

Jacq3G Loom User's Manual



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INTRODUCTORY INFORMATION

SAFETY

Before Getting Started:

Please read the entire manual before using the loom.

Warnings:

WARNING:

EQUIPMENT SHOULD ONLY BE USED FOR TEXTILE MANUFACTURING. IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.



WARNING:

ELECTRICAL SHOCK HAZARD. DO NOT TAMPER WITH ELECTRICAL WIRES OR OPERATE THE LOOM WITH SAFETY PANELS OPENED OR REMOVED.



WARNING:

PINCH, CRUSH, AND FINGER CUT-OFF HAZARDS. DO NOT OPERATE THE

LOOM WITH SAFETY PANELS OPENED OR REMOVED. DO NOT PLACE HANDS IN MOVING MECHANISMS OR SCISSORS.



WARNING:
EQUIPMENT PANELS ARE AWKWARD AND HEAVY. TO AVOID MUSCLE STRAIN OR INJURY, USE PROPER LIFTING TECHNIQUES AND A HELPER.

WARNING:
DO NOT POSITION EQUIPMENT IN A WAY TO BLOCK OR IMPEDE ACCESS TO DISCONNECTING DEVICES, EMERGENCY STOPS, OR ON/OFF BREAKER SWITCHES

WARNING:
USE OF CONDUCTIVE FIBER OR YARN ON OR AROUND THIS EQUIPMENT WILL VOID WARRANTY AND MAY DAMAGE EQUIPMENT.

WARNING:
THIS EQUIPMENT IS CLASSIFIED FOR LIGHT INDUSTRIAL ENVIRONMENT ONLY. OPERATION OF HIGH-CURRENT DRAW EQUIPMENT (EX. MIG WELDER) ON THE SAME ELECTRICAL CIRCUITS MAY CAUSE EQUIPMENT FAILURE.

Safety Features:

Covers and shielding separate weaver from moving components where pinch hazards exist. Do not reach under a covers and shielding while the loom is operating.

INTRODUCTION

About AVL

AVL Looms has been in the business of designing and building some of the world's finest handweaving looms since 1977.

Jim Ahrens had been building and designing looms for a number of years before Jon Violette, the "V" in AVL, approached Ahrens about a partnership in 1977. Violette, an industrial management professional, had discovered Ahrens' work through his sister who ran the Pacific Basin School of Textiles in Berkeley, where Ahrens was a volunteer advisor.

The two men worked together in the Bay Area for three years until Violette moved Ahrens and Violette Looms to Chico, where it officially became known as AVL Looms Inc., and has operated ever since.

In 1982, Violette was instrumental in the development of the first computerized dobby, then called the "Apple Dobby". He retired from active life in the company in 1987.

Once known for our production looms, AVL has broadened its line considerably and we now offer customers a full spectrum of fine weaving equipment, ranging from our small Home Looms, to our Industrial Dobby Looms, Rug Looms, and Jacquards.

LOOM FEATURES

The AVL Jacq3G is the ideal jacquard loom for designers, educational institutions, production hand weavers and artists. Whether weaving samples, production fabric or works of art, Jacq3G yields unprecedented design freedom and the latitude to create an unlimited variety of motifs and fabrics.

Like all jacquards, Jacq3G enables individual control over each thread, yielding the equivalent of an unlimited number of "harnesses". The design possibilities are endless.

The Jacq3G uses the same frame as the A-series loom and has most of the same weaving options.

Tension Device

The tension device allows you to advance the warp without a brake pedal. This is the standard setup for the Jacq3G loom. You will find that you can weave with less warp tension with a weight control than with the conventional ratchet system. Once the correct tension adjustment is made, it will be maintained automatically as the weaving is advanced. For light, fragile warps, it may be necessary to use a lighter weight than the one that comes with the loom and for dense, heavy warps, you may have to add some weight to the arm. You can order half size weights from AVL Looms. This can be used by itself for very light tension or can be used with the existing weight if more tension is needed.

Cloth Storage System

The Cloth Storage System consists of the Cloth Storage Beam, the Cloth Storage Apron, and the Cloth Advance Handle and pawl. This system allows your woven cloth to be maintained under a separate tension from your warp.

Bottom Swing Beater

The Bottom Swing Beater is a standard feature of the Jacq3G Loom. You can choose to have the bottom swing beater replaced by an overhead swinging beater when you buy your loom. You can have a one-box flyshuttle system with the bottom swing beater.

Overhead Swinging Beater (Optional equipment)

The Overhead Swinging Beater can be purchased in place of the bottom swing beater for your loom. This beater allows for a one-box, two-box, or four-box flyshuttle system.

Beams

The Jacq3G loom allows you to use two warp beams. You can customize the loom to use three beams. If you have done so, the setup of the beams and the tension system will be slightly different from the two-beam setup.

Sectional Beam

If you have purchased a Sectional Beam, you will find it to be extremely adaptable to your needs. Because each hoop is removable, you may create sections of any width starting at one inch.

An AVL Sectional Beam with metal hoops has holes for the hoops at 1" sections. The beam comes with enough metal hoops to setup 2" sections. More hoops can be ordered from AVL if narrower sections are desired. For wider sections, remove as many metal hoops as needed.

You can purchase either a ½-yard sectional warp beam for the A-series, or a one-yard sectional warp beam. The one-yard sectional warp beam can only be used in the upper position.

Plain Beam

The Plain Beam is provided with an apron, which will allow you to maximize the length of your warp.

Separation Roller

You will have one of these rollers for each warp beam. They serve to establish the warp in its horizontal plain.

Lift system

The Jacq3G loom can come with an E-Lift, or an A-Lift.

The E-Lift is an electrical motor, which replaces treadles on your loom and allows the shafts to be lifted easily and smoothly by pressing a pedal.

The A-Lift is a motorized lift powered by an air compressor, which replaces treadles on your loom. It allows the shafts to be lifted easily and smoothly by pressing a pedal.

Jacq3G Module

Each Jacq3G module consists of 120 independently acting hooks. The design is modular, allowing the addition of a single module up to 40 total modules on our largest frame. Hook activation is accomplished using miniature solenoids. When selected, the solenoid maneuvers a hook wire into position to be captured by a lifting knife. When unselected, the hook wire remains captured by a dropping knife. The lifting and dropping knives work in concert creating a countermarch-type action. And since each hook only moves half the shed height (either up or down), the shed is achieved in half the movement and half the time of rising shed or jack-style systems. Each module also contains the full complement of heddles, springs, anchors.

Dial-A-Sett

With a turn of a wheel, expand or contract the hooks to the full width of the loom or down to a tight sett; from 8 to 80EPI (or greater).

Dial-A-Sett consists of an exclusive accordion structure, which floats on bearings and is attached directly to the modules; framing connecting the accordion structure to the loom and a central screw-based adjusting mechanism.

Communications & Electronics

The Jacq3G has 3 built in modes of communication:

- Ethernet
- USB
- Serial

The electronics were designed from the ground up using the same tried-and-true Compu-Dobby technology. Further, we added a more robust signal transfer between the control box and the modules on the loom ensuring fantastic pattern reliability and to allow greater flexibility in control box placement.

Software

JacqPoint controlling software (by the author of WeavePoint) comes with every AVL Jacquard. JacqPoint reads the J1P standard format, which is currently supported by ArahWeave PE, ArahWeave Super PE, Pointcarre, ScotWeave, JacqCAD MASTER and others. JacqPoint can also import bitmaps from most paint programs like PhotoShop.

ABOUT THIS MANUAL

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 about the operation of your Jacq3G that you should be aware of, in order to prevent damage to your equipment and provide for many years of production. While important notes and warnings are called out in separate paragraphs, make sure you read all the information in this manual to make sure nothing important is missed.

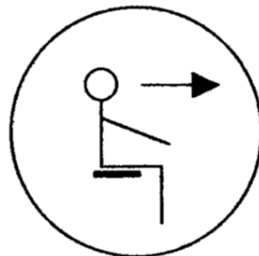
Here at AVL, we know that a picture is, indeed, worth a thousand words and have included many detailed images to help clarify our instructions. Some

pieces of your loom have identifying information stamped on them. However, others do not, so the pictures and diagrams are useful to help recognize certain parts.

AVL looms are very customizable. This manual covers the most common options for the Jacq3G loom. Sections which discuss options that you do not have on your loom can be skipped. Any features on your loom that are not covered here will come with a separate manual.

LOOM ORIENTATION

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 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.



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.

JACQ3G LOOM PARTS

The following two pictures offer a guide to the parts of the loom. You may want to remove these pages from the manual so that you can easily refer to them as you put together the loom. Study all the images carefully and make certain that your assembly looks like the one in the drawings as you assemble your loom.

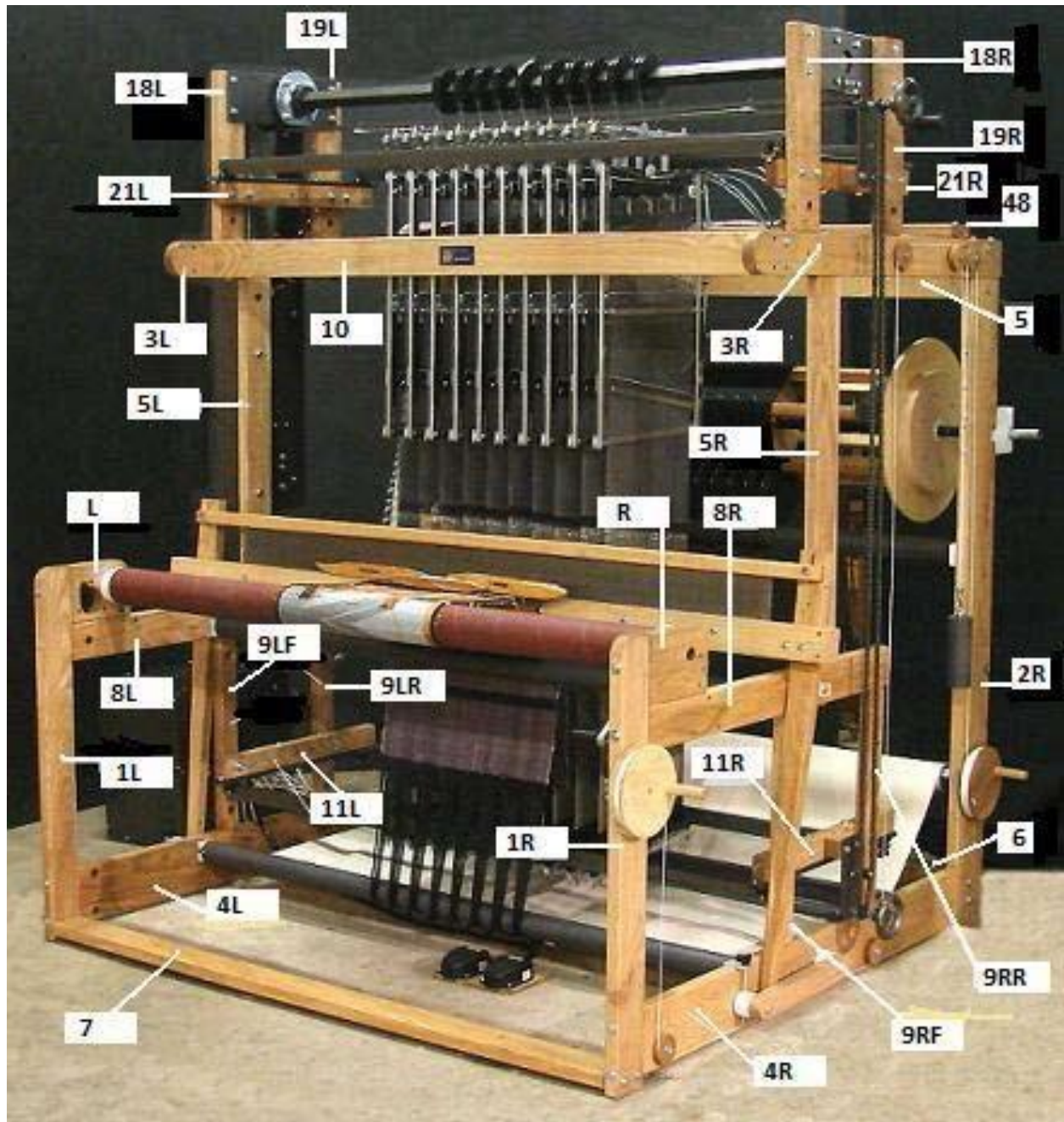


Figure 1 - Jacq3G - Full View

Part Number	Part Name
1R	Right Front Vertical Side Frame
2R	Right Rear Vertical Side Frame

1L	Left Front Vertical Side Frame
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
11 R&L	Channel Support, Lower
18R&L	Main Drive, Vertical Support, Front
19R&L	Main Drive, Vertical Support, Rear
21 R&L	Channel Support, Upper
48	Data Cable Guide

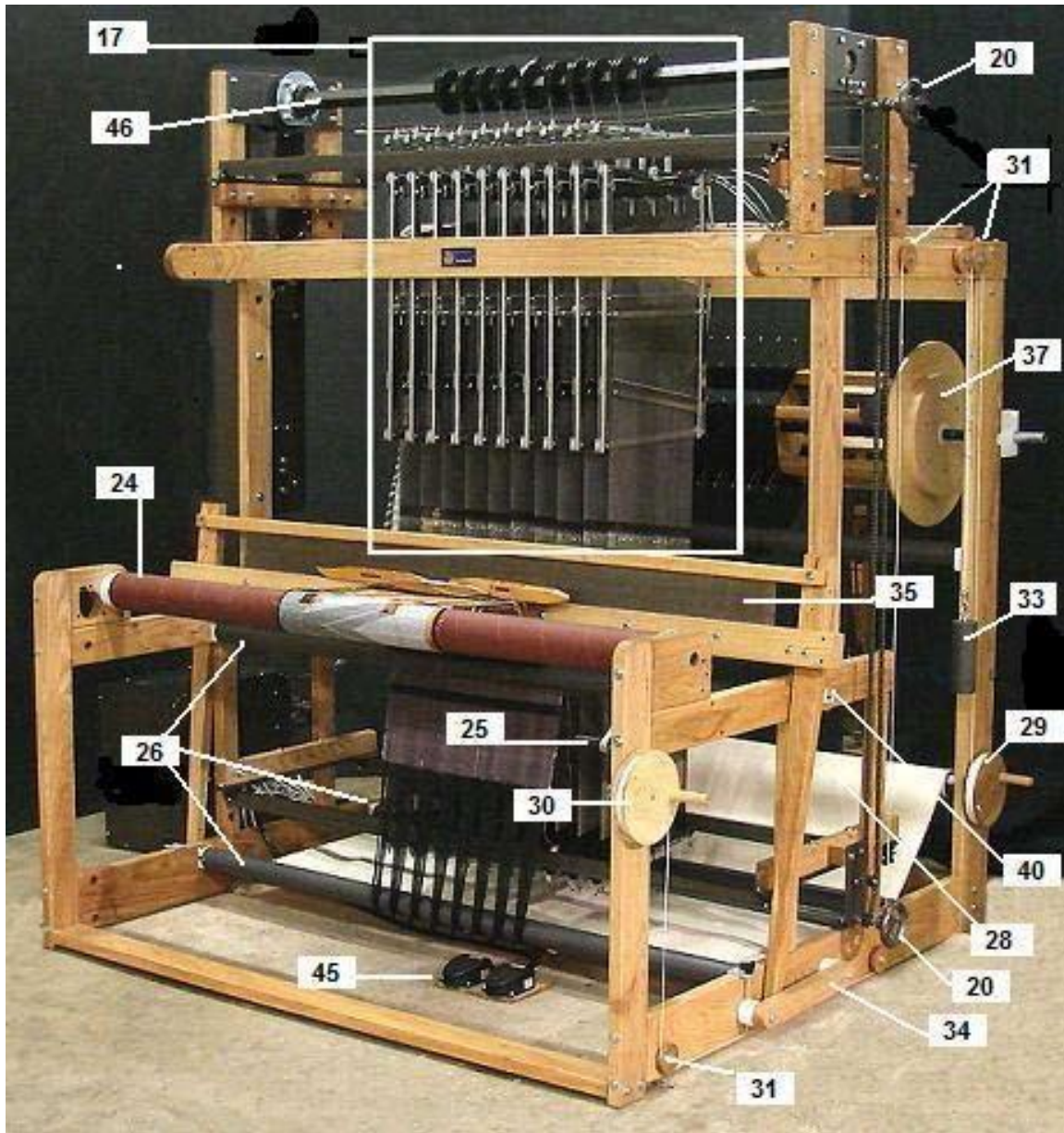


Figure 2 - Jacq3G - Full View

Part Number	Part Name
17	Modular Assembly
20	Dial-A-Sett Assembly, Upper and Lower
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 (<i>bottom swing</i>)
35	Beater Assembly
37	Second Warp Beam
40	Beater Bumpers (two)
45	E-Lift Foot Pedal
46	Main Drive Axle

Additional Parts

The following parts are not shown in the preceding pictures. For details of these parts, see the relevant sections.

Part Number	Part Name
2L	Left Rear Vertical Side Frame
16	Tension Arm Assembly, Standard
23	Warp Beam, Standard
38	Second Warp Beam Tension Arm
39	Warp Beam Separation Roller(s)
41	Raddle
42	Warp Beam Handle
43	Flyshuttle Cord Supports
47	Separation Roller Support, Track and Mount Assembly

TOOLS NEEDED FOR ASSEMBLY

There are a few tools you'll need to assemble the loom. These are:

- Phillips head screwdriver
- Flathead screwdriver
- 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, even after it has been assembled. Having the right tools available at the loom will ensure that over time you are more likely to maintain your loom.

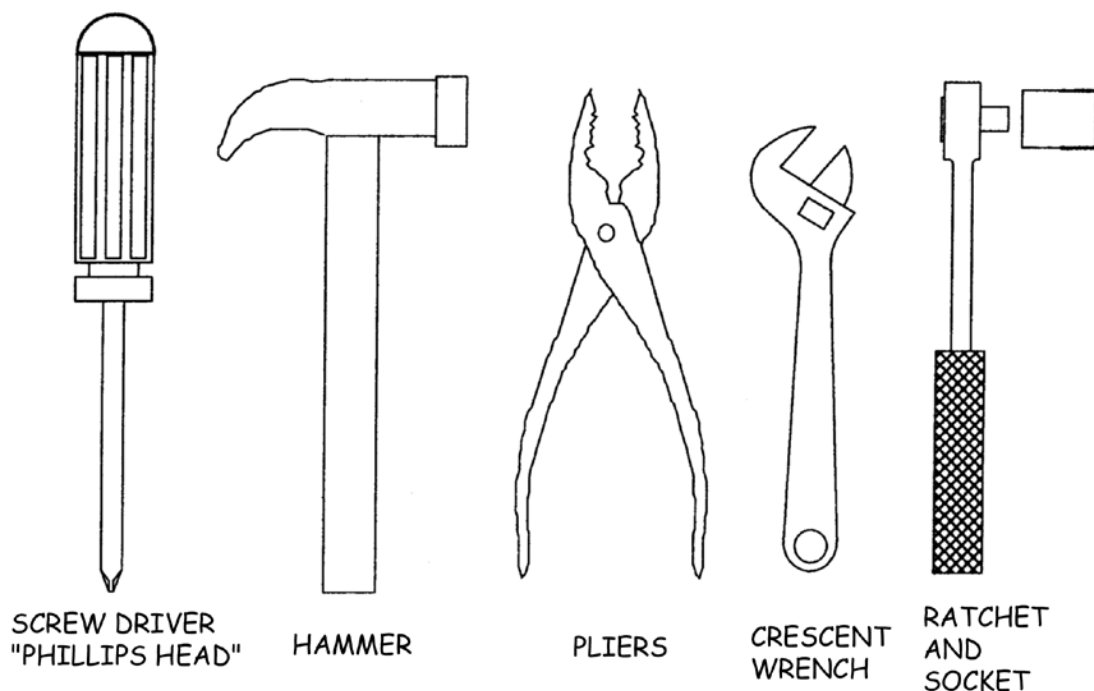


Figure 3 – Tools needed for assembly

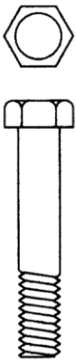
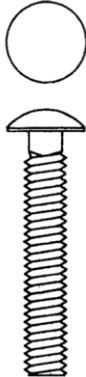

For protection in shipping, packing materials of several sorts are used around the pieces of your loom. Check the packing materials carefully for loom parts. You may want to keep all the shipping materials until the loom has been put together to make sure nothing is lost.



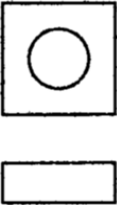
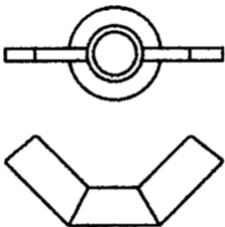
Remove all strapping tape and bubble pack. Layout parts as they are removed from the box so that you will be able to identify each one as they are identified in the instructions. Depending on the space you are assembling the loom in and your own work style, you can unpack boxes as you assemble the loom or you can unpack all the boxes before you assemble the loom.

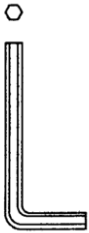

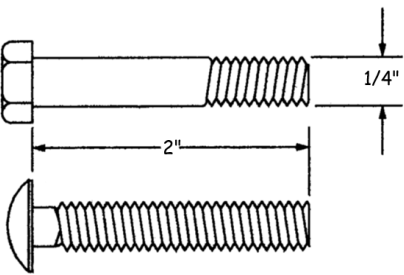
BOLT AND NUT HINTS

Hardware – Identify and Count

There are several hardware bags you will encounter as you progress through the assembly of your loom. Use the following pictures to familiarize yourself with the hardware.

 <p>Figure 4 - Hex Bolt</p> <p>These always get a washer between the head of the bolt and the wood.</p>	 <p>Figure 5 - Carriage Bolt</p> <p>These never get a washer between the head of the bolt and the wood.</p>	 <p>Figure 6 - Flat Head Machine Screw</p>
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 <p>Figure 7 - Flat Washer</p>	 <p>Figure 8 - Hex Nut</p> <p>These always have a washer between the nut and the wood and they attach to hex bolts or carriage bolts.</p>	 <p>Figure 9 - Square Nut</p> <p>These always go in a nut access hole. They attach with no washer between the nut and the wood, to hex bolts.</p>	 <p>Figure 10 - Wing Nut</p> <p>These always have a washer between the nut and the wood. They attach to carriage bolts.</p>
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 <p>Figure 11 - Allen Wrench</p>	 <p>Figure 12 - Socket Head Cap Screw (SHCS)</p>	 <p>Figure 13 - Measuring Bolts</p>
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If a bolt is a little tight going into a hole, give it a light tap with a hammer.

Remember to put washers under the heads of the hex bolts to prevent damage to the wood. Any nuts that are not in access holes will also need a washer.

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.

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.

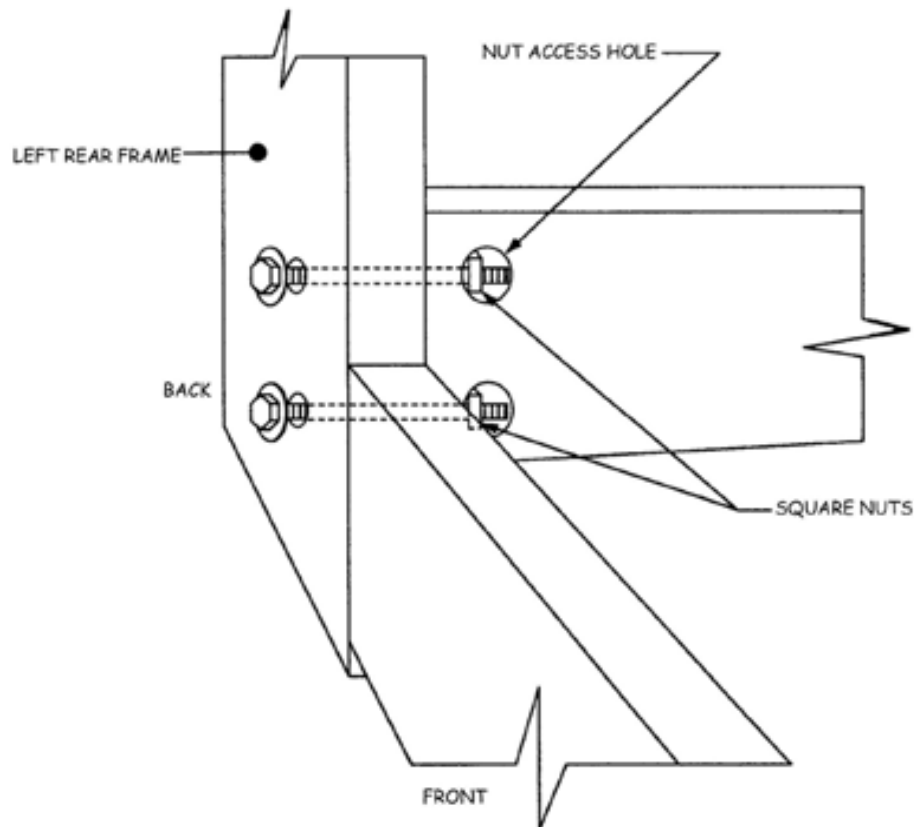


Figure 14 – Nut access hole

Always have the larger “nut access hole” facing toward the inside of the loom unless otherwise specified.

As shown, 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.

NOTE:

Given the limited space provided by the nut access holes, it can be challenging at first getting the nuts onto the bolt ends. You’ll find it helpful to push each bolt in just until it just appears in the access hole. Move the nut into position over the end of the bolt and hold it with your finger. Slowly turn the bolt clockwise and when the nut engages, tighten it most of the way down.

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.

BEFORE ASSEMBLY

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.

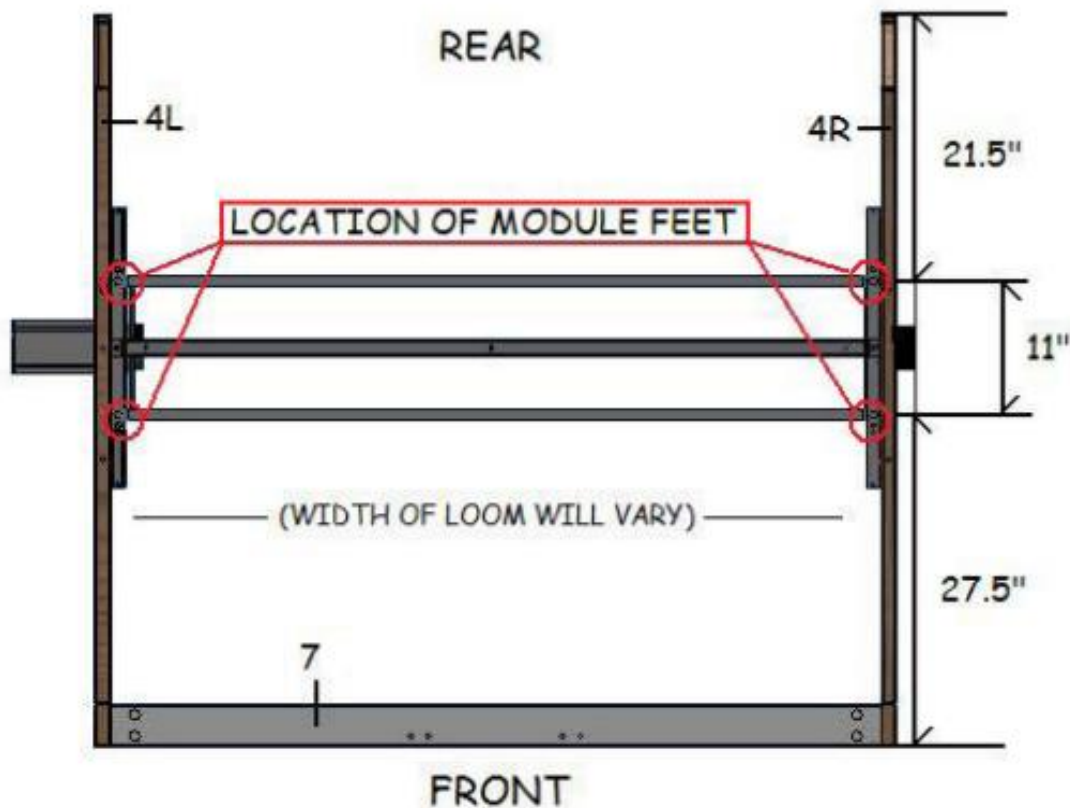


Figure 15 - Footprint of Wood Frame and Module Frame

ASSEMBLING THE LOOM

SIDE FRAMES

Hardware

Hardware	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

Side Frame Assembly

AVL Jacq3G Loom Side Frames are shipped disassembled. Use the following procedures to assemble them. The Side Frames must be assembled properly for the loom to operate.

The procedure for assembling a side frame is the same for the right and left side. The parts are stamped with a number and either R for the right side or L for the left side. Any differences in the parts will be noted in the instructions.

- 1) Unpack the side frame box and lay the pieces out. Separate the parts for the right side and the left side.
- 2) Locate the Side Frame hardware package. All bolts will be furnished with washers and square nuts.

