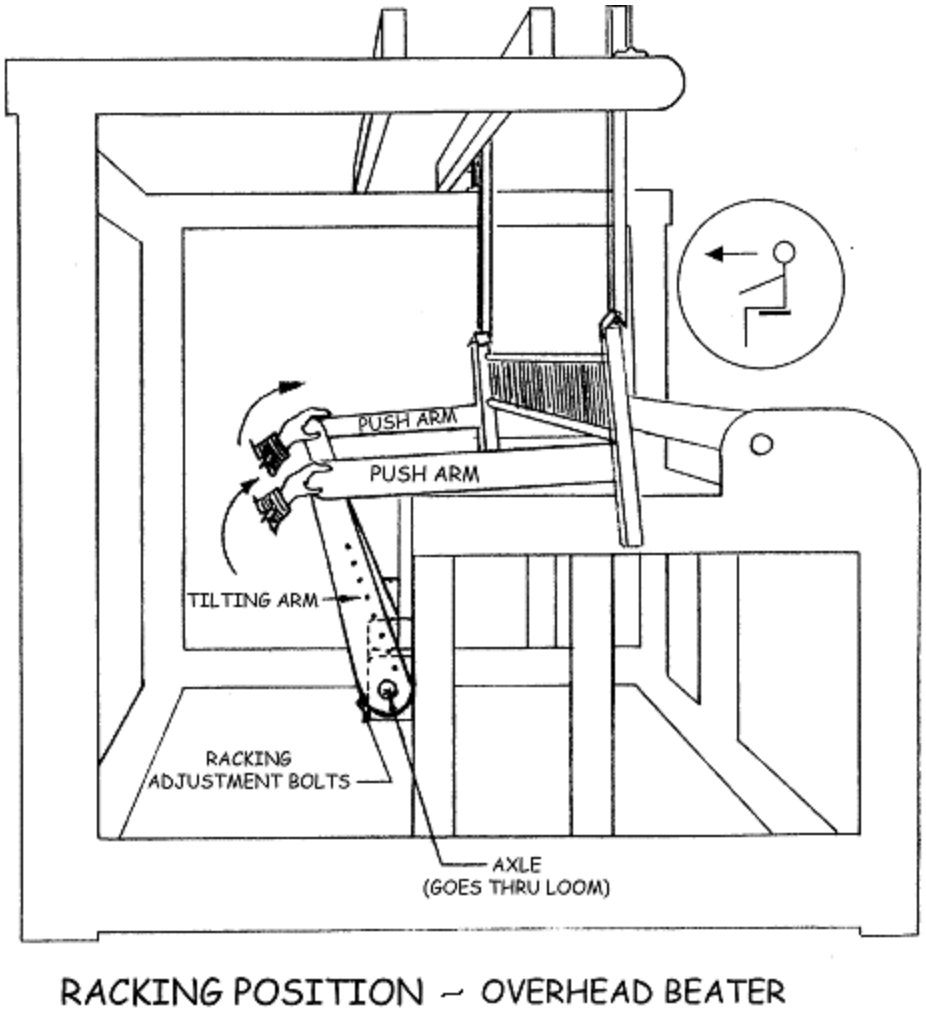


Figure 21 - Overhead Beater – Racking Position

12) **Racking the Beater** - (see Figure 21) Before tightening all of the bolts installed thus far, during your beater assembly, you want to ensure that the beater is centered in the loom and square in its position to the fell line. We know that, after completion of the frame, the loom is level and square. Now check that the two Beater Adjustment Screws are extended equally and that the Beater Top is level.

Obviously, at this time you have no fell line, so the next best way to check square is to align the beater by pushing the beater against the Front **or** the Rear Bumpers. Once the beater is touching both the left and the right bumpers at the same time, tighten the three bolts in the Right and Left Uprights.

The last bolts to tighten are the Racking Adjustment Bolts that you installed in Step 9), connecting the Tilting Arms to the axle. These bolts should be tightened while the entire beater is being held firmly against the Front Beater Bumpers (as shown in Figure 21). Push on the upper end of each Tilting Arm and, while the beater is in contact with the bumpers at either side, securely tighten the "Racking Adjustment Bolts". If you do not have a second pair of hands to help at this time, you can tie the Beater Race to the Cloth Beam with cord, at each side.

If the beater should come "out of square" in the future, if it should hit one bumper before the other, you will need to repeat Step 12 in its entirety, loosening the bolts before you start and tightening them securely after.

13) **Attaching the Beater Return Spring Assembly** - (see Figure 22) This is the previously mentioned Spring/Cord/Eyebolt assembly that hangs from each Tilting Arm. To attach this assembly, simply remove one hex nut and washer from each eyebolt and place the eyebolt, from the **outside**, through the hole provided on each bottom horizontal of the side frame assembly, directly below the Tilting/Push Arm Hinge. Replace the washer and hex nut and tighten securely.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in the back position for long periods of time, as that is the purpose of the Beater Retainer.

The Beater Return Spring Assembly is adjustable. It is tightened by pulling on the ends of the white cord and loosened by pushing the button on the Mini Cord Lock, while moving the lock up and down on the cord. Whenever an adjustment is made on one side of the beater, a similar adjustment must be made on the other side as well. The amount of tension at which you set these springs is strictly a matter of preference. Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

14) Installing the Flyshuttle Tie-Up - (see Figure 23) Notice the screweye that is taped to the bottom or side of the Front Cross-member Support (see Figure 23). Insert this screweye into the pre-drilled hole on the underside of the Harness Pulley Support. Screw the screweye in so that no screw threads are showing. Take the string Tie-Up and Shift Handle from its bag. As you can see, there are three screweyes coming out of the handle: one at the top and two at the sides. Hold the handle up by the clip attached to the string at the top of the handle. Hook this clip to the screweye you just installed.

At this point, there are two square pieces of wood hanging from the handle. These are the pickers. Take one of these to the very **outside** of the race on the right side. Orient the picker so that the leather loop is pointing down and the cord attachment is to the inside of the loom. Slide the picker into the slots between the Box Sides. Notice that there is a small, wooden spool spanning the shuttle entry to the box on each side of the race. These are the Snubbers. The cord should go over these Snubbers (above each shuttle box) on each side of the loom.

Now look up at the right Hanging Arm. About halfway down, there is a screweye on the front face of the arm. Also, midway on the cord between the Shift Handle and the picker is another cord, with a clip on the end. Attach the clip to the screweye on the Arm.

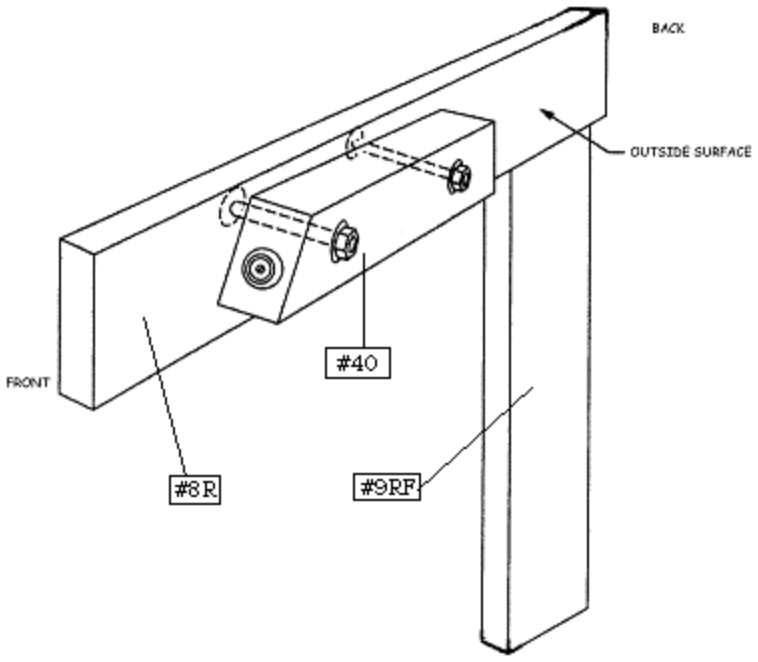
Repeat this process with the left Picker. Be sure the leather loop down and toward the outside, slide it into the grooves in the left Box Sides from the very outside of the race. Attach the clip at the end of the cord to the screweye on the left Hanging Arm.

This completes the installation of your Overhead Single-Box Flyshuttle Assembly. Please proceed to Chapter 12, for Assembly of your Bench.

NOTE: Since the beater system uses a lot of carriage bolts, the following information may be helpful. There is a square shape below the head of each carriage bolt. This square portion does not fit easily into the pre-drilled holes. You will find it necessary to tap these bolts into place to properly seat the bolts. This will cause the bolt to "bite" into the wood and stay in place while you tighten the nut.

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly. Please refer to all illustrations in this chapter for help with terminology and locations.

1A) Beater Bumpers (#40) – (see Figure 14) Locate the Beater Bumper Blocks (#40). The left is stamped "L" and the right one is stamped "R". They are each mounted to the outside of the respective cloth beam supports (#8R and #8L) with 5/16" x 3" carriage bolts, washers, and hex nuts. Orient these beater bumpers so that the bumper faces the front of the loom and the stamp faces the cloth beam support to which it will be mounted. It is best to situate the carriage bolts so that the washers and nuts are to the outside of the loom leaving the smooth head of the carriage bolt on the inside of the loom frame.



BEATER BUMPER BLOCK (#40)

Figure 14 - Beater Bumper Block Installed

1B) **Mount the Beater Retainer** – (see Figure 24) Locate the pre-drilled hole on the inside face of the Left Cloth Beam Support. Position the Beater Retainer at the hole and insert the #12 x 1-1/2" flat head wood screw through the Beater Retainer and into the pre-drilled hole. Leave the screw just loose enough so that the retainer is allowed to pivot around the screw.

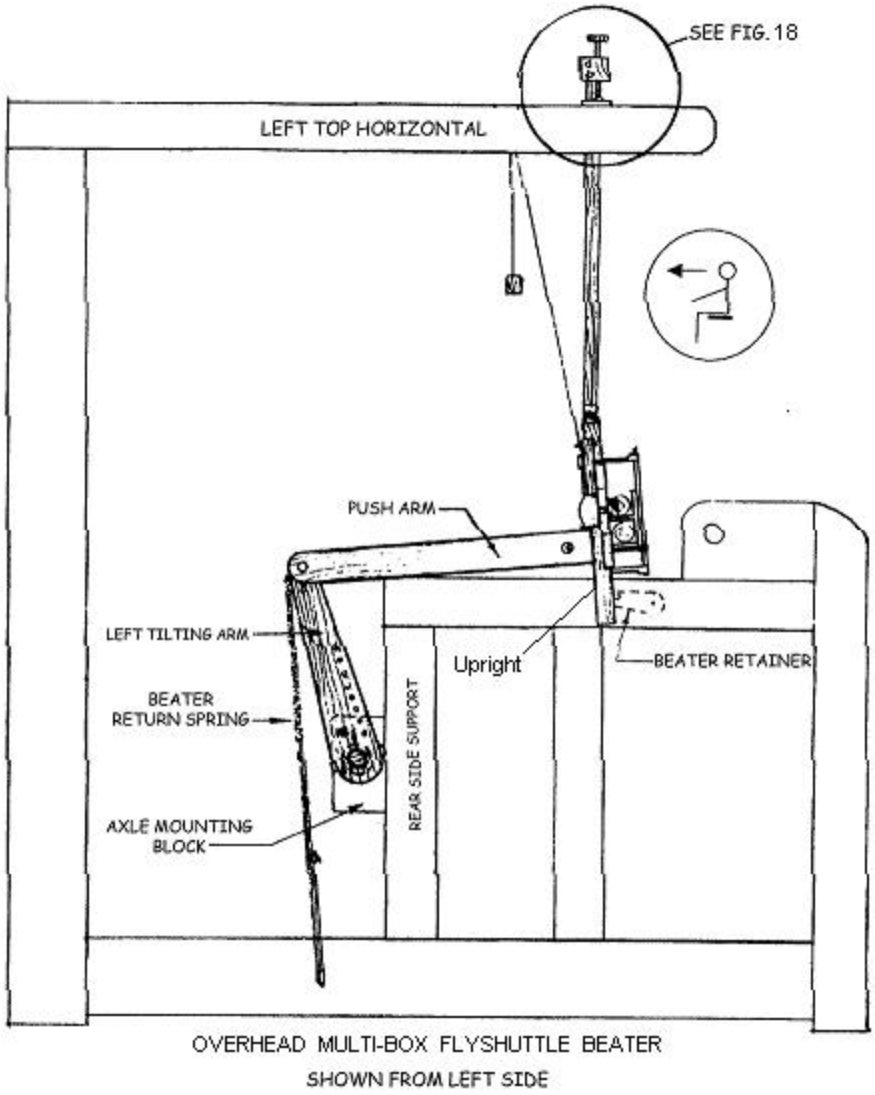


Figure 24 - Overhead Multiple Box Flyshuttle Beater -Left Side

2) **Mount the Beater Adjustment Bases** – (see Figures 18 and 24) Locate two pre-drilled holes on the upper edge of each Top Horizontal (3R and 3L) on the assembled Side Frames of your loom. Attach these metal plates, flat face to the wood, using the four #8 x 3/4" pan head wood screws. Tighten the four screws securely.

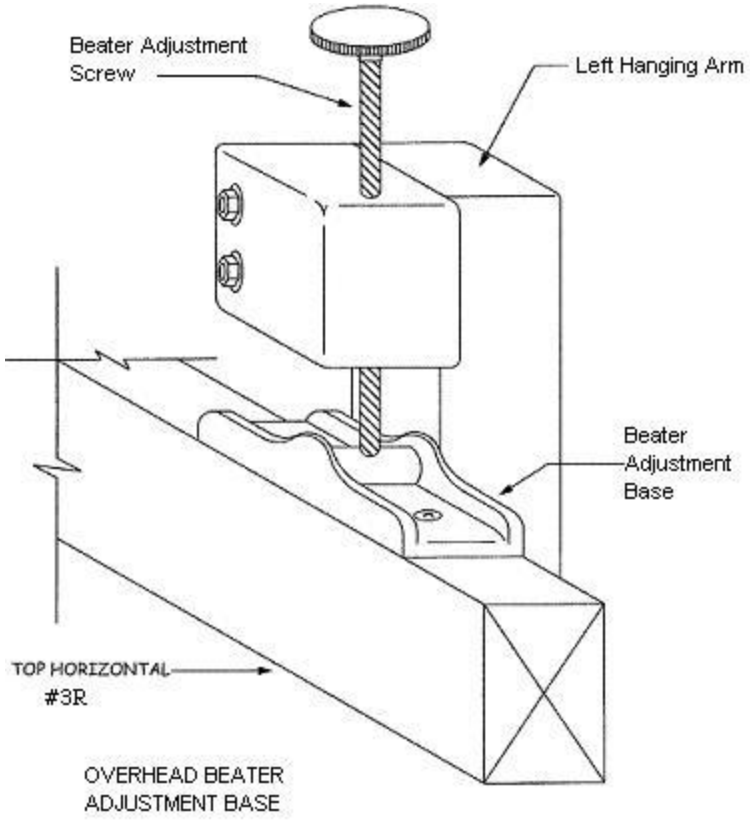


Figure 18 - Overhead Beater Adjustment Base

3) Locate the Upper Pulley Assembly – (see Figures 36 and 39) Locate the Upper Pulley Assembly. It is packaged with the wooden handle and cord. Find the two pre-drilled holes at the center bottom side of the Front Crossmember Support (#10). Position the Pulley Assembly (as shown in Figure 39), with the shield plate facing out, to the front of the loom, and the Pulleys only visible from the rear. Using the two 10 x 1" pan head screws, secure the assembly to the loom.

4) Assembling the Beater Frame – (see Figures 25 and 26) Locate the Left and Right Uprights. Position the Uprights on the floor spaced apart by a distance that is approximately equal to the width of your loom. The ends with the metal Pivot Brackets will be at the top of this assembly, and the metal rods will be pointing inward, toward each other. There is a metal pulley attached to the back of each upright. This pulley should now be touching the floor.

Locate the Shuttle Race and observe that there is a groove cut in one side of the Shuttle Race which must be oriented to the top and back of the Race which means that it should be facing the floor. Position the Race on top of the two Uprights so that it covers the two holes in the face of each Upright (as shown in Figure 24). You will see that there are two holes near each end of the shuttle race that correspond with the two holes on either upright. For now, only the innermost hole on each side will be used. The outer holes take a different bolt and will be used later. Secure the Shuttle Race to the Uprights with two 5/16" x 3-1/4" carriage bolts (one on each side), inserting them from front to back. Attach the washers and hex nuts to these carriage bolts, but do not tighten them just yet, as you will be making some adjustments later in this Beater installation.

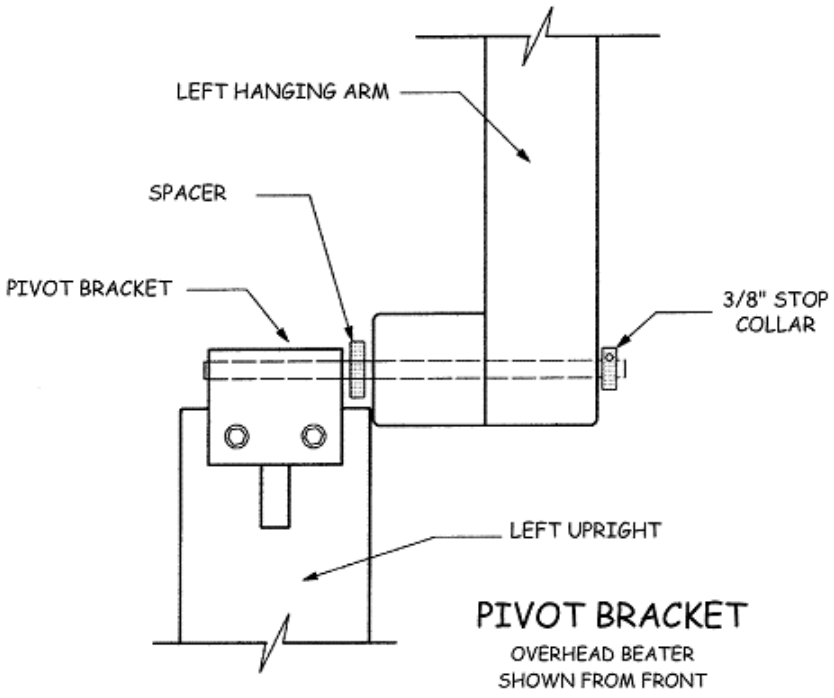


Figure 20 - Overhead Beater Pivot Bracket

5) Move the Beater into Place - Place the beater in the loom. For now, it will just sit in the loom resting on top of the cloth beam supports just in front of the harnesses. The assembly may tend to fall forward or backward, but as the assembly progresses considerable weight will be added and this proximity will facilitate lifting it all into place.

6) Attach the Hanging Arms to the Uprights and Hang the Beater Assembly – (see Figures 25 and 18) The next step is to mount the Hanging Arms to the Uprights on the Shuttle Race Assembly. Using an 1/8" Allen wrench, remove the 3/8" stop collars from the metal shafts of the Pivot Bracket at the top of each Upright. Notice that there is a block of wood at the other end of the Hanging Arm, through which the Beater Adjustment Screw is installed and there is a screweye that has been mounted near the middle of each hanging arm. The block of wood will point out of the loom and the screw eyes will face the front of the loom. Keep the small Spacer in place on the metal shaft and install the Hanging Arms onto these shafts, making sure that the right and left Arms are in their proper positions. Replace and tighten the Stop Collars, making sure to leave enough clearance for this Pivot point to swing freely.

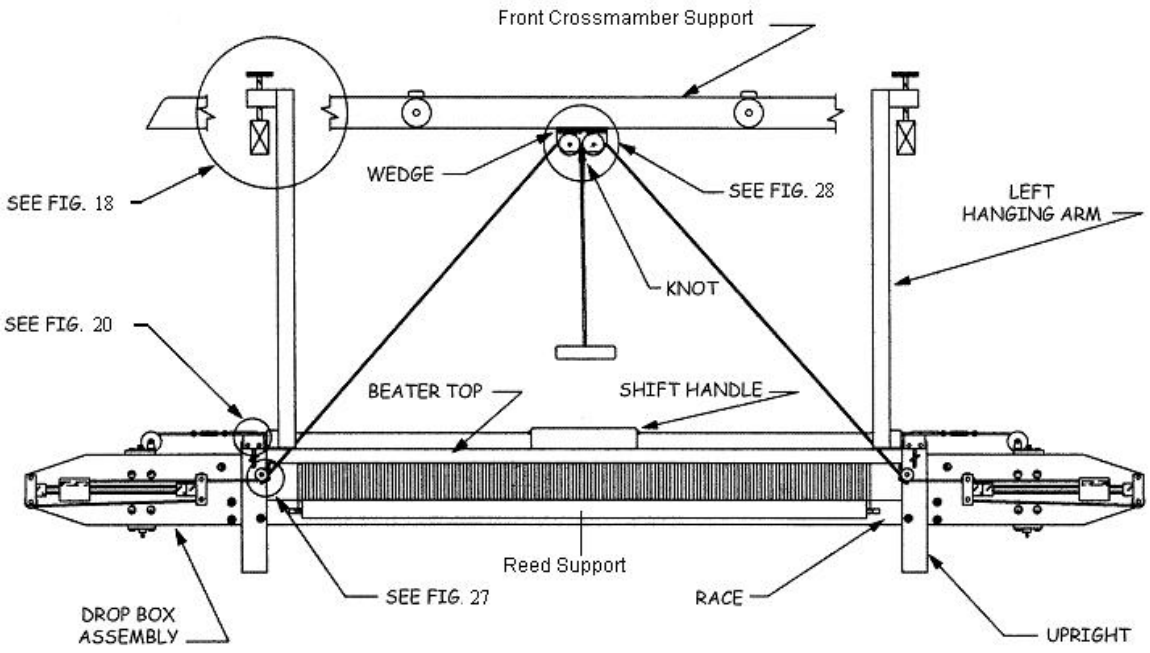


Figure 25 - Overhead Double Box Flyshuttle Beater Assembly - Rear View

Lift the Beater Assembly into place (as shown in Figure 36), placing the foot at the bottom end of the Beater Adjustment Screws into the notches in the center of the Beater Pivot Base at either side, attached to the loom in Step 2) of this assembly.

7) **Install the Axle Mounting Block** - (see Figures 24 and 26) Locate the two Axle Mounting Blocks in your package and find the two pre-drilled holes in both Rear Side Supports (9R and 9L). Position the blocks at the holes so that the 1" hole is facing through the loom and the bolt holes are lined up. If the 1" hole is offset from the center of the block, position the hole in the lower orientation. Insert two 1/4" x 5" carriage bolts, from the front side of 9R and 9L, through each block. Secure the bolt with washer and nut and fasten tight.