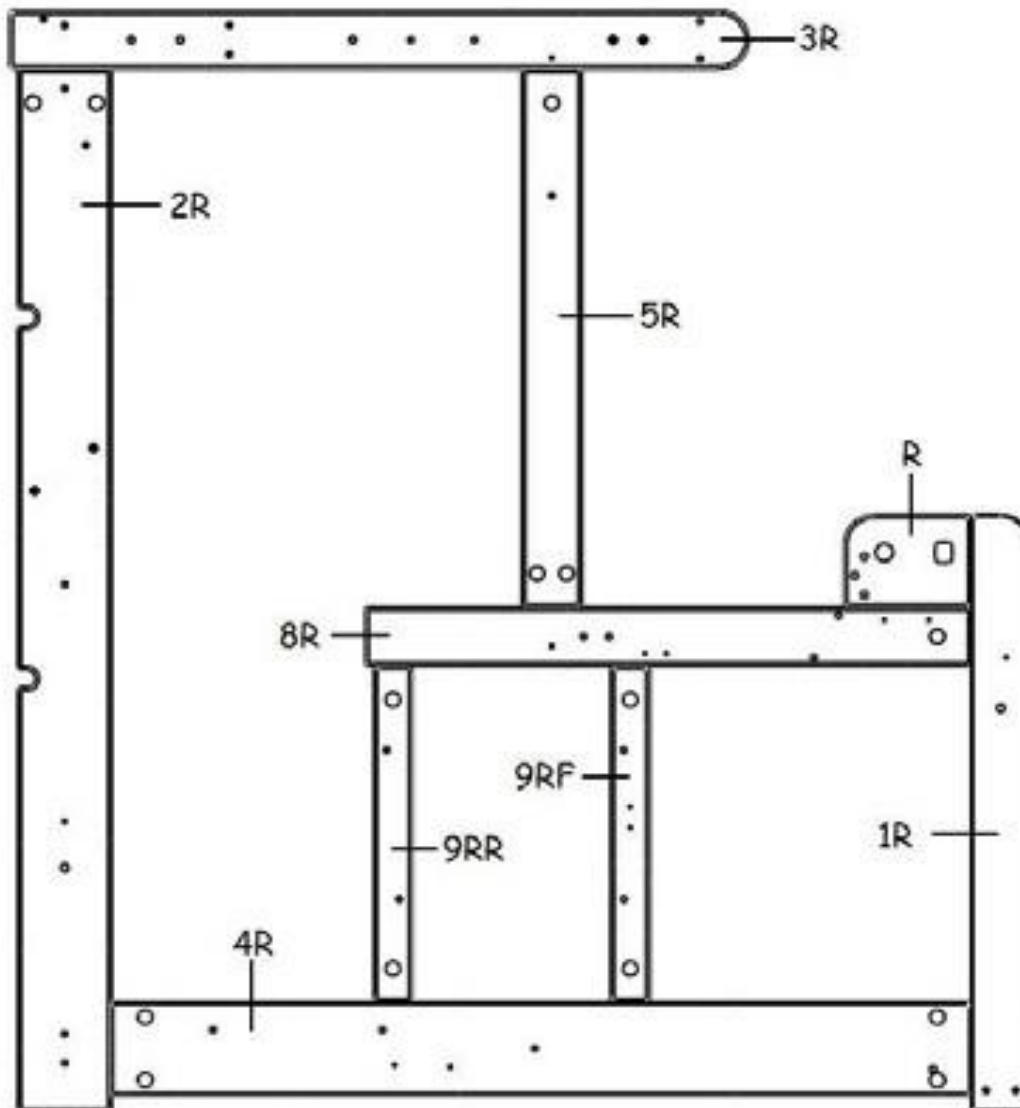


Figure 16 - Right Side Frame Assembly, inside view

- 3) Locate the Bottom Horizontal (4). Notice the four large nut access holes drilled in one side.

Note:

On all parts, nut access holes will go to the inside of the loom.

- 4) Using two 5- 1/2" hex bolts, secure the Front Vertical (1) to the front end (the end with the number stamp) of the Bottom Horizontal (4), making sure that the nut access holes on both parts are to the same side.

- 5) Secure the Rear Vertical (2) to the rear end of the Bottom Horizontal (4) using the same procedure with two 7- 1/2" long hex bolts.
- 6) Position the Front Side Support (9) to the Bottom Horizontal (4) at the hole toward the front of the loom.
- 7) Position the Rear Side Support (9) at the hole toward the Rear Vertical.

Note:

Make sure the number stamps on the Front and Rear Side Supports (9) are facing down and toward the Bottom Horizontal (4) and the nut access holes and bracket are to the inside.

- 8) Secure the two Side Supports (9) to the Bottom Horizontal (4) using two 7- 1/2" long bolts.
- 9) Secure the Lower Cloth Beam Support (8) to the Side frame. It attaches with one 5- 1/2" hex bolt through the Front Vertical (1) and with one 5- 1/2" hex bolt in each of the Side Supports (9).
- 10) Secure the Upper Cloth Beam Support to the side frame. It mounts on top of the Lower Cloth Beam Support (8) and attaches with one 5/ 16" x 5" bolt through the Front Vertical (1).
- 11) Secure the Castle (5) to the Side Frame. It attaches with two 5- 1/2" hex bolts through the Lower Cloth Beam Support.
- 12) Position the Top Horizontal (3) to the top of the Rear Vertical (2) and the top of the Castle (5), with the number stamp facing down. This will allow the several small holes on the top of the Top Horizontal (3) to be on top.
- 13) Secure the Top Horizontal (3) to the Rear Vertical (2) with two 5- 1/2" hex bolts and to the top of the Castle (5) with one 5- 1/2" bolt.
- 14) Repeat this process for the other side frame.

Note:

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

ASSEMBLY OF THE MODULE FRAME

Preparation

In the area where you laid out the loom footprint, check the location where the module feet will be when the frame is lifted into place. You will want to position the module frame in this spot.

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 18 - Initial Assembly Layout FOR SAFE POINTS FOR LIFTING AND MANUEVERING.**

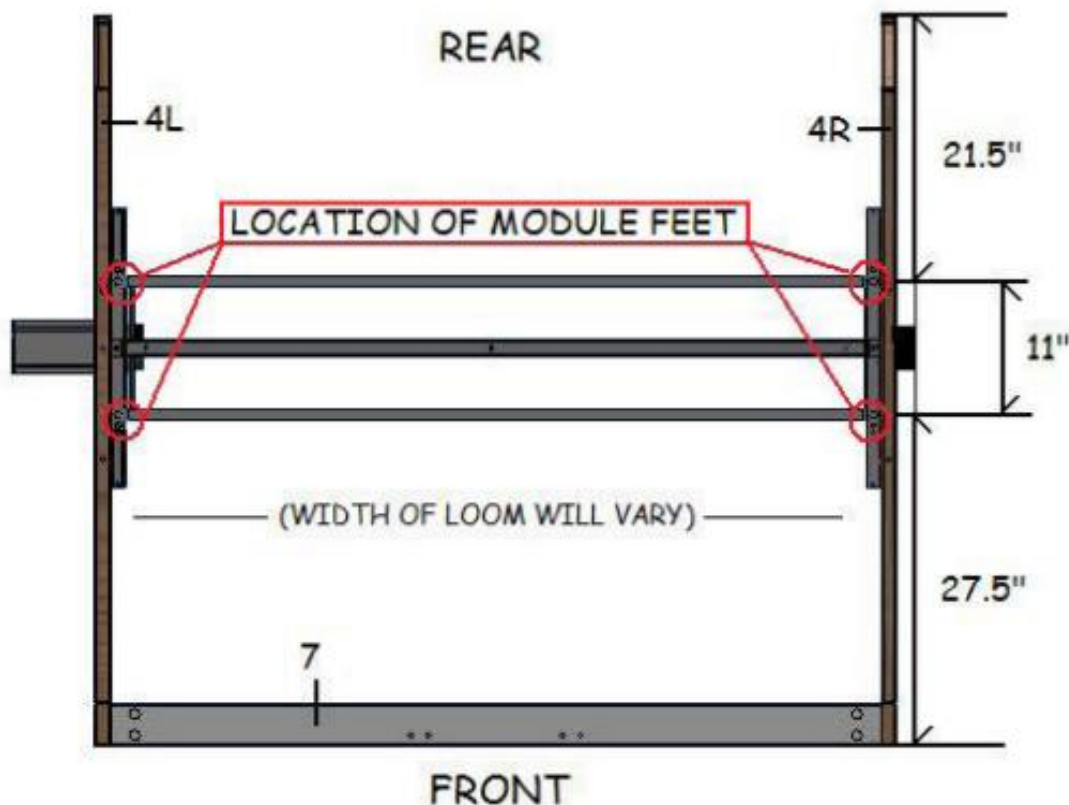


Figure 17 - Loom footprint

Hardware

Hardware	Location
8 - 3/8-16 x 1-1/2" Socket Head Assemblies Cap Screws (SHCS)	Side Frame Bars to Upper and Lower
8 - 5/16" x 7-1/2" Hex Bolts	Right and Left Wooden Frames to Module Frame
8 - Black Plastic Spacers	Standoffs between Wood and Modular Frames

Module Frame Assembly

- 1) Locate the Module Frame hardware package.
- 2) Locate the Lower Dial-a-Sett (D-A-S) Assembly. Position this assembly, so that the four rubber feet are pointing up, the circular DAS handle will be at the right side, and the bar upon which it is resting is about 6" in front of the foremost position line for the Module Frame.
- 3) 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. Position this assembly 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.

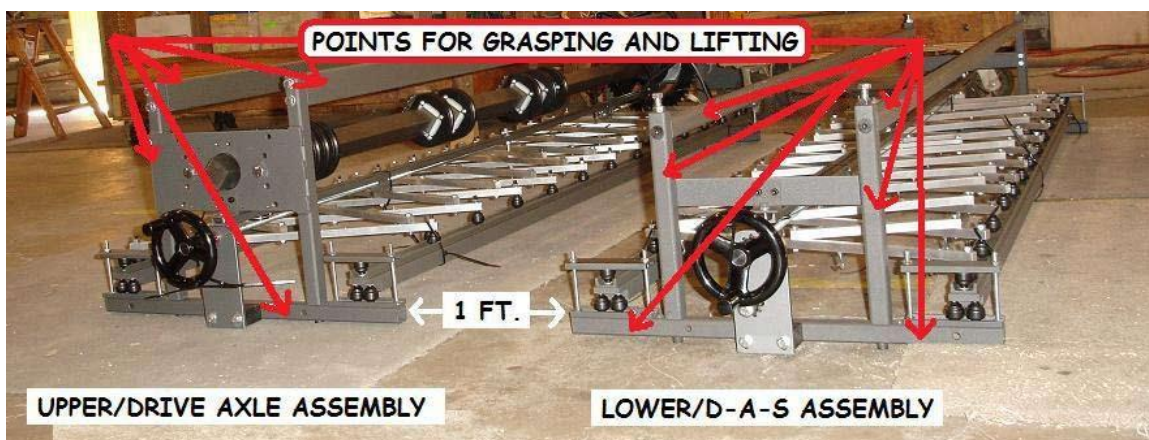


Figure 18 - Initial Assembly Layout

- 4) Locate the four wooden blocks that were packed with these two assemblies. Note that each block, standing on its short end, will fit

- neatly at the side of the assembly vertical supports. Place one at each outer corner of this layout.
- 5) 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.

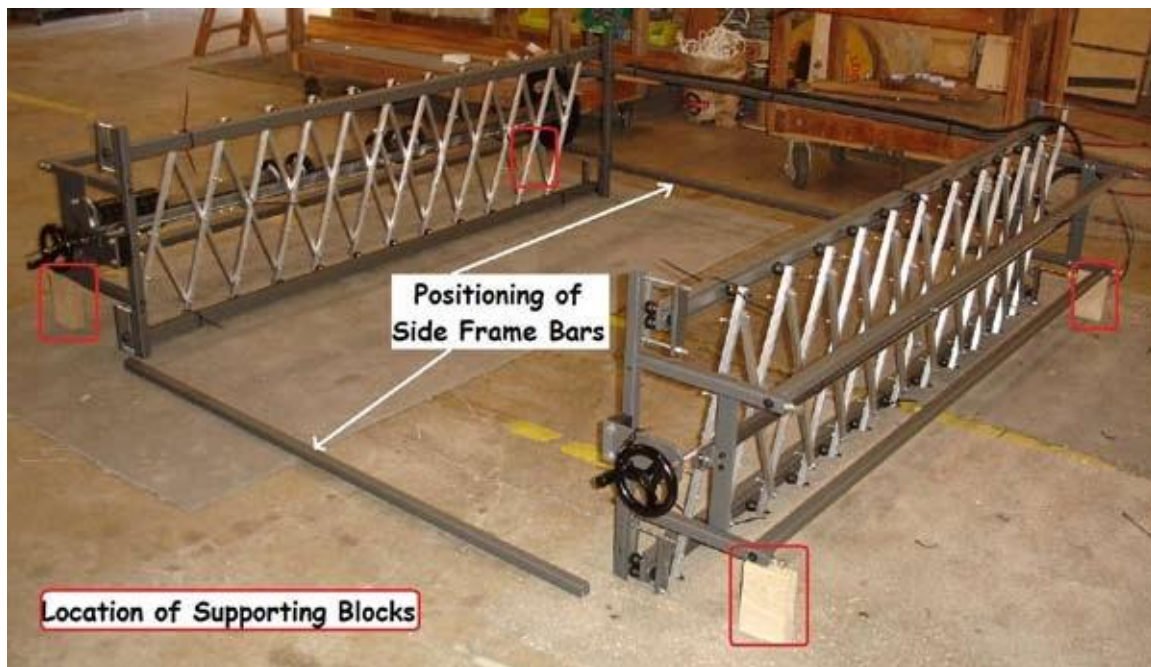


Figure 19 - Arrangement of Module Frame Pieces for Assembly

- 6) Carefully tip the Lower Assembly away from the Upper Assembly, so the feet are pointing towards the rear of the loom outline and supported by the wood blocks.



Figure 20 - Orientation of Side Frame to Upper and Lower Assemblies

- 7) Locate the four Side Frame Bars and install two at either side, connecting the Top and Lower Assemblies. 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- 6 x - 1/2" SHCS at both ends.

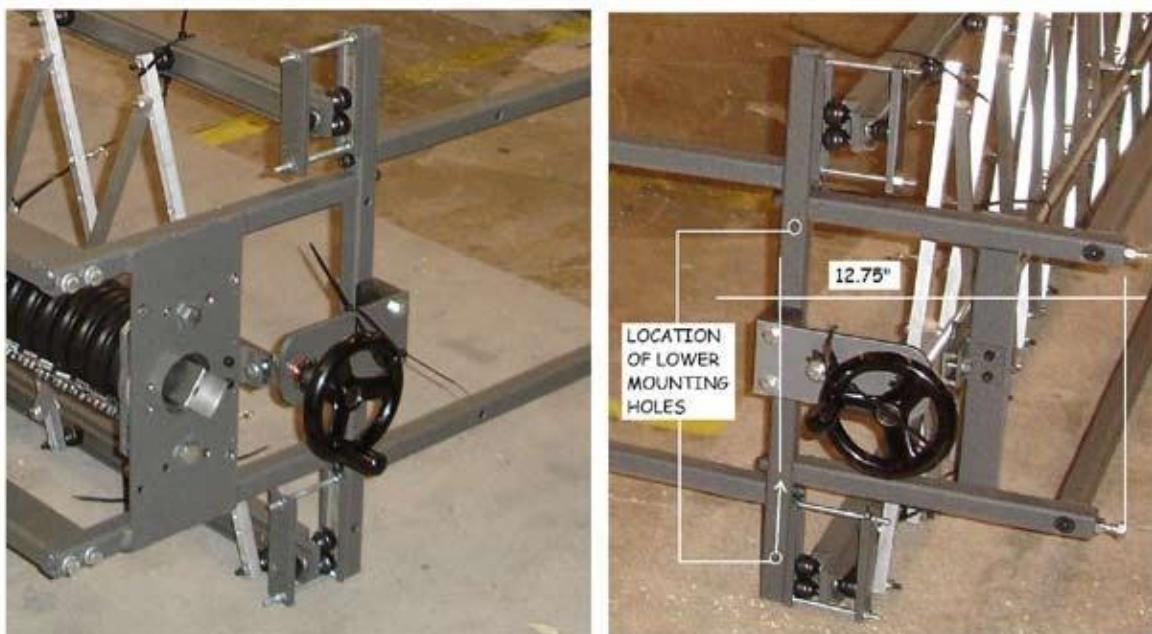


Figure 21 - Orientation of Side Frame Bars at Upper and Lower Assemblies



Figure 22 - Areas for grasping the Module Frame during the lift

- 8) 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 2-3/4". This will allow proper alignment with the corresponding holes in the wood frame.

Note:

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.

- 9) At least two people will be needed to lift the completed frame. Grasping the top cross members of the frame, lift the Top Assembly up, allowing the Lower Assembly to come to rest on its four feet.

INSTALL THE LOWER FRONT ASSEMBLY

The nut access holes for the lower front assembly are located on the bottom of the piece. You will need to be able to prop the side frames up so that you can secure the bolts easily. This will be easier to do before you have connected the side frames to the module frames.

- 1) Place the side frames in position around the module frame, but do not connect the frames yet.
- 2) Locate the Lower Front (7).

- 3) Position the Lower Front (7) between the two wooden sides. The nut access holes in #7 will face to the floor, so prop this piece up slightly, to allow enough room.
- 4) From the outside of the loom, insert the two 5/ 6" x 3- /4" hex bolts into the holes at each Side Frame, through the Lower Front. Secure each with a square nut in the access hole.

CONNECT SIDE FRAMES TO MODULE FRAME

Now that the module frame is assembled and in the correct location, it can be connected to the side frames. At this time, you will also connect most of the wooden crossmembers to the side frames.

Note:

When attaching the crossmembers to the side frames, do not tighten the bolts completely. You will tighten all the bolts on the loom after squaring the loom on page 35.

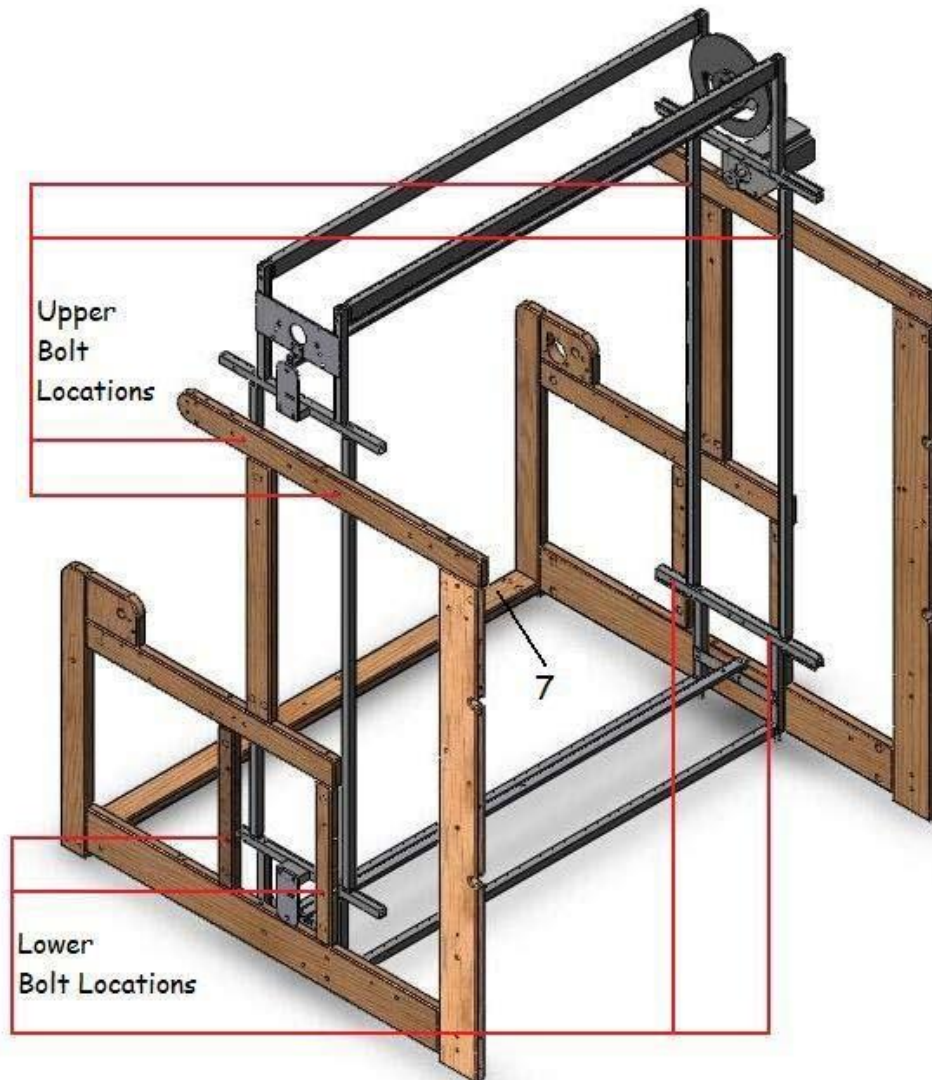


Figure 23 - Wood and Module Frames with Connecting Bolts

- 1) Align the connecting holes in the side frames and the module frame.
- 2) Secure in place with four (4) 5/ 6 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.

ADD THE DATA CABLE GUIDE

- 1) 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).
- 2) Align the holes drilled at each end of the Data Cable Guide with the third hole from the back, on the top edge of the Right and Left Top Horizontals (3R and 3L).
- 3) Hold it in place with two (2) 5/ 6 x 5" hex bolts with flat washers, inserted from the underside of the Top Horizontals.
- 4) Secure each with a second flat washer, a lock washer and 3/8" hex nut.

ADD THE LOWER BACK

- 1) Using four (4) 5/ 16" x 3- 1/4" hex bolts, with washers, attach the Lower Back (6) between the side frames. Remember, the nut access holes face the inside of the loom.
- 2) Secure the bolts with the nuts lightly.

Note:

Remember not to tighten the bolts on the frame until you have squared and leveled the loom.

INSTALL THE MODULES

The modules are installed at this point so that you will have enough room to work with them.

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.

- 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. If you have an Air Lift it will hold in this position without need of restraint.

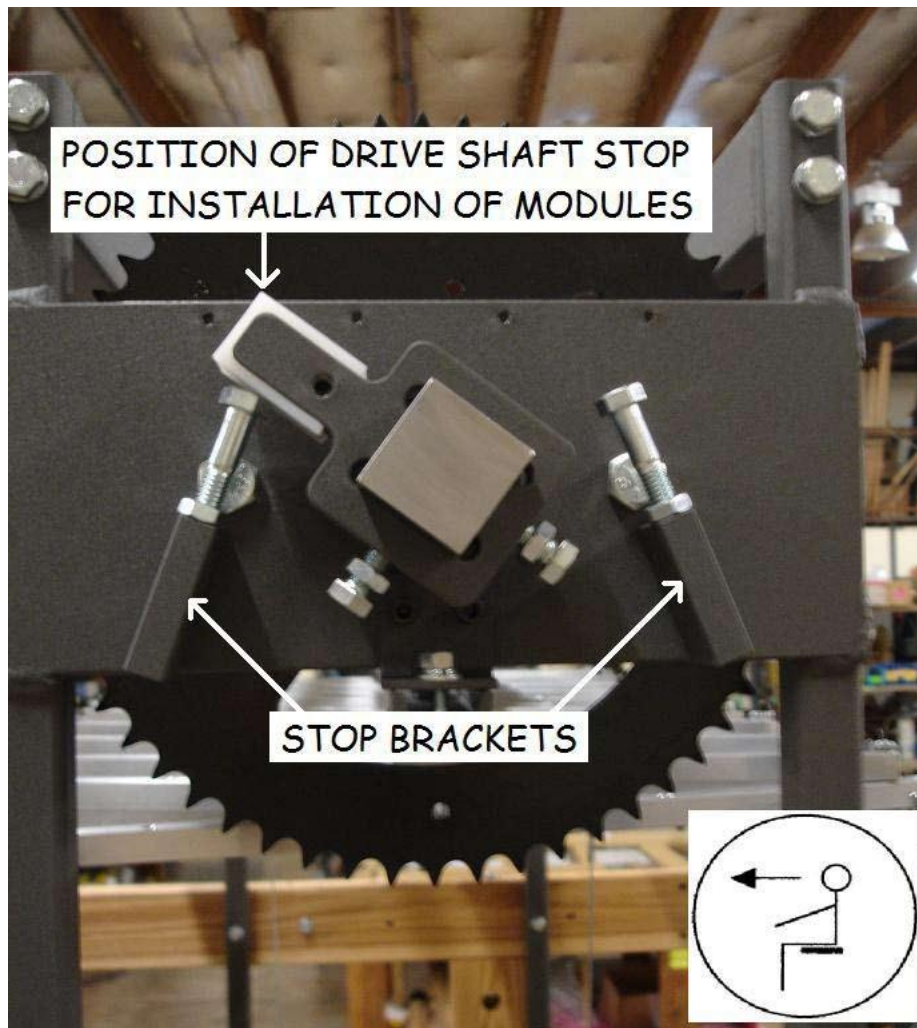


Figure 24 - Position for Securing Axle prior to Module Installation

- 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 while weaving), 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.
- 4) 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.
- 5) Tighten the button head cap screws that were loosened in Step 2.

- 6) 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.

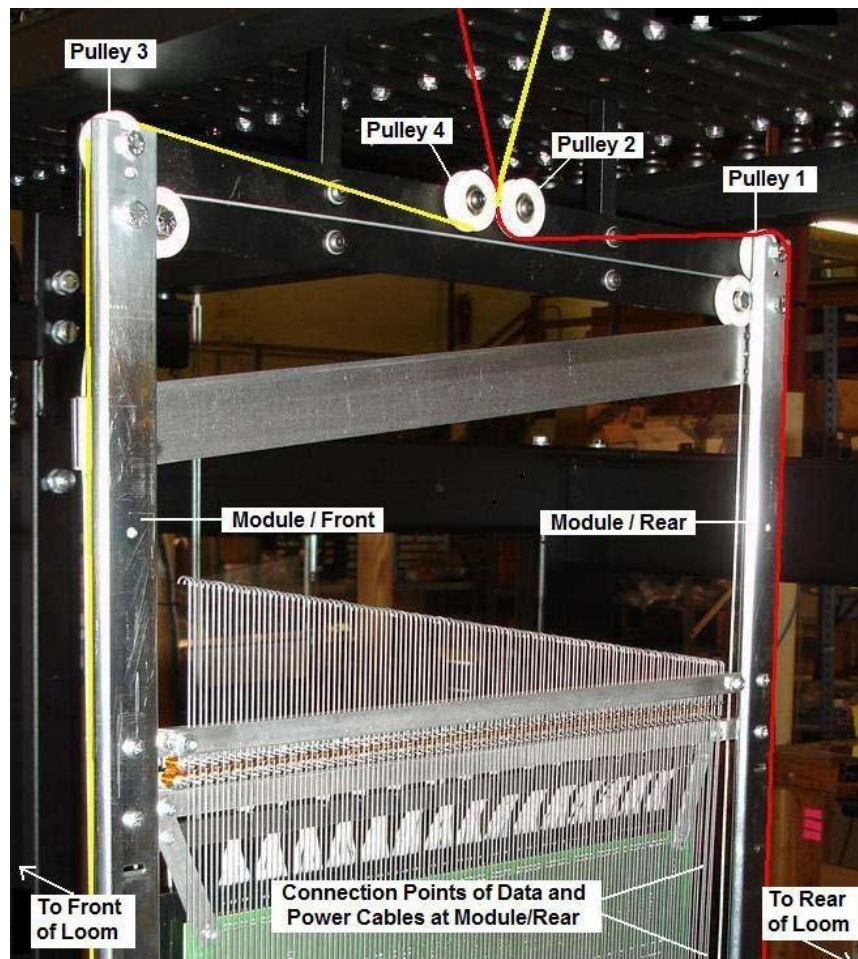


Figure 25 - Routing the Module Cables

Note:

During this next step, it is critical that the cables be mounted in the order described here.

- 7) Route the plastic coated cable, located at the rear of the Module, 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.
- 8) 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.

- 9) Pull the cable tight, making sure the Slide Bars come together in the middle of the Module. Tighten down the hex nut on the Drive Pulley.
- 10) 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, towards the rear of the loom. Then wrap it under Pulley #4, at the top middle of the Module.
- 11) 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.
- 12) Pull the cable tight and tighten down the hex nut on the Drive Pulley.
- 13) 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.
- 14) Repeat these steps for all modules.

Connect and secure Data and Power Cables.

- 1) Connect the Data and Power Cables to each Module/ Green Board.
- 2) 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.
 - 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.