8) **Install the Beater Axle** – (see Figures 24 and 26) Locate the Beater Axle (a long, black pipe with holes at each end). There is no particular right or left orientation for this axle as it is the same on both ends. Insert each end of the axle through a hole in the Axle Mounting Blocks, located at the rear of 9R and 9L (see Figure 26). The axle now goes all of the way through the loom, from side to side. Now you can center the axle in the loom and place an axle spacer (a round, wooden piece) on each exposed end of the axle.

9) **Installing the Tilting Arm Assemblies** – (see Figures 24 and 26) The Tilting Arm Assemblies are comprised of a Tilt Arm and a Push Arm, joined together at an elbow. These assemblies are stamped "L" and "R" and are to be mounted on the outside of the loom, at each end of the Beater Axle. It is important to mount each assembly correctly (as shown in Figures 24 and 26), with the Push Arms to the outside and the Tilting Arms to the inside, next to the Axle Mounting Blocks. The Tilting Arms are attached to the ends of the axle with 5/16" x 2-3/4" hex bolts with washers and hex nuts provided. These are the Racking Adjustment Bolts. Do not tighten these bolts yet. They will be part of a critical adjustment coming up shortly. You will see a Spring/Cord/Eyebolt assembly hanging from each Tilting Arm. Just let them hang for now. They will be attached later.

10) **Connecting the Push Arms to the Uprights** – (see Figures 24 and 27) Mount each Push Arm to the back face of each Upright (see Figure 27) using two 5/16" x 4-1/2" hex bolts, washers, and square nuts. These bolts go through the Shuttle Race and Uprights and end with a square nut in the nut access hole of each Push Arm. As before, do not yet tighten these bolts.

11) Racking the Beater (see Figure 26) – Before tightening all of the bolts installed thus far, during your beater assembly, you want to ensure that the beater is centered in the loom and square in its position to the fell line. We know that, after completion of the frame, the loom is level and square. Now check that the two Beater Adjustment Screws are extended equally and that the Beater Top is level.

Obviously, at this time, you have no fell line, so the next best way to check square is to align the beater by pushing the beater against the front **or** the rear bumpers. Once the beater is touching both the left and the right bumpers at the same time, tighten the three bolts in the Right and Left Uprights.

The last bolts to tighten are the Racking Adjustment Bolts that you installed in Step 9), connecting the Tilting Arms to the axle. These bolts should be tightened while the entire beater is being held firmly against the Front Beater Bumpers (as shown in Figure 26). Push on the upper end of each Tilting Arm and, while the beater is in contact with the bumpers at either side, securely tighten the "Racking Adjustment Bolts". If you do not have a second pair of hands to help at this time, you can tie the Beater Race to the Cloth Beam with cord, at each side.

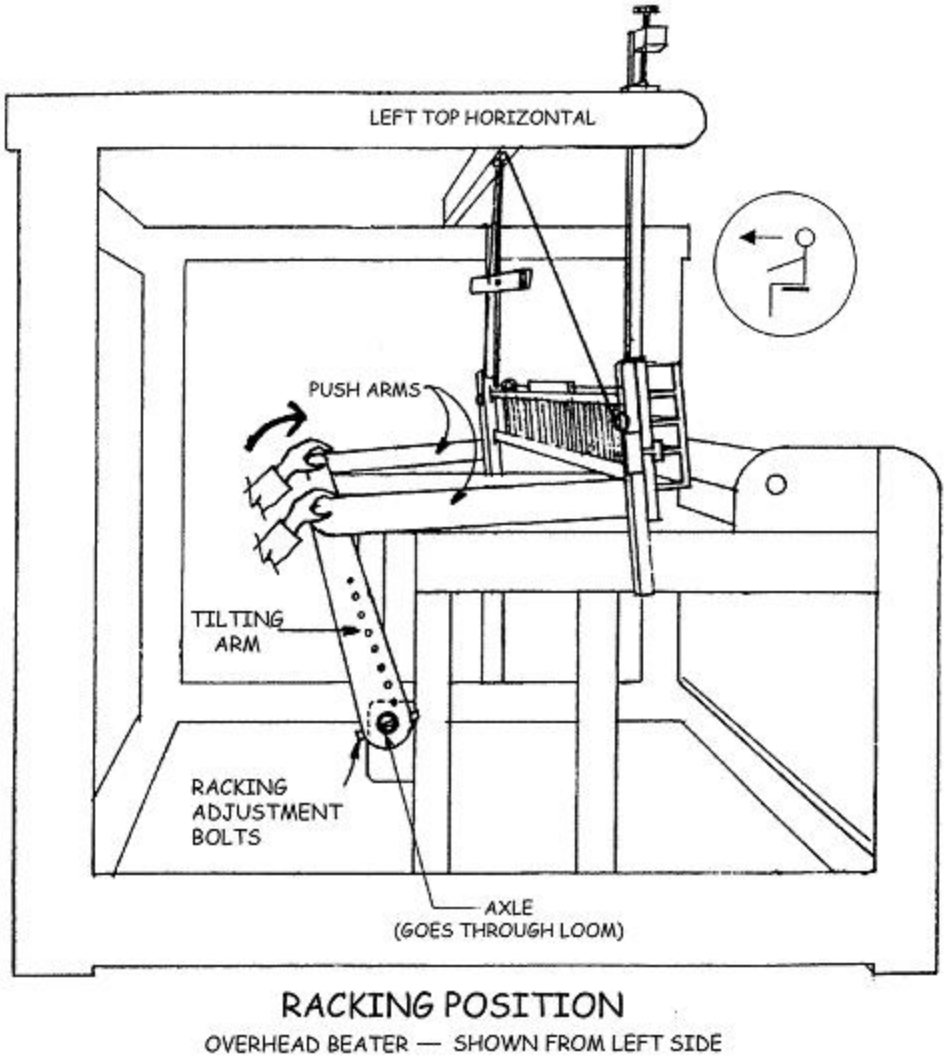


Figure 26 - Racking the Overhead Beater

Note: If the beater should come "out of square" in the future, if it should hit one bumper before the other, you will need to repeat Step 11) in its entirety, loosening the bolts before you start and tightening them securely after.

12) Installing the Drop Box Assemblies - (see Figures 25 and 27.) Locate your Left Drop Box Assembly (they are marked "L" and "R"). You will notice that there are two holes through the Back Plate in the lower right corner and one in the upper right corner with an intersecting hole coming from the right edge. Looking at the Left Upright, you will find a horizontal hole through the width of the Upright just below the slot for the Beater Top. This hole should be offset to the front of the Shuttle Race side of the Upright.

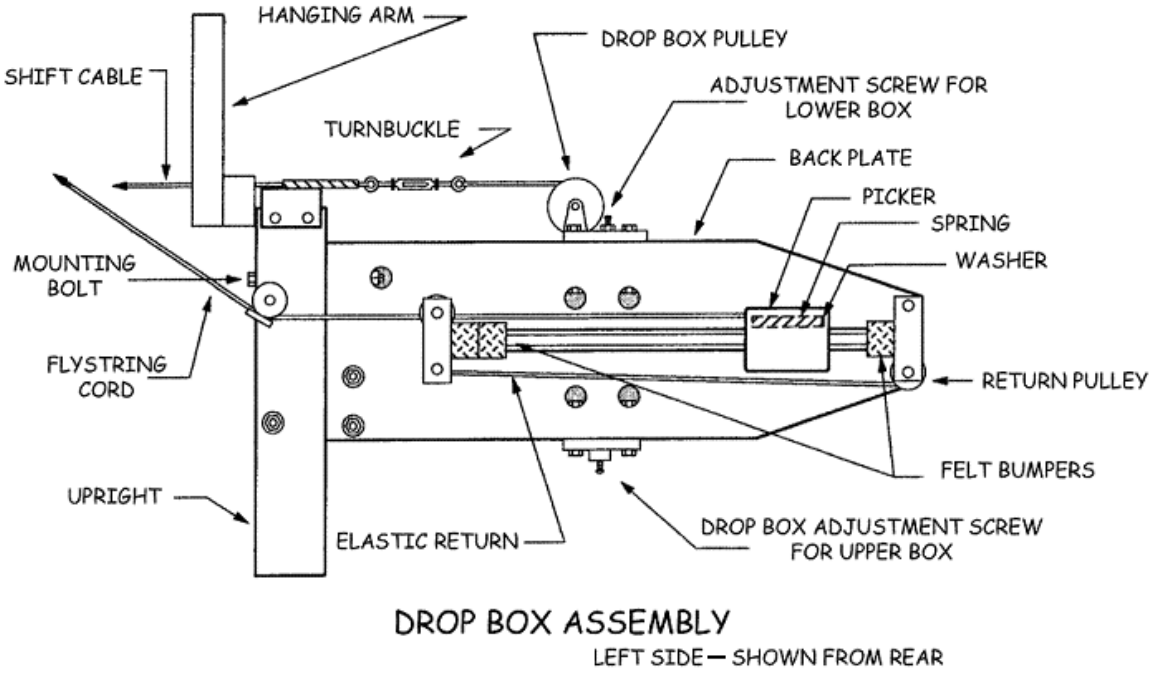


Figure 27 - Drop Box Assembly - Left Side, Rear View

Position the Left Drop Box so that this hole aligns with the hole in the upper right corner of the Left Drop Box. The moveable boxes will facing the front. Take a 5/16" x 4-1/2" hex bolt with a washer on it, insert it through the hole in the Upright from the inside through the hole in the edge of the upper right corner of the Left Drop Box Assembly and thread it onto a square nut inserted in the nut access hole in the back plate. Do not tighten this yet. Your Drop Box Assembly should now be attached to the Upright with this one bolt.

Attach the drop box assembly to the shuttle race with two 5/16" x 2-3/4" carriage bolts inserted from the front, with washers and hex nuts behind the back plate. Now tighten all bolts holding the Left Drop Box Assembly to the beater.

IMPORTANT: The face of the back plate must be precisely flush with the face of the upright. Check this alignment by laying a straight edge across the two surfaces.

13) **Right Drop Box Assembly** - Repeat this procedure for the right drop box assembly.

14) **Installing the Vertical Pull Flystring Tie-Up –** (see Figures 25, 27, and 28) Locate the bag marked "multi-box tie-up" and remove its contents. This Tie-Up consists of a long dacron cord, two springs, two small washers, and a handle.

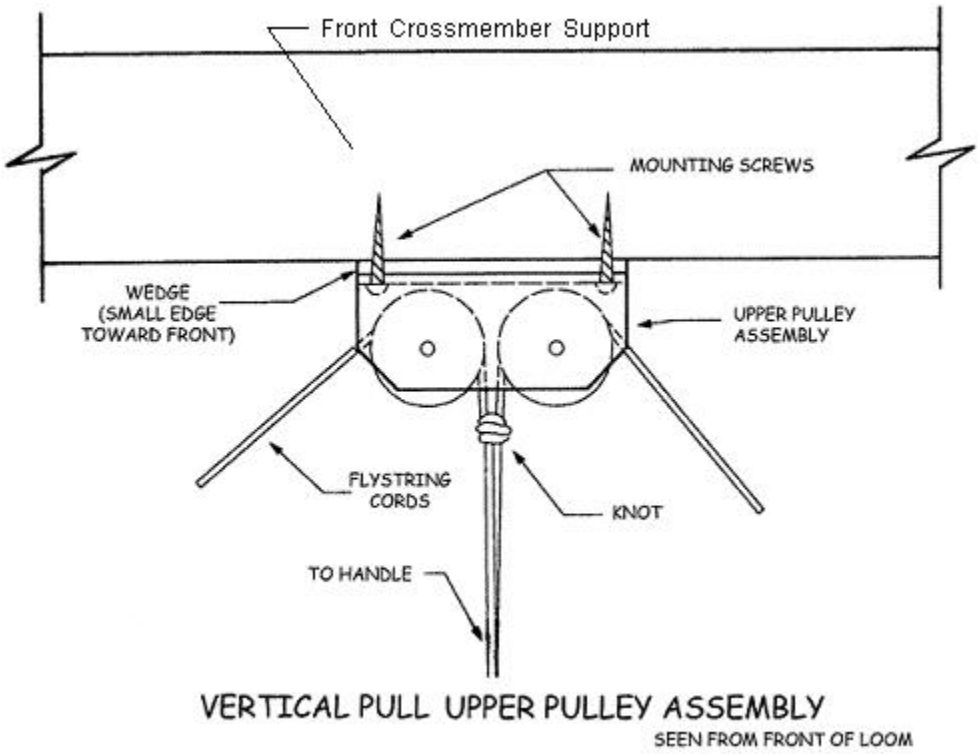


Figure 28 - Upper Pulley Assembly - Vertical Pull

Locate the center of the Flystring Tie-Up Cord, folding it in half. Take the center, looped end of the cord and thread it through the hole in the handle. Bring it back through the same hole, on the other side of the little pin that splits the hole. Draw the free ends of the cord through the loop, fixing the handle in the center of the cord. Pull the loose ends firmly, tightening the cord around the pin.

Feed both ends of the cord over either pulley in the Upper Assembly (as shown in Figure 28). Draw one end of the cord over to the corresponding Picker Assembly, being sure to run the cord under the Small Pulley, mounted on the Upright. The cord must be fed between the pulley and the little retainer that is attached to the pulley. The cord will then go straight across and under a second pulley located at the top of the Inner Picker Rod Support.

Slip the tip of the cord through the little 1/8" hole in the picker and out the other side, where the 3/8" hole allows for easy access to the cord. Now, thread one spring and one washer onto the cord and tie an overhand knot at the end of the cord. Do not over-tighten this knot, because you may want to shorten the cord once installation is completed and you have had a chance to try throwing the shuttle a few times.

Repeat this procedure for the cord on the opposite side.

The two new knots will determine the operating height of your Flystring Handle, so make sure that you are satisfied with the handle's position before tightening these knots. Do not trim the cords until you are certain that you are happy with the working height of your handle.

15) Adjusting the Flystring Assembly – (see Figure 28) Now try throwing the Shuttle to see if the action is comfortable.

If you tie the knots very near to the end of the cord, the handle will be at its lowest possible position (if it went much lower, the flystring handle could collide with the shift handle or beater top when you reached the bottom of your pull). We suggest that you try this position first as a lower handle position will generally be less fatiguing. If the handle is too low, tie knots a little further in from the cord ends, in equal increments, until the handle is about 1" below its ideal height.

Now you are going to tie an overhand knot in the cords between the Upper Pulley Assembly and the handle (see Figure 28). To do this, make a small mark on the cord just below where it comes down from between the two pulleys. Pull it straight down a few inches to where you can tie a simple overhand knot, with the handle already in place. Once the knot is tied, release the Cord and let it return to its resting position. If the knot was placed correctly, the pickers should still return to the end of the Picker Rod at each end of the boxes and the cord should stop before the knot stops the cord from moving any farther up into the pulleys. If there is more than an inch or so of cord left, you may want to adjust the cords further, before snipping off any excess cord.

16) Attaching the Beater Return Spring Assembly – (see Figure 24) This assembly is the previously mentioned Spring/Cord/Eyebolt assembly that hangs from each Tilting Arm. To attach this assembly, simply remove one hex nut and washer from each eyebolt and place the eyebolt, from the **outside**, through the hole provided on each bottom horizontal of the side frame assembly, directly below the Tilting/Push Arm Hinge. Replace the washer and hex nut and tighten securely.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in the back position for long periods of time, as that is the purpose of the Beater Retainer.

The Beater Return Spring Assembly is adjustable. It is tightened by pulling on the ends of the white cord and loosened by pushing the button on the Mini Cord Lock, while moving the lock up and down on the cord. Whenever an adjustment is made on one side of the beater, a similar adjustment must be made on the other side as well. The amount of tension at which you set these springs is strictly a matter of preference. Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

17) Installing the Reed Support – (see Figure 25) The Reed Support is the long, thin, wooden part with seven holes and a slot similar to the one in the Shuttle Race. Position the support to the back of the Shuttle Race with the slot at the top and facing the race. Insert the seven 5/16" x 3" carriage bolts provided, from the front, with washers and wing nuts behind. Do not tighten the wing nuts yet.

18) Installing the Reed and Attaching the Beater Top – (see Figure 25) Set the bottom edge of your reed in the space created between the slotted edges of the Reed Support and the race, centering the reed between the two Uprights. Slip the slot in the underneath side of the Beater Top onto the top of the reed. Align the holes at both ends of the Beater Top with the slots in the Uprights. Insert the two 1/4" x 2-1/4" carriage bolts from front to back and mount the washer and wing nut on each bolt. Now, pushing down firmly on the Beater Top with one hand, tighten the wing nuts to hold the Beater Top securely to the Uprights.

19) Testing the Picker System – Now that the reed is installed, your new Picker System should be ready to use. Try pulling on the handle a few times to see if everything is functioning properly. If all seems well, then put in a shuttle and see how it works.

20) Adjusting the Movement of the Drop Boxes – (see Figure 29) You will notice that the boxes slide up and down on a metal rod which is fixed at both ends to cast metal pieces. In each of these cast metal pieces, you will find a Brass Adjustment Screw with a lock nut. These Brass Screws provide a stop for the boxes at their upper and lower extremes of movement. Adjust the Top Screw so that when the boxes are all the way up, the Lower Box is in precise alignment with the Shuttle Race. Adjust the Bottom Screw so that when the boxes are all the way down, the Upper Box is in precise alignment with the Shuttle Race. **This adjustment is critical**. Please make it carefully.

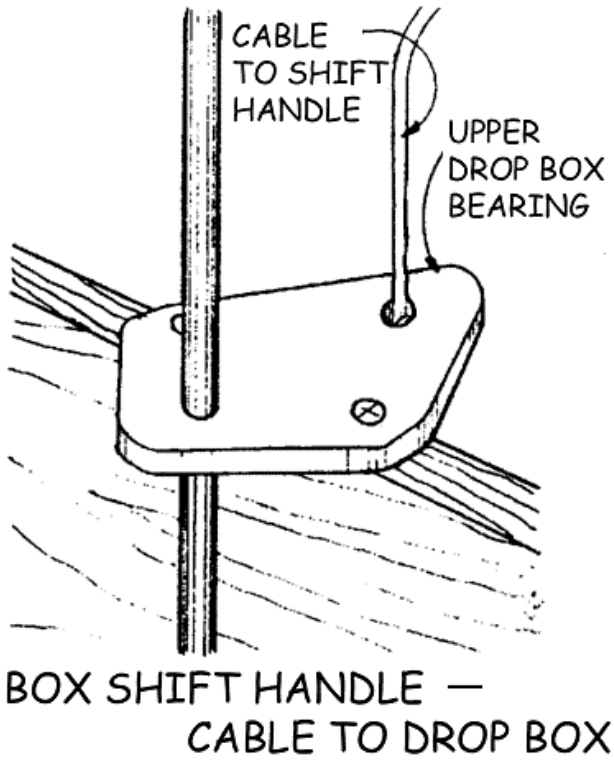


Figure 29 - Shift-Handle-to-Drop-Box Cable Attachment

It is wise to lay a straight edge across the Shuttle Race and Drop Box when doing this to assist you in getting the two perfectly aligned. When you have it properly adjusted, secure the lock nuts on the Brass Screws. Do these adjustments on both the Left and Right Drop Boxes. If your shuttle flight is erratic, re-check these adjustments. To make sure that the Adjustment Screws stay in place, you might want to purchase a small tube of a thread locking agent (such as Loc-tite) and apply a drop or two to each of these screws where the screws go into the cast metal brackets.

21) Connect the Drop Boxes to the Shift Handle – (see Figures 27 and 30) At the top of each Drop Box Assembly there is a cable extending from the Drop Box Pulley, with an eyebolt on the end. This cable is routed over the top of the Drop Box Pulley, towards the center of the loom and the eyebolt threads into the turnbuckle on the end of the cable coming from the Shift Handle. Once you have both sides attached, they are adjusted as follows:

With the Shift Handle moved to its rightmost position, adjust the Left Drop Box Turnbuckle so that the box is against its Top Stop and the Spring at the Turnbuckle is **slightly** extended. Move the Shift Handle to the left and adjust the Right Turnbuckle in the same manner.

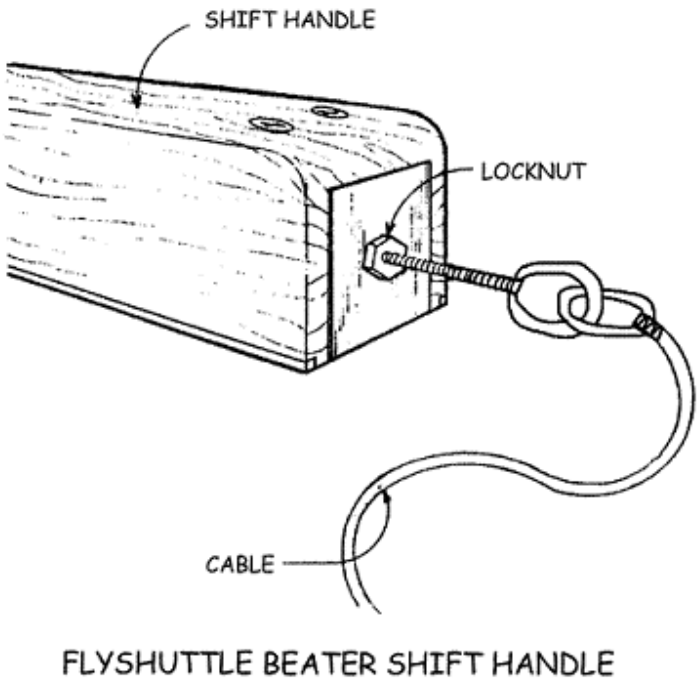


Figure 30 - Flyshuttle Beater Shift Handle

ATTENTION! When shifting, the leading end of the handle must be raised first. If the trailing end of the handle is lifted first, the handle will lock up and not shift. Also, you want to make sure that the turnbuckles are not adjusted so tightly as to not allow the boxes to drop to their full down position. Once properly adjusted, tighten the lock nut of each turnbuckle to keep them from moving.

This completes the installation of your Overhead Double-Box Flyshuttle Assembly. Please Proceed to Chapter 12 for the Assembly of your Bench.

NOTE: Since the beater system uses a lot of carriage bolts, the following information may be helpful. There is a square shape below the head of each carriage bolt. This square portion does not fit easily into the pre-drilled holes. You will find it necessary to tap these bolts into place to properly seat the bolts. This will cause the bolt to "bite" into the wood and stay in place while you tighten the nut.

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly. Please refer to all of the illustrations for help with terminology and locations.