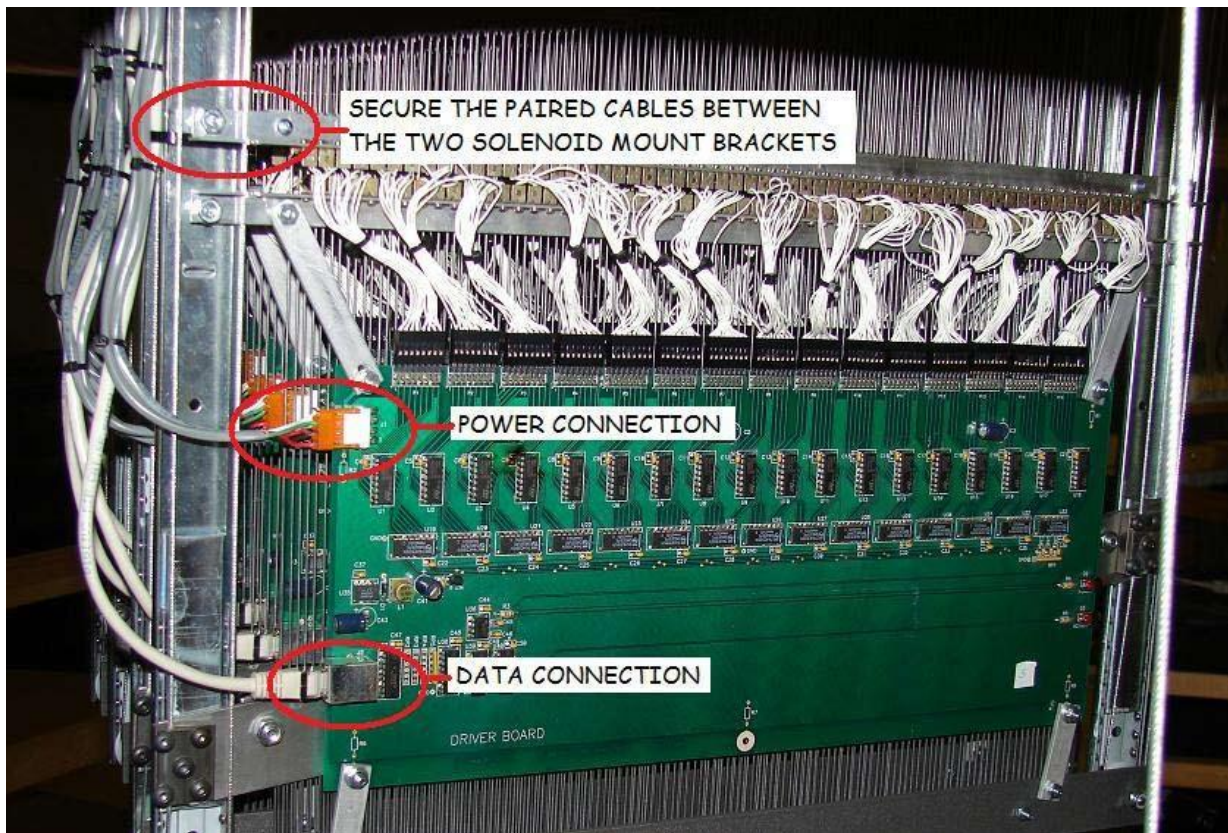


Figure 26 - Connection of Cables and Securing them to the Module Frame

- 3) 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.

FINISH CONNECTING THE FRAME

- 1) 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.
- 2) Locate the two holes at each side, on the Upper Horizontals (3R and 3L), located near the rounded, front tip of these pieces.
- 3) Align the Crossmember between these holes, with the plaque facing outward.

- 4) Secure in place with four 5/ 6 x 3- /2" hex bolts with washers and a square bolt.

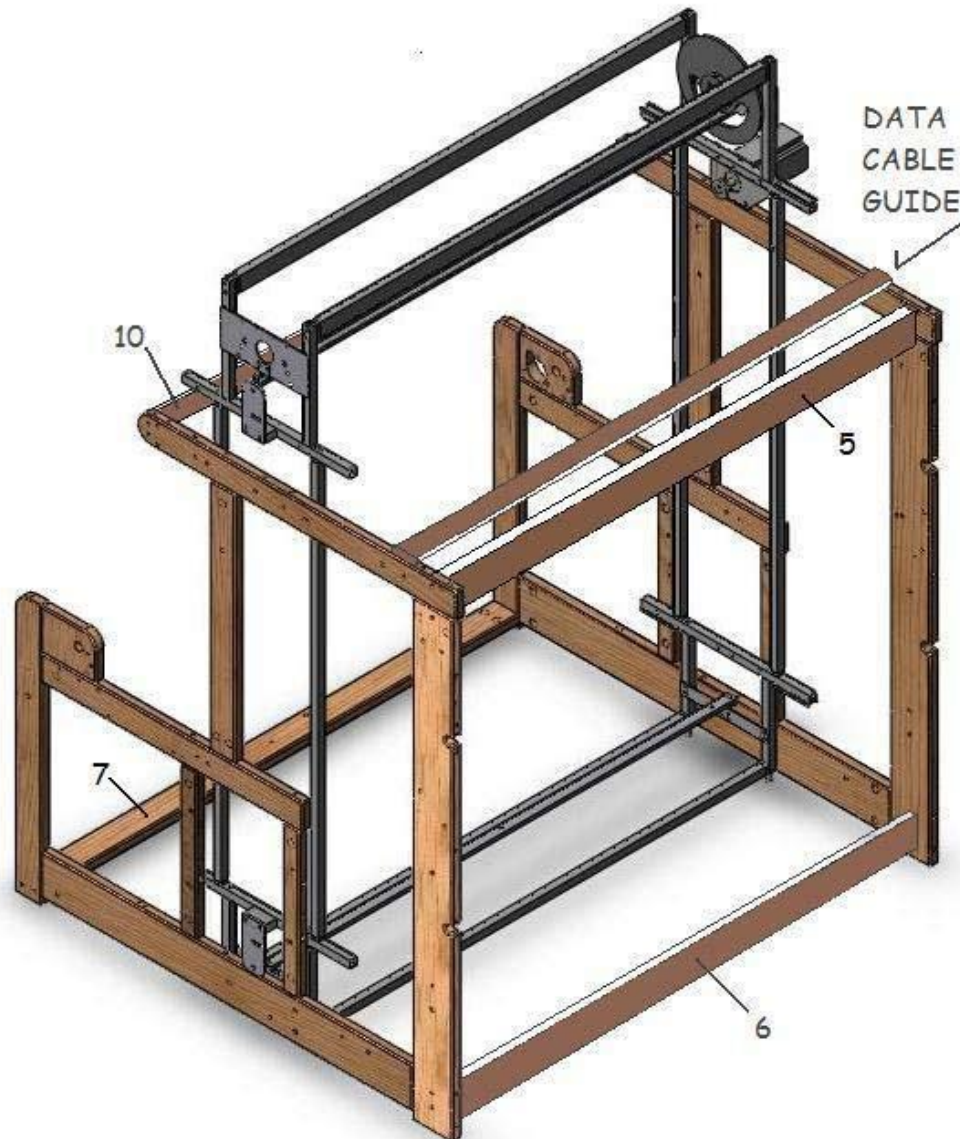


Figure 27 - Completed Module and Wood Frames

- 5) Install the Upper Back (#5) using four 5/ 6" x 3- /4" hex bolts, washers, and square nuts.

SQUARING THE COMPLETED FRAME

Now that you have completely assembled the Loom Frame, it is time to make sure 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.

- 1) 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).

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.

Note:

If you cannot adjust the frame easily, you may have tightened the bolts too much in the preceding steps. Loosen some of the bolts and try again.

- 2) 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.
- 3) Once the loom is square and level, then you must check and tighten all bolts and nuts that connect the frame pieces.
- 4) 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.

ADD THE WARP BEAMS

WARP BEAMS

The Jacq3G comes standard with the ability to use two warp beams at a time. With this system, you can use a one-yard sectional beam in the upper position. You can use a ½-yard sectional or plain beam in either the upper or the lower position depending on the brake cable you have available. For the lower position, you will receive a brake cable marked #16. For a plain or ½ yard sectional beam in the upper position, you will have a brake cable marked #38P. For a 1 yard sectional beam in the upper position, you will have a brake cable marked #38S.

You can order the Jacq3G loom with a three beam system. In this case, you can use a ½-yard sectional or plain beam in any position. You cannot use a one-yard sectional beam with the three beam system.

In either of the above options, installing the beams and tension systems are very similar. With three beams, the tension systems will be installed in different locations.

The warp beams are held in place by beam retainers that lock into place over the notch where the axle of the warp beam is placed. If these are not already installed on the loom frame, follow these steps to install them.

- 1) Locate the small plates and mounting bolts in your hardware bag, one pair for each Beam.
- 2) Secure the retainer plates with the bolts into the threaded inserts directly above each warp beam slot.
- 3) Swivel the plates up, positioning them horizontally above the slot and tighten the small bolt just enough to hold the plate in that position. This will allow you to easily install the warp beams.

INSTALL THE LOWER WARP BEAM

Either the plain warp beam or the ½ yard sectional warp beam can be installed in the lower position. The axle of the warp beam is locked in place by the beam retainers.

- 1) Lift up the warp beam, and with the large, round wooden drum to the left side of the loom, seat the beam axle into the slots.
- 2) Swing the retainers around to hold the beam.



Figure 28 - Beam Retainer

- 3) When the latches have captured the axle and are in a vertical position, tighten them down.

Warp Beam Handle

- 1) Find your warp beam handle (#42).
- 2) Remove the wing nut, washer, and bolt from the end of the handle.
- 3) Place the hole in the handle over the left end of the warp beam axle (making sure the handle faces away from the loom).
- 4) Line up the hole in the axle with the carriage bolt and push it through.



Figure 29 - Warp Beam Handle

- 5) Reattach the washer and wing nut and tighten.

INSTALL THE UPPER WARP BEAM

If you have ordered a one yard sectional beam, it can only be placed in the upper position. You can also install a second plain beam or ½-yard sectional beam in the upper position.

- 1) Lift the warp beam, and with the drum to the left side of the loom, seat the beam axle into the slots.
- 2) Swing the retainers and when they have captured the axle and are in vertical position, tighten them down.
- 3) Install the Warp Beam Handle.

Note:

If you are using three warp beams, install the third beam in the middle position with the brake drum to the right of the loom.

INSTALLING THE SEPARATION ROLLER

If you have ordered one beam, you will receive one separation roller. If that beam is in the lower position, the separation roller will go in the lower position. If that beam is in the upper position, the separation roller will go in the upper position.

Install a separation roller for each beam you install on your loom.

- 1) Slip one end of the roller into its pinned slot.
- 2) Pull the pin out of the other bracket, drop the roller in, and replace the pin.

TENSION ARM INSTALLATION

Lower Position Tension Arm

In the lower position, you can only have a plain warp beam or a 1/2 yard sectional warp beam. The brake cables for the upper and lower position are different, so check the labels. For the lower position, you will receive a brake cable marked #16. For a plain or 1/2 yard sectional beam in the upper position, you will have a brake cable marked #38P. For a 1 yard sectional beam in the upper position, you will have a brake cable marked #38S.

Note:

If you only have one beam and it is a plain or 1/2 yard sectional, you will normally use the upper position for the beam, unless you requested otherwise when ordering your loom. If you are only using one beam and it is a one yard sectional beam, it must be in the upper position. Please refer to the next section for tension arm instructions.

- 1) Find the tension arm and place it so that the face of the pulley lies against the inside of the left rear vertical.

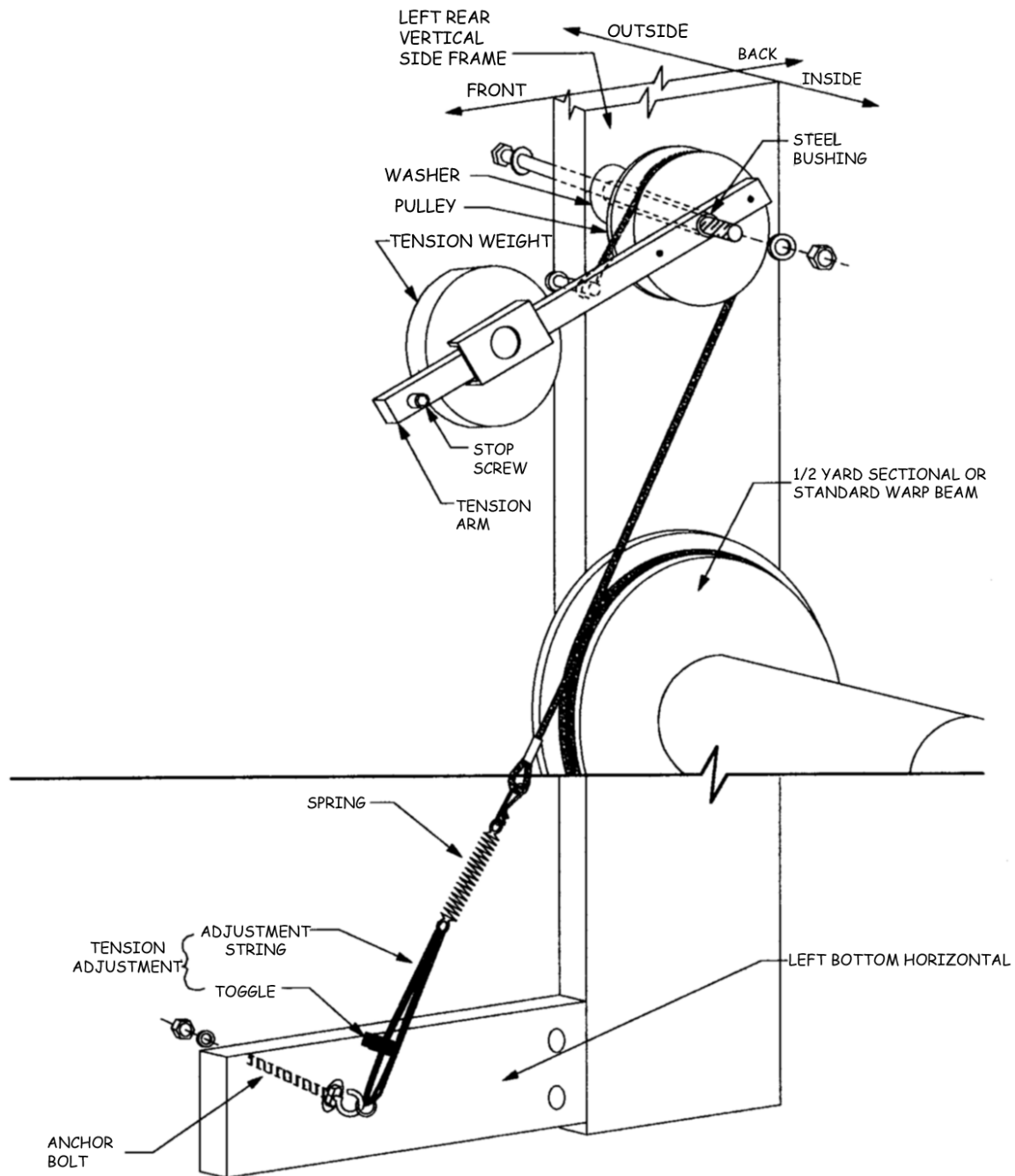


Figure 30 - Lower Warp Beam Tension

- 2) Remove the long bolt from the pulley end of the tension arm.
- 3) Keeping one washer on the bolt, push the bolt through the lower hole in the rear vertical from the outside for the plain beam. If you

are putting on a 1/2 yard sectional beam, insert the bolt from the inside to provide rotation clearance for the beam.

- 4) Put on another washer on and slip the tension arm, with its metal bushing, onto the bolt.
- 5) Add another washer and the hex nut, and tighten it down.
- 6) After tightening, check to make sure the arm swings freely. Now the cord tie-up can be attached.

Attach the tension arm cord

- 1) Find the tension arm cord labeled #16.
- 2) Attach this cord to the tension arm by removing the shoulder bolt (the bolt near the wooden pulley) using a 5/32" Allen wrench and place this bolt through the looped end of the cord.
- 3) Replace the bolt into the tension arm.

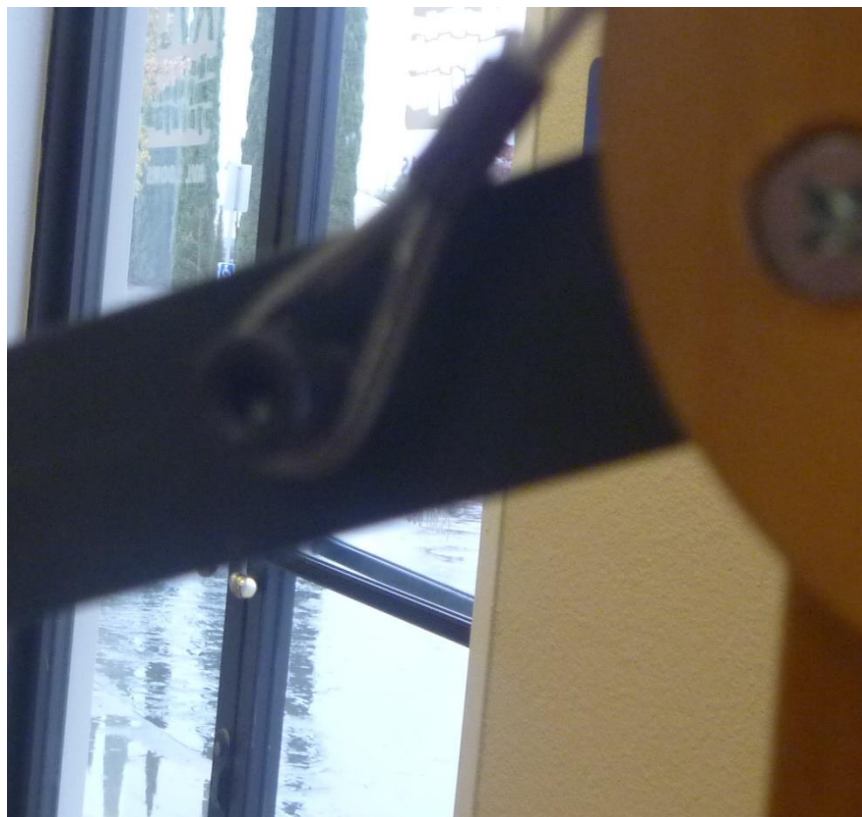


Figure 31 - Tension Arm Bolt

- 4) The cord comes from the bolt in the tension arm, over the top of the pulley, and down around the front side of the drum on the warp beam.
- 5) Wrap the cord around the warp beam drum three times with the first wrap toward the outside of the loom.

Tension Cord Adjustment

- 1) At the very end of the cord assembly is an eyebolt.
- 2) Remove one hex nut and washer from the eyebolt and insert it from the inside of the loom through the hole in the upper rear portion of the left bottom horizontal.



Figure 32 - Lower Beam Tension Cord

- 3) Replace the hex nut and washer on the outside of the loom and tighten the eyebolt, placing it so that it sets as far inward as possible. No threads should protrude beyond the nut on the outside of the loom).

Upper Position Tension Arm

You can have a one yard sectional beam, a ½ yard sectional beam, or a plain beam in the upper position. If you have a one yard sectional beam, the tension arm cable will be marked #38S and will be a coated cable. If you have a ½ yard sectional beam or a plain beam, you will have a cord marked #38P. Otherwise the setup is the same.

Note:

If you have a three beam system, install the upper tension arm so that it is on the outside of the loom rather than the inside. The hole for the tension cord eyebolt will be marked as it is further toward the front of the loom.

- 1) Find the tension arm and place it so that the face of the pulley lies against the inside of the left rear vertical.

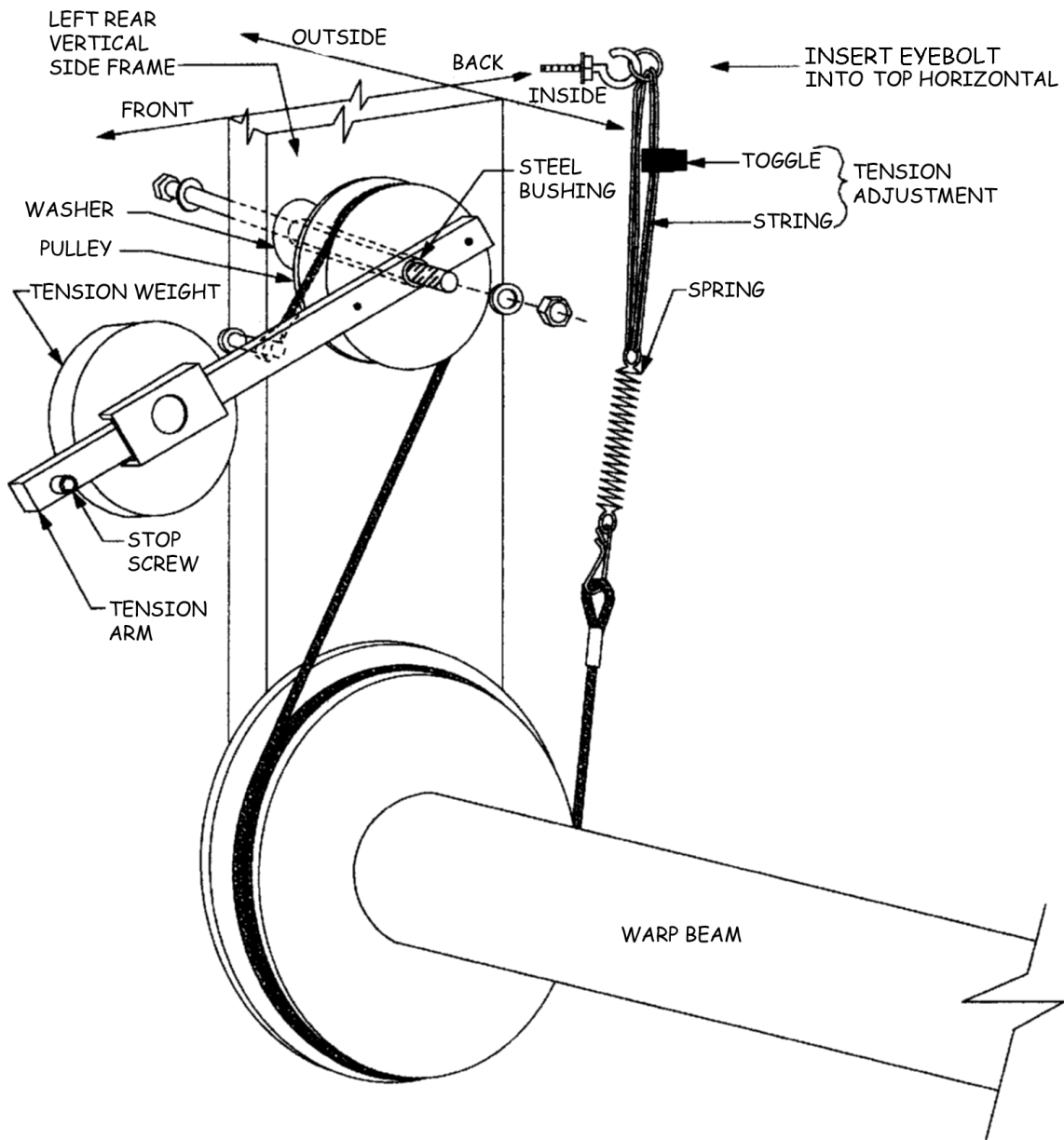


Figure 33 - Upper Position Tension

- 2) Remove the long bolt (with its nut and washers) from the pulley end of the tension arm.
- 3) Put one of the washers back on the bolt and push the bolt through the upper hole in the left rear vertical from the outside.
- 4) Put another washer on and slip the tension arm (with its metal bushing) onto the bolt.
- 5) Add another washer, then the hex nut, and tighten it down.

- 6) After tightening, check to make sure the arm swings freely.

Attach the Tie-up (Cord or Cable)

- 1) Find the tension arm cable (#38S) for the one yard sectional beam or the tension arm cord (#38P) for the ½ yard sectional or plain beam.
- 2) Attach the cable or cord to the tension arm by removing the shoulder bolt (the bolt near the wooden pulley) using a 5/32" Allen wrench and place this bolt through the looped end of the cable or cord and replace the bolt into the tension arm.
- 3) The cable comes from the bolt in the tension arm, over the top of the tension arm pulley, and down around the front of the sectional beam brake drum.



Figure 34 - Tension Cable around Brake Drum

- 4) Wrap the cable around the sectional beam drum three times (as shown) with the first wrap toward the outside of the loom.

Tension Cord Adjustment

- 1) At the end of the cable or cord assembly is an eyebolt.

- 2) Remove one hex nut and washer from the eyebolt and insert it (from the inside of the loom) through the hole at the very back of the upper left horizontal frame piece.



Figure 35 - Upper Tension Tie-up

- 3) Replace and tighten the hex nut and washer on the eyebolt.

Note:

If you have three warp beams, you will need to install the tension arm and cable for the third beam in the same way, but on the right side of the loom.

Tension Arm Weight Instructions

The tension arm weight provides the weight for the tension arm assembly, allowing you to easily adjust the tension on the warp beams. Once the arm is installed on either position, adding the weight is the same.

- 1) Find the tension arm weight. It is a heavy black disk with a wooden bracket on one side of it.

- 2) To attach the weight to the arm, you will need to remove the black knobs and wooden bracket from the weight.

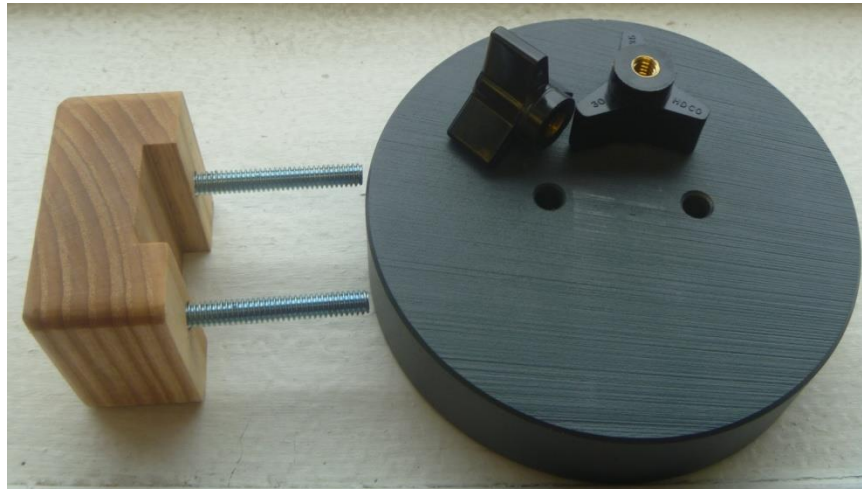


Figure 36 - Weight with wooden bracket removed

- 3) Position the weight so that the knobs will be accessible to you.
- 4) Slide the wooden bracket and bolts back through the weight (the arm should be in between the weight and bracket).



Figure 37 - Tension Arm with Weight

- 5) Re-attach the two black knobs and tighten down.

The weight will stay anywhere on the tension arm that you place it as long as you tighten the knobs on the weight. The screw at the end of the arm serves as a stop to keep the weight from accidentally slipping off. Proper adjustment of the tension arm is covered in the Weaving manual.

INSTALL THE CLOTH STORAGE SYSTEM

INSTALLING THE CLOTH BEAM

The cloth beam can be taken in and out of the loom simply and easily by removing the upper section of either cloth beam support. The cloth beam (or sticky beam) can have three different types of coating: sandpaper, softgrip, or smoothgrip. Sandpaper is the most common type of covering and works with most yarns. Softgrip is intended for yarns that still need to be tightly gripped, but cannot handle the abrasiveness of sandpaper. Smoothgrip works well with slippery yarns. If you prefer a different coating than you originally received, you can contact AVL to order a different beam covering.

- 1) Remove the left upper cloth beam support from the loom.
- 2) Find the cloth beam, which has a ratchet on one end, your cloth beam handle, and plastic spacer ring (#25).

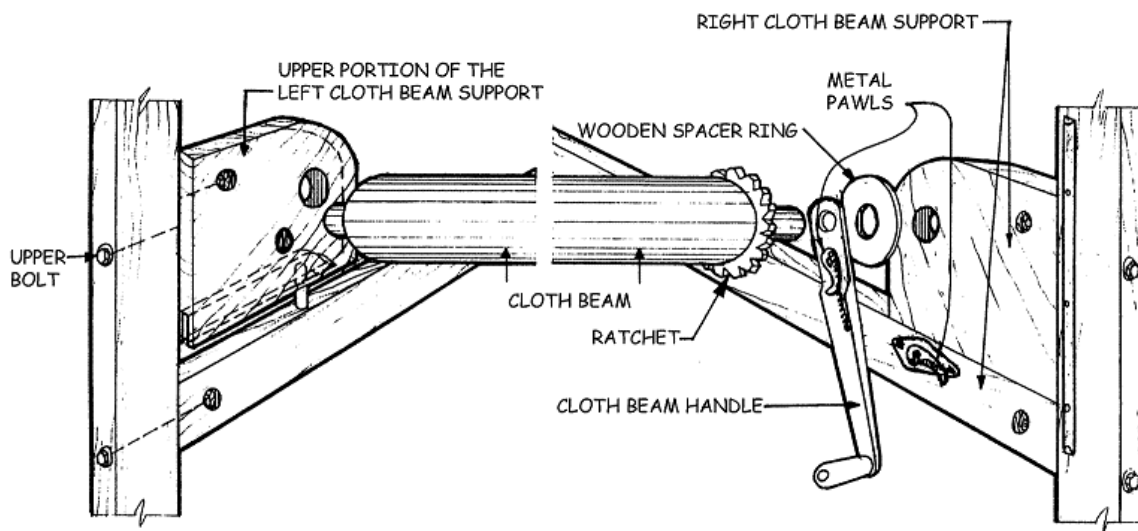


Figure 38 - Cloth Beam Assembly

- 3) Insert the ratchet end of the cloth beam into the hole in the cloth beam handle (with the wooden knob of the handle facing the inside of the loom), then into the spacer ring.
- 4) Insert the other end of the cloth beam into the large hole in the left upper cloth beam support.

NOTE:

Before installing the cloth beam on the loom, make certain that the metal pawl is in the “off” position or pulled back around so that it is out of the way of the cloth beam ratchet.

- 5) Slip the end of the cloth beam with the ratchet, handle, and spacer ring into the hole in the right cloth beam support.



Figure 39 - Right Side Cloth Beam Support

- 6) Now bring down the left end of the beam and fit the pin (belonging to the lower portion of the cloth beam support) into the slot (belonging to the upper portion).
- 7) Install the bolt and tighten the square nut on the left cloth beam support.

CLOTH STORAGE SYSTEM

Pressure Roller Assembly

The Pressure Roller adds increased capacity to the Cloth Storage System because it extends the contact of the woven cloth with the Sticky Beam 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.

The Pressure Roller Assembly consists of:

- 2 Support Brackets with Spacers
- 1 Pressure Roller
- 1 Hardware Pack
 - 4 5/16" x 3-1/2" Carriage Bolts
 - 4 Washers
 - 4 Hex/Jamb Nuts

Mounting the Pressure Roller Mount Brackets

- 1) Find the two diagonally spaced holes in the Lower Cloth Beam Support, below and slightly behind the Upper Cloth Beam Support.
- 2) Insert the carriage bolts, from the outside, through the Support and Bracket.
- 3) 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.
- 4) Mount the oblong Spacer (without the claw) on the two bolts.
- 5) Mount the Support Bracket onto the bolts, so that the claw-like end is up and opens away from the Cloth Beam.

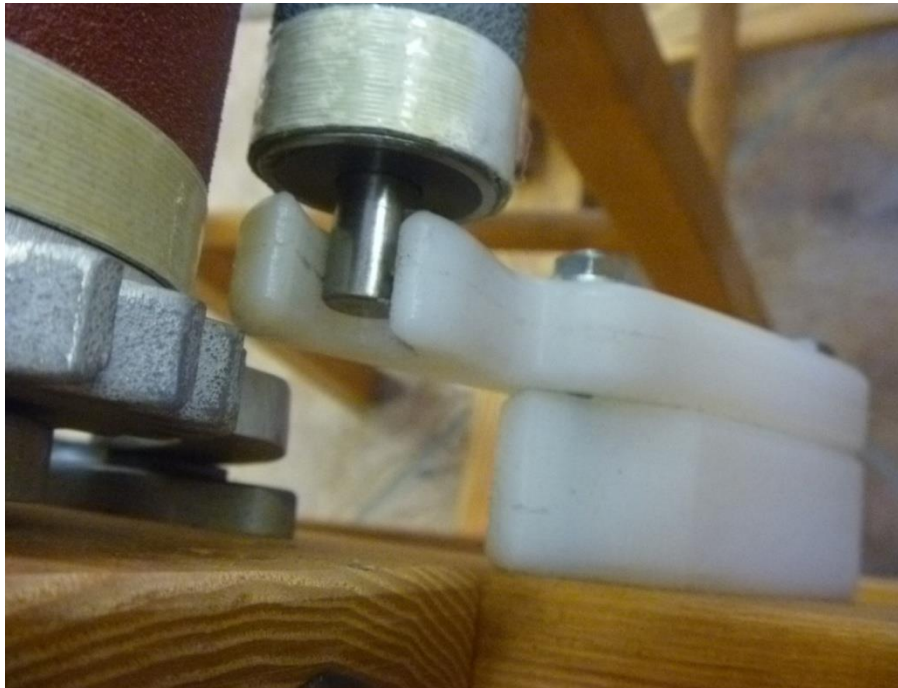


Figure 40 - Pressure Roller Bracket

- 6) Place one washer and one hex/jamb nut on the end of each bolt, in that order and tighten securely in place.
- 7) Repeat for the Bracket on the opposite side.

Installation of the Pressure Roller

- 1) Find the Pressure Roller.
- 2) Position it along the back of the Cloth Beam, aligning the pins at each end with the openings in the Mount Bracket "claws".

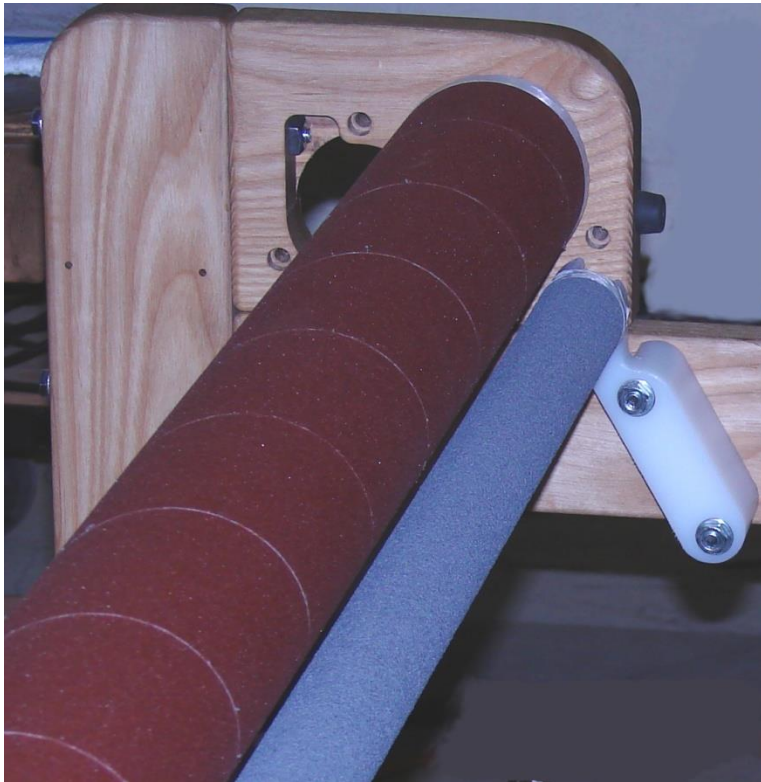


Figure 41 - Pressure Roller and Cloth Beam on Loom

- 3) Drop the Pressure Roller into place.

Rear Cloth Storage System Rollers

Upper and Lower Rollers

Now the roller tubes (#26) for the rear cloth storage system can be installed in the middle of the loom. At this time you will install the two cloth rollers marked #26. There is an additional roller (#28) which will be installed later.

- 1) Slip one end of the roller into the slot.

Note:

The brackets for the lower cloth storage roller have pins which will need to be removed to position the roller and replaced to hold the roller in position. The upper roller is held in place by gravity and the warp.

- 2) Place the roller in the bracket on the other side.



Figure 42 - Cloth Storage System Rollers

Cloth Take-Up Drum Assembly

- 1) Find 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.
- 2) From the outside of the loom, insert the shaft that's coming out from the center of the drum, into the hole in the right front vertical side frame member.
- 3) 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.



Figure 43 - Cloth Take-up Drum

- 4) Now tighten the set screw and flip the wooden ratchet dog around to intersect with the ratchet teeth.
- 5) Find the Cloth Storage Drum Assembly (#29). There is a cloth storage drum with roller tube end and shaft attached to it. It will be mounted to the bottom of the right rear vertical on the outside of the loom.
- 6) Loosen the set screw inside the tube end and remove it with one washer from the shaft.



Figure 44 - Cloth Storage Drum

- 7) Insert the shaft through the rear vertical from the outside.

- 8) Replace the washer and the tube end. Tighten the set screw.
- 9) Route the cord from the cloth storage drum around the pulleys as shown in the photo.
 - a. From the storage drum, route the cord up the rear vertical.
 - b. When the end of the cord is between the two pulleys that are side-by-side on the upper horizontal, insert the cord through the metal counter weight pulley and continue routing over the last pulley on the upper horizontal.

Note:

While you are setting up the loom, leave enough cord so that the cloth storage weight is on the floor. You can also lock the weight in place by putting the retention pin through the cloth storage drum and the rear vertical.

- c. Route the cord all the way down to the pulley on the lower horizontal.
- d. Continue on past the next pulley on the lower horizontal, then up to the concave surface of the cloth take-up drum/handle assembly.

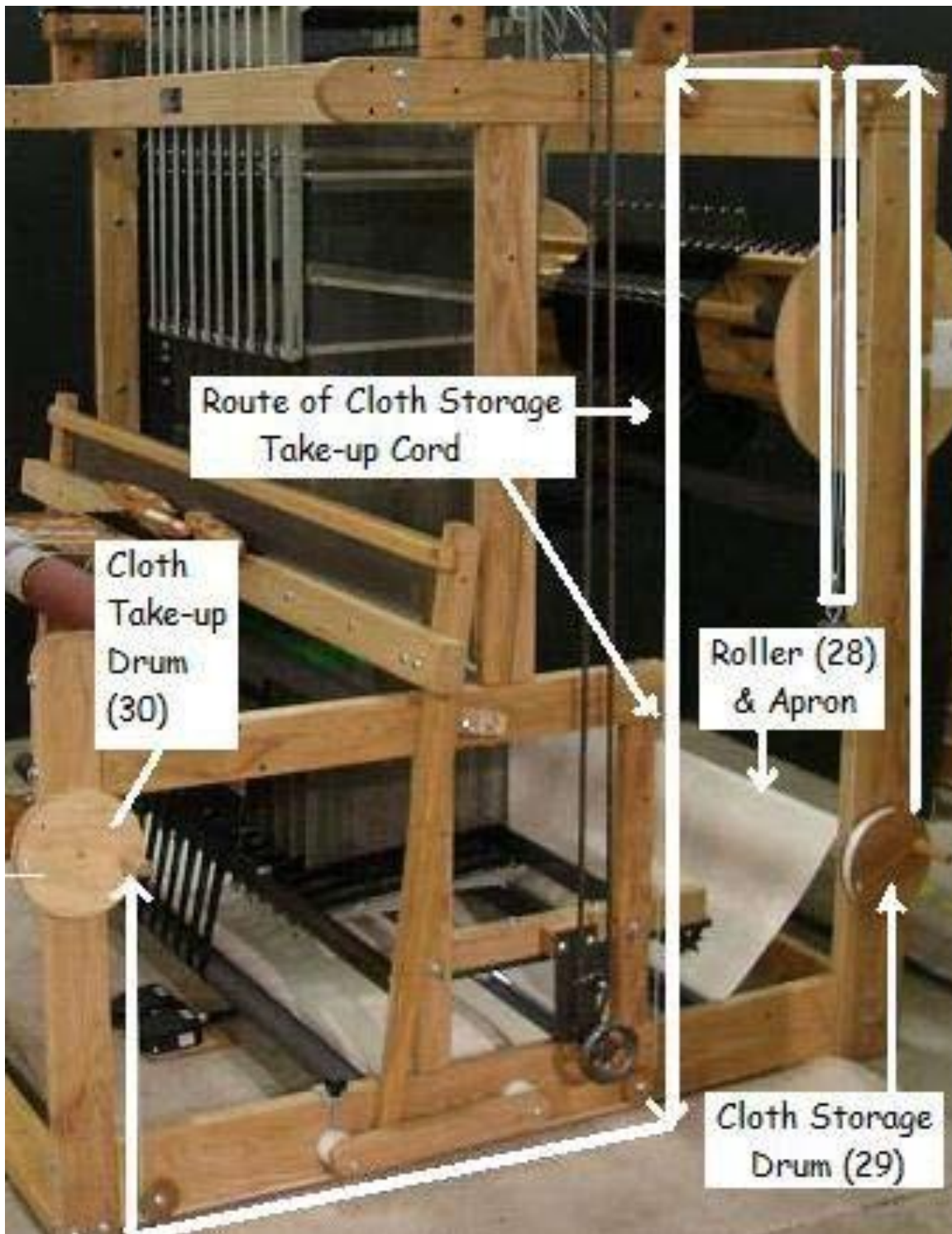


Figure 45 - Routing the Cloth Take-up Cord

- 10) Thread the cord end from the inside, through the hole at the base of the concave surface of the drum and tie a double-knot on the outside.



Figure 46 - Knot on Cloth Take-up Drum

- 11) There is a retention pin affixed to the rear vertical. Insert it through the hole in the cloth storage drum and the corresponding hole in the rear vertical of your side frame.
- 12) Attach the counterweight (a black cylindrical weight) to the loop on the counterweight pulley if it is not already on the pulley.

Storage Roller

When weaving long lengths of fabric, the material is taken around the front cloth beam and through the loom to the rear cloth storage roller which can accommodate a roll up to 20" in diameter. The cloth storage system is designed to automatically wind the cloth on to the storage roller as the warp is advanced. A looser tension is maintained on the storage roller than on the weaving. This eliminates any unnecessary strain or matting of the fabric.

The special abrasive surface of the cloth beam (either sandpaper, SoftGrip™ or SmoothGrip™) holds the proper weaving tension while allowing a lighter tension to be maintained for cloth storage. This also makes it possible to weave long lengths of fabric that have an uneven surface which would ordinarily cause poor tension because of the uneven build-up on the front beam.

- 1) You will need the long apron for this purpose. Stick the Velcro® (loop side) edge of the apron to the Velcro (hook side) on the storage roller.

- 2) Then wind the apron once around itself so that it holds itself in place.
- 3) Place a spacer, then the roller on the loom with one end on the cloth storage drum assembly.
- 4) Place the other end in the slot on the other side.
- 5) Route the apron over the rear cloth storage roller, under the lower roller, over the upper roller, and under the cloth beam, then up and over the top of the cloth beam.



Figure 47 - Cloth Storage Apron

- 6) Insert the apron rods and allow enough room between the reed and the cloth beam.
- 7) If necessary, gently wind the apron up until the metal apron bar is in the proper position for tying on to insert the retainer pin.
- 8) After tying on your warp, be sure to put on the weight before removing the retainer pin from the drum and rear vertical before weaving.
- 9) As the weaving proceeds and the cloth is wound forward, the weight on the pulley will gradually descend.
- 10) Before the weight hits bottom, wind it back up to the top using the take-up drum. This will happen about every 1-1/2 to 2 yards.

INSTALL THE BEATER

BOTTOM SWING BEATER

If you have an overhead beater, skip to page 74.

NOTE:

When using carriage bolts, be sure that the square portion is seated in the wood. You may need to tap the bolts with a mallet in order to properly seat the bolts.

Install Beater Bumpers

The beater bumpers are mounted to the cloth beam support. There is one for each side. The left is stamped "L" and the right one is stamped "R". Place one beater bumper following these instructions, then repeat for the other side.

- 1) Find the beater bumpers (#40).
- 2) Find 5/16" x 2-3/4" carriage bolts, washers, and hex nuts.
- 3) Place the beater bumper on the cloth beam support so that the bumper faces the front of the loom and the stamp faces the cloth beam support.

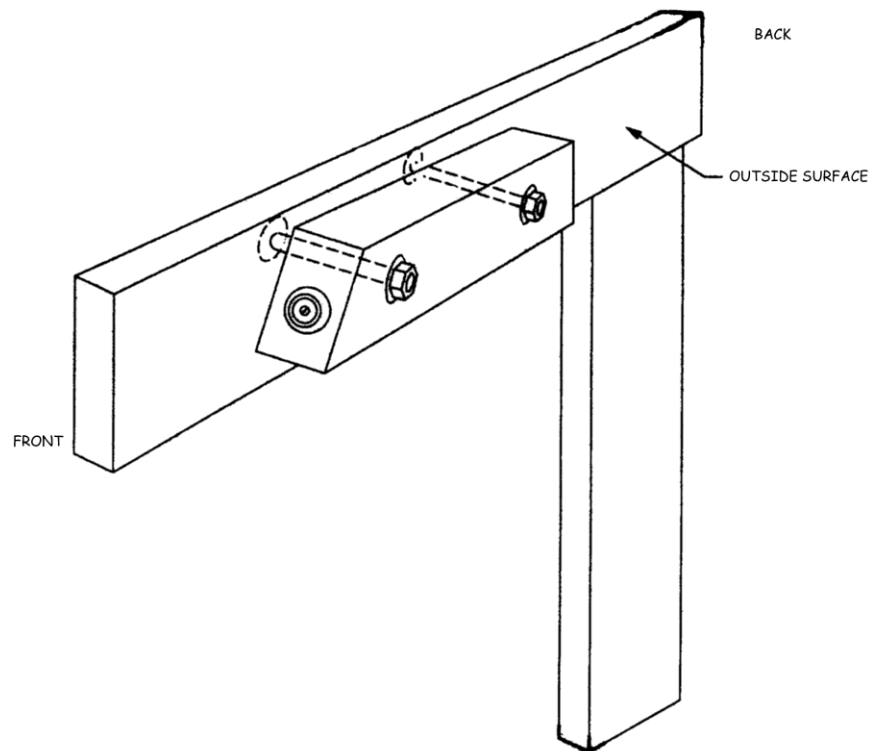


Figure 48 - Beater Bumper Block

- 4) Attach 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.

Bottom Swing Beater Supports

The beater supports can now be bolted to the loom.

- 1) Find your beater supports (#34). There's one for each side of the loom. Also take out two 1-1/2" long screws from the beater hardware package
- 2) Place the support so that the round spacers and metal pins are facing toward the loom and the spacer with the threaded rod and metal bracket is toward the front of the loom.

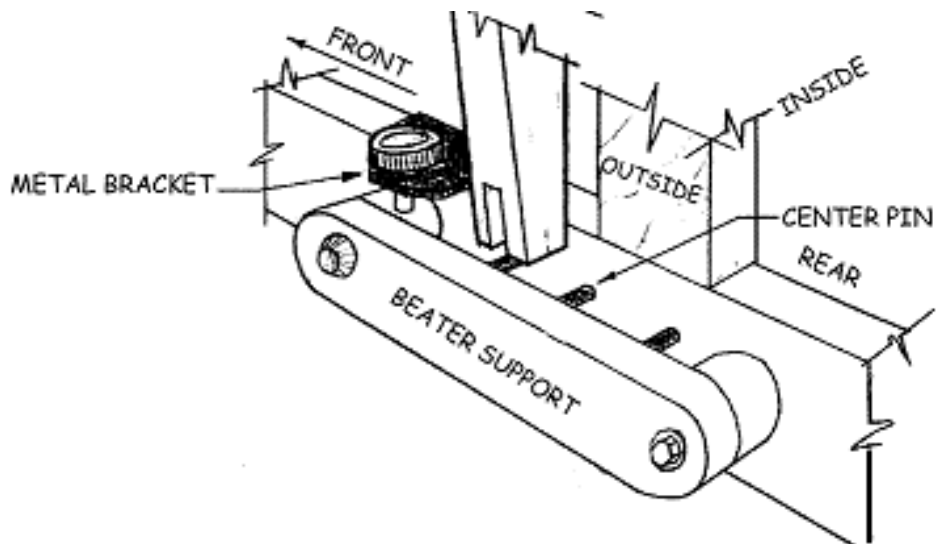


Figure 49 - Beater Support

- 3) Remove the hex nut and washer from the rear spacer and insert the bolt through the right lower horizontal.
- 4) Slip the washer and nut back on and tighten the nut just to the point where it almost cinches the two parts together. You want to leave it a little bit loose so that the beater supports can pivot during adjustment. Since the nut is a locknut, it will not loosen.

- 5) Position the metal bracket that's attached to the front of the beater support over the two holes and insert the screws. Tighten them down.



Figure 50 - Bottom Swing Beater Support

- 6) Repeat these steps for the other side.

Bottom Swing Beater

The Bottom Swing Beater can be ordered with a one-box flyshuttle. You can also add a flyshuttle system to your loom at a later date if desired.

If you received a one-box flyshuttle with your loom, put together the beater according to the following steps, then setup the flyshuttle system according to the next section. Note that the flyshuttle boxes will already be attached to the shuttle race.

- 1) Find the following loom pieces:
 - a. Shuttle race
 - b. Beater top
 - c. Two legs (marked left and right)
 - d. reed
 - e. reed support
 - f. hardware

- 2) Find the following hardware:
 - a. Four 5/16" x3-1/2" carriage bolts with washers and hex nuts
 - b. Six, seven, or nine (depending upon the width of your loom) 5/16" x 3-1/4" carriage bolts with washers and wing nuts attached
 - c. 1/4" x 2-1/4" carriage bolts
- 3) Place the shuttle race so that the lengthwise groove is to the top and is facing toward the rear of the loom. Rest it on the cloth beam supports between the cloth beam and the harnesses until you attach the legs.
- 4) Take one of the legs and position the small notch at the bottom end of the leg over the center pin in the beater support. The tapered side of the leg will face away from the loom. Place it so it is behind the shuttle race.

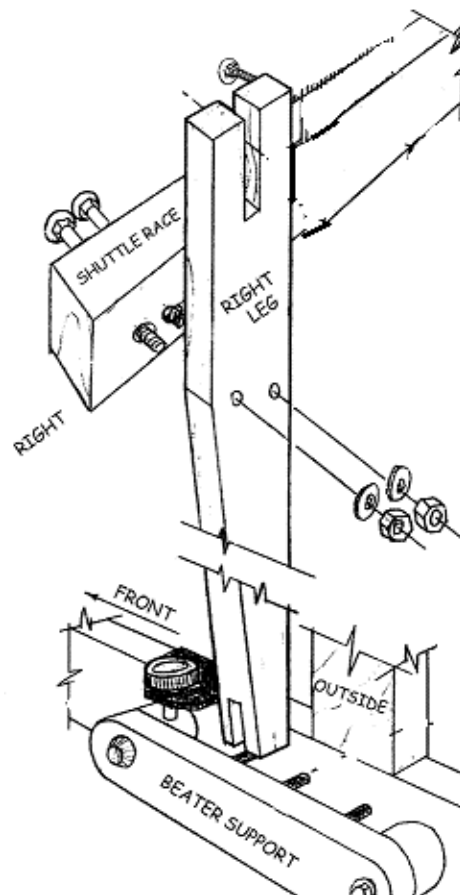


Figure 51 - Beater Leg

- 5) Insert two of the 5/16" x3-1/2" carriage bolts, from the front of the race, through the race, and into the two innermost holes in the beater leg. Use the carriage bolts with the hex nuts.
- 6) Attach the washers and nuts and tighten slightly. Leave the nuts slightly loose until you have completely assembled the beater.
- 7) Repeat this procedure for the other side of the loom making sure that the tapered side of the leg is facing away from the loom.
- 8) You will use the carriage bolts with the wing nuts to attach the shuttle race to the reed support. Remove the wing nuts and washers.

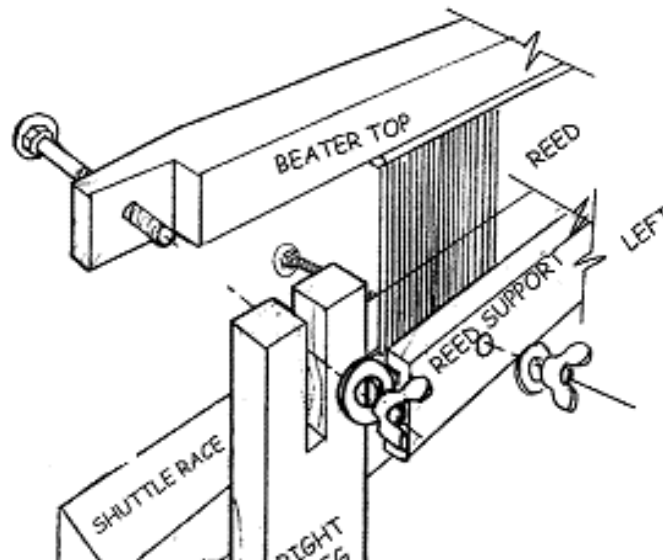


Figure 52 – Beater Top and Reed

- 9) 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).
- 10) Now carefully slide the reed support onto these bolts so that the lengthwise groove in it faces the groove in the race.
- 11) 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.

- 12) Place your beater top over the reed so that the groove is facing down and the cut outs at either end are facing toward the rear of the loom.
- 13) Insert 1/4" x 2-1/4" carriage bolts into the holes at each end from the front. Place them through the slot at the top of the beater leg. Make sure the reed is secure and tighten the wing nuts.
- 14) Now securely tighten the carriage bolts that attach the legs to the race.
- 15) Center the beater assembly in the loom and tighten the bolts that attach the beater legs to the shuttle race. Centering the beater will make sure that the legs will not rub on the loom frame.

If your loom has a single-box flyshuttle, your completed beater will look like this:

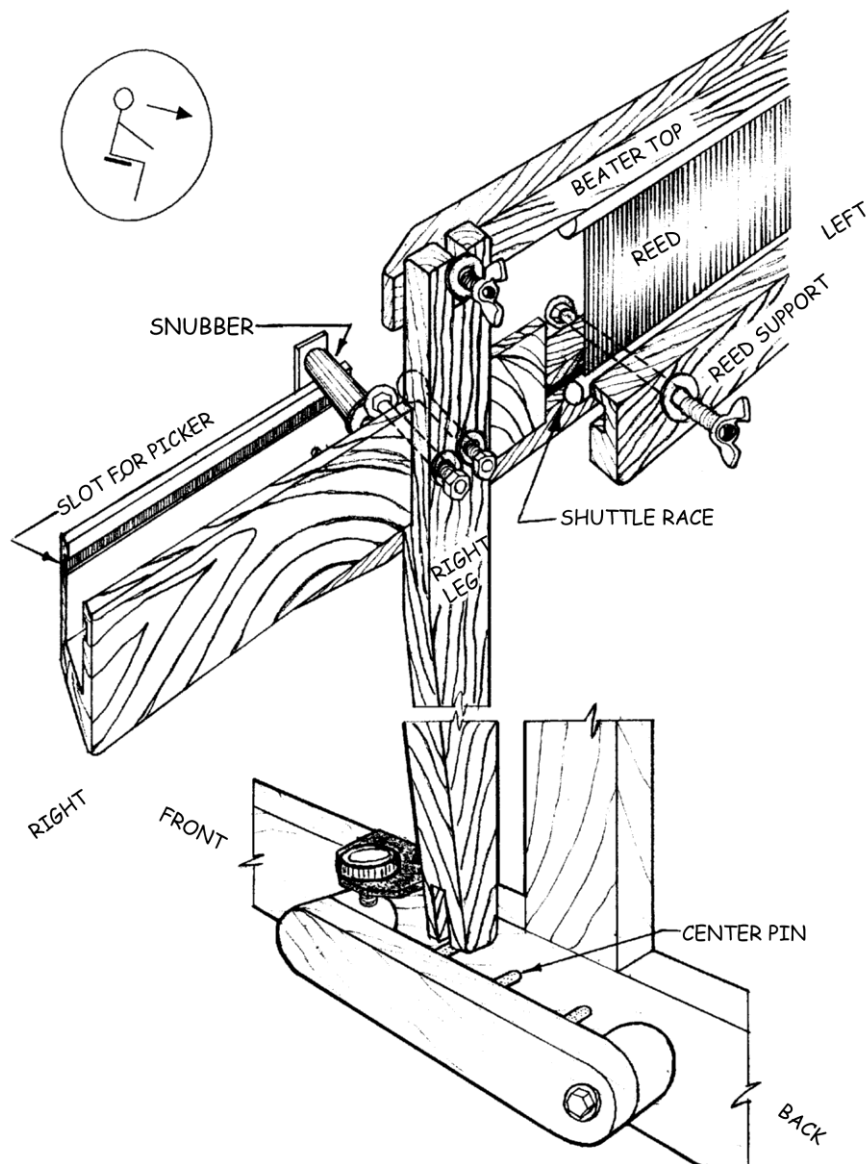


Figure 53 - Single-box Flyshuttle Beater

Add the reed to the beater

- 1) Find the reed support. It is the long, thin, wooden part with several holes and a slot similar to the one in the shuttle race.
- 2) Attach the reed support to the back of the shuttle race with the slot to the top and facing the shuttle race using the 5/16" x 3-1/4" carriage bolts inserted from the front with washers and wing nuts behind.



Figure 54 - Beater Reed Support

- 3) Before attaching the nuts, install the bottom edge of your reed in the void created by the slots in the reed support and shuttle race.
- 4) Center the reed between the two uprights and tighten the wing nuts.
- 5) There is a slot in the underneath side of the beater top which slides over the top edge of the reed.
- 6) Push the beater top down on the reed and tighten the wing nuts which hold it in place.

If you do not have a flyshuttle, you can skip to page 99 to assemble the bench.

Single-Box Flyshuttle Tie-Up (optional)

- 1) Find the following parts:
 - a. string tie-up and handle
 - b. flystring supports (#43)
- 2) Find the following hardware:
 - a. Screweye
 - b. two 5/16" x 2-1/4" carriage bolts
- 3) Place a flystring support on the inside face of a top horizontal side frame piece. Insert a 5/16" x 2-1/4" carriage bolt from the outside

- of the top horizontal directly above the beater assembly. Attach a washer and hex nut and tighten.
- 4) Repeat this on the other side. These supports should hang down from the top horizontal with the screw eye end on the bottom. Tighten the supports securely.
 - 5) Take the screw eye from the hardware package and screw it into the center hole on the underside of the front harness pulley support so that no screw threads are showing.
 - 6) The handle has a screw eye at the top and one at each side with cords attached. There is a clip attached to the cord at the top of the handle. Attach this clip to the screw eye on the front harness pulley support.