1A) Beater Bumpers (#40) - (see Figures 1 and 14) Locate the beater bumpers (#40). The left is stamped "L" and the right one is stamped "R". They are each mounted to the outside of the respective cloth beam supports (8R and 8L) with 5/16" x 3" carriage bolts, washers, and hex nuts. Orient these beater bumpers so that the bumper faces the front of the loom and the stamp faces the cloth beam support to which it will be mounted. It is best to situate the carriage bolts so that the washers and nuts are to the outside of the loom leaving the smooth head of the carriage bolt on the inside of the loom frame.

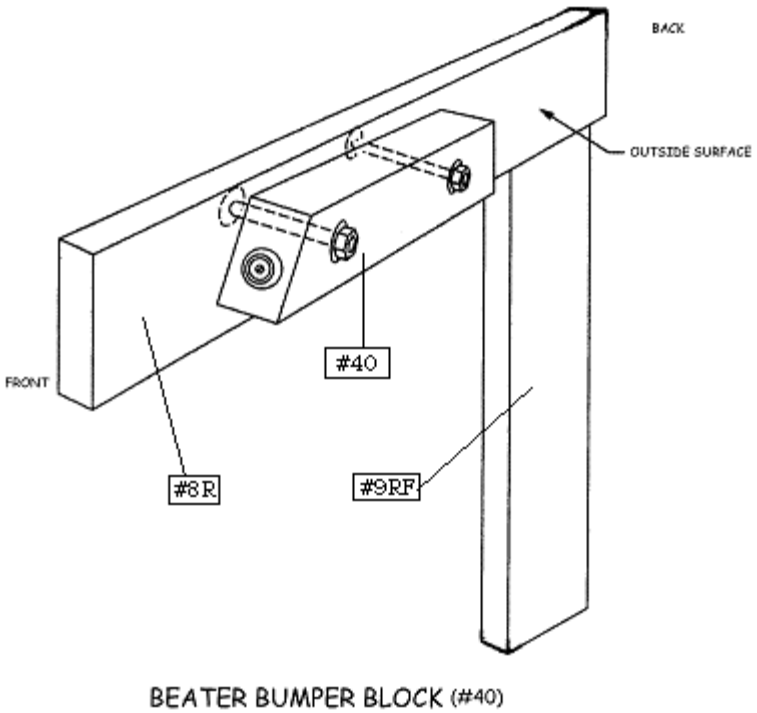


Figure 14 - Beater Bumper Block Installed

1B) **Mount the Beater Retainer** - (see Figure 24) Locate the pre-drilled hole on the inside face of the Left Cloth Beam Support. Position the Beater Retainer at the hole and insert the #12 x 1-1/2" flat head wood screw through the Beater Retainer and into the pre-drilled hole. Leave the screw just loose enough so that the retainer is allowed to pivot around the screw.

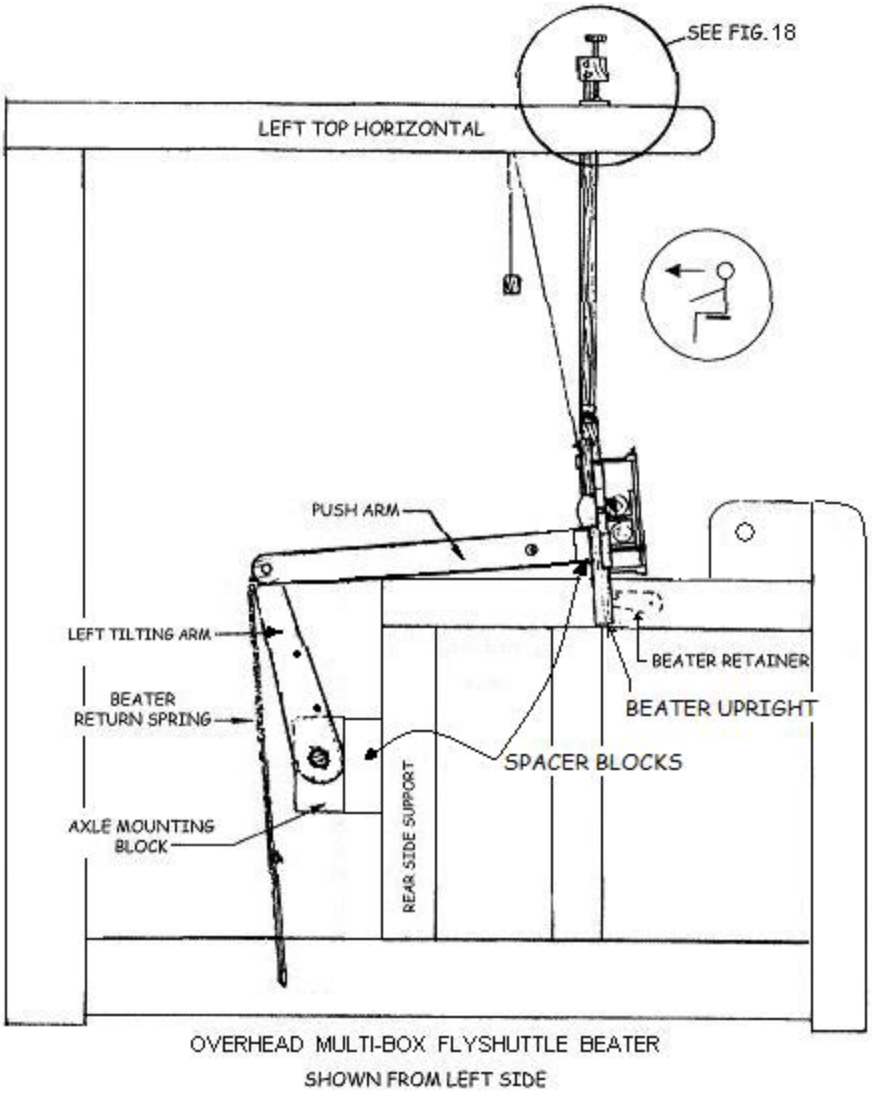


Figure 24 - Overhead Flyshuttle Beater

2) **Mount the Beater Adjustment Bases** - (see Figures 18 and 32) Locate two pre-drilled holes on the upper edge of each Top Horizontal (3R and 3L) on the assembled Side Frames of your loom. Attach these metal plates, flat face to the wood, using the four #8 x 3/4" pan head wood screws. Tighten the four screws securely.

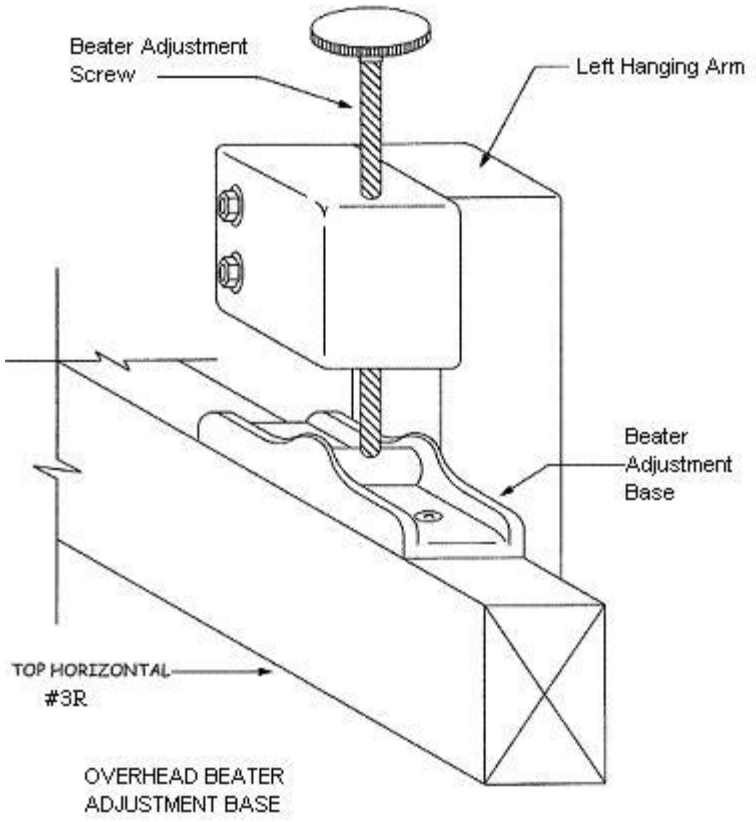


Figure 18 - Overhead Beater Adjustment Base

3) **Locate the Upper Pulley Assembly** - (see Figures 28 and 32) Locate the Upper Pulley Assembly. It is packaged with the wooden handle and cord. Find the two pre-drilled holes at the center bottom side of the Front Harness Pulley Support (#10). Position the Pulley Assembly (as shown in Figure 39), with the Shield Plate facing out, to the front of the loom, and the pulleys only visible from the rear. Using the two 10 x 1" pan head screws, secure the assembly to the loom.

4) **Assembling the Beater Frame** - (see Figure 32) Locate the Left and Right Uprights. Position the uprights on the floor spaced apart by a distance that is approximately equal to the width of your loom. The ends with the metal Pivot Brackets will be at the top of this assembly, and the metal rods will be pointing inward, toward each other. There is a metal pulley attached to the back of each upright. This pulley should now be touching the floor.

Locate the Shuttle Race and observe that there is a groove cut in one side of the Shuttle Race which must be oriented to the top and back of the race which means that it should be facing the floor. Position the race on top of the two uprights so that it covers the two holes in the face of each upright (as shown in Figure 32).

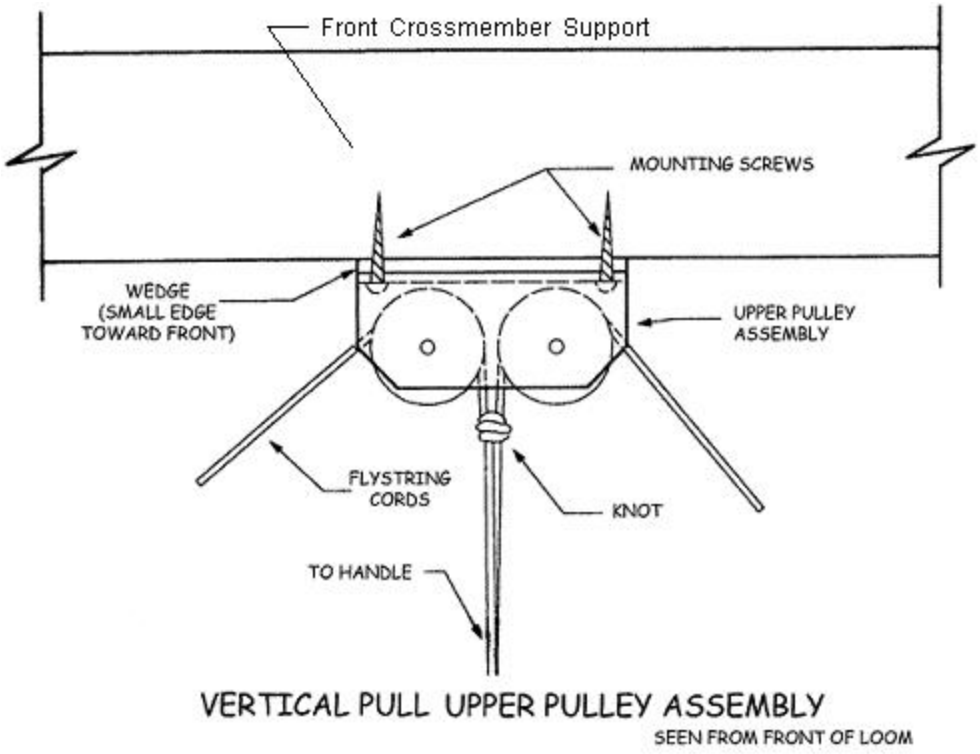


Figure 28 - Upper Pulley Assembly

You will see that there are two holes near each end of the shuttle race that correspond with the two holes on either upright. For now, only the innermost hole on each side will be used. The outer holes take a different bolt and will be used later. Secure the Shuttle Race to the Uprights with two 5/16" x 3-1/4" carriage bolts (one on each side), inserting them from front to back. Attach the washers and hex nuts to these carriage bolts, but do not tighten them just yet, as you will be making some adjustments later in this Beater installation.

5) **Move the Beater into Place** - Place the beater in the loom. For now it will just sit in the loom resting on top of the cloth beam supports just in front of the harnesses. The assembly may tend to fall forward or backward, but as the assembly progresses considerable weight will be added and this proximity will facilitate lifting it all into place.

6) **Attach the Hanging Arms to the Uprights and Hang the Beater Assembly** - (see Figure 32) The next step is to mount the Hanging Arms to the uprights on the Shuttle Race Assembly. Using an 1/8" allen wrench, remove the 3/8" stop collars from the metal shafts of the Pivot Bracket at the top of each upright. Notice that there is a block of wood at the other end of the Hanging Arm, through which the Beater Adjustment Screw is installed and there is a screweye that has been mounted near the middle of each hanging arm. The block of wood will point out of the loom and the screweyes will face the front of the loom. Keep the small spacer in place on the metal shaft and install the Hanging Arms onto these shafts, making sure that the right and left arms are in their proper positions. Replace and tighten the Stop Collars, making sure to leave enough clearance for this pivot point to swing freely.

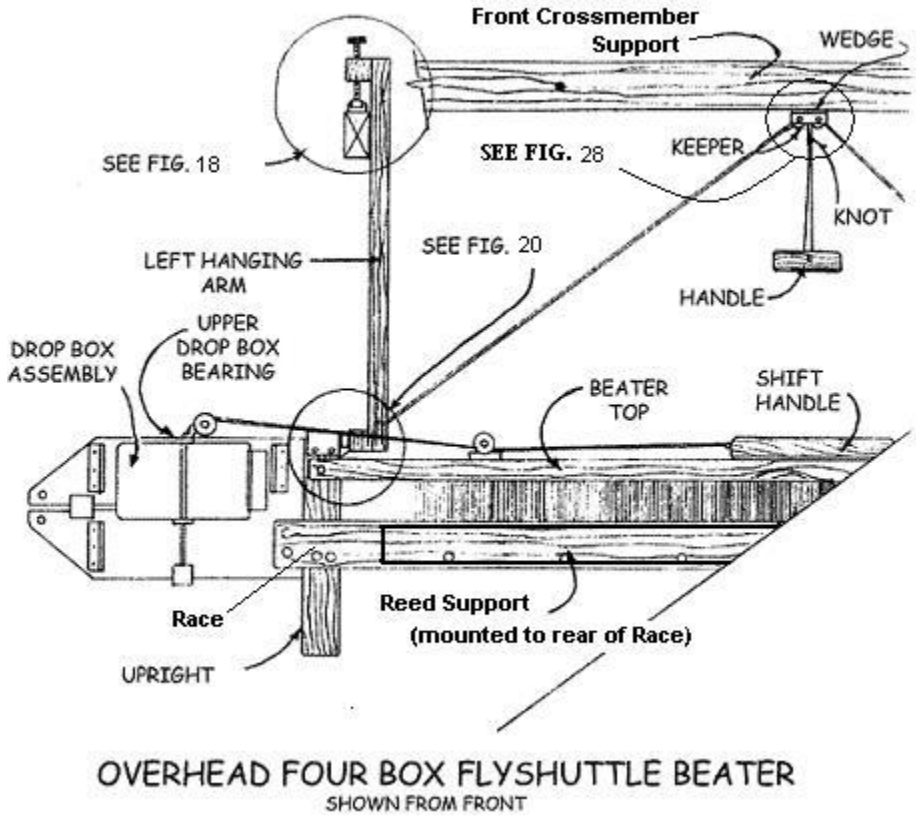


Figure 32 - Overhead Flyshuttle Beater Assembly

(6) continued) Lift the Beater Assembly into place (as shown in Figure 32), placing the foot at the bottom end of the Beater Adjustment Screws into the notches in the center of the Beater Pivot Base at either side, attached to the loom in Step 2 of this assembly.

7) Install the Axle Mounting Block and Spacer - (see Figures 24 and 26) Locate the two Axle Mounting Blocks/Spacers in your pack and find the two pre-drilled holes in both Rear Side Supports (9R and 9L). Position the blocks at the holes so that the 1" hole is facing into the loom and the bolt holes are lined up. Insert two 5/16" x 7-1/2" hex bolts, from the front side of 9R and 9L, through each Support, Spacer, and Block (in that order). Secure the bolt with washer and nut and fasten tight.

8) Install the Beater Axle - (see Figures 24 and 26) Locate the Beater Axle (a long, black pipe with holes at each end). There is no particular right or left orientation for this axle as it is the same on both ends. Insert each end of the axle through a hole in the Axle Mounting Blocks, located at the rear of 9R and 9L (see Figure 24). The axle now goes all of the way through the loom, from side to side. Now you can center the axle in the loom and place an Axle Spacer (a round, wooden piece) on each exposed end of the axle.

9) Installing the Tilting Arm Assemblies - (see Figures 24 and 26) The Tilting Arm Assemblies are comprised of a Tilt Arm and a Push Arm with spacer, joined together at an elbow. These assemblies are stamped "L" and "R" and are to be mounted on the outside of the loom, at each end of the Beater Axle. It is important to mount each assembly correctly (as shown in Figures 37 and 41), with the Push Arms to the outside and the Tilting Arms to the inside, next to the Axle Mounting Blocks. The Tilting Arms are attached to the ends of the axle with 5/16" x 3" hex bolts with washers and hex nuts provided. These are the Racking Adjustment Bolts. Do not tighten these bolts yet. They will be part of a critical adjustment coming up shortly. You will see a Spring/Cord/Eyebolt assembly hanging from each Tilting Arm. Just let them hang for now. They will be attached later.

10) Connecting the Push Arms to the Uprights - (see Figures 24 and 26) Mount each Push Arm to the back face of each upright using two 5/16" x 7-1/2" hex bolts, washers, and square nuts. These bolts go through the Shuttle Race and uprights and the spacers, ending with a square nut in the nut access hole of each Push Arm. As before, do not yet tighten these bolts.

11) Attaching the Beater Return Spring Assembly - (see Figure 24) This assembly is the previously mentioned Spring/Cord/Eyebolt assembly that hangs from each Tilting Arm. To attach this assembly, simply remove one hex nut and washer from each eyebolt and place the eyebolt, from the **outside**, through the hole provided on each bottom horizontal of the side frame assembly, directly below the Tilting/Push Arm Hinge. Replace the washer and hex nut and tighten securely.

This assembly is used to assist the weaver in returning the beater to the back position. It is not necessarily intended to hold the beater in the back position for long periods of time, as that is the purpose of the Beater Retainer.

The Beater Return Spring Assembly is adjustable. It is tightened by pulling on the ends of the white cord and loosened by pushing the button on the Mini Cord Lock, while moving the lock up and down on the cord. Whenever an adjustment is made on one side of the beater, a similar adjustment must be made on the other side as well. The amount of tension at which you set these springs is strictly a matter of preference. Generally speaking, the stronger the tension, the harder you will have to pull against these springs during the beat. At the same time, however, it will be easier to hold the beater away from you while opening a shed and throwing the shuttle. You may wish to experiment with these adjustments in order to come up with a setting that works best for you and any particular warp.

12) **Racking the Beater** - (see Figure 26) Before tightening all of the bolts installed thus far, during your beater assembly, you want to ensure that the beater is centered in the loom and square in its position to the fell line. We know that, after completion of the frame, the loom is level and square. Now check that the two Beater Adjustment Screws are extended equally and that the Beater Top is level.

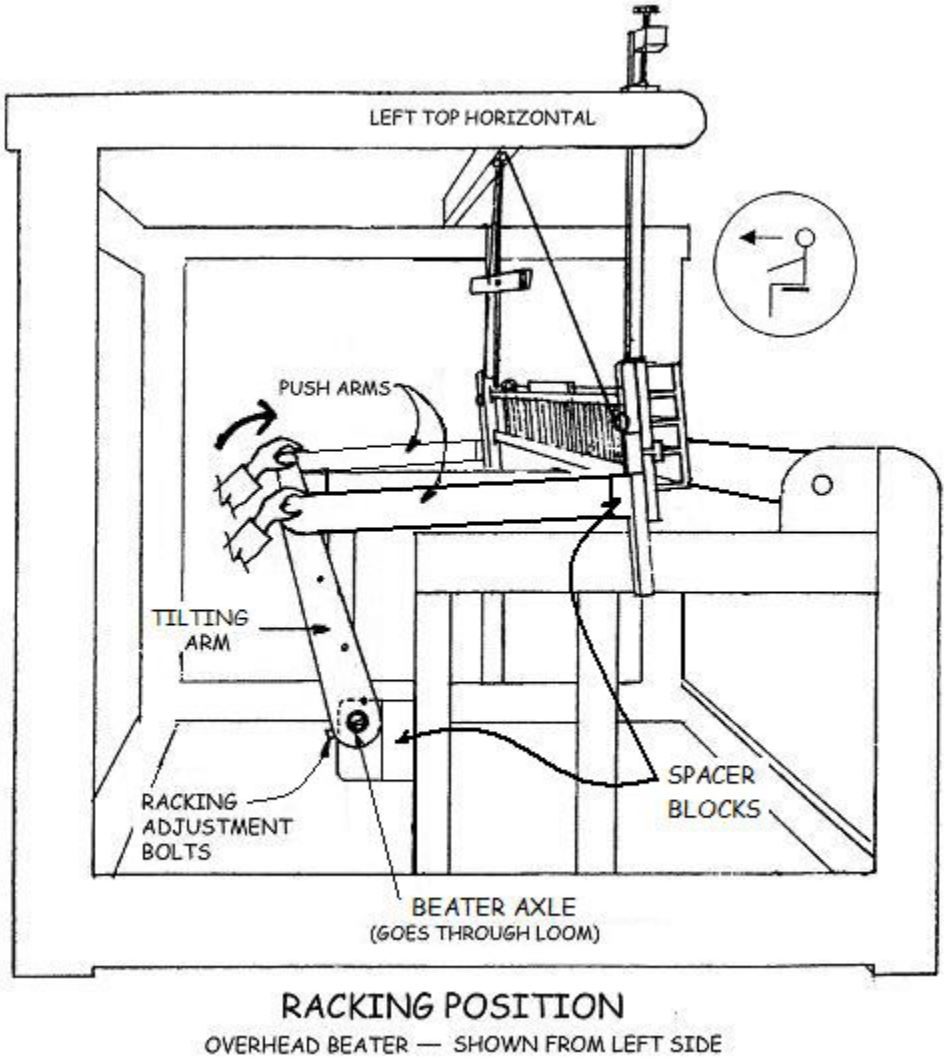


Figure 26 - Racking Position - Overhead Beater

(12 continued) - Obviously, at this time you have no fell line, so the next best way to check square is to align the beater by pushing the beater against the Front **or** the Rear Bumpers. Once the beater is touching both the left and the right bumpers at the same time, tighten the three bolts in the Right and Left Uprights.