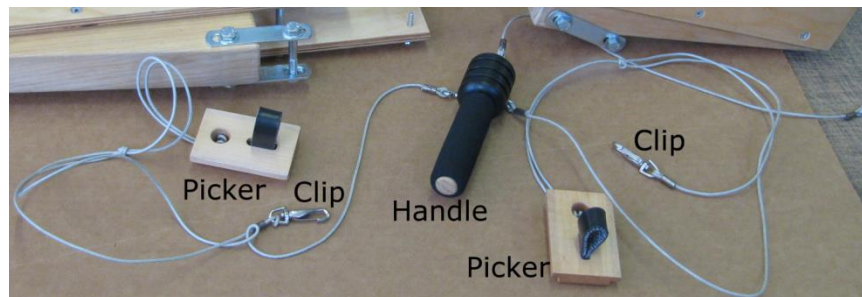


Figure 55 - String tie-up and handle

- 7) There are two pickers hanging below the handle. These are wooden pieces which have a leather loop and cord attached. Take one of these and place it so that the leather loop is toward the bottom.
- 8) Slide the picker into the slots on the top of one flyshuttle box. The leather loop should be down and to the outside.
- 9) Attach the clip at the end of the cord coming from the picker to the screw eye on the flystring supports that you just installed. Make sure the cord goes over the top of the snubber. The snubber is a small, round plastic piece above the shuttle box.

Repeat for the other side making sure that the picker loop is down and toward the outside.

You can now go to page 99 to assemble the bench.

OVERHEAD BEATER (OPTIONAL EQUIPMENT)

NOTE:

When using carriage bolts, be sure that the square portion is seated in the wood. You may need to tap the bolts with a mallet in order to properly seat the bolts.

The Overhead Beater can come with or without a flyshuttle system. The overhead beater flyshuttle system can include a single-box, double-box, or four-box. The installation of the overhead beater is the same whether or not it includes a flyshuttle system. If your loom includes a flyshuttle system, there will be additional steps to complete to add the boxes and tie-up.

This system is shipped partially disassembled to facilitate packing. Follow the instructions below to complete the assembly.

Overhead Beater Axle Mounting Blocks

- 1) Find the package marked "axle blocks". These blocks have a large hole in them.
- 2) Using the 5/16" x 5" carriage bolts in the package, mount these blocks to the back edge of each rear side support.



Figure 56 - Axle Block on loom

Mount the Beater Retainer

The beater retainer will be attached to the inside face of the left cloth beam support.

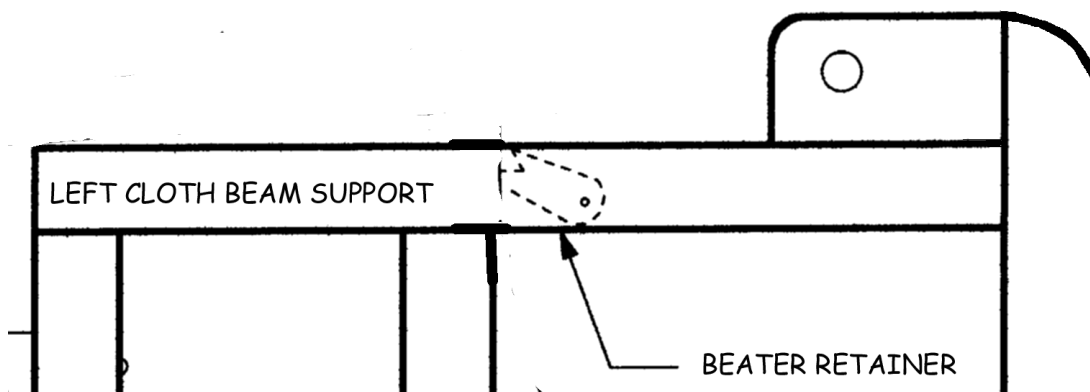


Figure 57 - Beater Retainer

- 1) Insert the #12 x 1-1/2" flat head wood screw through the beater retainer and into the pre- drilled hole on the inside of the left cloth beam support.



Figure 58 - Beater Retainer

- 2) Leave the screw just loose enough so that the retainer is allowed to pivot around the screw.

Attach the Beater Pivot Base

Note:

You may need a small ladder or stepstool to install the Beater Pivot Base.

- 1) Place the beater pivot bases on the upper edge of each top horizontal on the assembled side frames of your loom so the notched ends face upward.
- 2) Insert the #8 x 3/4" pan head wood screws from the top of the beater pivot bases and screw them into the pre-drilled holes.

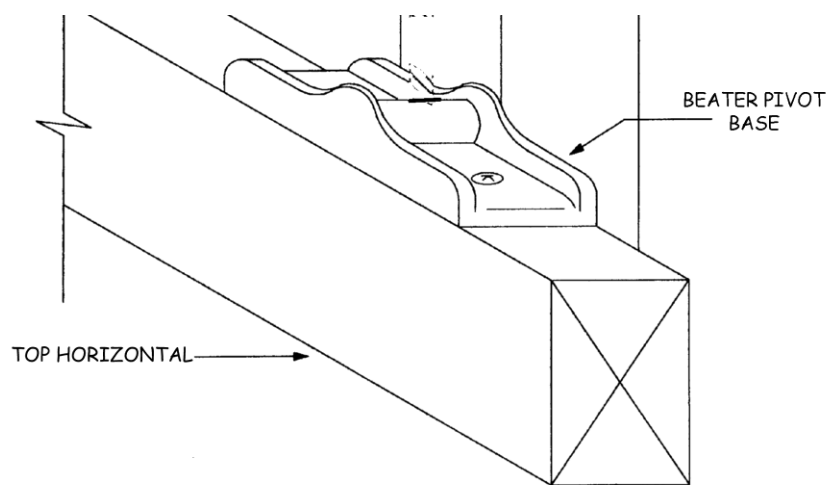


Figure 59 - Beater Pivot Base

Assemble the Beater

- 1) Find the two uprights and lay them on the floor spaced apart a distance that is approximately equal to the width of your loom. The ends with the metal brackets will be the top of this assembly. The metal rods should be pointed inward or toward each other.

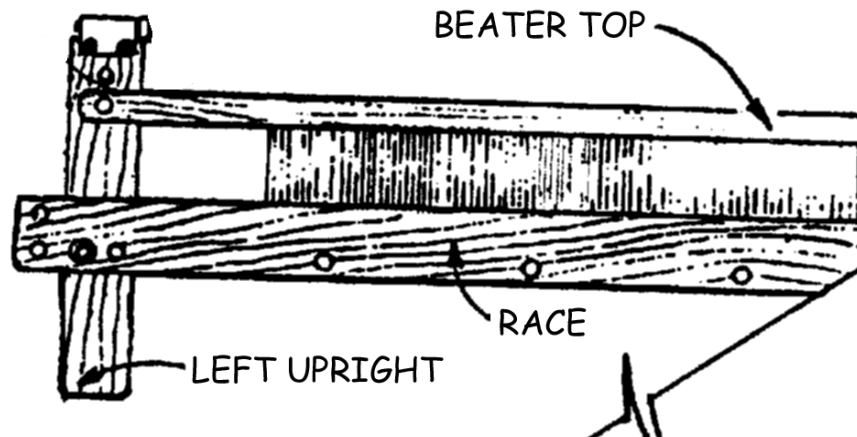


Figure 60 - Overhead Beater

- 2) Lay the shuttle race on top of the two uprights so that it covers the two holes in the face of each upright. The groove in the shuttle race will be to the top and back when the beater is on the loom. For now it should face the floor.

Note:

If you have the single-box flyshuttle, the two rear plywood box sides should fit into the notches on the front face of each upright. If you have a two-box or four-box flyshuttle, there is a metal pulley attached to the back face of each upright. These pulleys should now be touching the floor.

- 3) Attach the shuttle race to the uprights with a 5/16" x 3-1/2" carriage bolts on each side using the innermost hole on each end.
- 4) Place the washers and hex nuts on these carriage bolts, but do not tighten them yet.
- 5) The beater top will be attached to the same side of the uprights as the shuttle race with the long groove facing downward. Temporarily attach the beater top to the uprights with two 1/4" x 2-1/4" carriage bolts with washers and wing nuts behind the uprights.

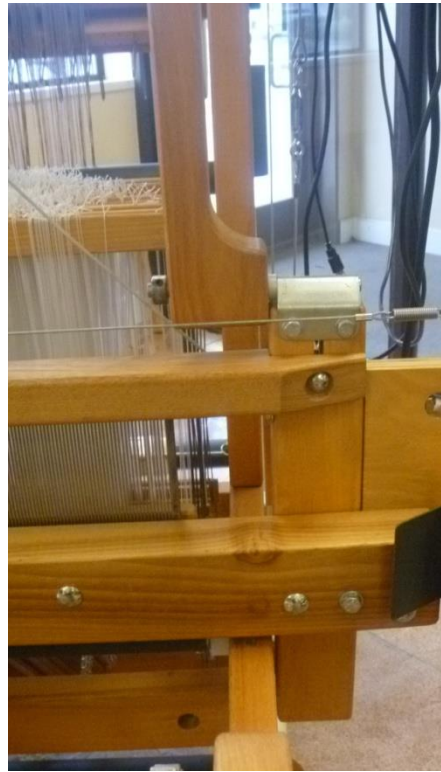


Figure 61 - Overhead Beater Uprights

- 6) Insert the carriage bolts through the holes near each end of the beater top and then through the slots that are just below the metal bracket of each upright.
- 7) 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. It may tend to fall forward or backward until it is attached later in this process.

Mount the Hanging Arms

The hanging arms are marked right and left. Make sure you install the correct arm for each side.

- 1) Using a 1/8" Allen wrench, remove the 3/8" stop collars from the metal shafts at the top of the upright on the beater.

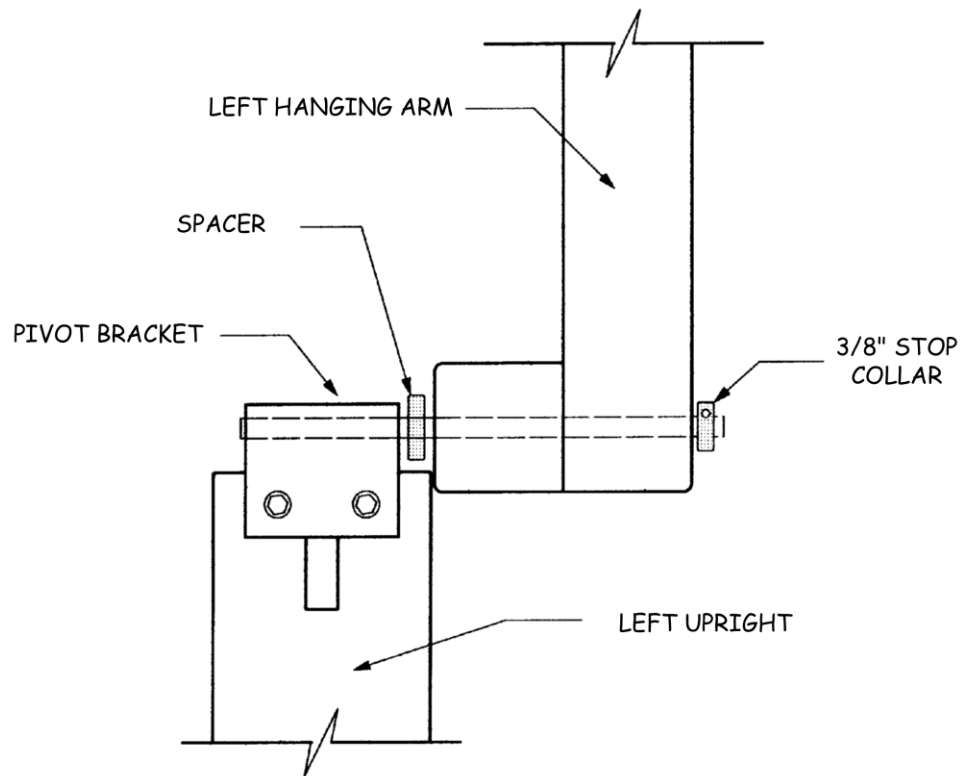


Figure 62 - Mount hanging arms

- 2) Put a spacer, than a hanging arm onto the shaft
- 3) Replace and tighten the stop collar. Make sure to leave enough clearance for this pivot point to swing freely.
- 4) Install the other arm in the same way.
- 5) On the other end of the hanging arm there is a block of wood that the beater adjustment screw goes through.
- 6) Set the foot at the bottom of the beater adjustment screw into the notch in the center of the beater pivot base.

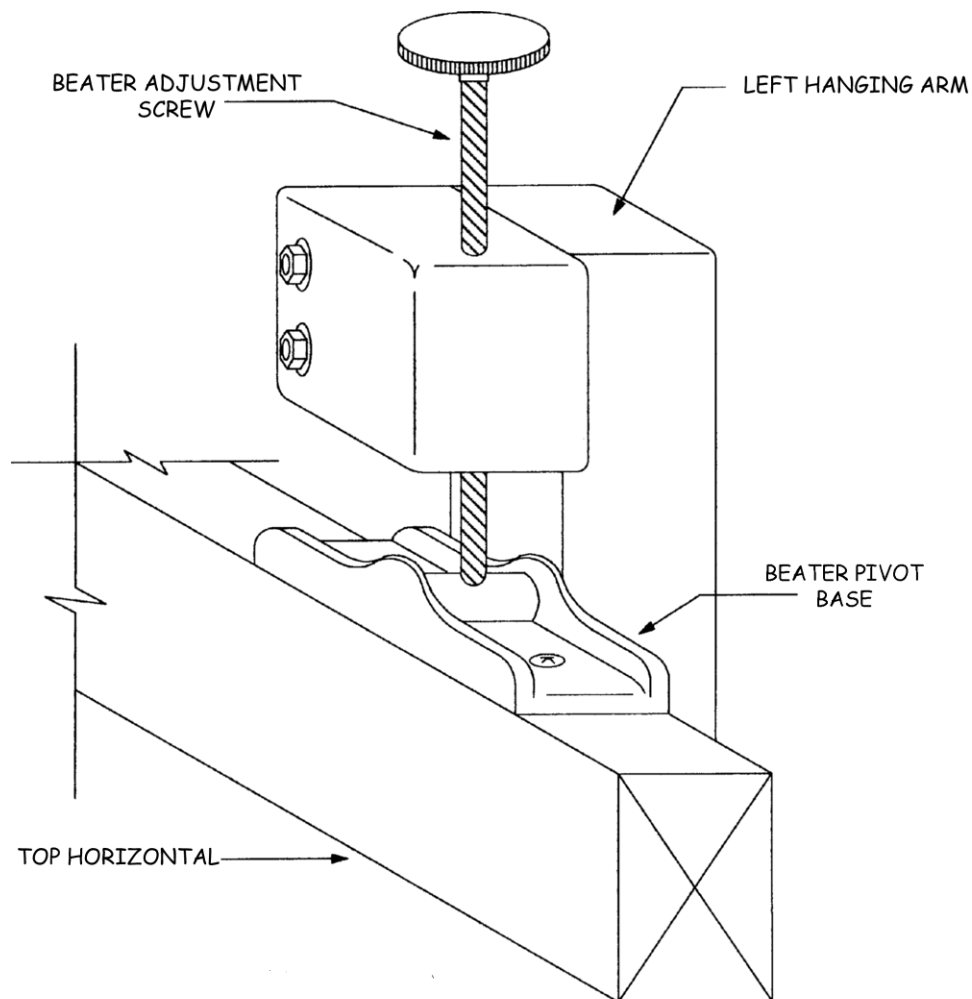


Figure 63 - Place Hanging Arms on Loom

- 7) Once you have both of the beater adjustment screws in place, the assembly of the hanging arms is complete.

Note:

You can use the beater adjustment screws to adjust the height of the beater. Make sure to adjust them equally so that the beater is level.

Insert the axle and the tilting arms

The axle is a long, black pipe that goes through the axle mounting blocks at the bottom of the loom. It will hold the tilting arms for the overhead beater, which are marked right and left. The tilting arms have a beater return spring assembly consisting of a spring, cord, and eyebolt. This is attached later in the process.

- 1) Center the axle in the loom and place an axle spacer (a round, plastic piece) on each end of the axle.
- 2) The hole at the larger end of the tilting arm will be pushed onto the axle.



Figure 64 - Beater Axle

- 3) Attach the tilting arm with 5/16" x 3" hex bolts using the washers and hex nuts provided.

Note:

These are called “racking adjustment bolts”. Do not tighten these bolts yet.

- 4) Repeat these steps for the other side.

Add the push arms

- 1) Mount the push arm to the back face of the upright.
- 2) Insert two 5/16" x 5" hex bolts, washers, and square nuts through the shuttle race and uprights into the nut access hole of the push arm.

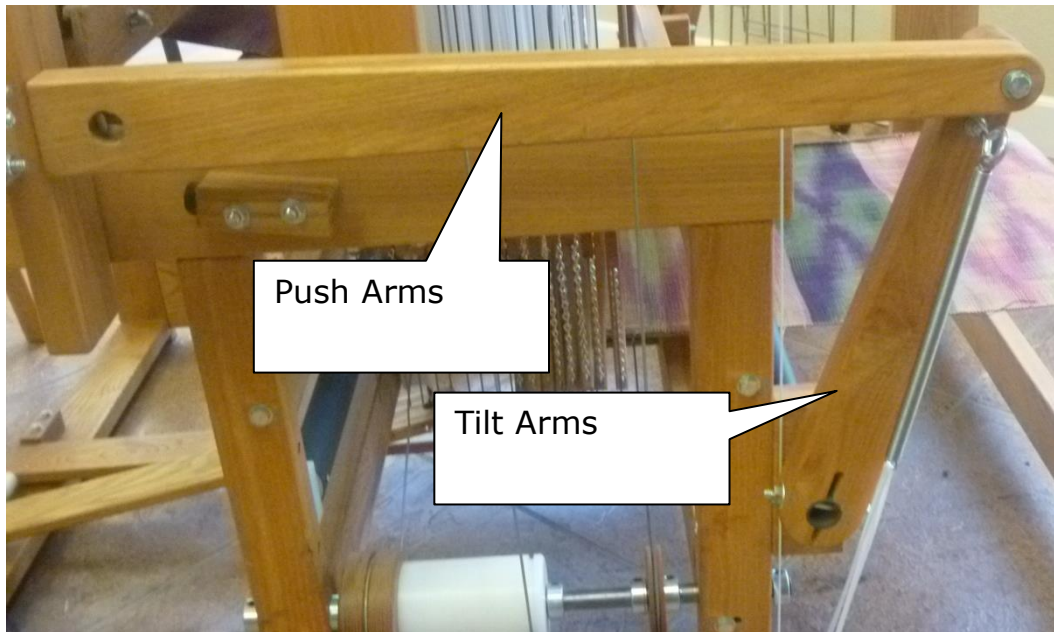


Figure 65 - Push Arms and Tilt Arms

- 3) Tighten these bolts making sure that the outer face of each push arm is flush with the outer edge of the uprights.
- 4) Repeat for the other side of the loom.

Tighten bolts

- 1) At this point you can tighten the bolts on the beater, except for the racking adjustment bolts. Make sure the beater is relatively square and centered in the loom.

Rack the Beater

You will rack the beater to make sure it is square to the loom so that it beats your fabric properly. You can tell if the beater is square to the loom by seeing if the beater hits one bumper before it hits the other. If the beater should come "out of square" in the future, you will need to repeat this adjustment, loosening the bolts before you start and tightening them securely after.

Note:

You will need two people to complete this operation.

- 1) The racking adjustment bolts should be tightened while the entire beater is being held firmly against the beater bumpers.

Note:

When racking the beater, the beater must touch both the left and the right bumpers at the same time.

- 2) Push on the upper end of each tilting arm and while the beater is in contact with both of the bumpers, securely tighten the "racking adjustment bolts".

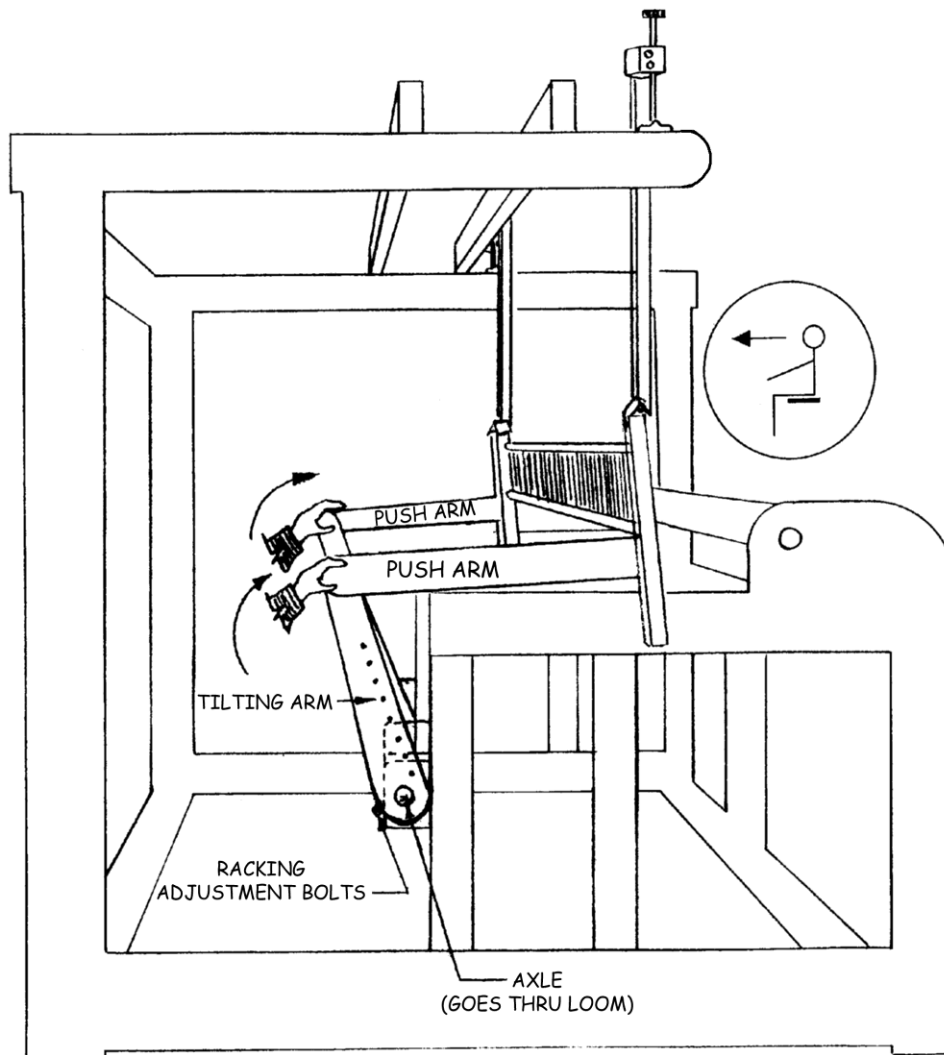


Figure 66 - Racking the Overhead Beater

Attach the Beater Return spring assembly

This assembly is used to assist the weaver in returning the beater to the back position. It is not intended to hold the beater in this position 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 while squeezing the black, minicord lock on the assembly. Whenever an adjustment is made on one side of the beater, a similar adjustment should be made on the other side as well. The amount of tension you set these springs at is strictly a matter of preference.

Generally speaking, the stronger the tension, the harder you will have to pull against these springs to 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.

Note:

If you will be installing a two-box or four-box flyshuttle, you may want to add the boxes before attaching the Beater return spring assembly.

- 1) Remove one hex nut and washer from the eyebolt.
- 2) Place the eyebolt through the hole provided on each bottom horizontal of the side frame assembly with the eye of the bolt on the outside of the side frame.



Figure 67 - Beater Return Spring Assembly

- 3) Replace the washer and hex nut and tighten securely.

Add the reed to the beater

- 1) Find the reed support. It is the long, thin, wooden part with several holes and a slot similar to the one in the shuttle race.
- 2) Attach the reed support to the back of the shuttle race with the slot to the top and facing the shuttle race using the 5/16" x 3-1/4" carriage bolts inserted from the front with washers and wing nuts behind.



Figure 68 - Beater Reed Support

- 3) Before attaching the nuts, install the bottom edge of your reed in the void created by the slots in the reed support and shuttle race.
- 4) Center the reed between the two uprights and tighten the wing nuts.
- 5) There is a slot in the underneath side of the beater top which slides over the top edge of the reed.
- 6) Push the beater top down on the reed and tighten the wing nuts which hold it in place.

If you do not have a flyshuttle, you can skip to page 99 to assemble the bench. If you have a multi-box flyshuttle, skip to page 88 to assemble it.

OVERHEAD SINGLE-BOX FLYSHUTTLE BEATER TIE-UP (OPTIONAL EQUIPMENT)

NOTE:

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. The boxes are already installed.

- 1) Find the following parts:
 - a. string tie-up and handle

- b. flystring supports (#43)
- 2) Find the following hardware:
 - a. Screweye
 - b. two 5/16" x 2-1/4" carriage bolts
- 3) Place a flystring support on the inside face of a top horizontal side frame piece. Insert a 5/16" x 2-1/4" carriage bolt from the outside of the top horizontal directly above the beater assembly. Attach a washer and hex nut and tighten.
- 4) Repeat this on the other side. These supports should hang down from the top horizontal with the screweye end on the bottom. Tighten the supports securely.
- 5) Take the screweye from the hardware package and screw it into the center hole on the underside of the front harness pulley support so that no screw threads are showing.
- 6) The handle has a screweye at the top and one at each side with cords attached. There is a clip attached to the cord at the top of the handle. Attach this clip to the screweye on the front harness pulley support.

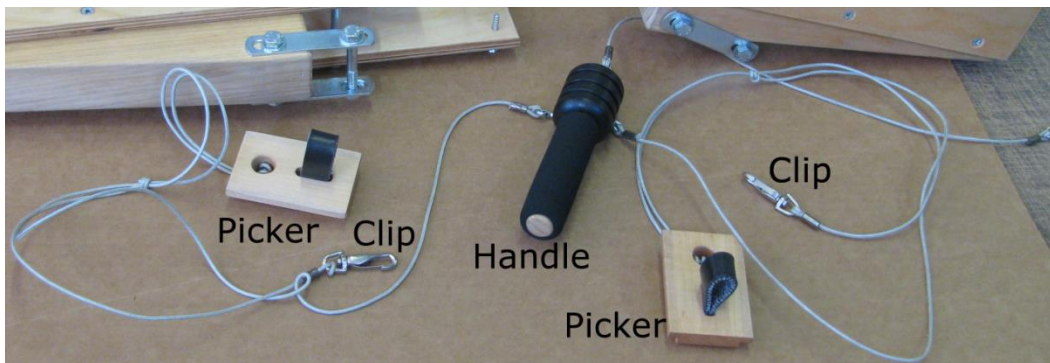


Figure 69 - String tie-up and handle

- 7) There are two pickers hanging below the handle. These are wooden pieces which have a leather loop and cord attached. Take one of these and place it so that the leather loop is toward the bottom.
- 8) Slide the picker into the slots on the top of the flyshuttle box. The leather loop should be down and to the outside.

- 9) Attach the clip at the end of the cord coming from the picker to the screweye on the flystring supports that you just installed. Make sure the cord goes over the top of the snubber. The snubber is a small, round plastic piece above the shuttle box.
- 10) Repeat for the other side making sure that the picker loop is down and toward the outside.

OVERHEAD MULTI-BOX FLYSHUTTLE BEATER (OPTIONAL EQUIPMENT)

The following section applies to both the two-box flyshuttle and the four-box flyshuttle. You will find instructions for completing each assembly later in this chapter.

Add the Pulley Assembly

- 1) Position the pulley support and wedge at the pre-drilled holes in the harness pulley support. Place them together so that the pulleys and the thick edge of the wedge face the rear of the loom.
- 2) Use the two #10 x 1" pan head screws to attach the upper pulley assembly to the bottom front of your harness pulley support.

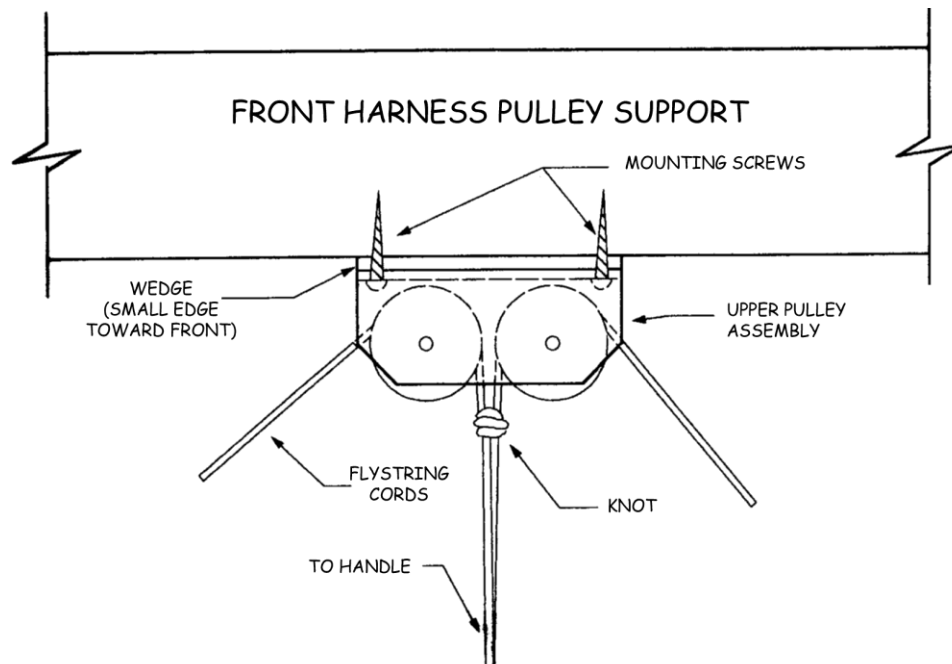


Figure 70 - Vertical Pull Upper Pulley Assembly

Add the drop box assembly to the beater

The Drop box assembly is marked left or right.