The last bolts to tighten are the Racking Adjustment Bolts that you installed in Step 10), connecting the Tilting Arms to the axle. These bolts should be tightened while the entire beater is being held firmly against the Front Beater Bumpers (as shown in Figure 26). Push on the upper end of each Tilting Arm and, while the beater is in contact with the bumpers at either side, securely tighten the Racking Adjustment Bolts. If you do not have a second pair of hands to help at this time, you can tie the Beater Race to the Cloth Beam with cord, at each side.

NOTE: If the beater should come "out of square" in the future, if it should hit one bumper before the other, you will need to repeat Step 12, in its entirety, loosening the bolts before you start and tightening them securely after.

13) Installing the Drop Box Assemblies - (see Figures 27 and 32) Locate your Left Drop Box Assembly (they are marked "L" and "R"). You will notice that there are two holes through the Back Plate in the lower right corner and one in the upper right corner with an intersecting hole coming from the right edge. Looking at the Left Upright, you will find a horizontal hole through the width of the upright just below the slot for the Beater Top. This is offset to the front of the Shuttle Race side of the upright. Position the Left Drop Box so that this hole aligns with the hole in the upper right corner of the Left Drop Box. The moveable boxes will be facing the front. Take a 5/16" x 4-1/2" hex bolt with a washer on it, insert it through the hole in the upright from the inside through the hole in the edge of the upper right corner of the Left Drop Box Assembly and thread it onto a square nut inserted in the nut access hole in the back plate. Do not tighten this yet. Your Drop Box Assembly should now be attached to the upright with this one bolt.

Attach the drop box assembly to the shuttle race with two 5/16" x 2-3/4" carriage bolts inserted from the front, with washers and hex nuts behind the back plate. Now tighten all bolts holding the Left Drop Box Assembly to the beater.

IMPORTANT: The face of the back plate must be precisely flush with the face of the upright. Check this alignment by laying a straight edge across the two surfaces.

Repeat this procedure for the Right Drop Box assembly.

14) Installing the Vertical Pull Flystring Tie-Up - (see Figures 28 and 32) Locate the bag marked "multiple box flystring tie-up" and remove its contents.

Remove the Flystring Tie-Up from the bag. This Tie-Up consists of a long dacron cord with a spring attached to one end of it with a small knot.

Notice that there is a hole in each picker that is larger on the outside than it is on the inside. Now locate the Flystring Tie-Up Cord. Notice that there is a small spring and washer at the knotted end of this cord. Take the unknotted end of the cord and thread it through the hole at the outer end of one of the pickers. This hole is about 3/8" in diameter on the outer side and only about 1/8" diameter on the inside face. Once you have threaded the cord through this hole, pull all of the remaining Cord through the Picker until the Spring and Washer become seated inside of the larger (outer) hole.

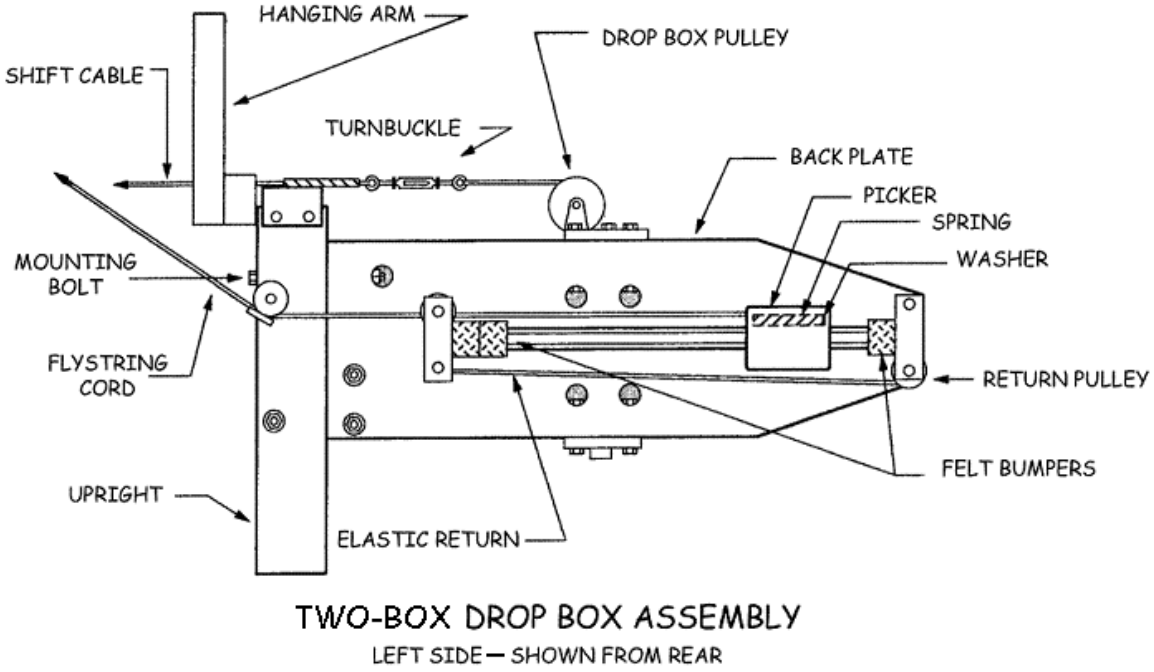


Figure 27 - Two-Box Drop Box Assembly (Rear View)

Now thread the cord under the pulley on the Inner Picker Rod Support, then thread it under the pulley that is on the back face of the Beater Upright. Next, route the cord upward and over the Upper Pulley Assembly that you previously mounted on the bottom edge of the Harness Pulley Support (see Step 3). Pull a large loop of cord down between these two Upper Pulleys and route the remaining cord through the pulleys and picker on the other side of the beater in a way the mirrors the side you just did.

After the cord has gone through the remaining picker, make sure to include the second small spring and washer on the cord before you tie the final knot. The positioning of this knot will determine the operating height of the Flystring Handle, so make sure that you are satisfied with the handle's position before tying the knot.

If you tie the knot very near to the end of the cord, the handle will be at its lowest possible position (if it went much lower, the Flystring Handle could collide with the shift handle or beater top when you reached the bottom of your pull). We suggest that you try this position first as a lower handle position will generally be less fatiguing.

Now go back to the Upper Pulley Assembly where the cord passed over both of the pulleys. You now want to route the cord down between the two pulleys, taking up all of the slack between the pickers and the Upper Pulley Assembly, forming a large loop at the center of the loom.

15) Installing the Fly Shuttle Handle - (see Figures 32 and 30) Locate the Flyshuttle Handle. It is a small, dark colored piece of wood with a hole and a brass pin through the center of it. In attaching the cord to the handle, you are going to create a Hitch Knot. Form a tight loop with the cord that is now hanging below the Upper Pulley Assembly. Make the center of the cord the tip of the loop. Feed the loop down through the hole in the handle, on either side of the brass pin that divides the hole. Now feed the loop back up through the hole on the **other** side of the brass pin, being careful to maintain the center of the loop, so that your cord is balanced on both sides of the loom. Now form a larger loop (6" or so) and flip the handle end over end, all the way around and through the loop. Now pull straight down on the handle, tightening the cord around the brass pin. This procedure should automatically center the handle on the tie-up.

Now you are going to tie an overhand knot in the cord between the Upper Pulleys (see Figure 28). To do this, make a small mark on the cord just below where it comes down from between the two pulleys. Pull it straight down a few inches to where you can tie a simple overhand knot, with the handle already in place. Once the knot is tied, release the cord and let it return to its resting position. If the knot was placed correctly, the pickers should still return to the end of the Picker Rod at each end of the boxes and the cord should stop before the knot stops the cord from moving any farther up into the pulleys. If there is more than an inch or so of cord left, beyond the knot, you may want to snip off the excess cord.

16) **Installing the Reed Support** - (see Figure 32) The Reed Support is the long, thin, wooden part with seven holes and a slot similar to the one in the Shuttle Race. Position the support to the back of the Shuttle Race with the slot at the top and facing the race. Insert the seven 5/16" x 3" carriage bolts provided, from the front, with washers and wing nuts behind. Do not tighten the wing nuts yet.

17) **Installing the Reed and Attaching the Beater Top** - (see Figure 32) Set the bottom edge of your reed in the space created between the slotted edges of the Reed Support and the race, centering the reed between the two uprights. Slip the slot in the underneath side of the Beater Top onto the top of the reed. Align the holes at both ends of the Beater Top with the slots in the uprights. Insert the two 1/4" x 2-1/4" carriage bolts from front to back and mount the washer and wing nut on each bolt. Now, pushing down firmly on the Beater Top with one hand, tighten the wing nuts to hold the Beater Top securely to the uprights.

18) **Testing the Picker System** – Now that the Reed is installed, your new Picker System should be ready to use. Try pulling on the Handle a few times to see if everything is functioning properly. If all seems well, then put in a shuttle and see how it works.

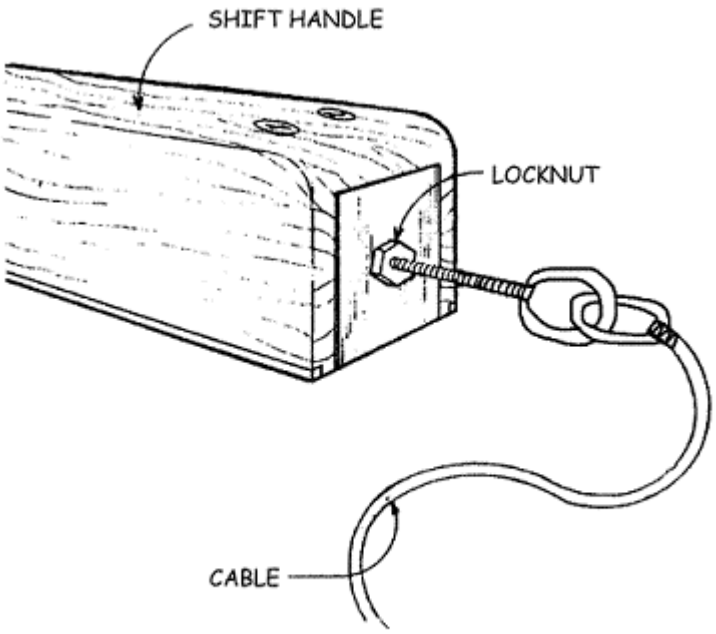


Figure 30 - Flyshuttle Beater Shift Handle

19) **Connect the Drop Boxes to the Shift Handle** - (see Figures 30, 32, 27, and 29) There is a long, dark, wooden handle located at the top and center of the beater top. This is the Shift Handle. By moving this handle laterally, you will be able to shift from one Shuttle Box to another, but first you will have to attach the handle to each set of Drop Boxes. First, un-wrap the cable that is attached to the Metal Bracket mounted on top of the Drop Box Assembly. Run each cable, from the bracket, over the adjacent pulley, over to and underneath the pulley on the Beater Top, and over to the handle. At the end of each cable, you will find a small eyebolt and nut. To attach the cable, you will need to move the lock nut up toward the eye-end of the bolt and insert the eyebolt into the hole at the end of the handle (see Figure 30). Repeat this procedure on the other side of the loom.

You may find it handy to use the following trick when attaching or adjusting the drop box cable:

To give yourself some slack in the cable, it may be helpful to raise the drop box on the side you are working on to its uppermost position. To hold it in this position, you can insert one of your shuttles halfway into the box that is now aligned with the shuttle race. This will hold the box in the upper position and both of your hands will be free to install the Cable.

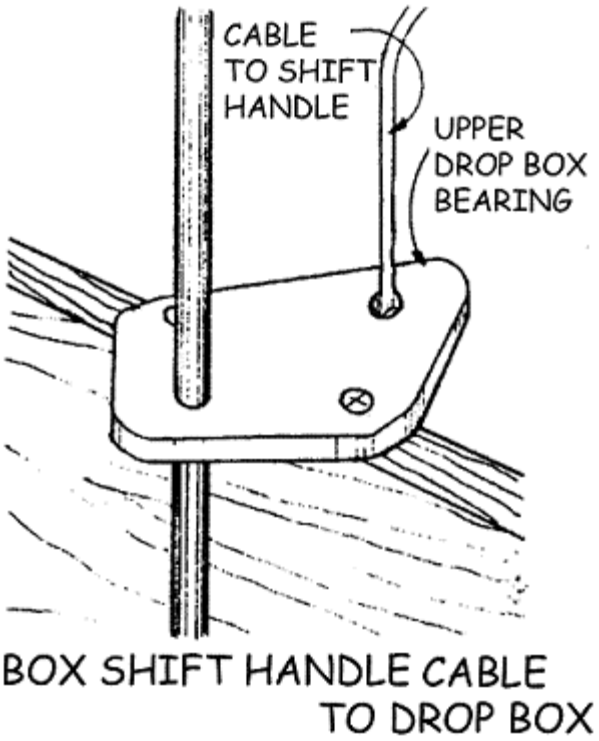


Figure 29 - Box-Shift-Handle-to-Drop-Box Cable Attachment

20) Adjustment of the Cable Lengths - (see Figures 30 and 27) When you slide the Shift Handle back and forth, notice that there are four detents (or places where the shift handle can be stopped). Each of these four detents corresponds to the Four Shuttle Boxes. The best way to adjust the two cables is to slide the Shift Handle to either the far left or far right detent position. This will put one Drop Box in the upper position and the other one in the lower position. Now, to insure that the Drop Box Shelf is at the same height as the top of the Shuttle Race, lay a straight edge or shuttle (as in Step 19) across the place where the Shuttle Race and Drop

Box meet. Loosen the lock nut and shorten or lengthen the cable by screwing this threaded end into or out of the plate at the end of the Shift Handle. When you have it properly adjusted, secure the lock nuts by running it up the bolt threads until it is flush with the plate. Repeat this for the other side.

Once you have adjusted both cables, it's a good idea (after removing the wedged shuttle) to put the Shift Handle in each detent position and check the boxes on each side for alignment. It is possible that there will be some very slight variation in the spacing of the Drop Box Shelves, so you may not get absolutely perfect alignment. If this is the case for you, go for an average adjustment.

ATTENTION! When shifting, the leading end of the handle must be raised first. If the trailing end of the handle is lifted first, the handle will lock up and not shift. Also, you want to make sure that the turnbuckles are not adjusted so tightly as to not allow the boxes to drop to their full down position. Once properly adjusted, tighten the lock nut of each turnbuckle to keep them from moving.

This completes the installation of the Four-Box Flyshuttle Beater Assembly. Please proceed to Chapter 12 for Assembly of your Bench.

The bench comes disassembled to facilitate shipping. The contents of the box should be:

- one bench top with two metal brackets attached
- two legs
- two feet, with toes installed at factory
- one lower cross piece
- one hardware package
- instructions (Please refer to Figure #33 for help with the assembly of your bench.)

Figure 33 - Bench (shown with Tool Bag - optional)

A) **Assemble the Feet and Legs** - Notice that one end of each leg has only two holes. The other end has several vertically aligned holes. Attach the end of the legs with two holes to the horizontal feet, using the 3" bolts.

NOTE: The legs are mounted toward the short end of the feet. The long end of the feet are intended to face into the loom.

B) **Mount the Crosspiece** - Bolt the crosspiece to the legs using the 3-1/4" bolts (the square nuts should go into the nut access holes of the crosspiece and the bolts should be tightened securely once you've made sure the assembly is fairly square).

NOTE: It doesn't matter which way it faces, but most folks mount it so the access holes face into the loom (in the direction of the long part of the feet).

C) **Mount the Seat to the Legs** - Please find the two holes on one long edge of the bench top. Position the top so that these holes face the rear of the bench assembly, that is, away from the loom. (These holes are used to mount the AVL Bench Bag. This bag, which can be ordered separately from AVL, gives you a handy place to store shuttles, bobbins, and other weaving accessories.) Also, before securing the top to the legs, please notice that there are several vertically aligned holes near the top of each leg. Choose which holes are best for your particular height.

When the top is lined up appropriately for your height and the mounting of the Bench Bag, attach the Bench Top Brackets to the legs with the 2-1/4" bolts. Do not tighten the bolts yet because the angle of the bench top is also adjustable. Now, tilt the seat to the angle that you prefer and finish tightening the two nuts and bolts that attach the brackets to each leg.

Now your bench is fully assembled and ready to use. If you are using the bench along with an AVL loom, you will notice that the feet of the bench are designed to interlock with the lower front cross member of your loom. When used in this way, it will add stability to the loom by adding the weight of the bench and the weaver to that of the loom.

Your new E-Lift II takes the work out of lifting your harnesses and is designed to provide years of dependable service. The E-Lift is composed of four basic parts:

1) The Power Box – this contains the electrical source and driver for the motor, and the On/Off switch for the system (as well as the electronics which control the Modules).

2) The Motor – Mounted on the left side of the loom, the Motor drives the Sprocket, Chain, and Axle Assembly and is powerful enough to drive twenty-four modules.

3) The Sprocket, Chain, and Axle Assembly – Mounted on the left side of the Modular Support Assembly, and driven by the motor, this assembly will cause the hooks to lift (the springs mounted in the modules will bring the hooks back down into their starting position).

4) The Foot Pedal – Attached to the Power Box, the pedal is used to advance the pattern, direct the shed mechanism, and select between the Single and Double Treadling Actions.

Certain parts of your E-Lift II will be factory installed because they are an integral part of the axle and modular systems of your Jacq3G Jacquard Loom. These parts include the Module Support Assembly, Module Pulleys, the Main Drive Sprocket, Stop Sensors, and Axle. The steps included here will guide you through:

- Installation of the E-Lift II Motor
- Installation of the Drive Chain
- Proper connection of all Cables
- Home Sensor Adjustment

Tools Required: Needle-nose pliers

1) Installing the Motor/Bracket Mount Assembly
(see Figures 34 and 35)

A) Unpack the Motor/Bracket Mount Assembly (with Power Cord attached). From the hardware packet, find the three 5/16 x 18 – 1-1/2" hex bolts, washers, lock washers, and nuts. Notice that, along the top edge of the Mount Bracket there are three slotted holes.

B) Insert the motor at the left aide of the loom. Orient the three slots in the mount bracket at the top of the assembly and slip the motor between the Upper Left Channel Support and the Upper Left (Wood) Horizontal (as shown in Figure 34). The Mount Bracket will remain in the interior of the loom. The Motor Cord will loop from the outer end of the motor back inside the loom frame, between the motor and the front left Vertical Support of the Module Frame.

C) Align the three slotted holes in the Mount Bracket with the three holes in the Upper Channel Support. Insert each hex bolt, with flat washer, from the inside of the loom, through the Mount Bracket and the Upper Channel Support. Secure each bolt with a lock washer and a nut. Tighten them enough to secure the motor but do not tighten completely at this time. It is helpful to allow the Motor/Mount Bracket Assembly to move somewhat in the slotted holes until the Drive Chain has been installed.

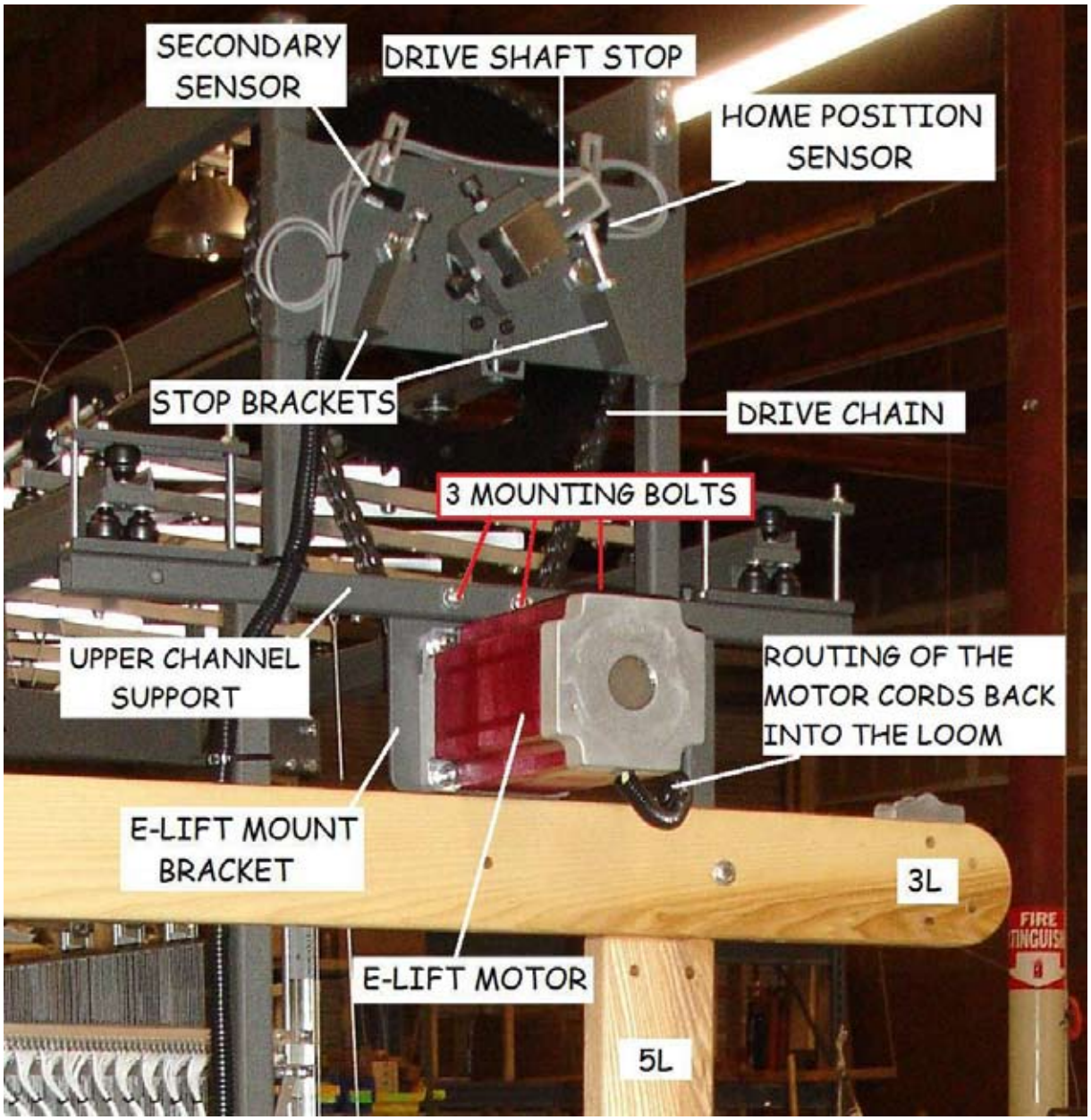


Figure 34 - E-Lift parts installed (Main Drive Sprocket not visible)

2) Installation and Assembly of the Drive Chain
(see Figures 35 through 39)

A) Locate the drive chain and the three small connecting link parts. You will need pliers (needle-nose is best) for this assembly.

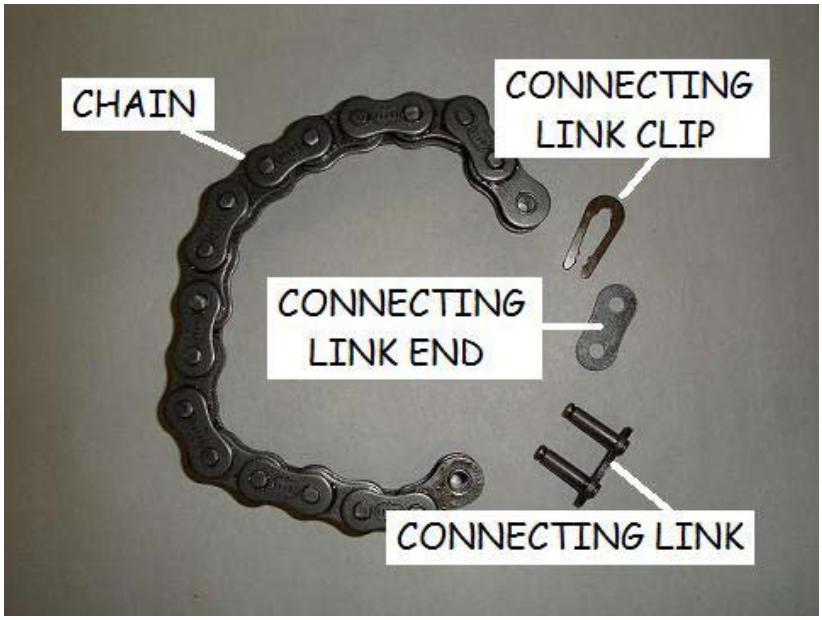


Figure 35 - Chain with Connecting Parts

B) Position the drive chain over the top of the Main Drive Sprocket and under the motor Drive Sprocket, bringing the two loose ends together for the chain assembly.

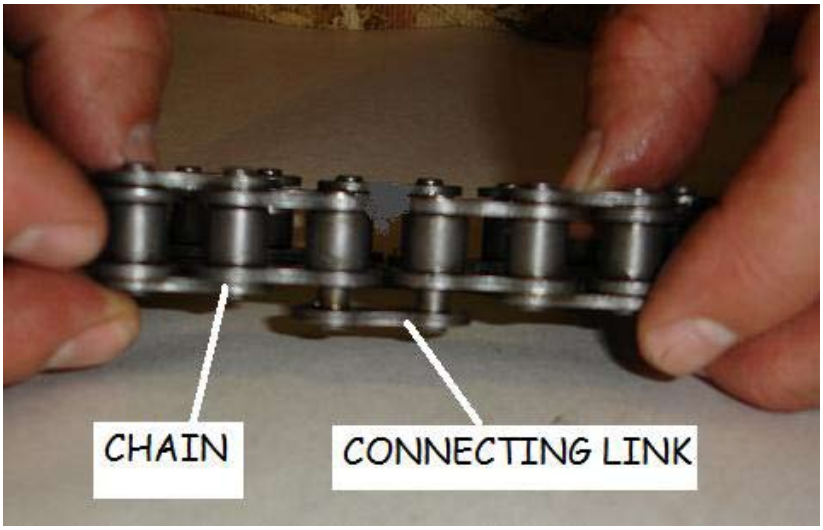


Figure 36 - Chain with Connecting Link partially inserted

C) Insert the two tips of the connecting link into the open link at each end of the chain (see Figure 37), closing the circle. Place the connecting link end over the tips of the connecting link that are now exposed above the two joined links.

D) Place the U-shaped connecting link clip flat on top of the connecting link end, positioning it so that one of the connecting link tips is enclosed within the U-shape and the two tips of the link clip are touching the other tip.

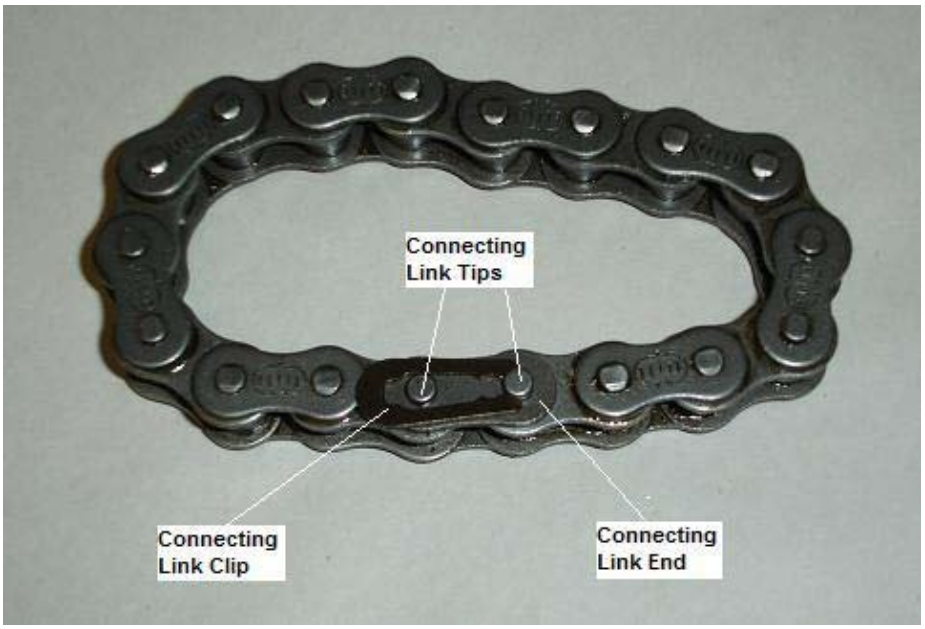


Figure 38 - Chain with Link End and Link Clip in place

E) With the tips of your pliers, pinch the round, outside end of the link clip and the side of the nearest connecting link tip. Squeeze the pliers, pushing the round end of the link clip into the end of the U-shape. The open ends of the link clip will move over and secure around either side of the other link tip.

Figure 39 - Closing the Connecting Link Clip with Pliers

F) With the closed circle of the chain in place, align the motor axle directly below the drive axle. Now, fully tighten the three bolts, securing the Motor/Mount Bracket Assembly in place.

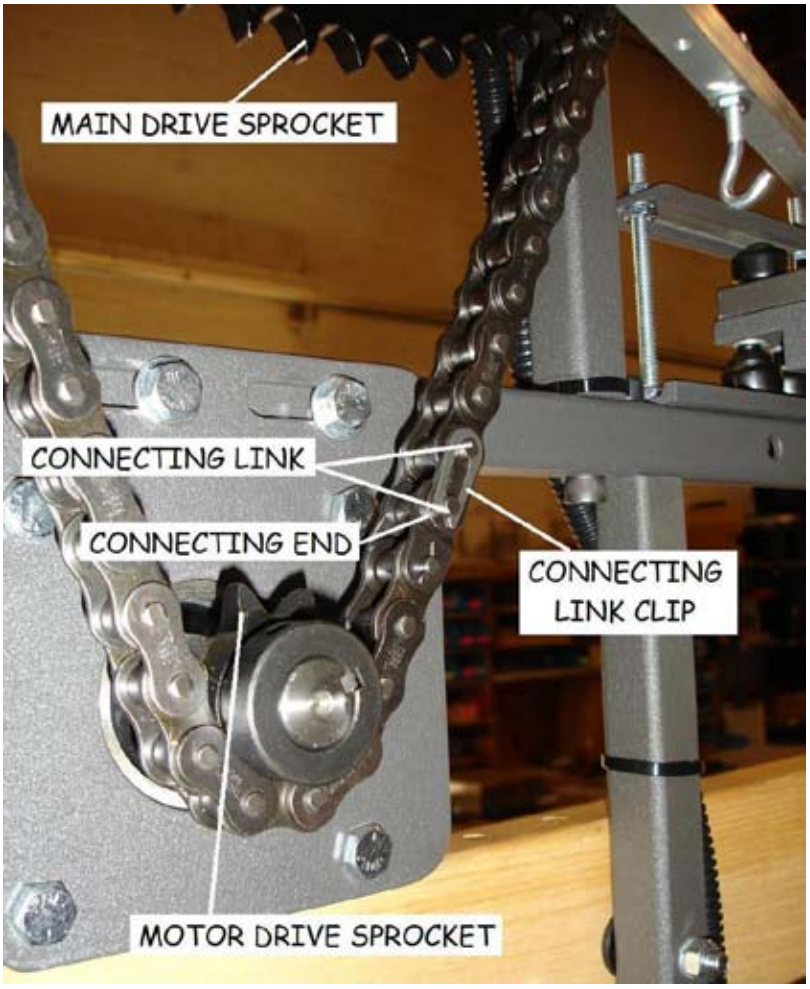


Figure 37 - Main Drive Sprocket, Motor and Chain Installed (Interior View)

G) Secure the Motor Power Cord to the Module Frame (as shown in Figure 34). Guide the flexible cable housing down the side of the front edge of the Metal Vertical Support and out the left side of the Frame, to the Control Box. Secure in place with tie straps.

H) Attach the Foot Pedal to the Control Box at the round outlet and position the pedal in the front area of the loom, under the Cloth Beam, where it will be accessible to the weaver.

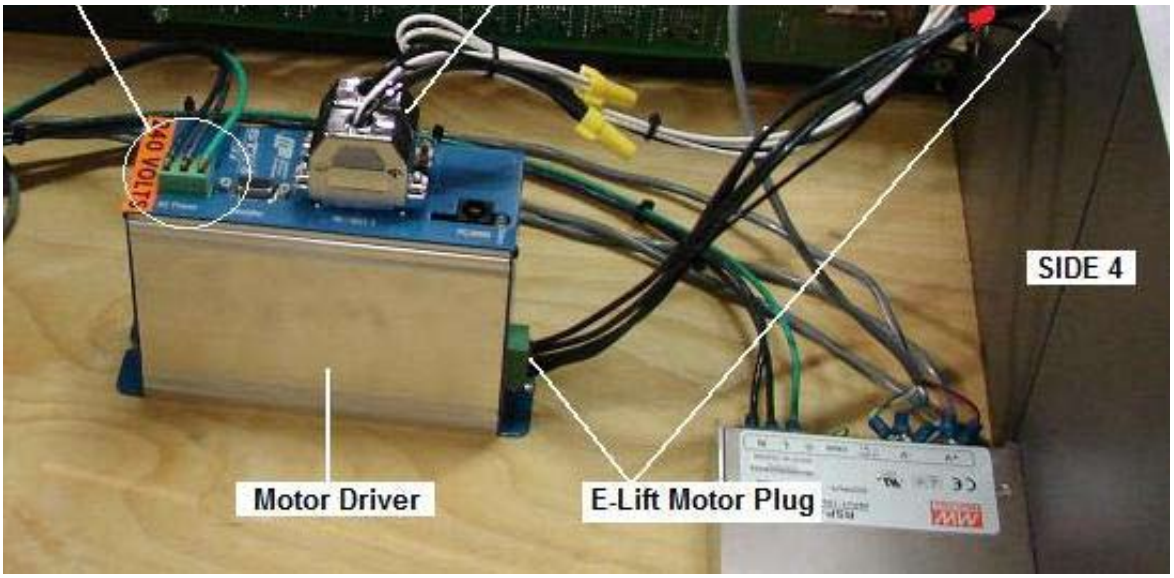


Figure 38 - Interior of Control Box, connection for E-Lift Motor

I) Run the Motor Cord through the lined opening on the Control Box and connect it to the E-Lift Driver (see Figure 38) for location of this outlet on the Motor Driver Box.

3) Home Sensor Adjustment

Each time the E-Lift is turned on it will automatically check and re-align itself to the Home Position. This will enable the E-Lift to synchronize its operation with the other systems that also work off of the Main Drive Sprocket and Axle. **The ideal Home Position will allow the Drive Axle to stop just prior to striking the Front Stop Bracket** (see Figure 4). Whenever the loom is shut down, it is important that the stop be resting at the Home Position.

A) Check to see that the Power Switch on the Control Box is in the off position (0). Reconnect the Control Box to the external power source.

B) Turn the Main Drive Axle about half way toward the back of the loom or until the Drive Shaft Stop is pointing directly up.

C) Before turning on the power, be in position to see the movement of the Main Drive Axle and to be able to shut off the External Power Switch. Please Note: When the power is turned on, the Drive Axle will rotate toward the Front Drive Shaft Stop and you may be able to see the blink of the red light on the sensor, as it is activated by the magnet, reflected in the surface of the Drive Axle Support. If the Home Sensor is not in the correct position when the power is turned on, the Drive Axle will continuously try to turn through the Stop Bracket, causing the Shaft Stop to pound the Stop Bracket. *If, when the power is turned on, the Drive Axle does not come to a complete stop before striking the Front Shaft Stop, be prepared to turn off the power, immediately*.

D) Turn on the power at the Control Box (l). If the Drive Shaft Stop is not in the correct position you will see the motor automatically turn the Main Drive Sprocket clockwise, until movement of the axle is stopped by the Front Stop Bracket. If the Drive Shaft does not come to a complete stop *before striking the Stop Bracket, immediately turn off the power*.

E) Move the Home Sensor slightly away from the Front Stop Bracket and tighten in place. Reposition the axle with the Drive Shaft Stop pointing up and turn on the power. Repeat as necessary, until the Drive Shaft Stop comes to a halt *just before striking the Front Stop Bracket*.

F) The Main Drive Axle is now in position to initiate shed operation.

Please refer to the Weaving Manual for more information regarding the Operation of you E-Lift II.

A) Recommended Lubricant: Liquid Wrench Dry Lubricant. It comes in a spray can, with a little red tube to direct/control the stream. *It is critical that no lubricant comes into contact with the Solenoids or the Driver Board.*

B) Bearings: With the power off, pull down the top slide bar. Point the tip into the topmost inner corners of the frame on each side of the module and apply a little spray. The lubricant will run down and as the bars go up and down the bearings will come in touch with the lubricant. There is no need to spray directly on the bearings.

C) Wires: When all of the hooks are down, run the spray across the wires, under the Lower Guide. Then, when all of the hooks are up, run the spray across the wires between the upper Slide Bar and the upper Hook Guide. This procedure will keep the lubricant well away from the solenoids.

This section is intended to explain and clarify the various Systems which enable your AVL Jacq3G Jacquard Loom to function and offer guidance in the manner of operation. Please read this information carefully prior to using the loom.

Part One: LOOM SYSTEMS (please refer to the illustrations for each System discussed)

1) The CONTROL BOX (CPU or CENTRAL PROCESSING UNIT) - (refer to Figures BX-1 through BX-5). The Control Box contains the Power Supply/Disbursement and the Electrical Components for the Circuit Boards and the Solenoids/Hooks, and for the E-Lift (if ordered for your Jacq3G). Your Power Box has been custom built to your electrical specifications, so the configuration of your box may differ somewhat from the one shown in Figures BX-1 through BX-5, but the appearance and approximate location will be similar. Below is a review of the Electrical Requirements. Be sure that you have planned adequately for the correct installation of your Jacq3G Loom.

Please note: Under no circumstances should the top of the Control Box be opened without the expressed, written consent of AVL Looms, Inc.

Jacquard Loom Control Box Specifications

	3-20 Modules	21-48 Modules
Height	20" (.51m)	38" (.97m)
Overall Width	18" (.46m)	18" (.46m)
Front to Back	18" (.46m)	18" (.46m)
Weight, Base Loom (3 Modules)	30 lbs. (13.7 kgs.)	<125 lbs. (<57 kgs.)

Jacquard Loom Power Requirements

	4 Modules (per Power Supply)	Per Module	System
Electrical Input Pattern (MAX)**	12A @ 110V 6A @ 220V	5A @ 110V 2.5A @ 220V	
Pneumatic Input, A-Lift (MAX.)**			5CFM @ 100PSI
Electrical Input,** E-Lift (MAX.)			8A @ 110V, 4A @ 220V

** Varies based on Hooks activated

Figure BX-1 – Control Box, Side 1
(Showing Vents, Power Switch and Power Source)

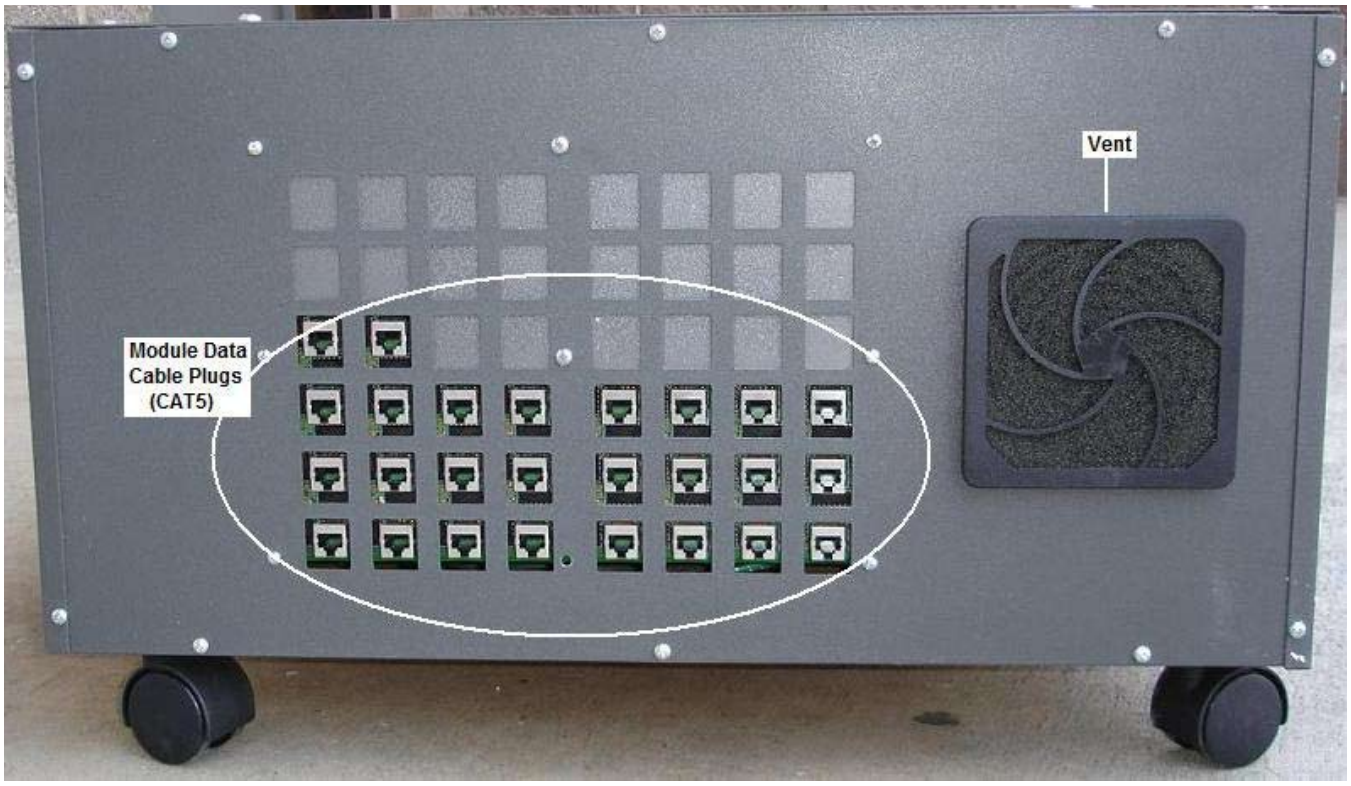


Figure BX-2 – Control Box, Side 2
(Showing Module Data Cable Plugs –CAT5)

Figure BX-3 – Control Box Side 3
(Showing Driver Board Power Cable Plugs)

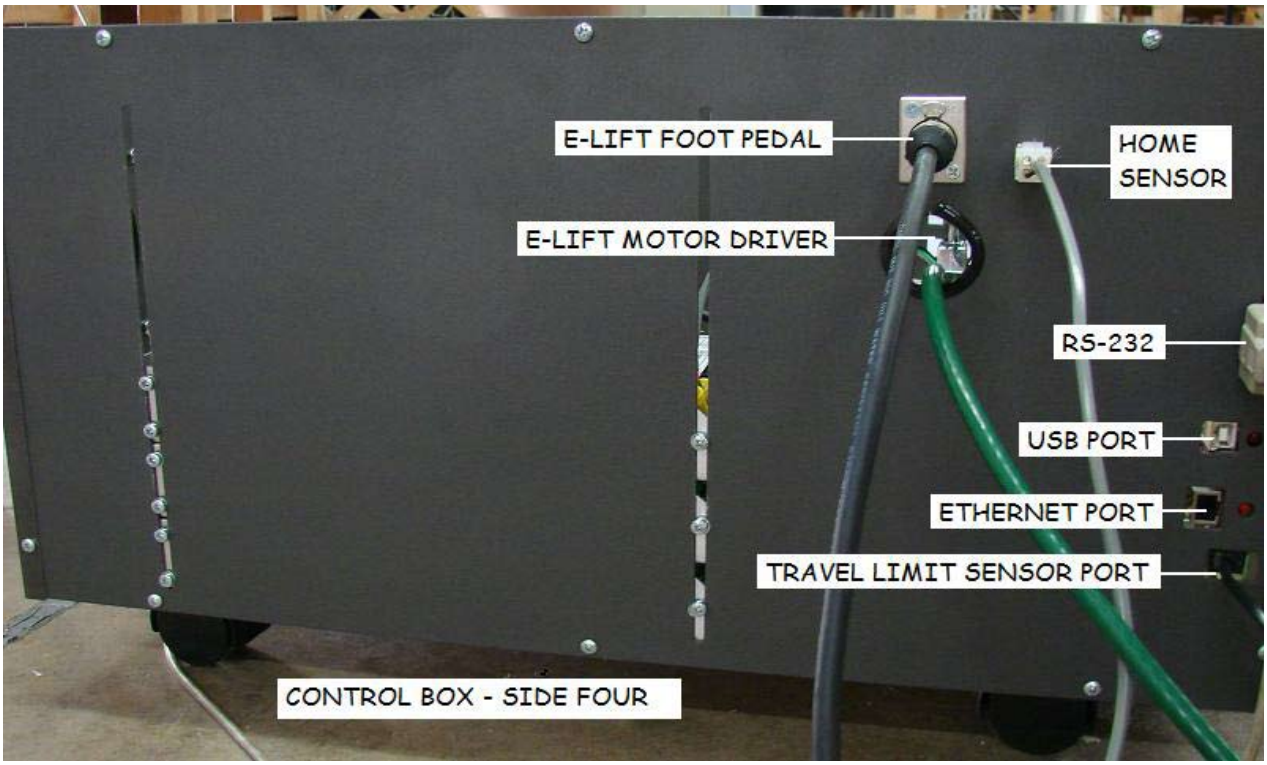


Figure BX-4 – Control Box, Side 4
(Showing E-Lift and Computer Connections)