- 1) Find the left drop box assembly. There are two holes through the back plate in the lower right corner and a nut access hole in the upper right corner.

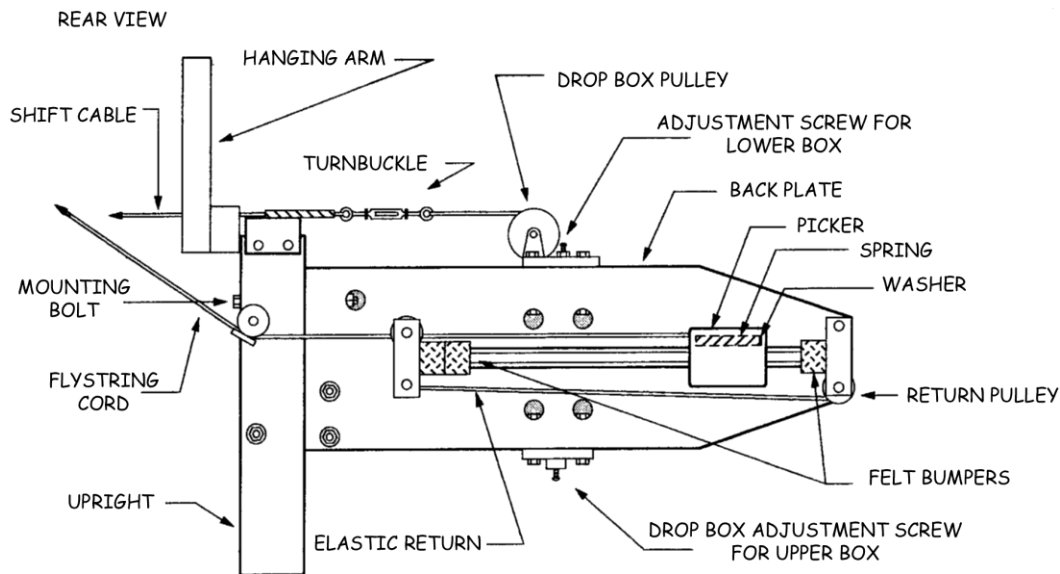


Figure 71 - Drop Box Assembly from Rear

- 2) On the left upright, there is a horizontal hole through the width of the upright just below the slot for the beater top. This hole is offset to the front of the shuttle race side of the upright.
- 3) Take a 5/16" x 5" hex bolt with a washer on it, insert it through the hole in the upright from the inside through the nut access hole in the upper right corner of the drop box assembly. Thread a square nut onto the bolt.
- 4) Do not tighten this yet. Your drop box assembly should now be attached to the upright with this one bolt with the moveable boxes in the front.
- 5) Attach the drop box assembly to the shuttle race with two 5/16" x 3" carriage bolts inserted from the front with washers and hex nuts behind the back plate.



Figure 72 - Flyshuttle Box from back

- 6) Now tighten all bolts holding the 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.

- 7) Repeat this procedure for the right drop box assembly.

VERTICAL PULL FLYSTRING TIE-UP

The flystring tie-up cord should come with the handle already attached in the middle. You will route the flyshuttle cord from the middle of the loom to one side, then do the other side.

Attach the Flyshuttle handle

If the flyshuttle handle is not attached to the cord already, follow these instructions to attach it.

- 1) 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.
- 2) Form a tight loop at the center of the cord.
- 3) Feed the loop down from the top of the handle through the hole on either side of the brass pin that divides the hole.

- 4) Now feed the loop back through the hole on the other side of the brass pin. Form a larger loop (6" or so) and put the handle through this loop. Bring the string of the loop all the way back up to the top of the handle.



Figure 73 - Flyshuttle on cord

- 5) Pull straight down on the handle, tightening the cord around the brass pin. This procedure should automatically center the handle on the tie up.
- 6) You will tie an overhead knot in the cord between the two upper pulleys. Tie a simple overhand knot with the handle already in place.



Figure 74 - knot on flyshuttle cord

Route the flyshuttle cord

There is a hole in each picker that is larger on the outside than it is on the inside. This hole is about 3/8" in diameter on the outer side of the picker and about 1/8" in diameter on the inner side

- 1) From the middle of the loom, route the cord over one of the pulleys attached to the Harness Pulley Support. The knot above the handle should be about an inch below the pulley.

Note:

If the knot was placed correctly, the pickers should still return to the end of the picker rod at each end of the beater and the cord should stop before the knot stops the cord from moving any farther.

- 2) Take it under the pulley on the back face of the beater upright, under the pulley on the inner picker rod support.



Figure 75 - Routing Flyshuttle Cord

- 3) Thread the cord through the hole in the picker, from the small side to the larger outside part.
- 4) After the cord has gone through the picker, add the small spring, then the washer from the hardware packet to the cord



Figure 76 - Spring and washer on Flyshuttle cord

- 5) Tie a knot in the cord.

Note:

The positioning of this knot will determine the operating height of the flystring handle, so make sure that you are satisfied with its position before tying the knot. If there is more than an inch or so of cord left beyond the knot, you may want to snip off the excess cord.

- 6) Repeat these steps for the other side of the loom.

TWO-BOX FLYSHUTTLE – DROPBOX MOVEMENT

Skip to page 95 to complete the four-box flyshuttle.

Attach the shift handle

The shift handle allows you to switch between boxes.

- 1) On each side there is a cable attached to the drop box which has an eyebolt on the end. This cable is routed over the top of the drop box pulley and the eyebolt threads into the turnbuckle on the end of the cable coming from the shift handle.

Adjust the movement of the dropboxes

Note:

You can adjust the movement of the boxes both with the adjustment screw and with the turnbuckle on the shift handle cables. Adjust each as needed until the boxes are in the correct position.

The boxes slide up and down on a metal rod which is fixed at both ends to cast metal pieces in order to change the box. There is 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.

- 1) 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.
- 2) 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.



Figure 77 - Flyshuttle adjustment screw

Note:

This adjustment is critical. Please make it carefully. 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.

- 3) 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.
- 4) 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

Loctite) and apply a drop or two to each of these screws where the screws go into the cast metal brackets.

Adjust the shift handle cables

- 1) With the shift handle shifted to its rightmost, adjust the left drop box turnbuckle so that the box is against its top stop and the spring at the turnbuckle is slightly extended.



Figure 78 - Flyshuttle Turnbuckle

- 2) Shift the handle to the left and adjust the right turnbuckle in the same manner.

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.

You can now go to page 99 to assemble the bench.

FOUR-BOX FLYSHUTTLE DROPBOX MOVEMENT

Attach the drop boxes to the shift handle

There is a long, dark, wooden handle 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.

Give yourself slack in the cable

Note:

This will hold the box in the upper position and both of your hands will be free to adjust the cable.

- 1) 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.
- 2) 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.

Attach the cable

- 1) Unwrap the cable that is attached to the top of each drop box.
- 2) Run each cable over to the shift handle.

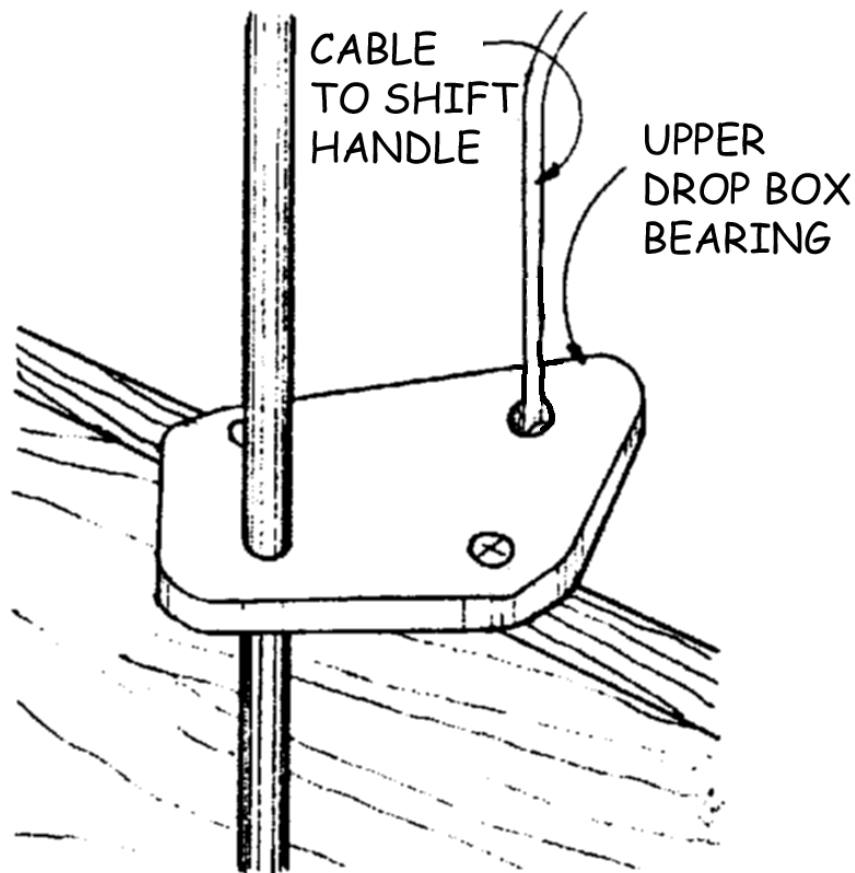


Figure 79 - 4-box Shift Handle Cable to Drop Box

- 3) At the end of each cable, there is a threaded eyebolt with a lock nut. Thread each eyebolt into the metal bracket on the ends of the shift handle.
- 4) Once the cable is attached to the drop box assembly, run the cable over the drop box pulley on the larger cast metal piece directly above the drop box assembly and under the small pulley near the end of the beater top.

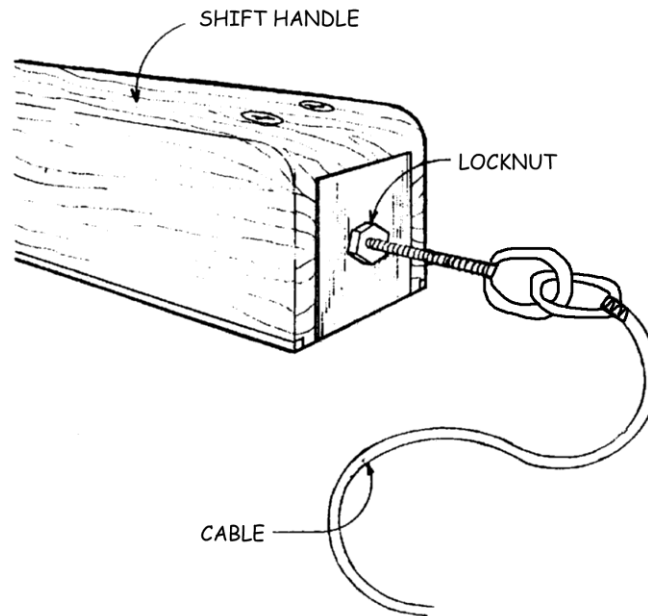


Figure 80 - 4-box Flyshuttle Beater Shift Handle

- 5) Repeat this procedure on the other side of the loom.
- 6) Once both cables are attached, you will need to adjust the cable lengths.

Note:

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.

- 7) The best way to adjust these 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.
- 8) Loosen the lock nut and you can shorten or lengthen the cable by screwing this threaded end into or out of the plate at the end of the

- shift handle. Adjust the cable so that the drop box shelf is at the same height as the top of the shuttle race.
- 9) It may help you to lay a straight edge across the shuttle race and drop box when doing this to assist you in getting the two perfectly aligned.
 - 10) When you have it properly adjusted, secure the lock nuts.
 - 11) Once you have adjusted both cables, it's a good idea to put the shift handle in each detent position and check the boxes on each side for alignment.

Note:

It is possible that there will be some 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.

ASSEMBLE THE BENCH

ASSEMBLE THE 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



Figure 81 - Bench (shown with Tool Bag - optional)

- 1) 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.

- 2) 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 people mount it so the access holes face into the loom (in the direction of the long part of the feet).

- 3) 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.

Note:

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.

- 4) 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.
- 5) 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.
- 6) 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.

CONNECT THE LIFT SYSTEM

AVL JACQ₃G E-LIFT II INSTALLATION

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:

- 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).
- 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.
- 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).
- 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 Treading 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

Installing the Motor/Bracket Mount Assembly

- 1) Unpack the Motor/Bracket Mount Assembly (with Power Cord attached). From the hardware packet, find the three 5/ 6 x 8 – 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.

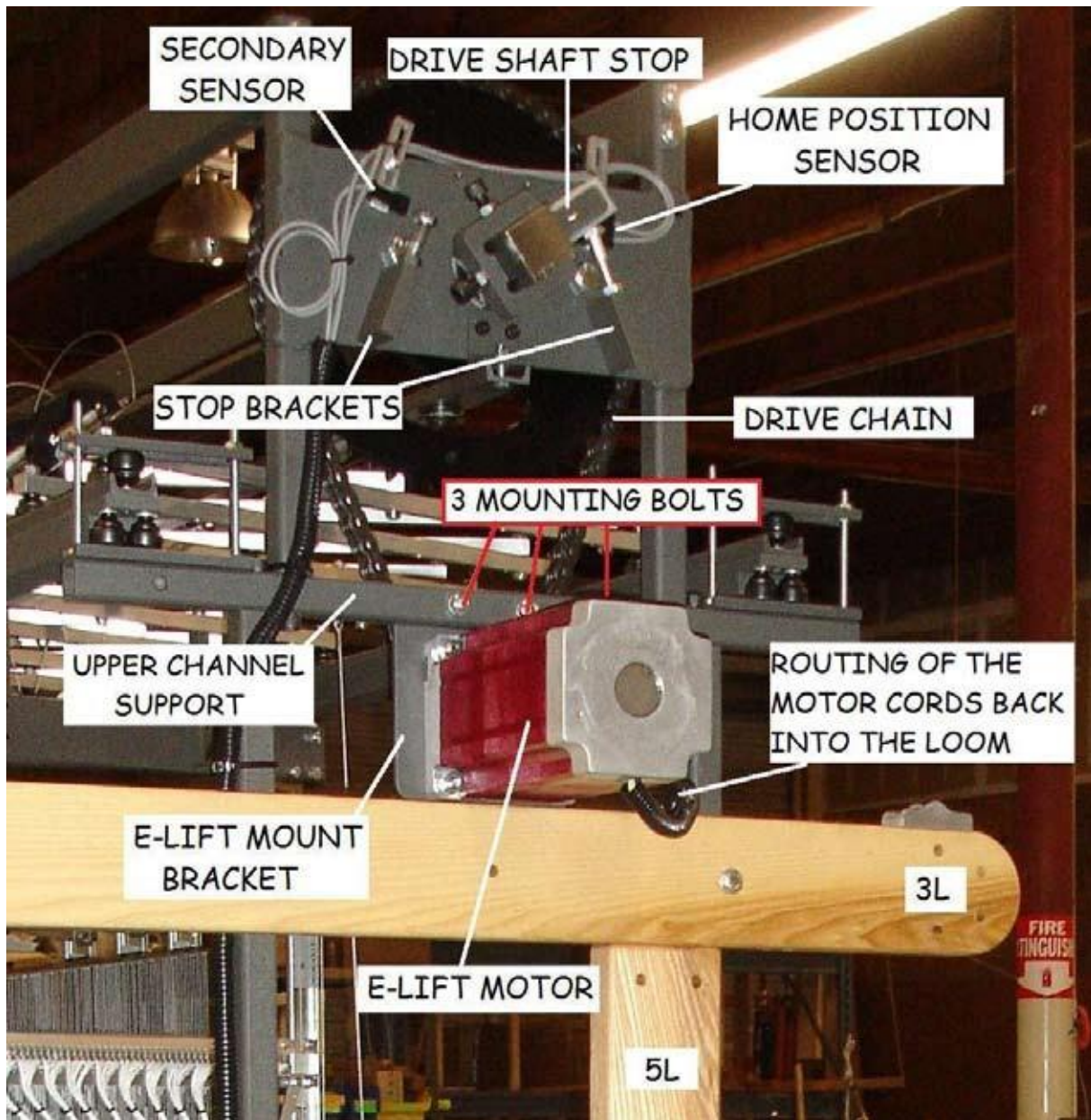


Figure 82 - E-Lift parts installed (Main Drive Sprocket not visible)

- 2) Insert the motor at the left side 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. 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.

- 3) 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.
- 4) 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.

Installation and Assembly of the Drive Chain

Note:

Several of the pictures in this section show only a portion of the drive chain. It has also been put together off the loom in order to take clear pictures. Make sure to install and connect your drive chain in the appropriate location on the loom.

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

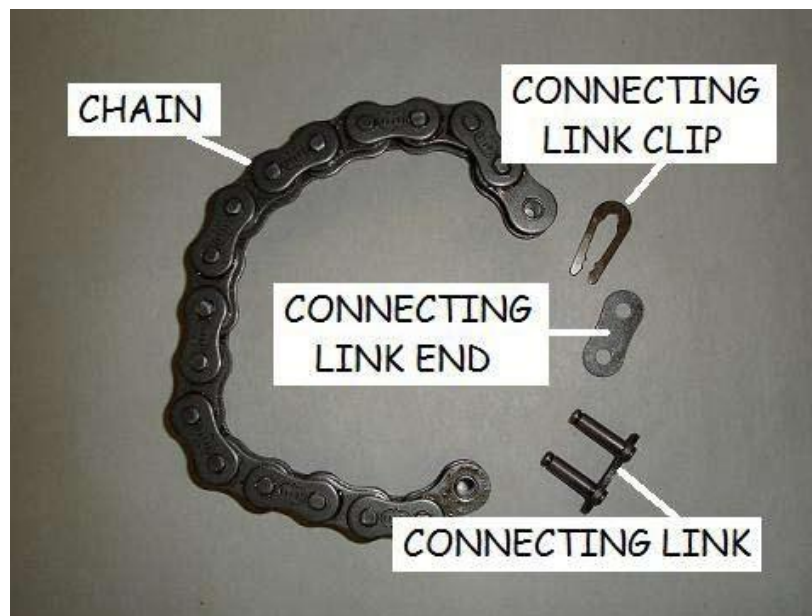


Figure 83 - Chain with Connecting Parts

- 2) 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.

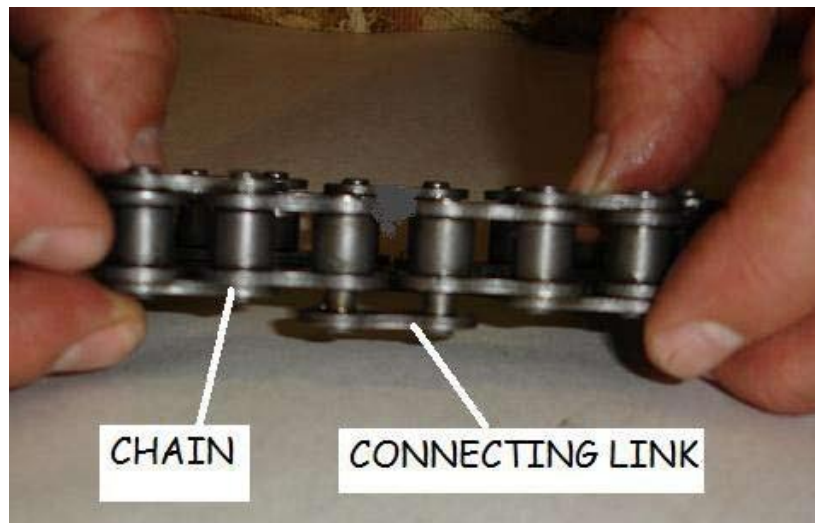


Figure 84 - Chain with Connecting Link partially inserted

- 3) Insert the two tips of the connecting link into the open link at each end of the chain, closing the circle. Place the connecting link end over the tips of the connecting link that are now exposed above the two joined links.
- 4) 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.

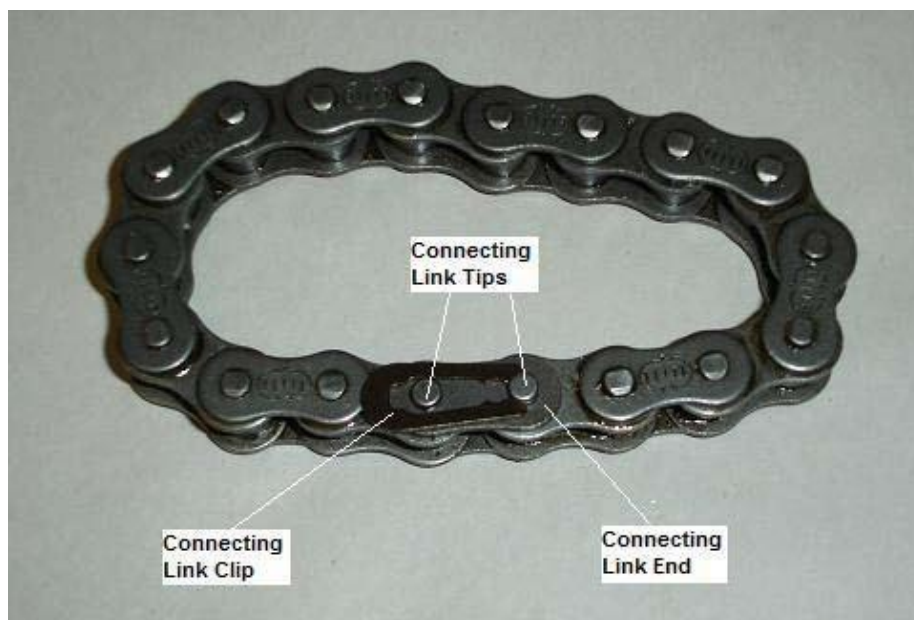


Figure 85 - Chain with Link End and Link Clip in place

- 5) 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 86 - Closing the Connecting Link Clip with Pliers

- 6) 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.

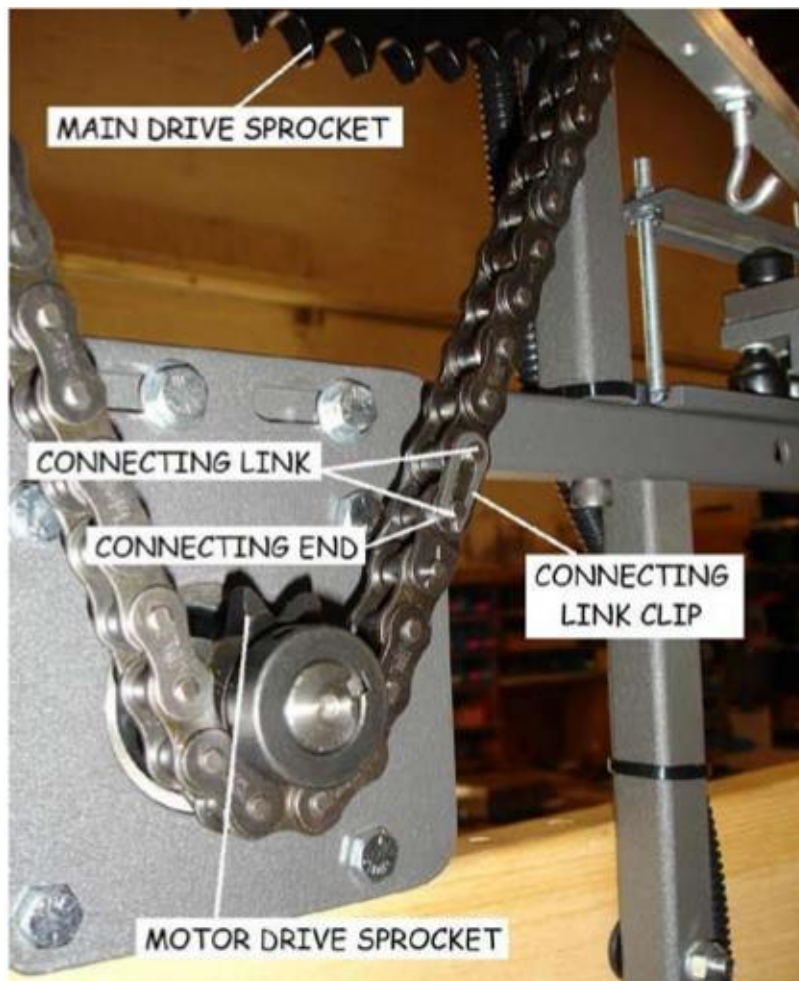


Figure 87 - Main Drive Sprocket with motor and chain (Interior View)

Connect Power and Control to the E-Lift

- 1) Secure the Motor Power Cord to the Module Frame. 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.
- 2) 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.

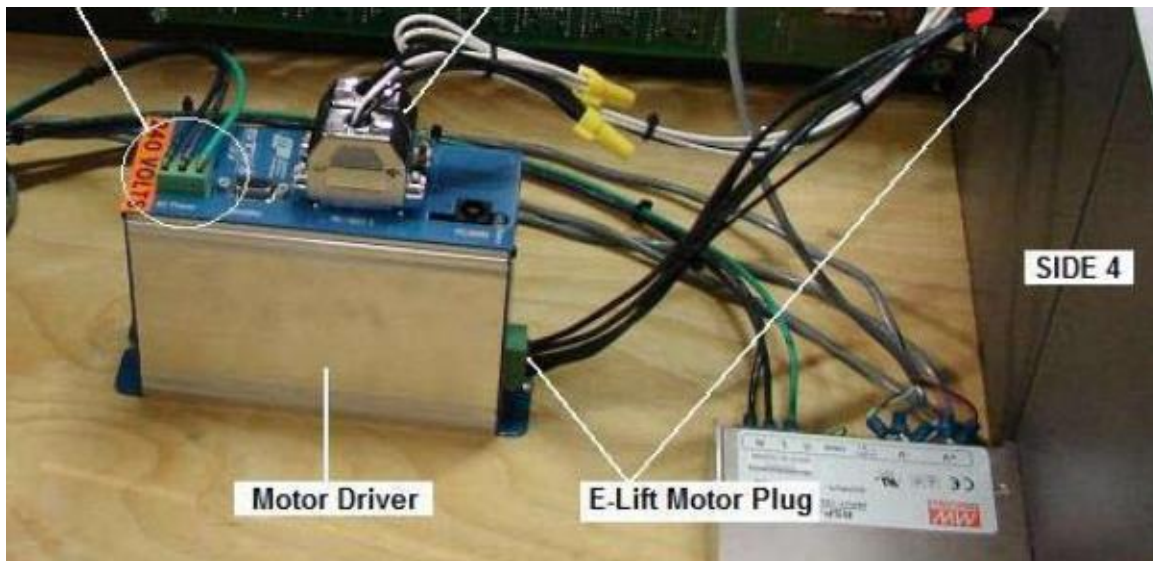


Figure 88 - Interior of Control Box, connection for E-Lift Motor

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

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. Whenever the loom is shut down, it is important that the stop be resting at the Home Position.

- 1) 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.
- 2) Turn the Main Drive Axle about half way toward the back of the loom or until the Drive Shaft Stop is pointing directly up.
- 3) 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.

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.

- 4) Turn on the power at the Control Box (I). 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.
- 5) 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.
- 6) The Main Drive Axle is now in position to initiate shed operation.

INSTALLING AN AIR LIFT

Air Component Information

Component	Description
Compressor	A machine which compresses, stores, and delivers air to an air system.
Air Cylinder	A sealed tube that contains a movable shaft. This shaft is caused to move in or out by the action of compressed air.
Exhaust Valve	The work in your Air Shuttle is done by compressed air. This air comes into the system via the compressor, is forced through the cylinder, and is then vented from the system. An exhaust valve is the door through which the air leaves.
FRL	This is a filter and regulator together in a single device. The air that comes from your compressor feeds directly into the FRL where it's conditioned and its pressure regulated.
Piloted Valve	This valve directs the flow of air to and from different parts of the system.
Rod End	The working end of an air cylinder. It connects to the mechanism that needs to be moved.

Air Compressor Requirements

Compressors are rated according to the volume of compressed air they can delivery in one minute. This rating is known as C.F.M., cubic feet per minute.

DEVICE	USAGE	UNITS	PER	COMPRESSOR RATING *	UNITS	NOTES
A' Loom Dobby (all models) A-Lift	1.25	CFM @ 100 PSI	Loom	4	CFM	Rated @ 60 PPM
Air-Assisted Shuttle Boxes	0.47	CFM @ 100 PSI	Loom	2	CFM	Rated @ 60 PPM

PPM = Picks Per Minute

CFM = Cubic Feet Per Minute

PSI = Pounds Per Square Inch

We suggest sizing a compressor for worst case scenarios like 50% duty cycle. When using a 50% duty cycle, doubling the usage rate is the first step, then adding another 50% will insure the compressor is not working at maximum capacity, making it last longer and delivering reliable compressed air to AVL products.

Note:

If you will be using multiple air components, make sure your air compressor is sized to handle all of them.

Exceptions to the above sizing methods are products that may use compressors other than the reciprocating type. Screw type compressors are often used in higher volume applications such as IDL's, or a Jacquard with several heads.