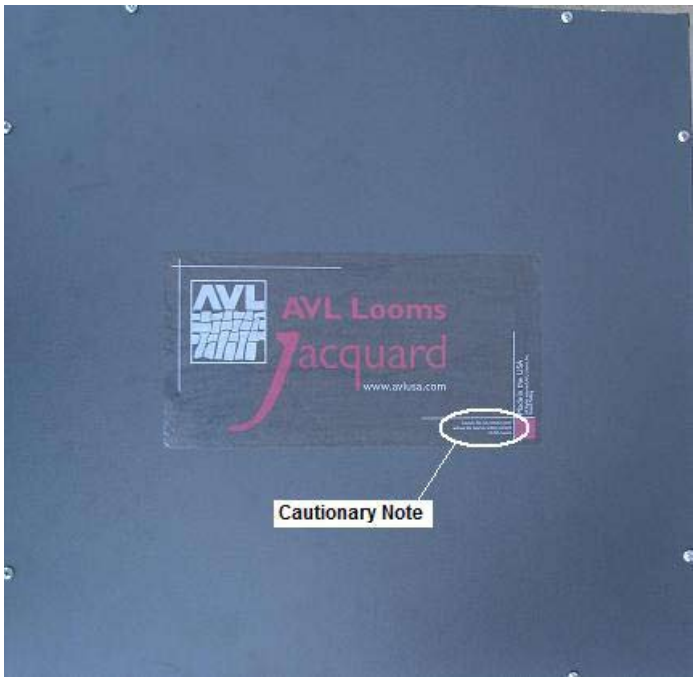
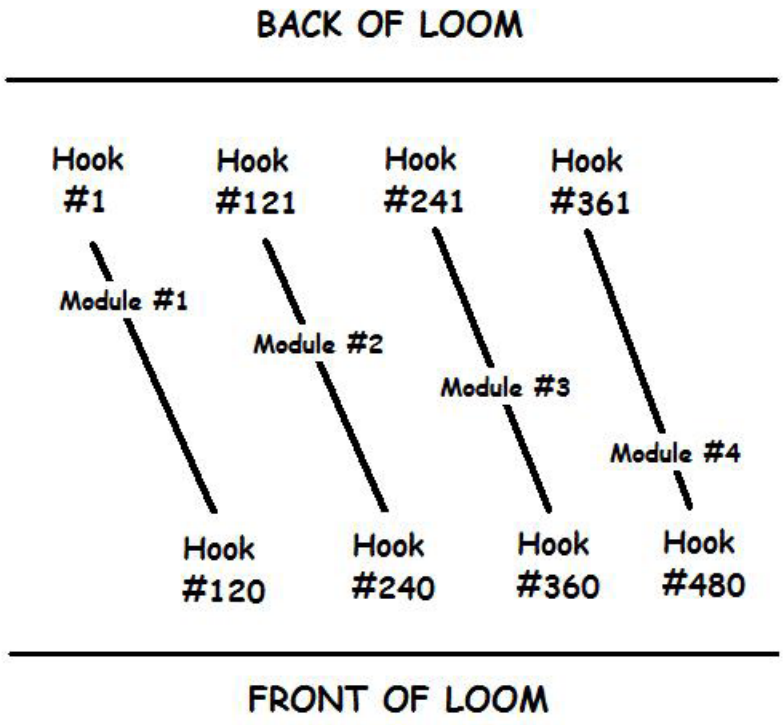


Figure BX-5 – Control Box, Top
(Showing Cautionary Note)
Please note that this reads: "Do not remove cover without the express written consent of AVL Looms"

2) **MODULES (HOOK AND FRAME ASSEMBLIES)** – These large, steel frames support the electronic boards, hooks, heddles, and springs (please refer to Figs. MOD-1 through MOD-6).

A) The sequence of hook numbers runs from left to right and rear to front. The first hook in the left-most frame is #1; the last hook in that frame is #120. The first hook in the second frame from the left is #121 and the last hook in that frame is #240, and so on across the loom. So that hook #1 is the hook furthest to the rear of the FIRST FRAME on the LEFT and HOOK #1200 is the hook closest to the front, in the LAST FRAME on the RIGHT. (Please note: Looms can be equipped with as few as three frames, for a total of 360 Hooks, or as many as 48 Frames, across a 72" loom width, for a total of 5,760 Hooks.)



Note: If only a portion of the Hooks are to be used:

a) Disconnect the CAT5 cable on the Control Box for the unused frames, and plug the CAT5 cables for the frames to be used into the Control Box plugs, beginning with plug #1, 2, etc.

b) Program all unused hooks as empty in the design software.

B) **The Frame Lights** – There are two lights at the front of each Driver Board. The TOP LIGHT indicates that the power is on. The BOTTOM LIGHT blinks to indicate information transmission from the Control Box. *It will only be lit when the control box is transmitting information and, otherwise, will not remain lit*.

C) The Driver Board is the printed circuit board (the green board), located on each frame, which transmits information to the electronic components and lights. It sends the power to the selected hooks for activation. The small, rectangular boxes affixed to the boards are the drivers.

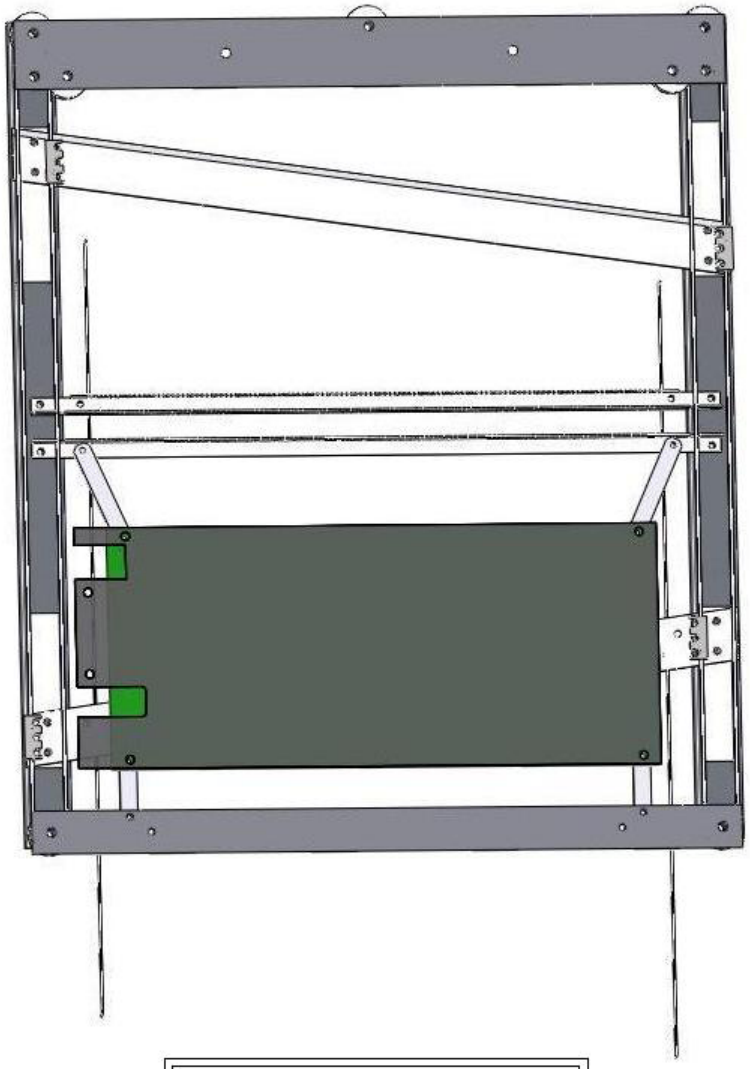


Figure MOD-1, Module, Front

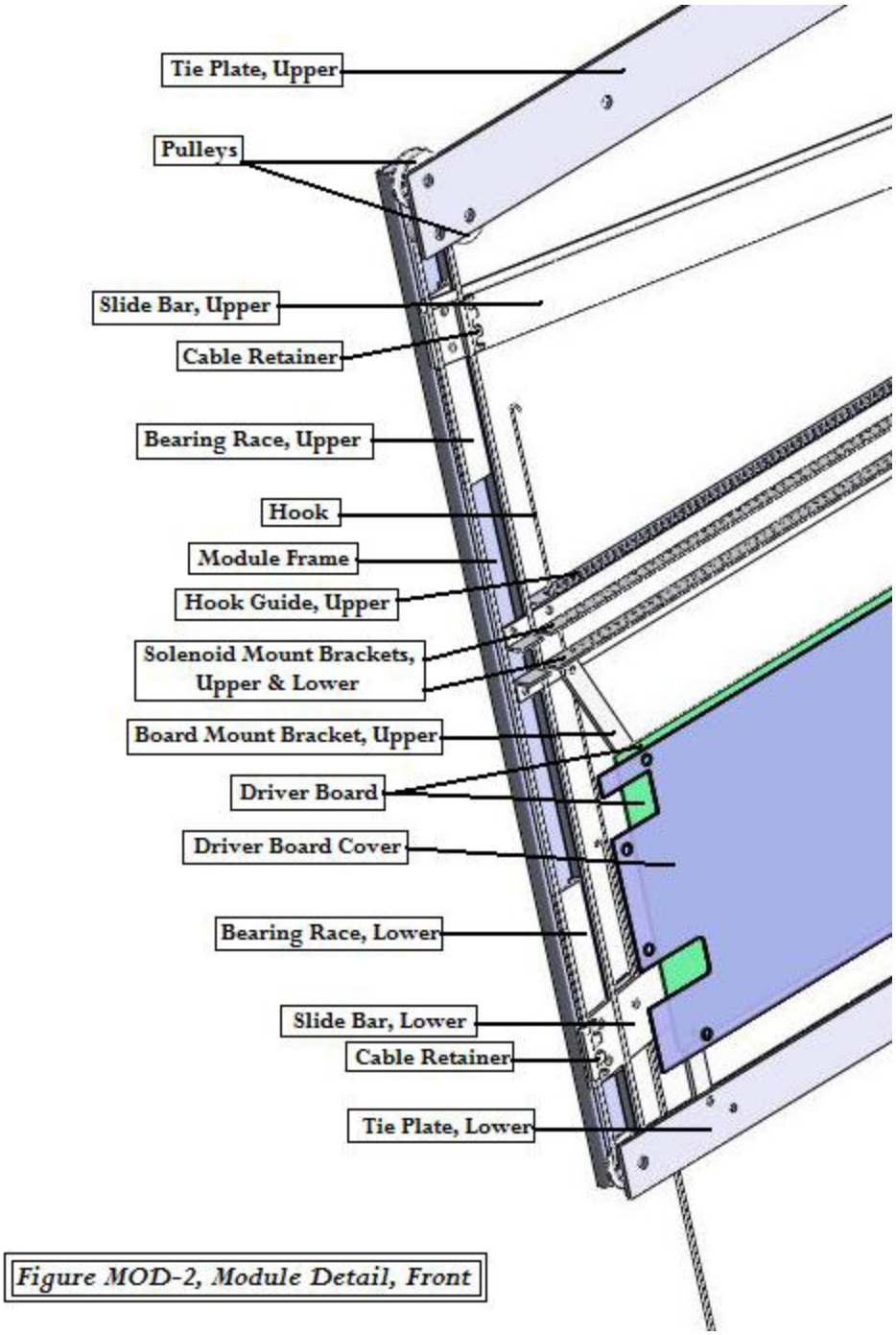


Figure MOD-2, Module Detail, Front

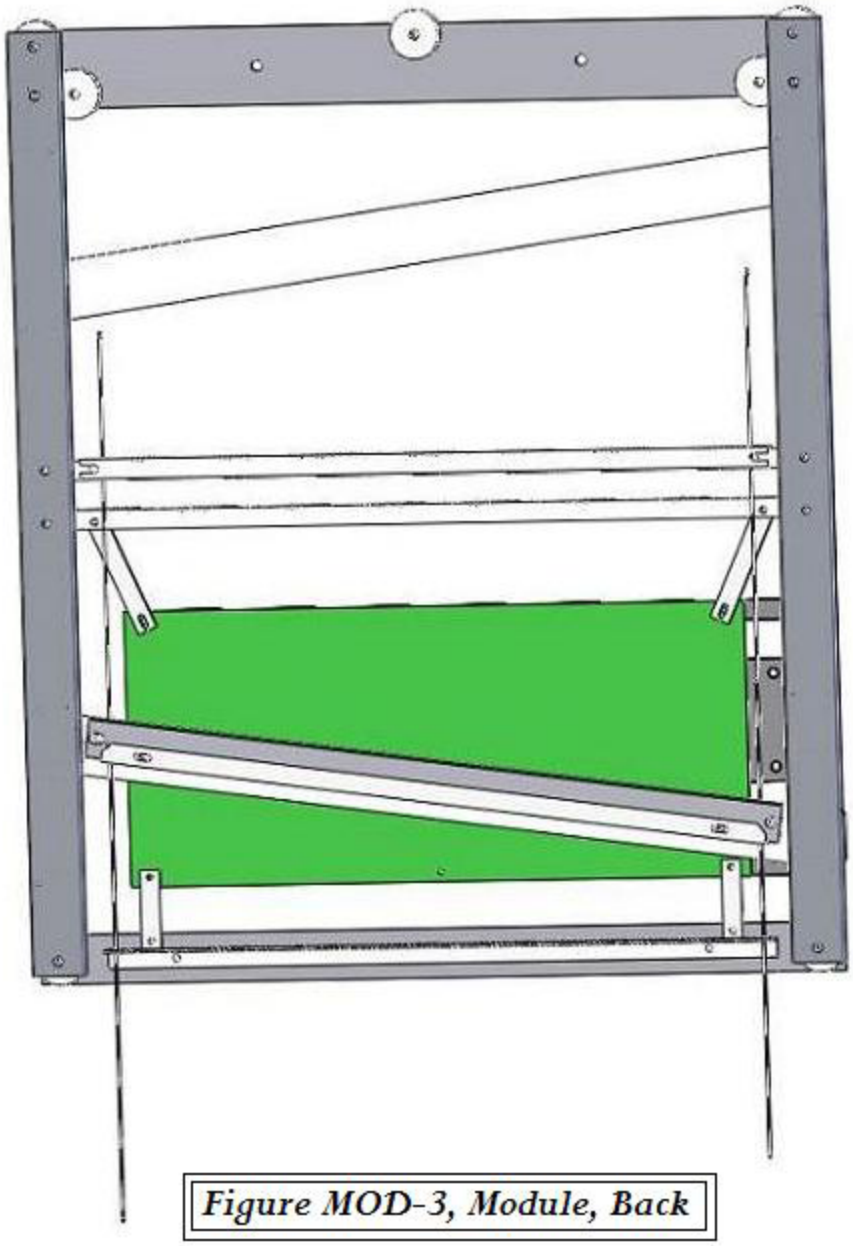


Figure MOD-3, Module, Back

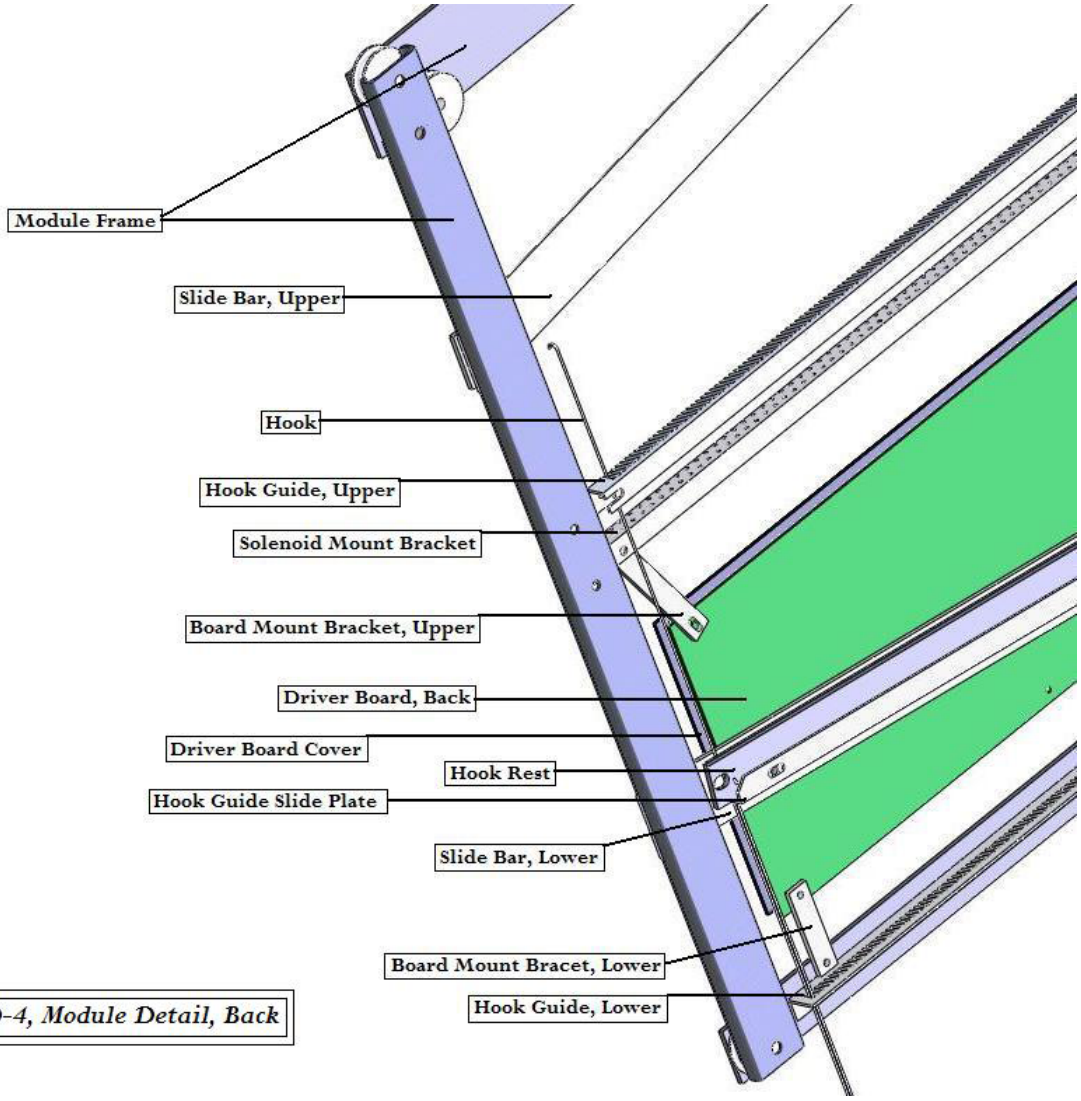


Figure MOD-4, Module Detail, Back

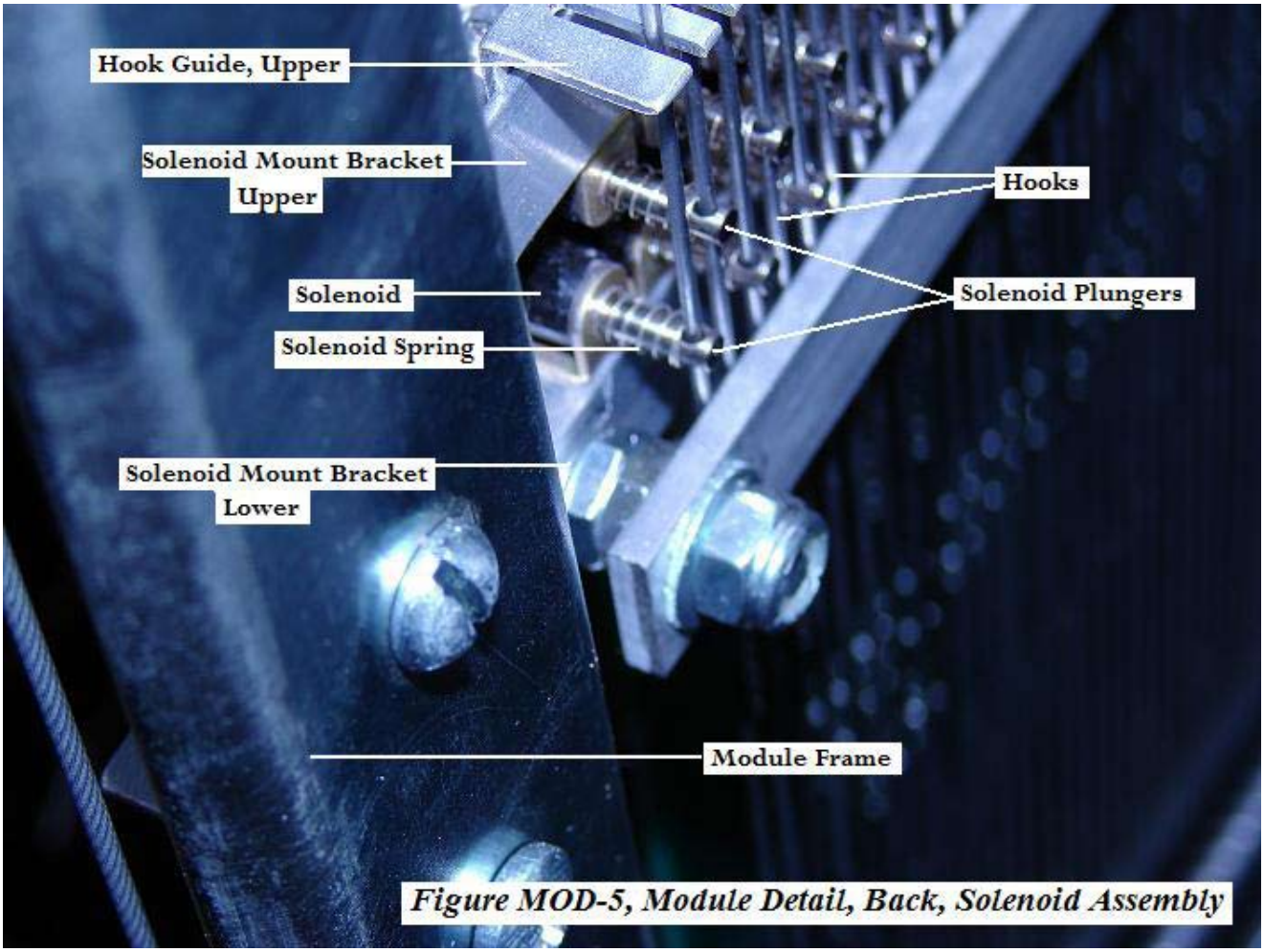


Figure MOD-5, Module Detail, Back, Solenoid Assembly

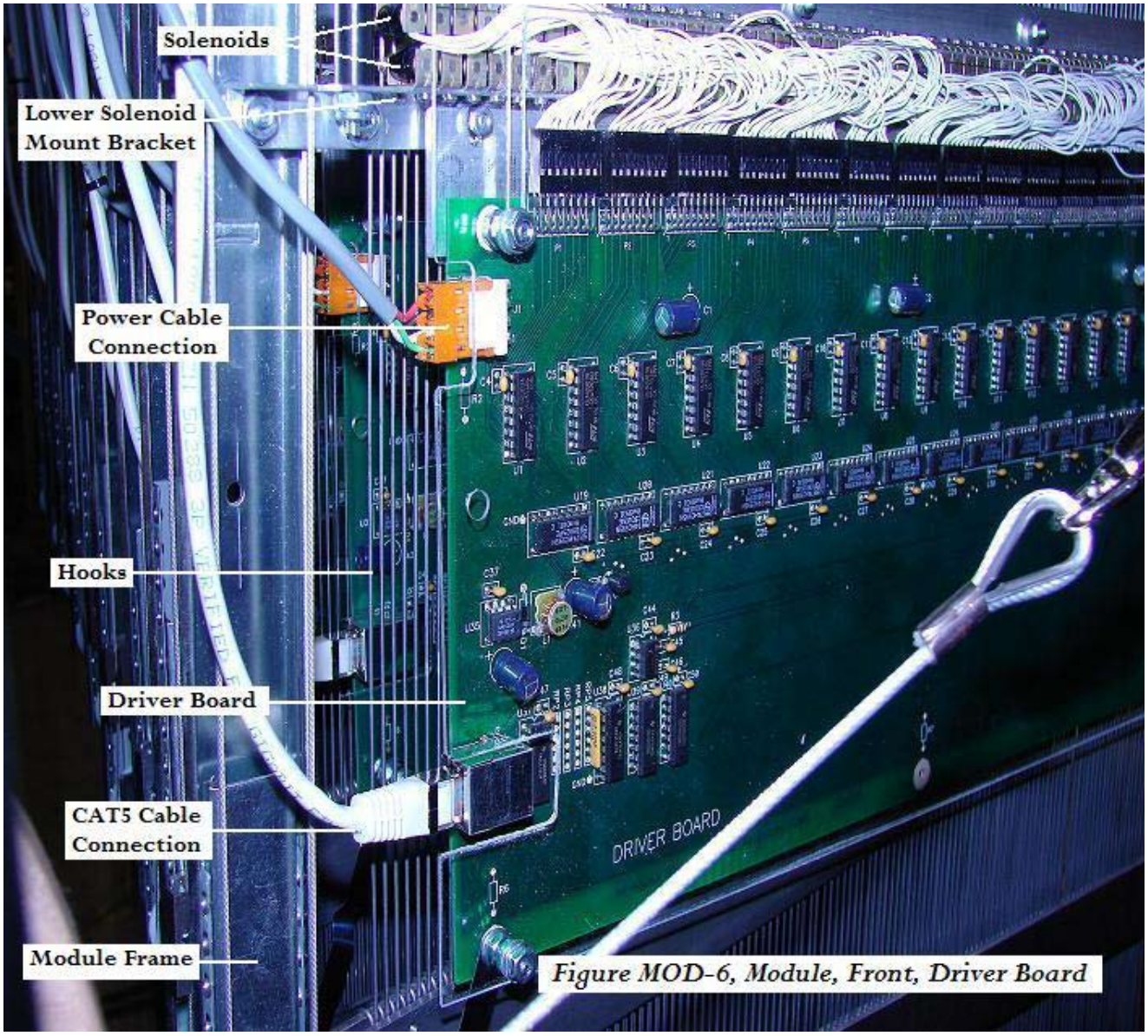


Figure MOD-6, Module, Front, Driver Board

Figure MOD-7, Modules, Front View showing Board Lights

3) The "Dial-A-Set" or WARP DENSITY ADJUSTMENT ASSEMBLY – The Warp Density Adjustment Assembly, otherwise known as the "Dial-A-Sett", is comprised of the two wheels and running chain located down the middle of the right-hand castle.

The Dial-A-Sett enables you to increase or decrease the sett of your project or to more easily access the heddles for threading, and turn them into a position more parallel to the beater and front beams (please refer to Figures DAS-1 through DAS-9).

A) Decreasing the Warp Density – Moving the Fames away from each other and away from the loom center, as well as turning them more parallel to the reed. This will serve two functions:

- This is how to decrease the density/sett of your warp.
- Adding this step to your threading procedure will allow for easier access to the heddles/hooks.

Turn the circular wheel, at the top of the ADJUSTMENT ASSEMBLY, CLOCKWISE.

Please Note: *It is critical to prevent the DRIVE CABLES from rubbing on the FRAMES*. To prevent this type of wear, it is important to pay close attention to the vertical alignment of the DRIVE CABLES (connecting the DRIVE PULLEYS to the FRAMES). As the frames move away from each other, it will be necessary, periodically, to reach up and realign the PULLEYS over the HOOK FRAMES, by gently pushing them outward, taking care to maintain the vertical alignment of the DRIVE CABLE in relation to the FRAMES.

B) Increasing the Warp Density – This will bring the HOOK FRAMES back toward the center of the loom and at a more perpendicular angle to the reed. This will serve two functions:

- This will enable you to increase the density/sett of your warp.
- This will enable you to bring the heddles, once threaded, back into a straight path through the loom from warp beam to reed.

Turn the circular wheel, at the top of the ADJUSTMENT ASSEMBLY, COUNTER CLOCKWISE.

C) **Cautionary Note**: During the changing of your warp density *it is critical to prevent the DRIVE CABLES from rubbing on the FRAMES*. To prevent this type of wear, it is important to pay close attention to the vertical alignment of the DRIVE CABLES (connecting the DRIVE PULLEYS to the FRAMES). As the FRAMES move towards the center and each other, it will be necessary, periodically, to reach up and realign the PULLEYS over the HOOK FRAMES, by gently pushing them inward, taking care to maintain the vertical alignment of the DRIVE CABLE in relation to the FRAMES.

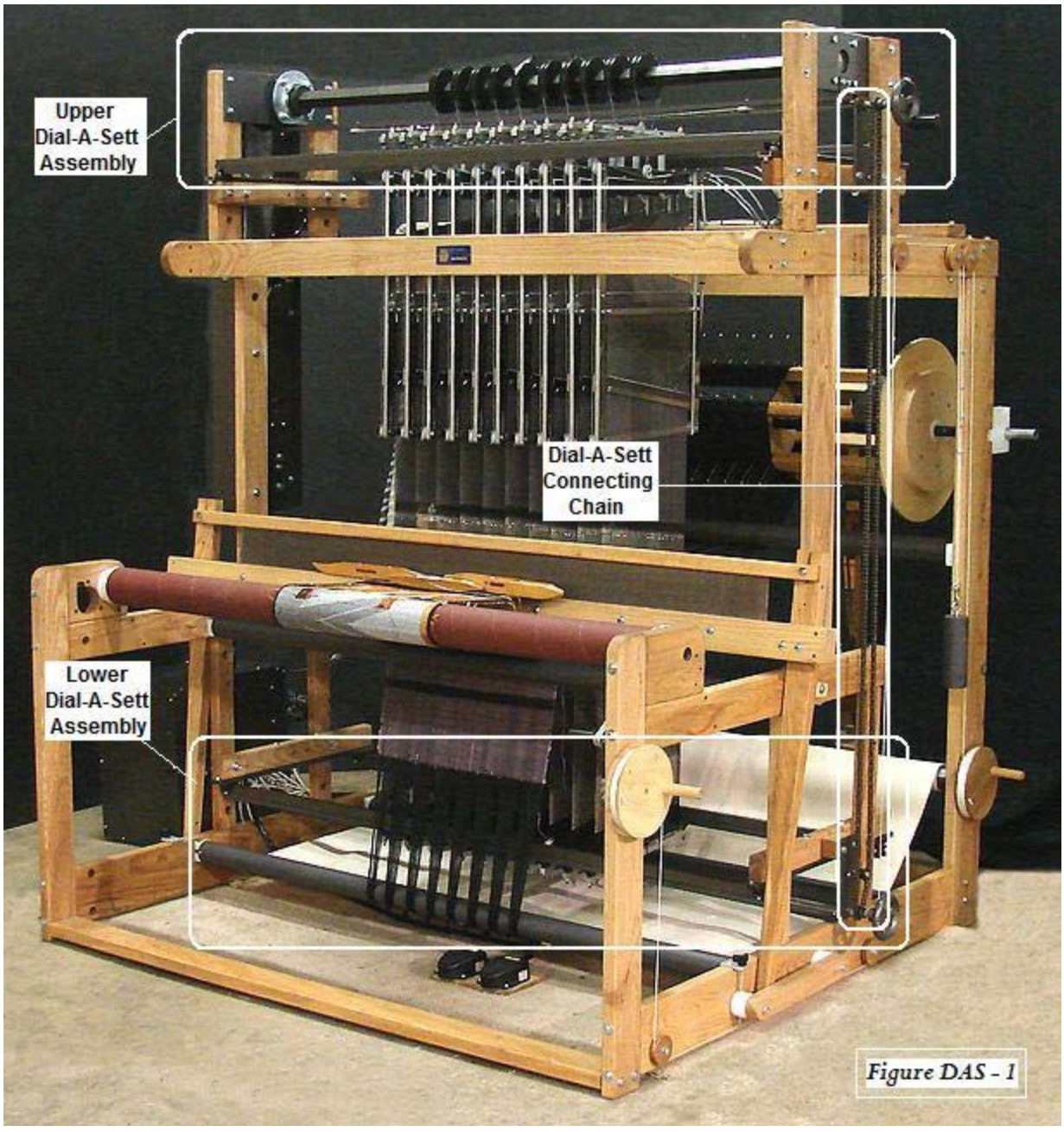


Figure DAS - 1

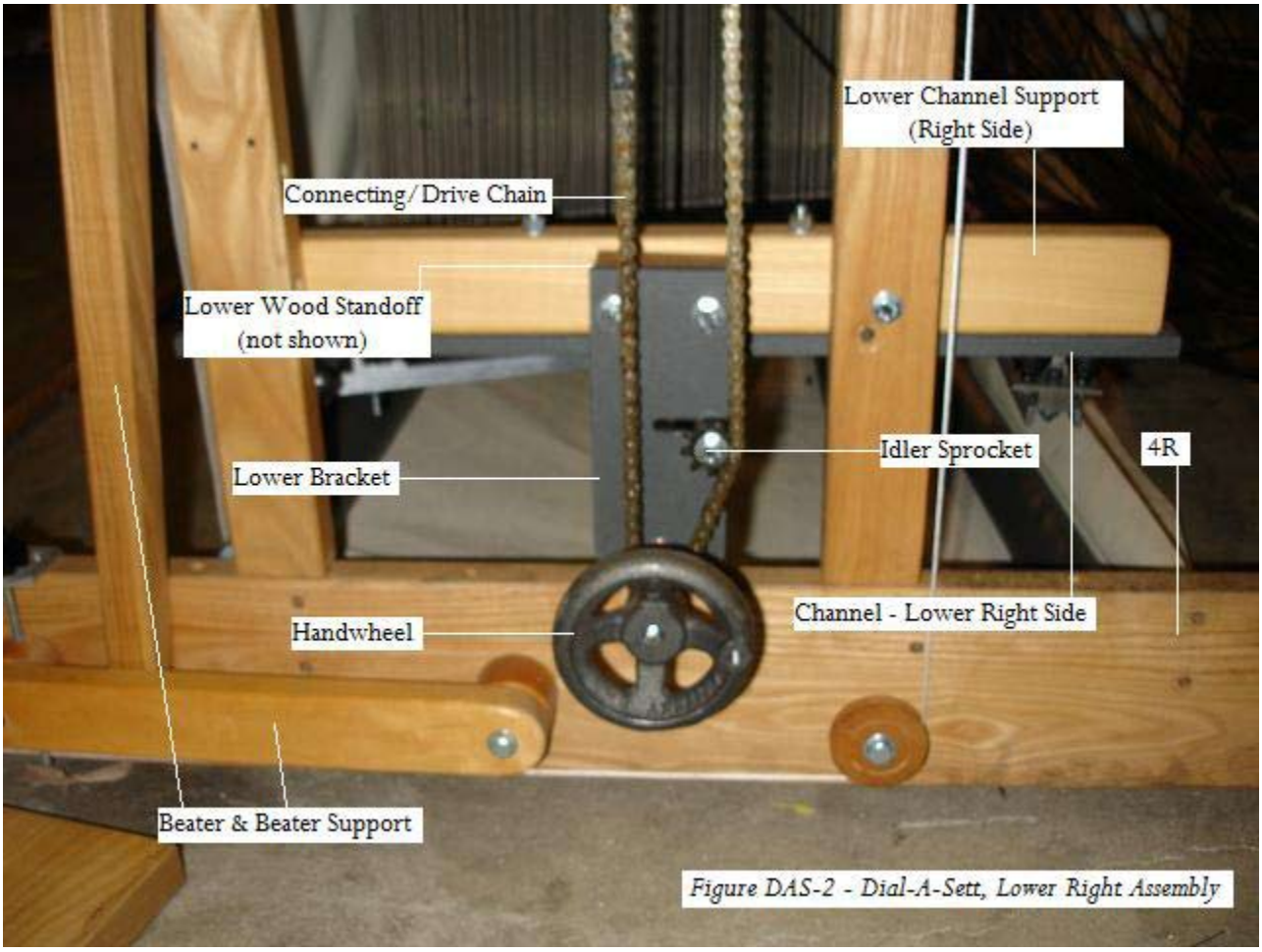


Figure DAS-2 - Dial-A-Sett, Lower Right Assembly

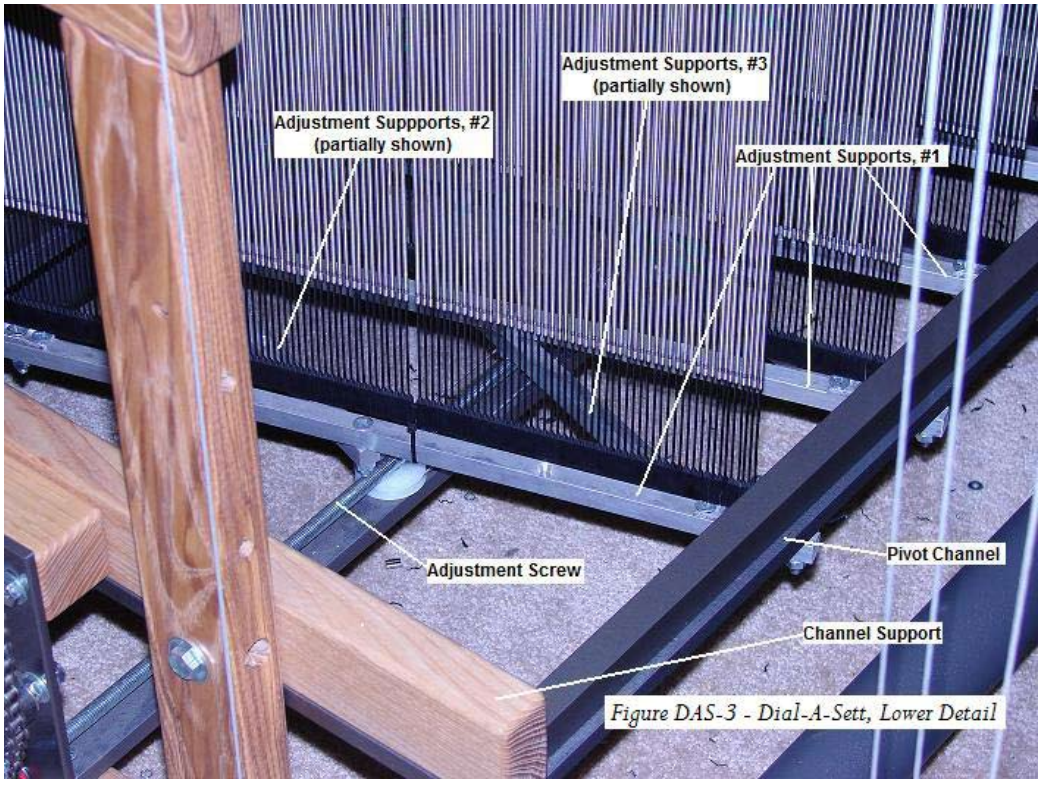


Figure DAS-3 - Dial-A-Sett, Lower Detail

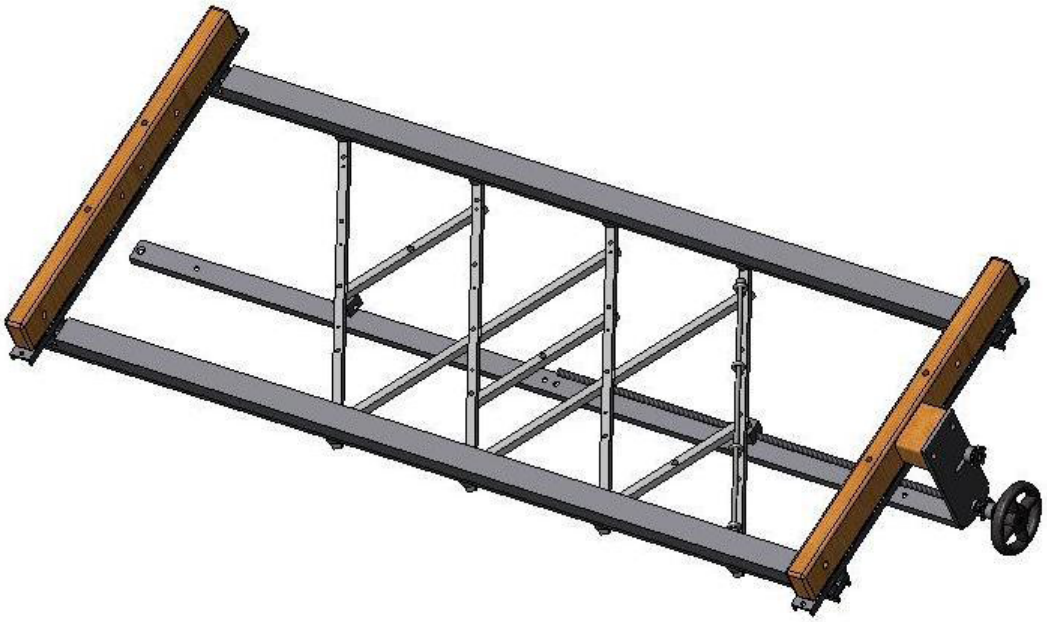


Figure DAS-4 - Dial-A-Sett, Lower Assembly (graphic)