The choice of a compressor is yours. In general, we advise you to buy a compressor that can deliver more air than you actually need -- it will run more efficiently, last longer, and allow the addition of future air components.

Air Requirements

In order for this air-activated system to work, you will need to have compressed air available at the loom. The A-Lift will consume approximately 1.25 CFM (Cubic Feet per Minute) of air at 100 PSI (pounds per square inch) when weaving a maximum speed. We recommend a compressor rated at double this consumption with a minimum 5 gallon tank.

This system has been designed to operate from a line pressure between 60 PSI and 100 PSI. The pressure within the system can be adjusted depending upon how many harnesses you will be lifting within a given weave.

Nearly all compressors have storage tanks. Here, too, size is important. We recommend that you consider a compressor with at least a twenty gallon tank.

Installing the FRL

All of the Air components require a Filter/Regulator/Lubricator (FRL) to be installed on the loom. This component connects the air compressor to the air

components on your loom. The FRL for the Jacq3G is part of the Control Box. It is usually installed on the outside of one of the long sides.

- 1) Install the air component(s) for your loom.
- 2) Connect the FRL to the correct color coded air line from the coil of tubing with the air cylinder. The air lines have been connected to their fittings by pushing them into place. They will not come out. In fact, the harder you pull, the harder it will hold.

Installing An A-Lift

The A-Lift replicates the action of treading. When you activate the foot switch, the cylinder retracts and selected harnesses rise or fall. The motion is smooth, quick, and precise and does not jar the harnesses.

- 1) The air lift cylinders are mounted at the top of the module frame near the drive chain.

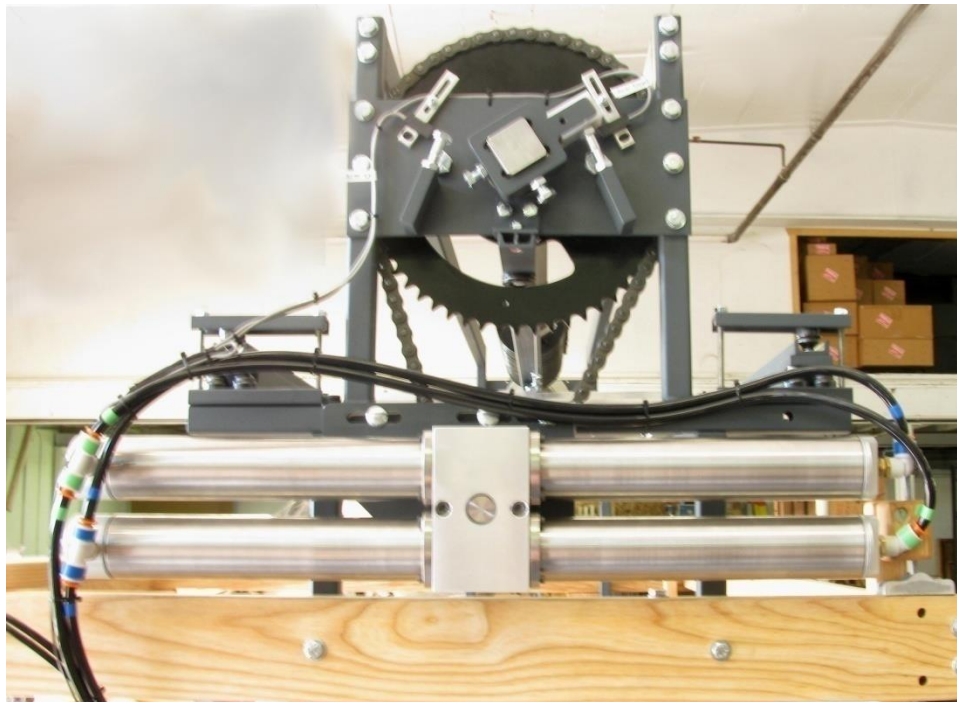


Figure 89 - Air Lift cylinders on loom

- 2) Connect the drive chain as described on page 106.
- 3) Connect the air lines to the system. The ends are color coded for ease of assembly. Route the lines through the loom as necessary.

Fasteners have been included with the system so that you can attach the air lines to the loom.

Foot Pedal

- 1) Place the foot pedal under the loom near where your feet will be when you're sitting on the bench.

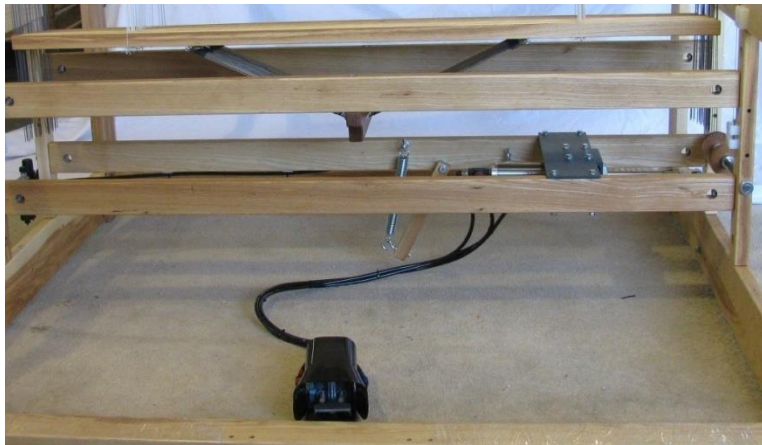


Figure 90 - A-Lift Foot Pedal

- 2) Connect the correct color coded air lines to the foot pedal.

Connecting the components to compressed air

Your loom is now ready to be hooked up to a compressed air line. This line will be connected to the FRL unit. You need to purchase a fitting to hook up to your air line. For convenience, we suggest that you use a "quick disconnect" type fitting which can easily be released from the loom without any tools. You will need to buy a male fitting with either 1/4" or 3/8" pipe threads to thread into the FR. A corresponding *female* connector will be needed for the hose end.

- 1) Once the loom has been hooked up to an air line, set the regulator to a pressure range that will operate the cylinder to your satisfaction.
- 2) Start at 40 to 50 PSI. You may wish to change this adjustment when you change weaving patterns as you will find that a higher pressure is needed when you are lifting more harnesses.
- 3) The cylinder can now be activated by depressing the foot valve. The speed of how quickly the harnesses lift (your weaving speed) can be further altered by adjusting the flow control valves.

- 4) The left valve adjusts inward and the right valve adjusts outward of the rod in the cylinder.

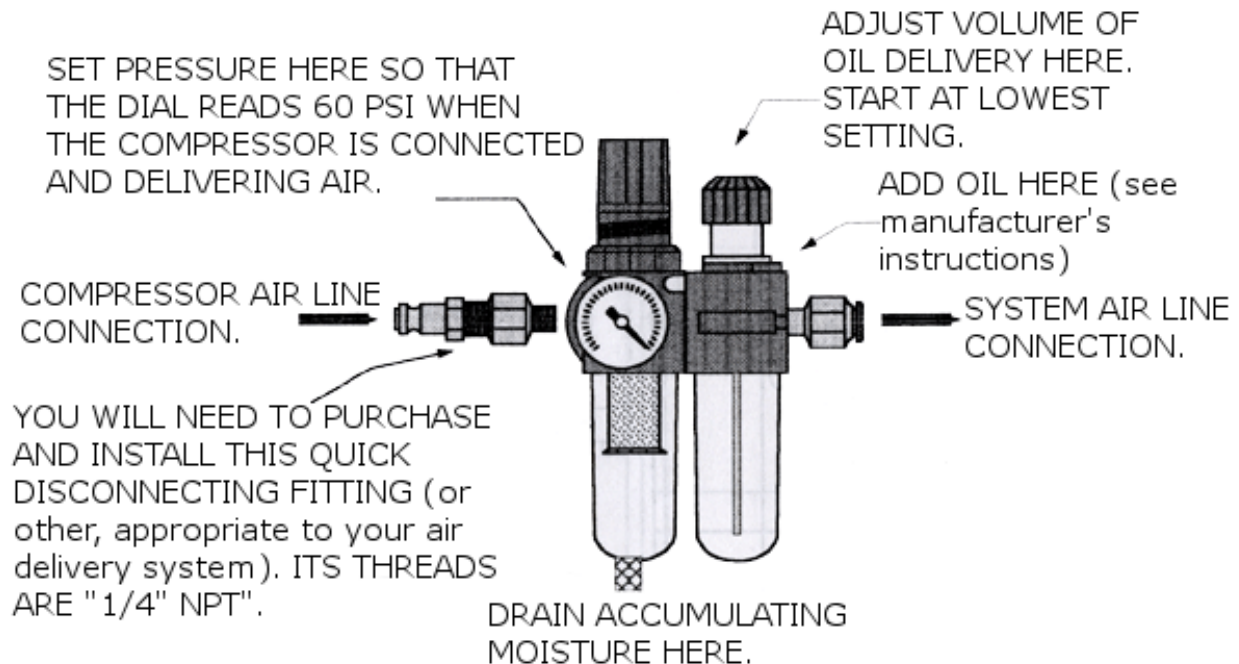


Figure 91 - FRL Detail (may vary)

Maintaining Your System

- 1) Check the FRL weekly (if you use your loom daily).
- 2) Drain the filter bowl if you note a build up of condensation. There's a drain plug at the bottom of the bowl.
- 3) Wipe the shuttle box slide rods clean of lint.
- 4) Wipe the picker slide rods clean of lint regularly.
- 5) The shift handle may get sticky after a while. A lubricating spray can be applied to the pivot mechanism. Periodically blowing or brushing lint out is recommended.
- 6) Check and tighten the bolts as needed.
- 7) Adjust the various mechanisms as needed.

NOTE:

Please disconnect the air from your compressor before you drain your system.

USING THE JACQ3G LOOM

INTRODUCTION TO THE LOOM SYSTEMS

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.

The CONTROL BOX (CPU or CENTRAL PROCESSING UNIT)

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 in this section, 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.

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" (.5 m)	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 92 - Control Box, Side 1 (Showing Vents, Power Switch and Power Source)

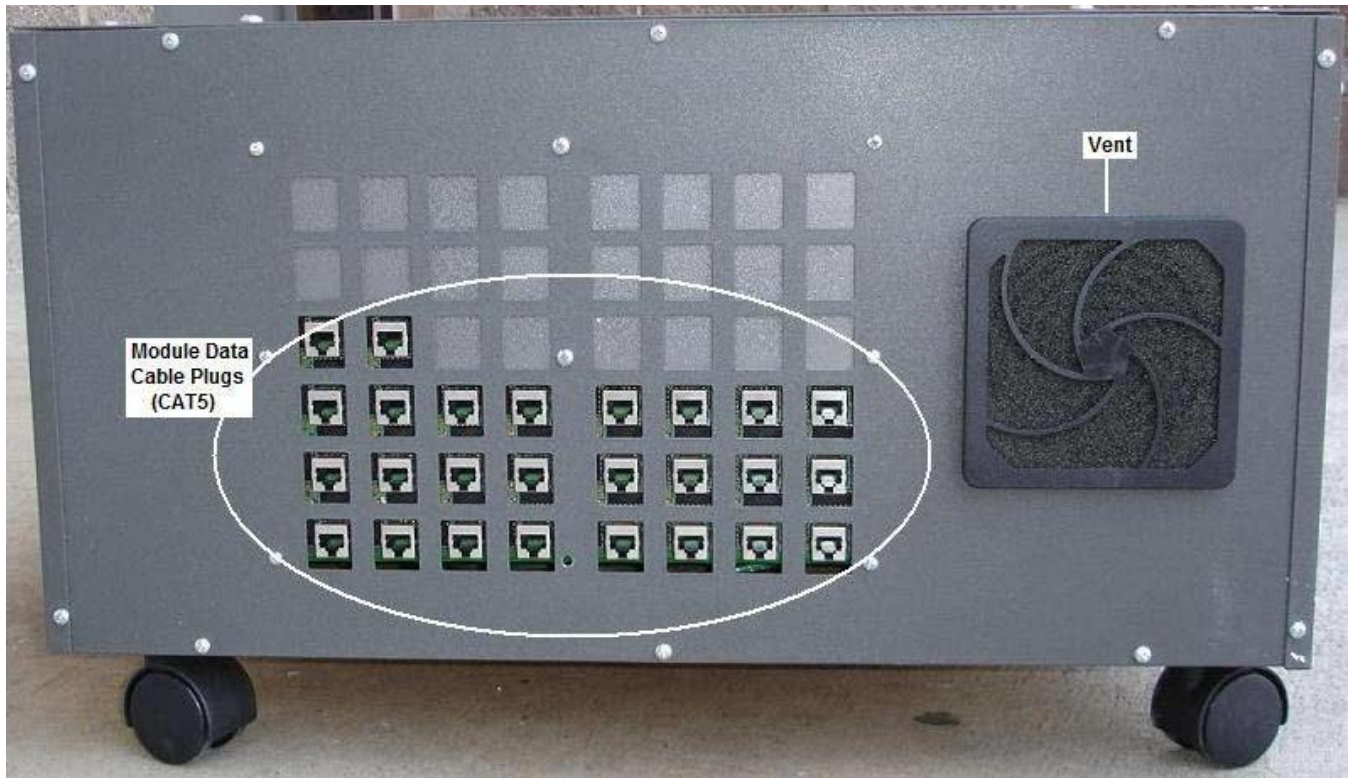


Figure 93 - Control Box, Side 2 (Showing Module Data Cable Plugs – CAT5)



Figure 94 - Control Box Side 3 (Showing Driver Board Power Cable Plugs)

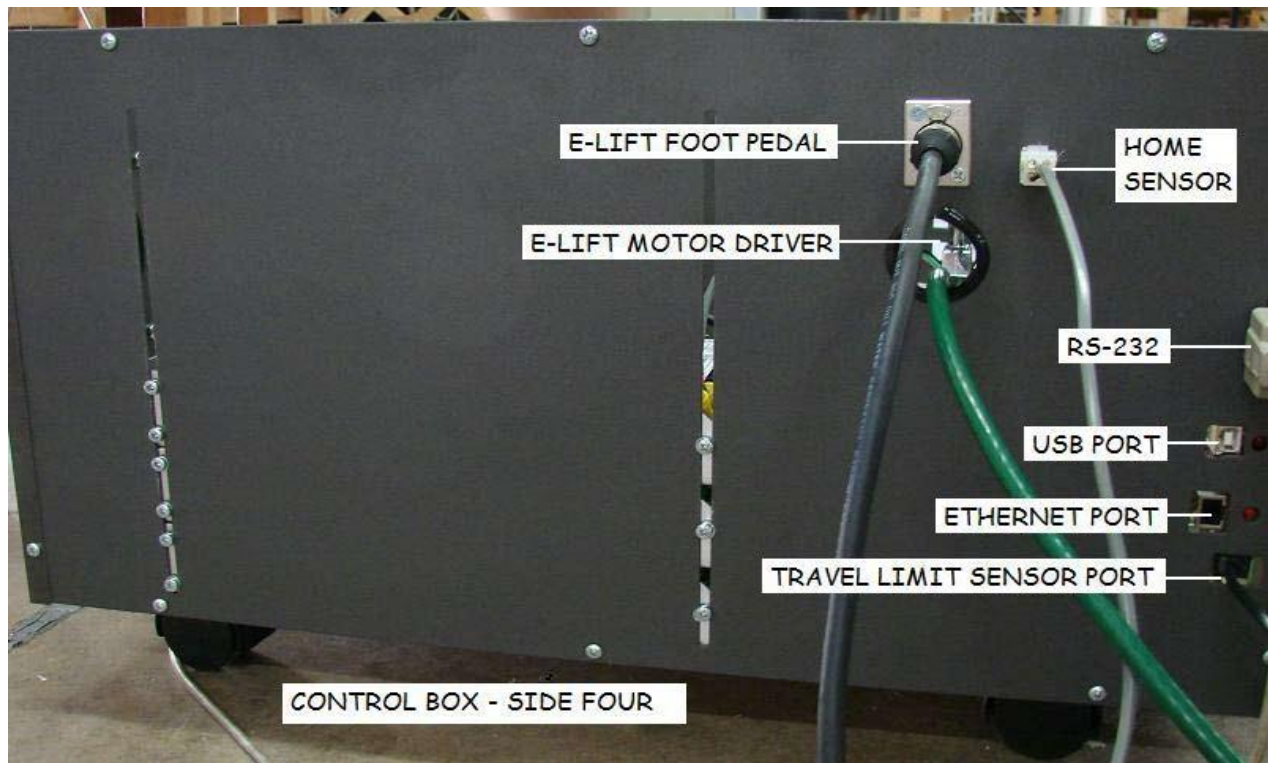


Figure 95 - Control Box, Side 4 (Showing E-Lift and Computer Connections)

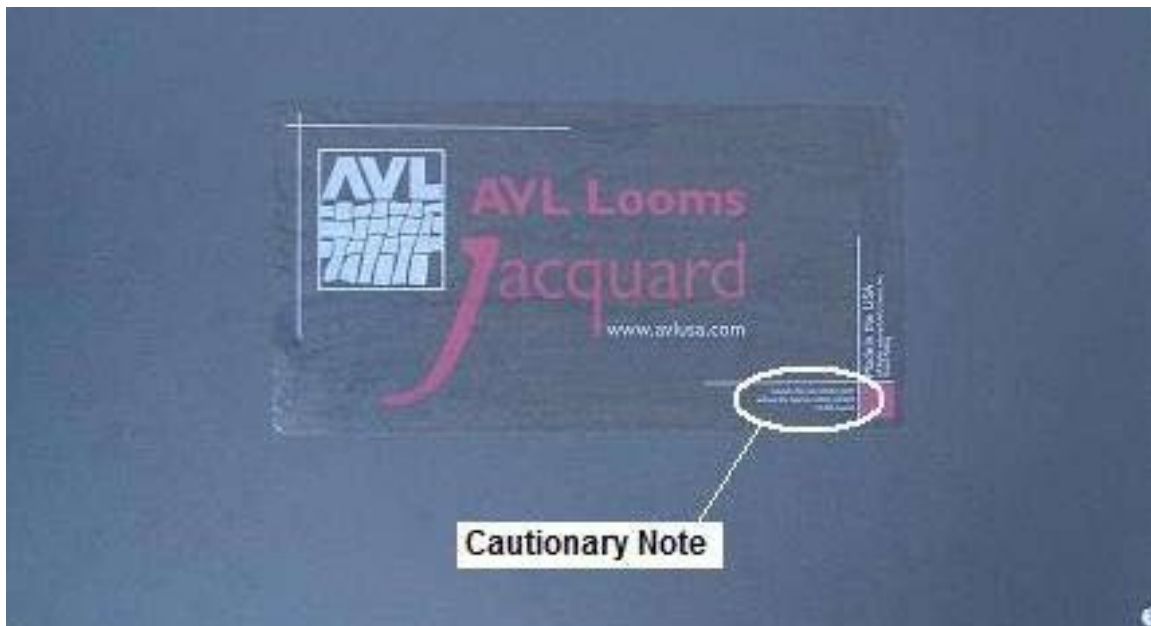


Figure 96 - Control Box, Top (Showing Cautionary Note)

Note:

This reads: “Do not remove cover without the express written consent of AVL Looms”

MODULES (HOOK AND FRAME ASSEMBLIES)

These large, steel frames support the electronic boards, hooks, heddles, and springs.

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 hook #1 is the hook furthest to the rear of the FIRST FRAME on the LEFT and the highest hook number 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.)

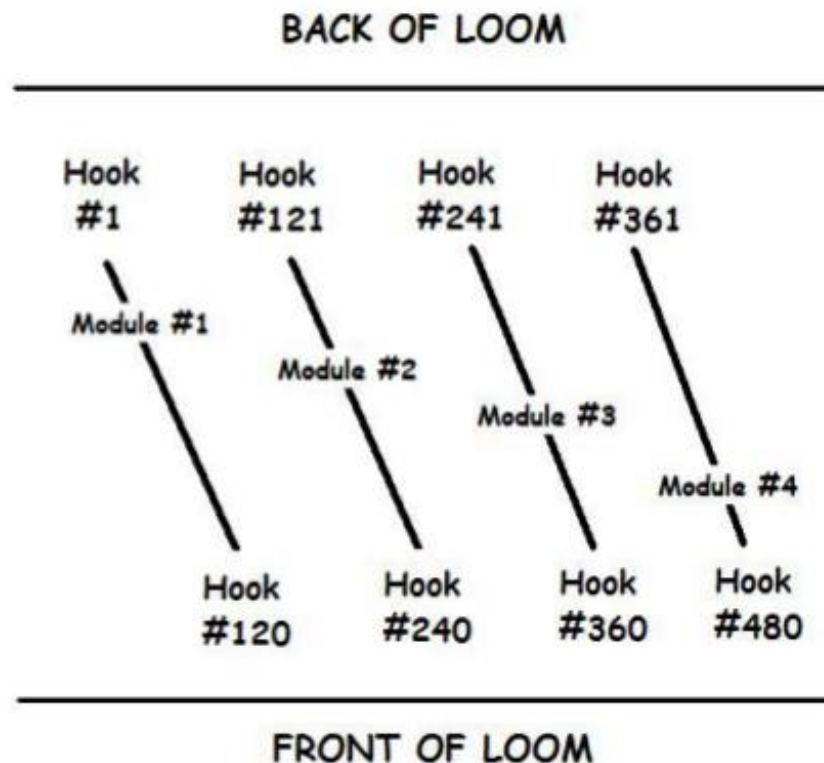


Figure 97 - Numbered hooks on modules

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.

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.

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.