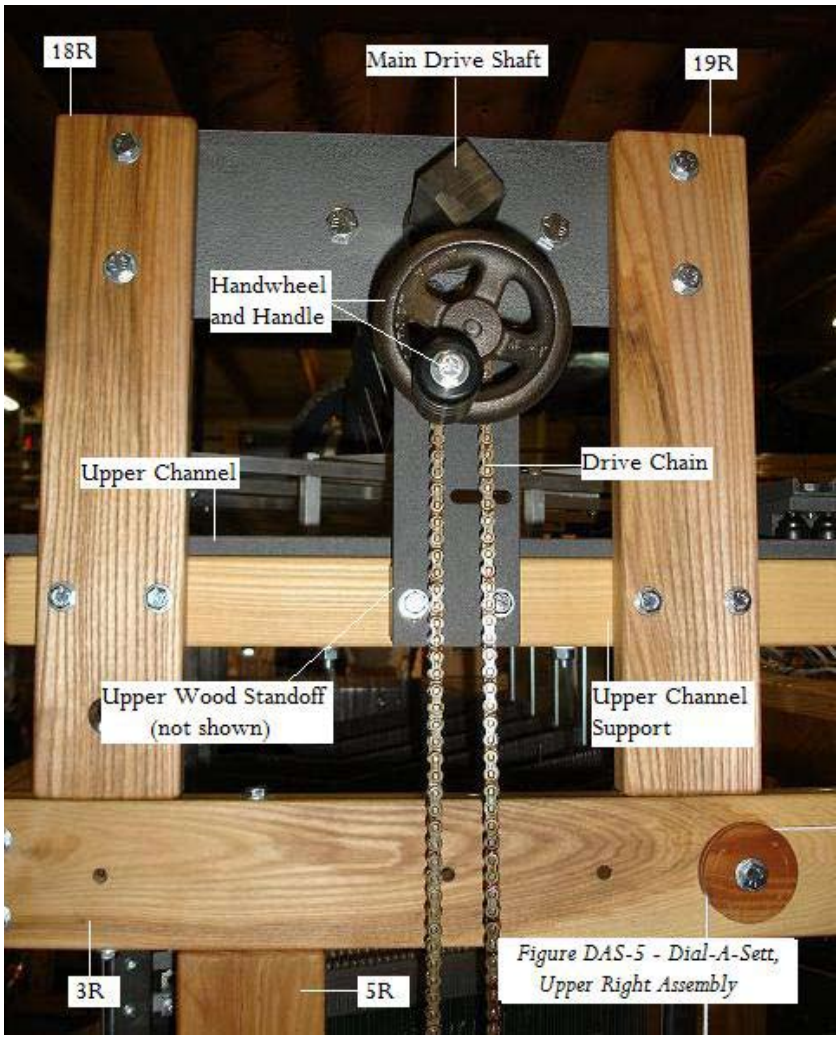


Figure DAS-5 - Dial-A-Sett, Upper Right Assembly

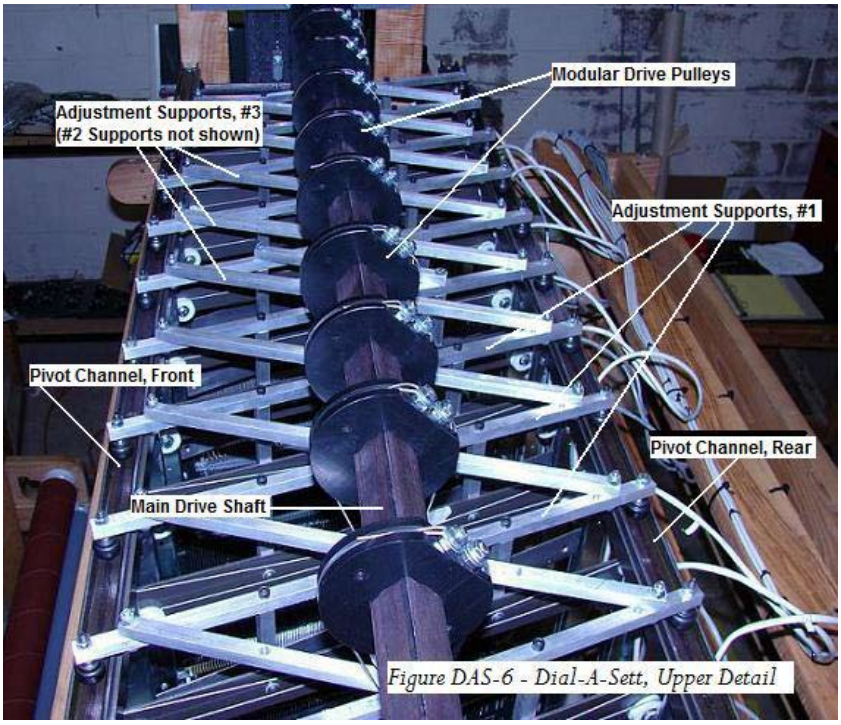


Figure DAS-6 - Dial-A-Sett, Upper Detail

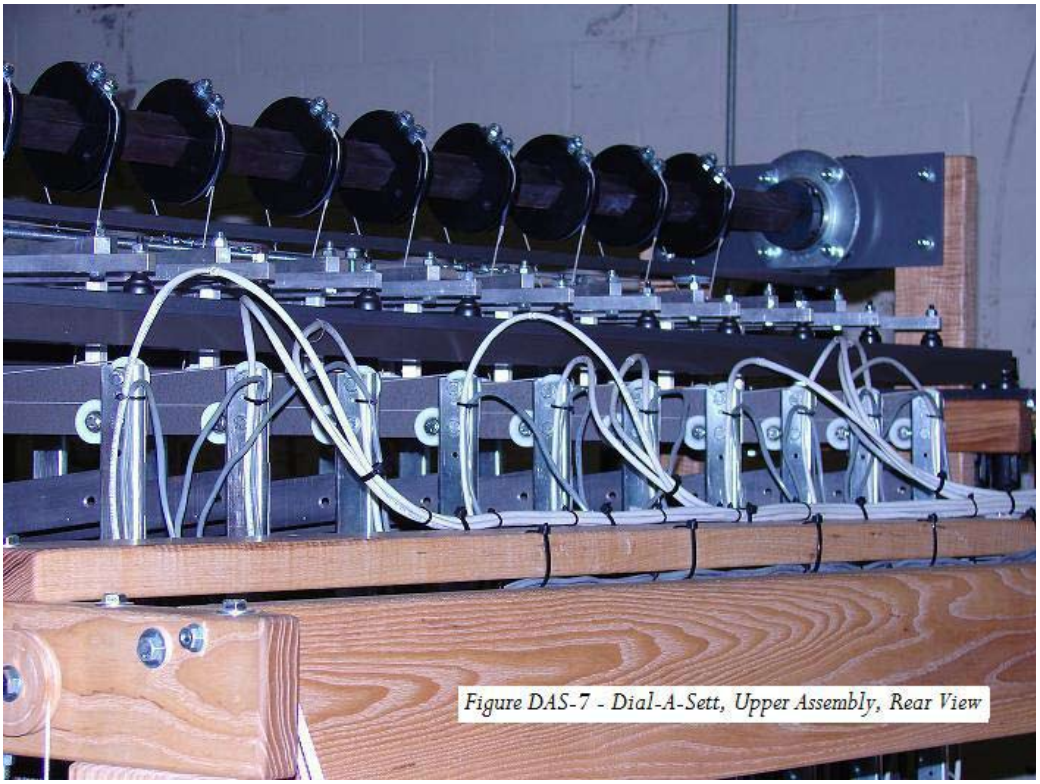


Figure DAS-7 - Dial-A-Sett, Upper Assembly, Rear View

Figure DAS-8 - Dial-A-Sett, Upper Assembly, Front View

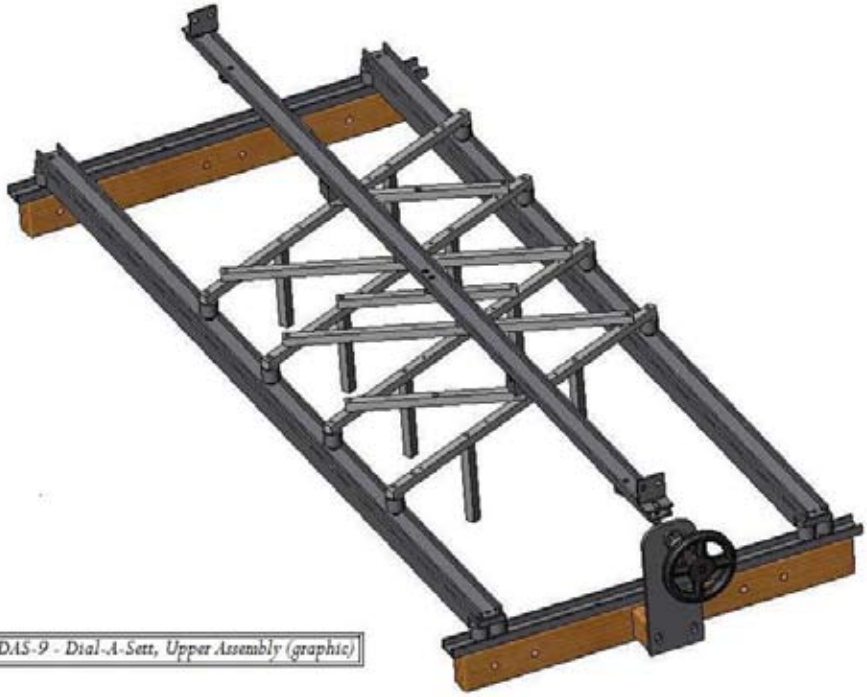


Figure DAS-9 - Dial-A-Sett, Upper Assembly (graphic)

Part Two: SHED OPERATION

The AVL Jacq3 is a Counter-Marche mechanism. For each shed, all hooks are engaged, that is they are pulled up or down, to create the shed. If selected to rise, the Solenoid will push the Hook into position to be picked up by the UPPER SLIDE BAR. If is it not to be raised, the Hook will engage with the LOWER SLIDE BAR and be lowered. The mechanics which drive the Shed Mechanism will vary depending on the type of Loom, whether it be Electric (E-Lift), Manual (M-Lift), or Pneumatic (A-Lift).

NOTE I: Once the Solenoids fire and the selection is made, if for any reason, the shed is not opened within 20 seconds, the Solenoids will de-activate. *This is a safety feature that has been build into the hardware, to prevent overheating of the Solenoids*. When activity is resumed, the selection will be for the last, incomplete pick. There is no need to reverse to insure continuity.

NOTE II: This double-action shed is made by the simultaneous rising and dropping of hooks. In the reed, under tension, there are three (3) positions for the warp:

- Open – Slide Bars are separated, the shed is OPEN and ready to receive the shuttle. The selected hooks have been pulled up by the Upper Slide Bar and the deselected hooks have been lowered on the Lower Slide Bar.

- Closed – Slide Bars are at their closest position to each other. The shed is CLOSED between picks. In this position, the warp yarns coming through the center of the reed height and will not be in a single, level plane, but will "shingle", or come through the reed at a slight angle, repeated again for each module, across the reed. The first warp end in a Module will be at approximately the center of the reed and subsequent warp ends will progress at an angle, with the last warp end in a particular Module at a slightly higher position in the reed. This will repeat across the reed for each Module. NOTE: the hooks should never be engaged when in this position; there should be no computer connection at this time.

- At Rest – The Slide Bars are separated, but the SOLENOIDS are de-activated. There has been no selection and all hooks are resting on the Lower Slide Bar. The hooks have dropped, and the warp is resting at the Shuttle Race.

1) **M-Lift - Instructions for Treadle Operation**: To Weave – Alternately activate the Right and Left Treadles (please refer to the M-Lift Section of your Assembly Manual for more information on the M-Lift Components and Installation).

- Left Treadle – Opens the Shed: it separates the Slide Bars to their most extreme position.
- Right Treadle – Closes the Shed: it closes the shed, bringing the Slide Bars back to their central position AND signals the dobby to select the next pick.
- TO REST or DE-ACTIVATE THE SOLENOIDS
  a) Open shed and do not treadle for 20 Seconds, then treadle twice OR
  b) Insert a Dead or Blank Pick into the Program/Design
- TO SHUT DOWN THE LOOM
  a) Close the shed or
  b) Allow the Solenoids to deactivate with an open shed
  c) Turn OFF the power at the Control Box

2) **E-Lift - Instructions for Foot Pedal Operation** (please refer to the E-Lift Section of your Assembly Manual for more information on the E-Lift Components).

A) **Turn on the E-Lift at the Power Box** – Upon start-up, if the sprocket is not already in the Home Position, the motor and sprocket will move to Home Position immediately (see Assembly Chapter 12, Figure 34).

B) To initiate Shed Activation – Step on the Pedal. The first time the pedal is depressed the warp will rise off the race.

C) To Open and Close the Shed – Single Action – This setting for your pedal action is to limit motion of the Modules and hooks to one movement. In other words, each time the pedal is tapped the hooks will open or close, as required.

D) To Open and Close the Shed – Double Action – This setting is the default setting and will enable you to move from one open shed to the next open shed with one action.

E) To Change From Double Action to Single Action – step on the pedal *and while the shed opens, continue to depress the pedal, until the Slide Bars have separated and you have then continued the pressure on the pedal for an additional five seconds after the shed has opened*. Only after all of this should you release the pedal. This will change the setting in the program. The next time you tap the pedal the shed will close and reopen in one action.

F) To Change from Single Action to Double Action – while the shed is closed, depress the pedal and *continue to depress the pedal, until the Slide Bars have separated and you have then continued the pressure on the pedal for an additional five seconds after the shed has opened*.

G) To Turn Off – Do not turn off the power while hooks are raised. While this will not cause any immediate damage, the powerful action of the sprocket returning to Home Position upon start-up could eventually result in premature wearing of parts. To turn off the loom:

a) Create a Null Pick – this may be done either of three ways:

i) Use the Null Pick button in the Loom Control Window and treadle once more, to the Null Pick or

ii) Press the "C" Key on your keyboard ("C" for Close) or close your file and pedal once more or

iii) If you are in Double –Action Mode, switch to Single-Action Mode, wait 20 seconds for the solenoids to go into Rest Mode and treadle once more, to the Null Pick.

b) You will notice that the Drive Shaft Stop (see Assembly Chapter 12, Figure 34) is positioned at the Home Sensor and you may safely turn off the power at the Control Box.

3) **A-Lift** (please refer to the A-Lift Section of your Assembly Manual for more information on the A-Lift Components and Installation).

Part Three: STEPS FOR INITIAL SET-UP

1) Hook up all cords and cables (please refer to Figures BX-1 through BX-4).

A) DRIVER BOARD POWER CABLES – These cords connect each frame to the power source and may be plugged into the Control Box in any sequence

B) **CAT-5 CABLES** – the numerical sequence is critical for these cables, as these cables supply the information to the FRAMES/HOOKS. Each cable has a number on it. Look for matching number on the plugs. If only the center three frames are to be used, plug the three corresponding cables into the Box at #1, #2, and #3 respectively.

C) END-OF-TRAVEL SENSOR CABLE – Match the colored collar to the color spot on the Control Box. This sends the information from the sensors located on the Main Drive Axle and the Supporting Plate, to the computer, signaling for the next shed in the sequence.

D) AC POWER CORDS(S) – Connects the Control Box to the main power source. Depending on your specifications at the time of order, there may be one or several, and either 110v or 220v.

E) E-LIFT POWER CABLE – (E-Lift only) This Cable connects the E-Lift unit contained in the Power Box with your Power Supply.

F) E-LIFT DRIVER CABLE – (E-Lift only) This Cable connects the E-Lift Driver Unit inside the Power Box to the E-Lift Motor.

G) AIR SUPPLY HOSE – (Air-Lift only) Connect to the ON/Off Valve found at the upper rear, left side of the loom (as determined when standing in position to weave).

H) SERIAL CABLE (RS-232) – This is the 9-pin plug which connects the computer to the driver in the box.

2) **COMPUTER CONNECTIONS** – There are three different methods for establishing connection between the Control Box and your computer:

A) **ETHERNET** - You must use a "crossover" CAT-5 cable between the PC and the Rabbit. These are available from AVL or a local computer store.

i) In JacqPoint go to Weave\Jacquard Options and select the Ethernet connection. Select "Set IP Address" and set the IP Address to 192.168.100.40 with the Port number of 23.

ii) On your PC go to the Control Panel and select "Network Connections". Then select the "Local Area Connection" to bring up the "Properties" window. Under the "General" tab scroll down until you can select the "Internet Protocol (TCP/IP)". Select it and then choose "properties" again. Un-select the radio button that says "Obtain an IP address automatically", and instead select the button that says "Use the following IP address". Then enter 192.168.100.41 for the IP address and 255.255.255.0 for the Subnet mask. Nothing else needs to be set. Hit OK and the Ethernet connection from JacqPoint should be usable.

iii) Make a note of the existing settings before making any changes so that you can restore them later.

Figure BX-1 – Control Box, Side 1
(Showing Vents, Power Switch and Power Source)

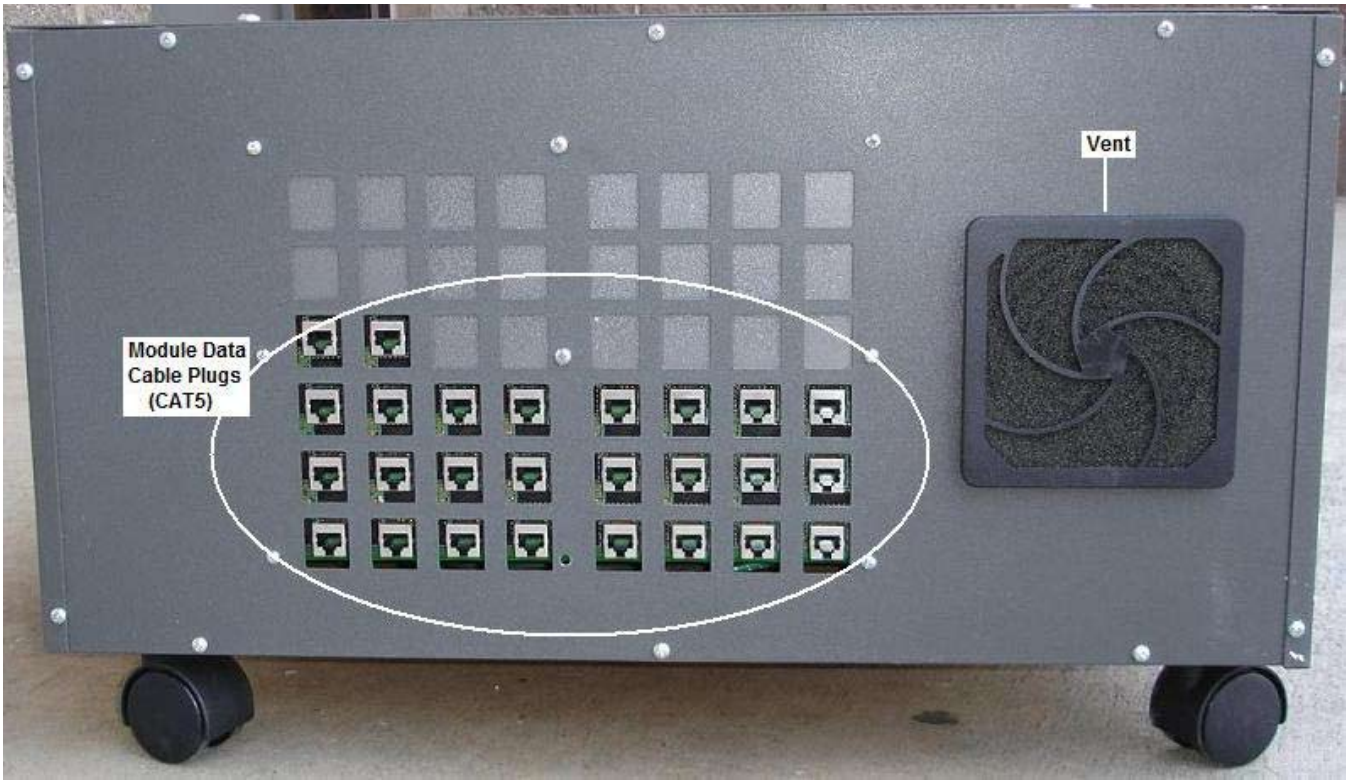


Figure BX-2 – Control Box, Side 2
(Showing Module Data Cable Plugs –CAT5)

Figure BX-3 – Control Box Side 3
(Showing Driver Board Power Cable Plugs)

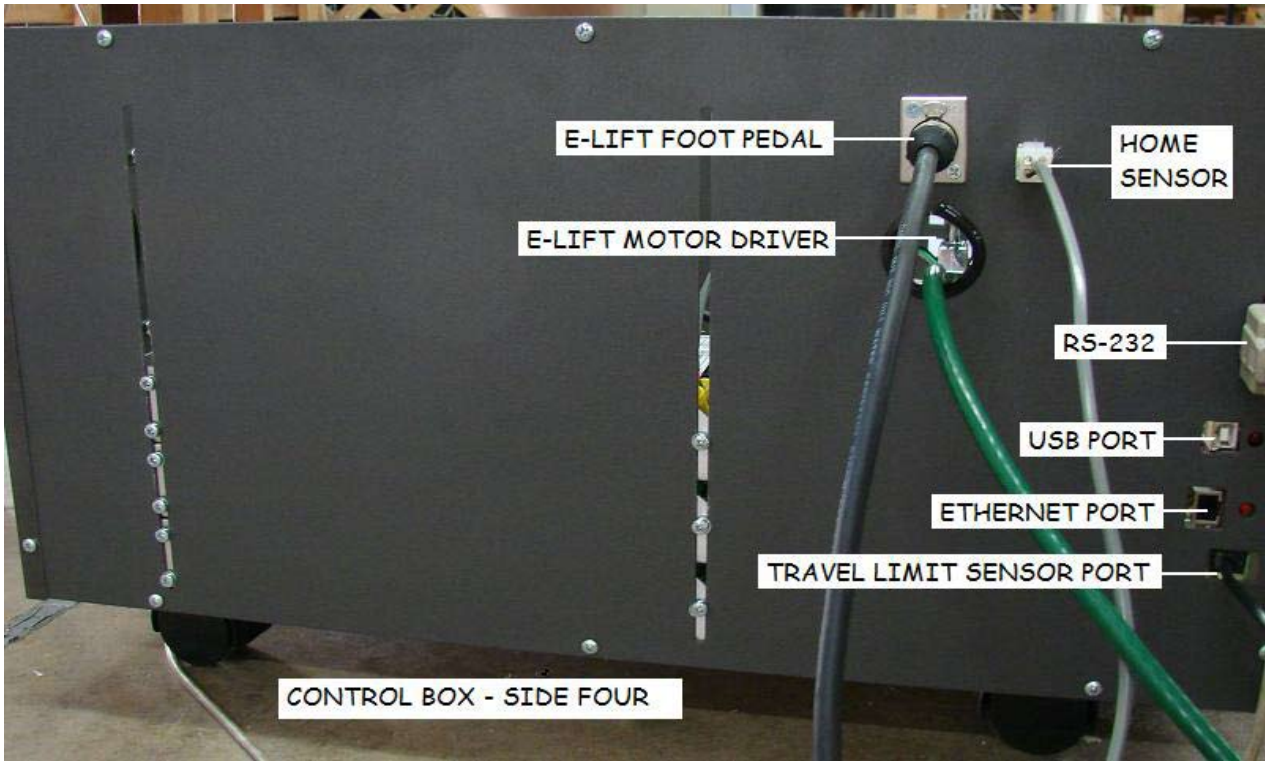


Figure BX-4 – Control Box, Side 4
(Showing E-Lift and Computer Connections)

Part Four: PROCEDURE FOR WARPING

Note: Jacquard Heddles are not rigid. This equipment will not tolerate significant distortion in the line of the warp yarns through the loom. For best results it is recommended that warp ends, when under tension, go from the warp beam, through the heddles, and through the reed with as little lateral distortion as possible.

1) **Wind the warp onto the WARP BEAM**. Follow the warping procedures outlined in the Weaving Section of your User's Manual for the A-Series Loom (Sections 2-1 through 4-4).

2) **Spread the HOOK FRAMES - Decreasing the Warp Density** (see Section III, #1, above). On the right side of the loom, locate the Warp Density Adjustment Assembly. Turn the circular handle on the assembly clockwise. This will cause the frames to separate from each other and to turn in a more parallel position with regard to the reed/front of the loom.

3) **Remove Beater Bar and Reed from the front of the Loom Frame**. This will enable you to reach the interior of the loom, through the frames to grasp and pull the warp ends through the heddle eyes.

4) **Thread the HOOKS**. Begin at the center of your warp beam, and thread the center most warp end through the center most HOOK EYE. Now, threading the next warp end, continue to the last warp end on that selvage. Go back to the center on the other side, and warp from the center to the other selvage. Be sure that you have not lost continuity in the threading across the center of the warp. This will insure that the warp is centered in the loom.

5) **Replace the Beater Bar and sley the reed**. Repeat the process as for #4 (above), beginning from the center and working out to the selvedges.

6) **Adjust the frames into position for weaving**. Follow instructions in Section III, #2 for Increasing the Warp Density.

Part Five: USING THE JACQPOINT SOFTWARE

1) **JACQPOINT SOFTWARE**: This loom must be used in conjunction with the JacqPoint Software (Version 2.0). This software allows for a 20 second time-out. This will prevent prolonged activation of the components that might result in damage caused by overheating. Caution: Do not use any other version of the JacqPoint software.

A) Open the JacqPoint program.

B) Select the desired pattern.

C) **In the <u>Weave Menu</u>**, select the correct Jacq Com Port.
- i) In the same window, disable the screen saver and
- ii) Select 120 Hook/Board System.

D) **Again, in the Weave Menu**, select Loom Control.
- i) Select the Start and End Picks.
- ii) Hit Enter and the Jacquard Control Window will open.

E) **The Jacquard Control Window** will show.
- i) Total Pick count.
- ii) Last Pick Woven.
- iii) Present Pick Number.
- iv) Next Pick Number.
- v) You may also select to Reverse in this window.

F) When you leave the pattern, closing the Loom Control Window, your settings will be saved. <u>Caution: When ready to begin weaving again, use the Resume Option on the Weave Menu</u>. This will enable you to continue from the last pick woven. *If you do not use the Resume Option, your settings will not be saved.*