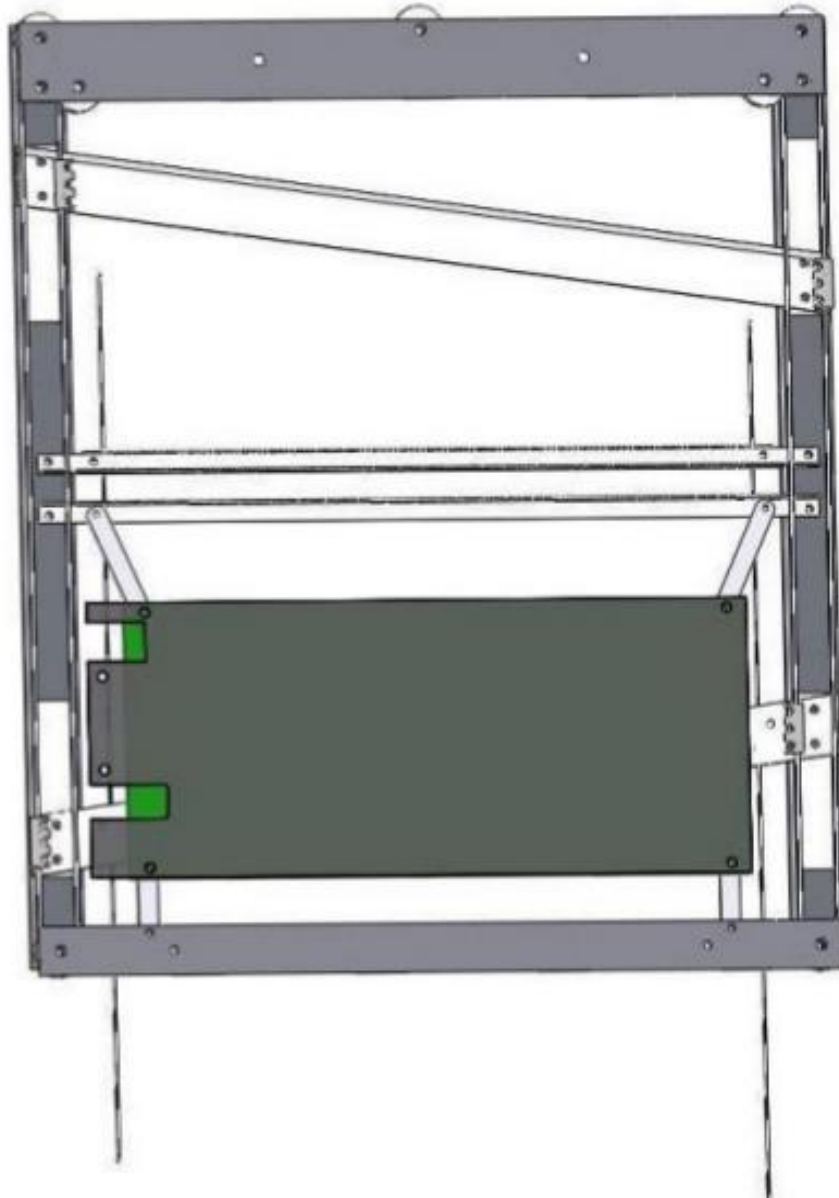


Figure 98 - Module, front

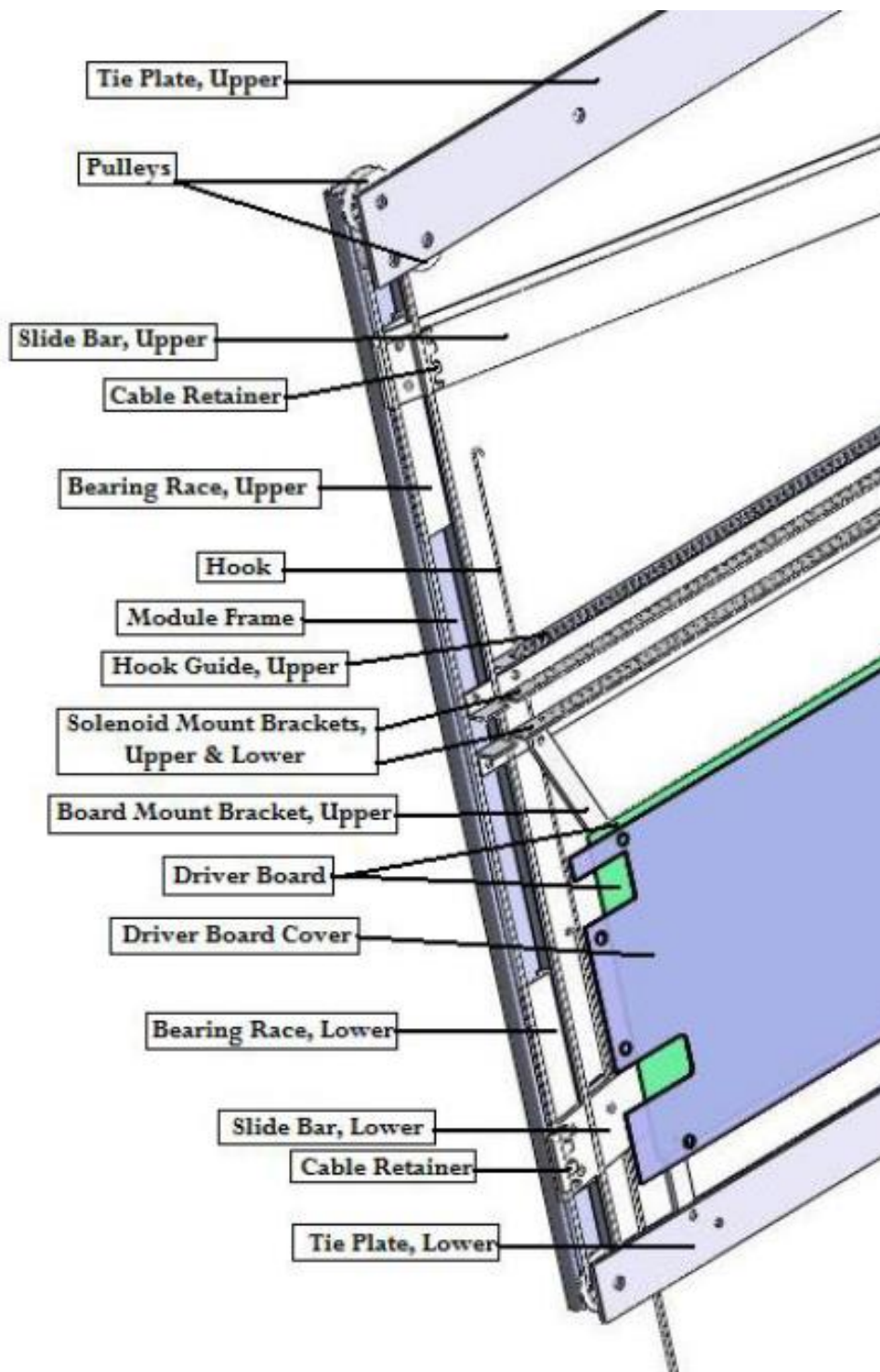


Figure 99 - Module detail, front

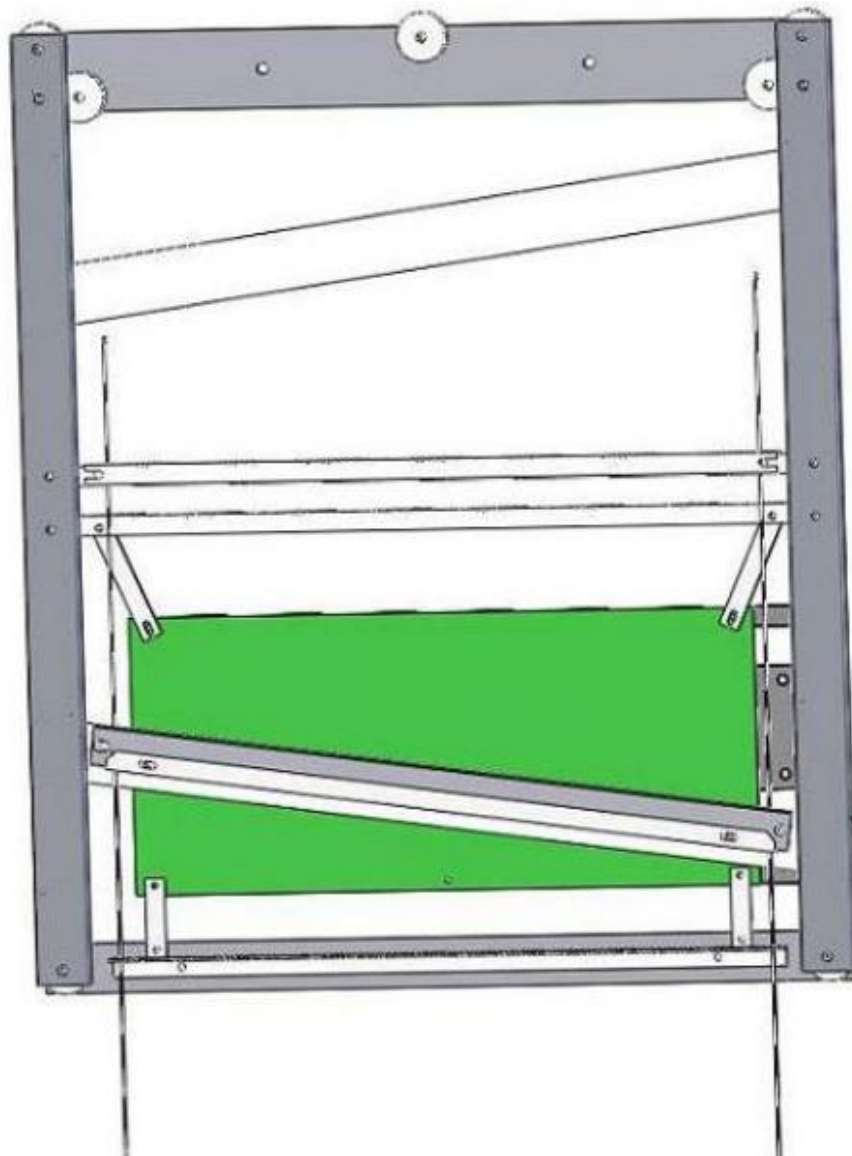


Figure 100 - Module, back

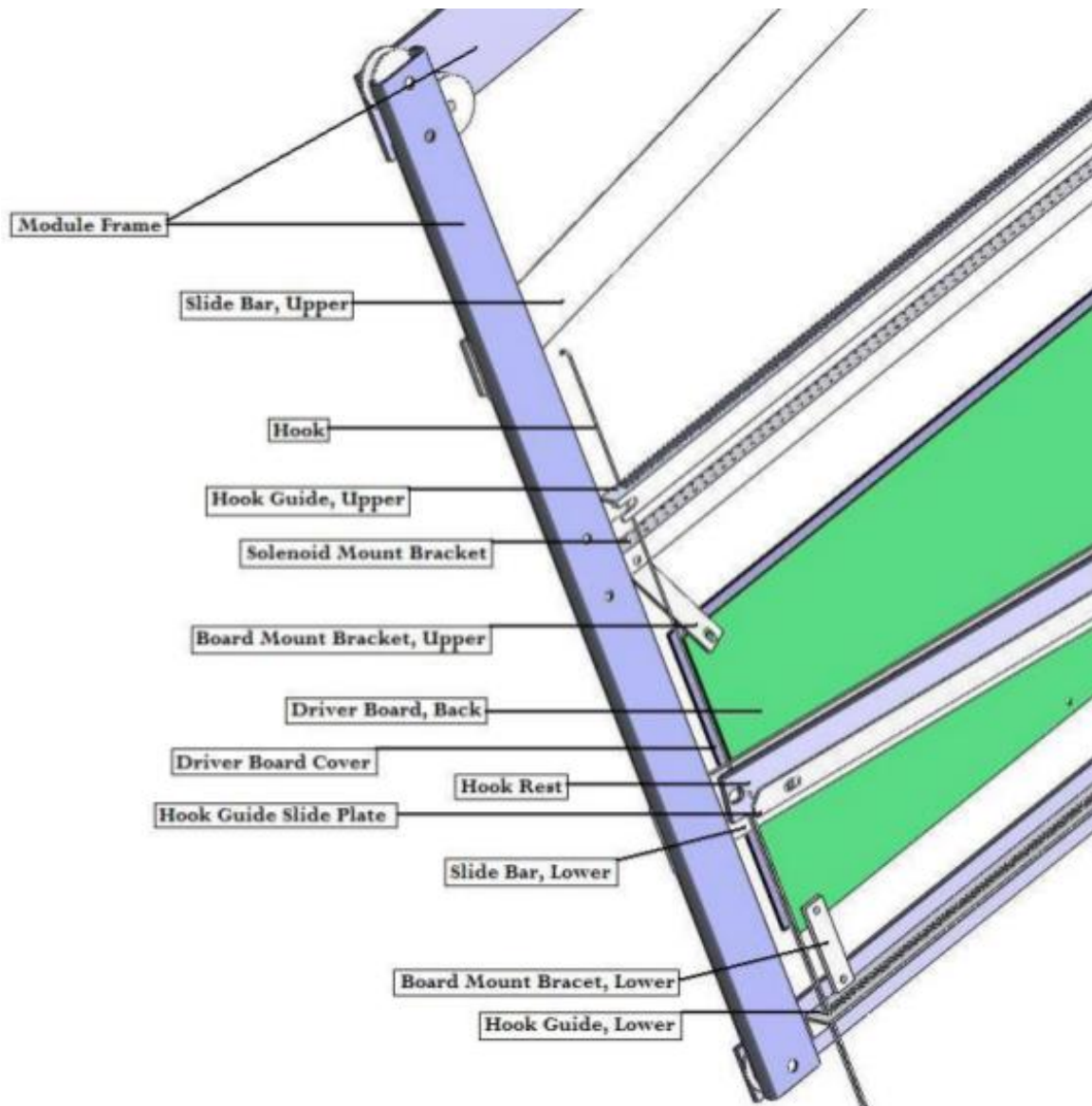


Figure 101 - Module detail, back

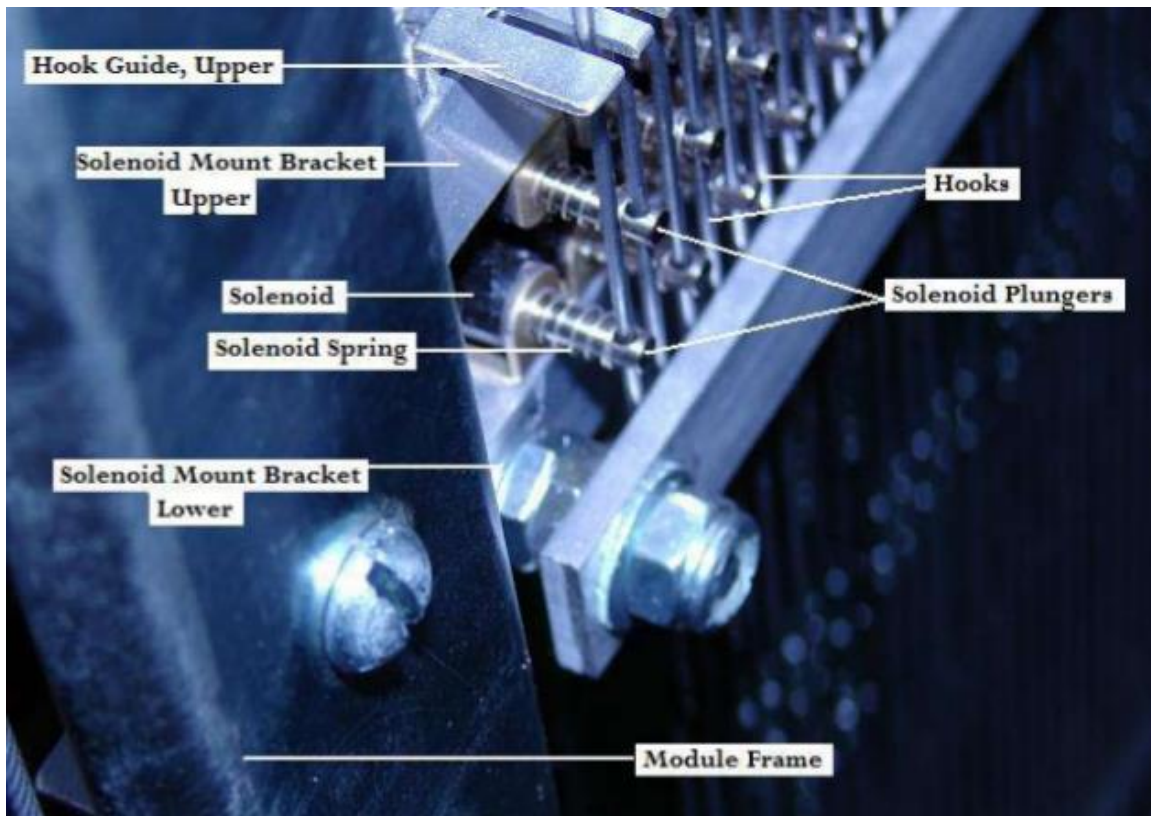


Figure 102 - Module detail, back, solenoid assembly

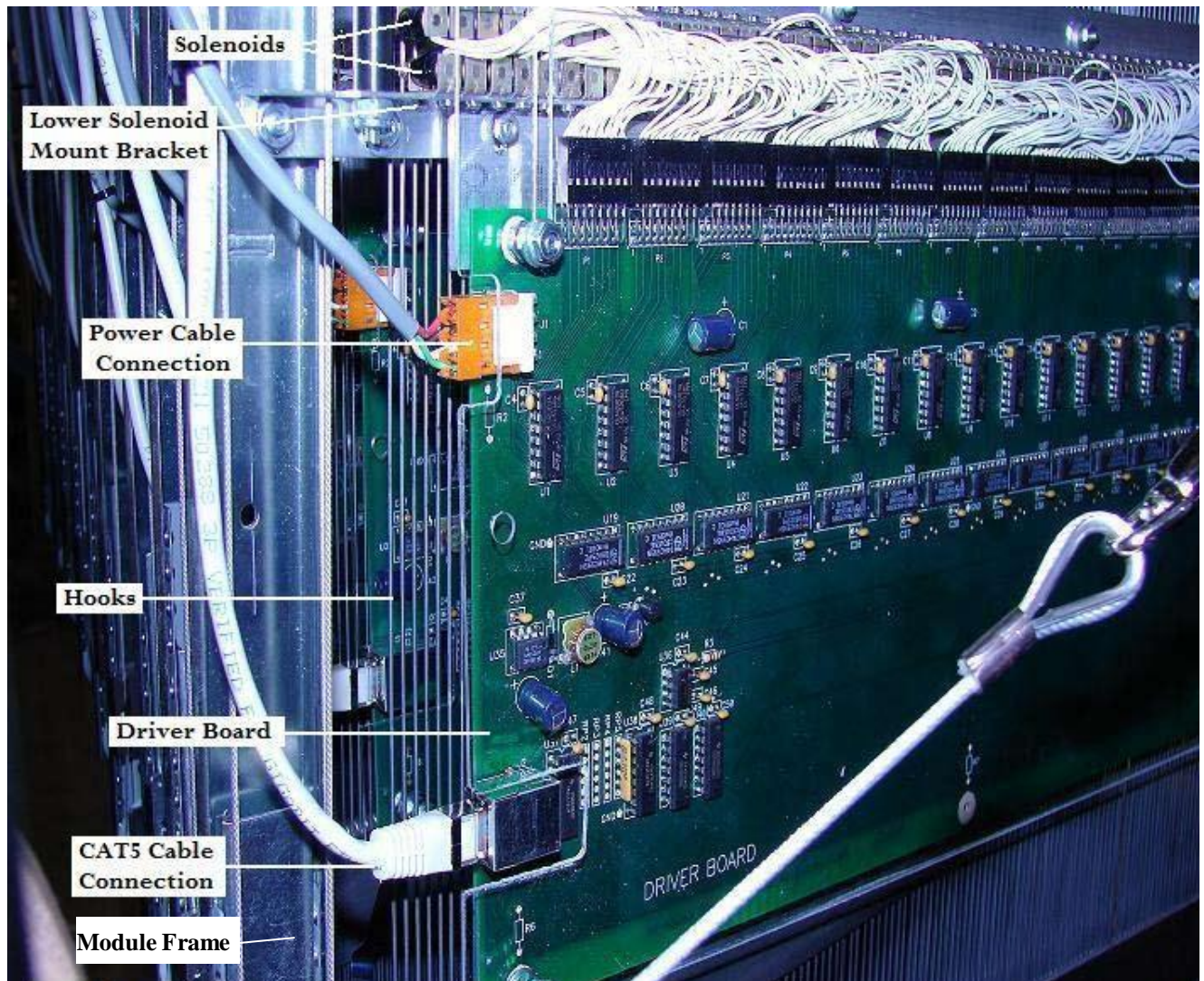


Figure 103 – Module, Front, Driver Board



Figure 104 – Modules, front view showing board lights

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.

Decrease the Warp Density

To decrease the density, or sett, of your warp, move the Frames away from each other, away from the loom center, and turn them more parallel to the reed. When threading, decreasing the density will allow for easier access to the heddles/hooks.

- 1) Turn the circular wheel at the top of the adjustment assembly, clockwise.

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).

- 2) 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.

Increase the Warp Density

To increase the warp density, bring the hook frames back toward the center of the loom and at a more perpendicular angle to the reed. This will also enable you to bring the heddles, once threaded, back into a straight path through the loom from warp beam to reed.

- 1) Turn the circular wheel, at the top of the adjustment assembly, counter clockwise.

Note:

While changing 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).

- 2) 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.

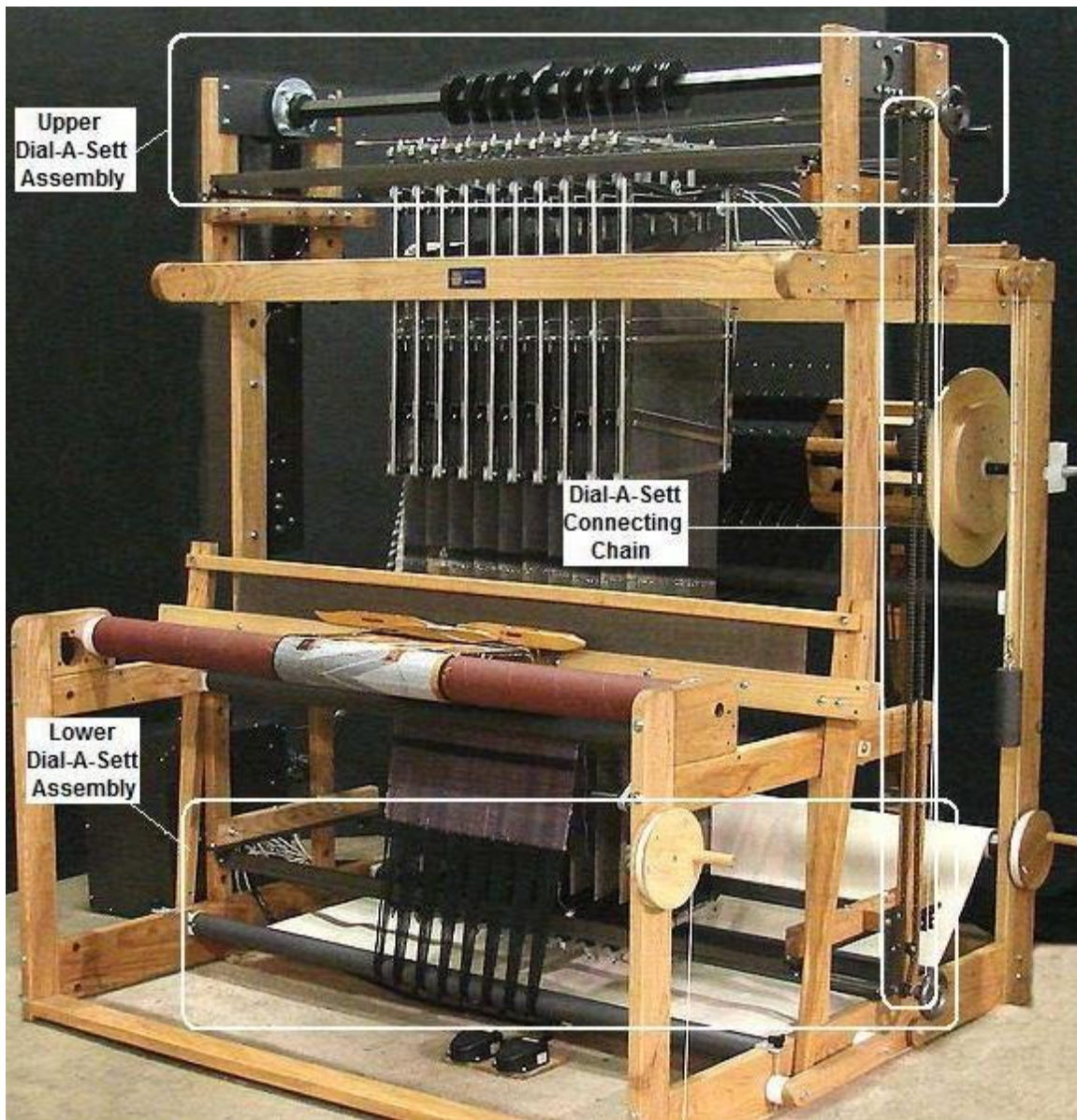


Figure 105 – Upper and Lower Dial-A-Sett Assemblies

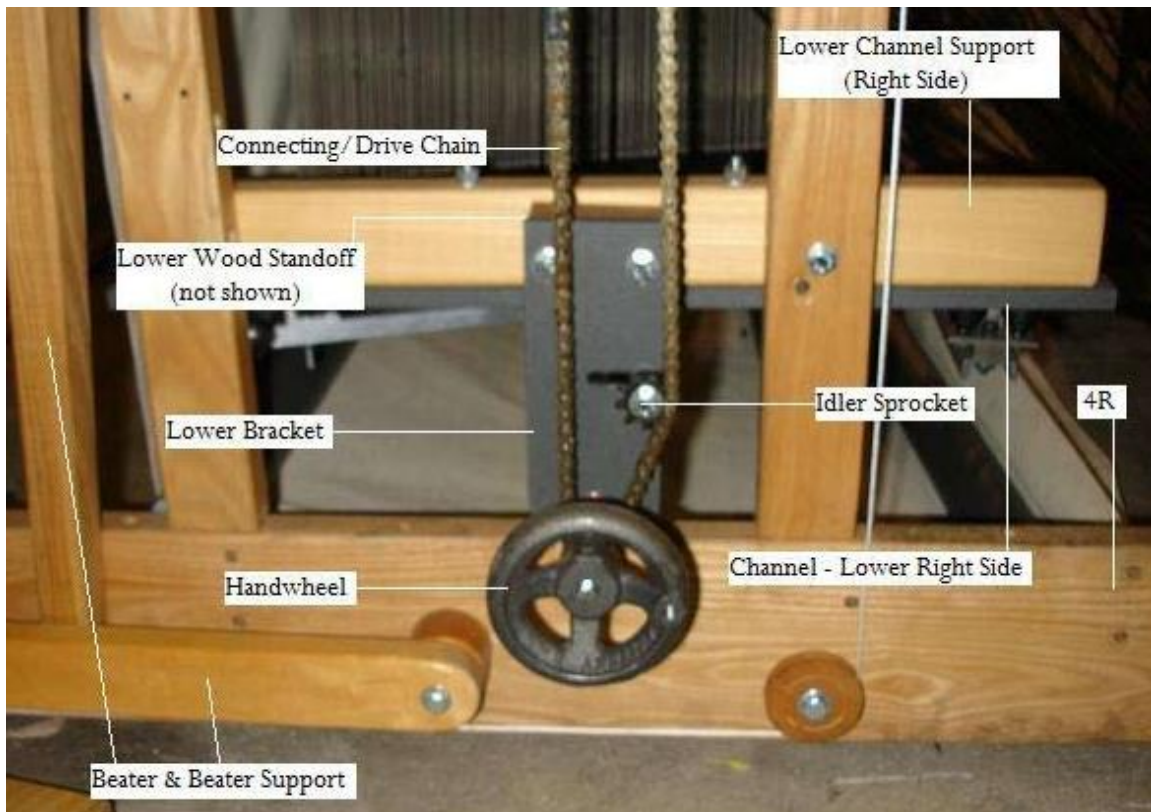


Figure 106 – Dial-A-Sett, lower right assembly

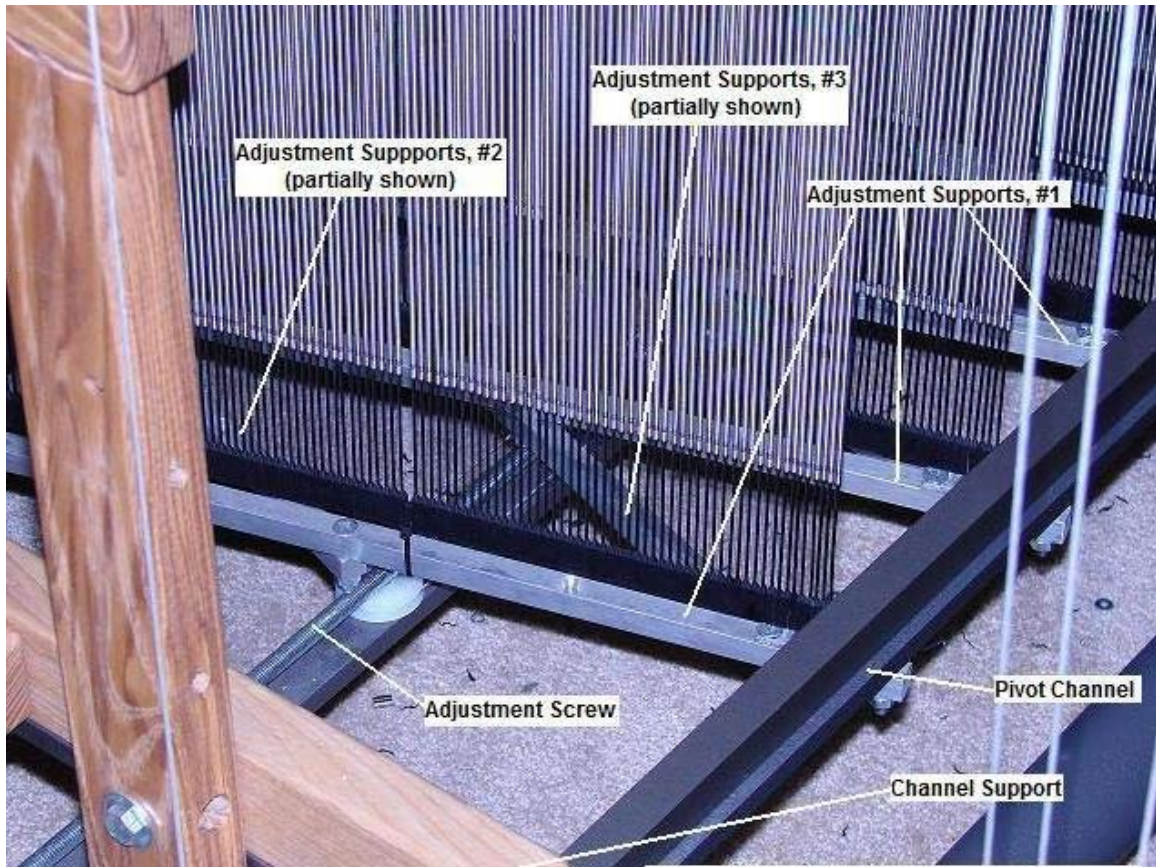


Figure 107 – Dial-A-Sett, lower detail

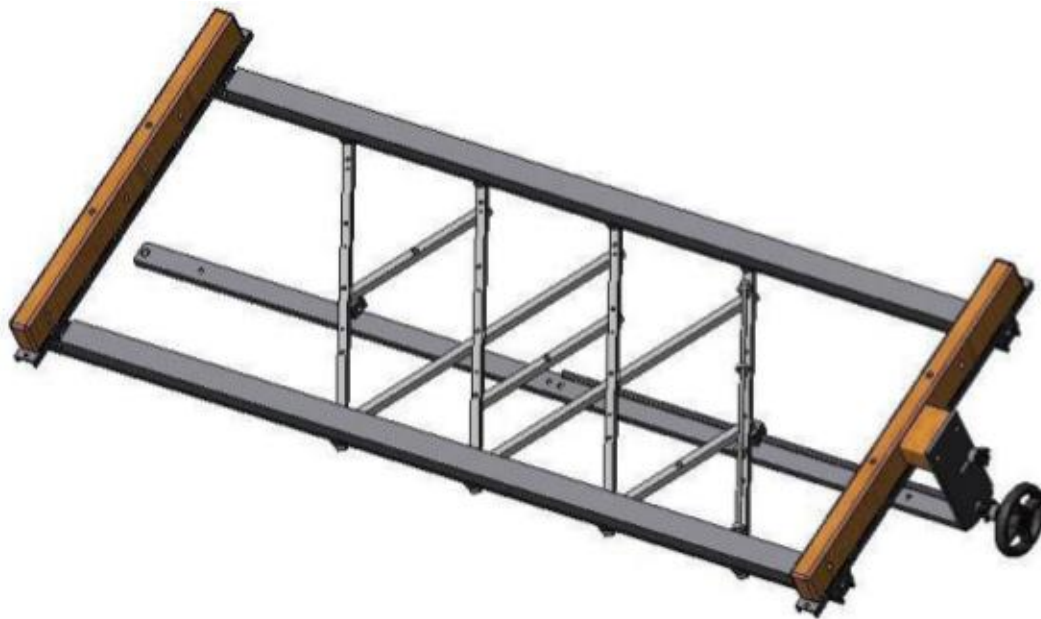


Figure 108 - Dial-A-Sett, lower assembly

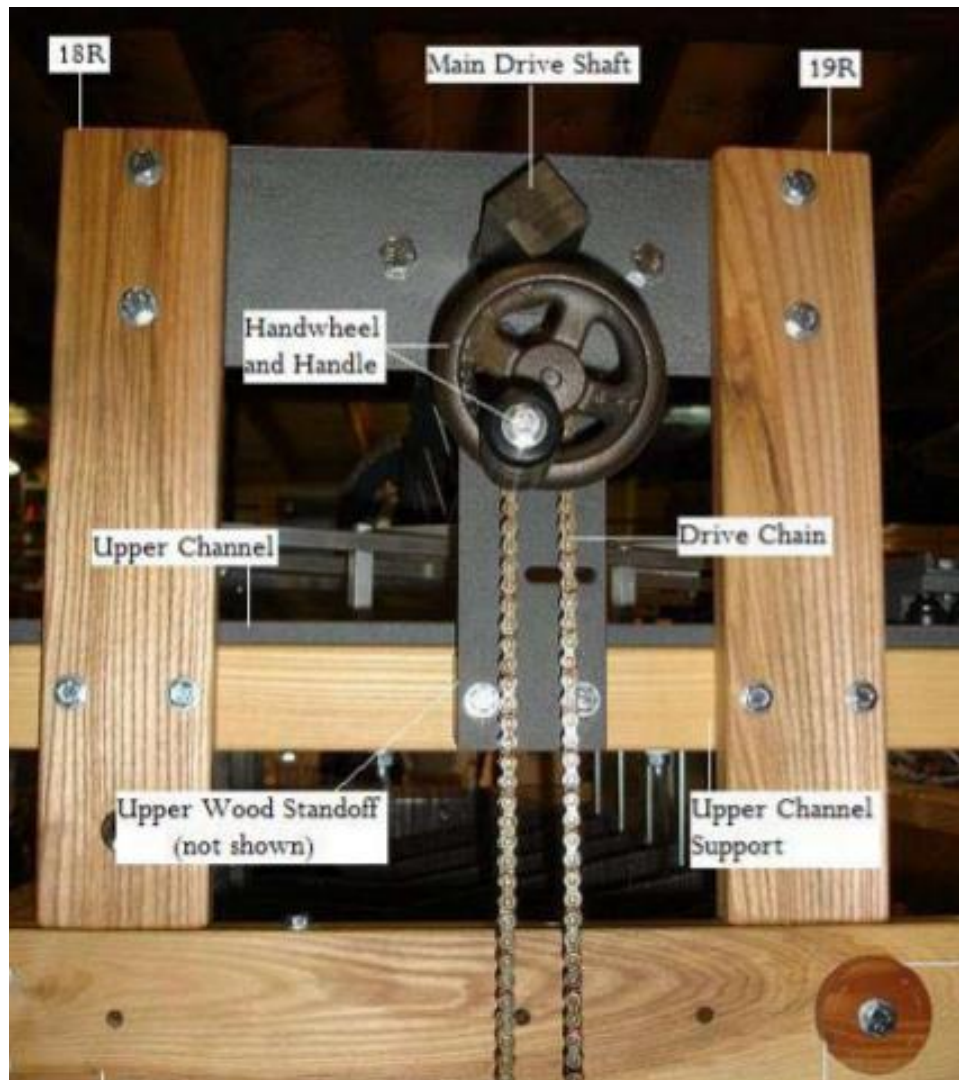


Figure 109 - Dial-A-Sett, Upper right assembly

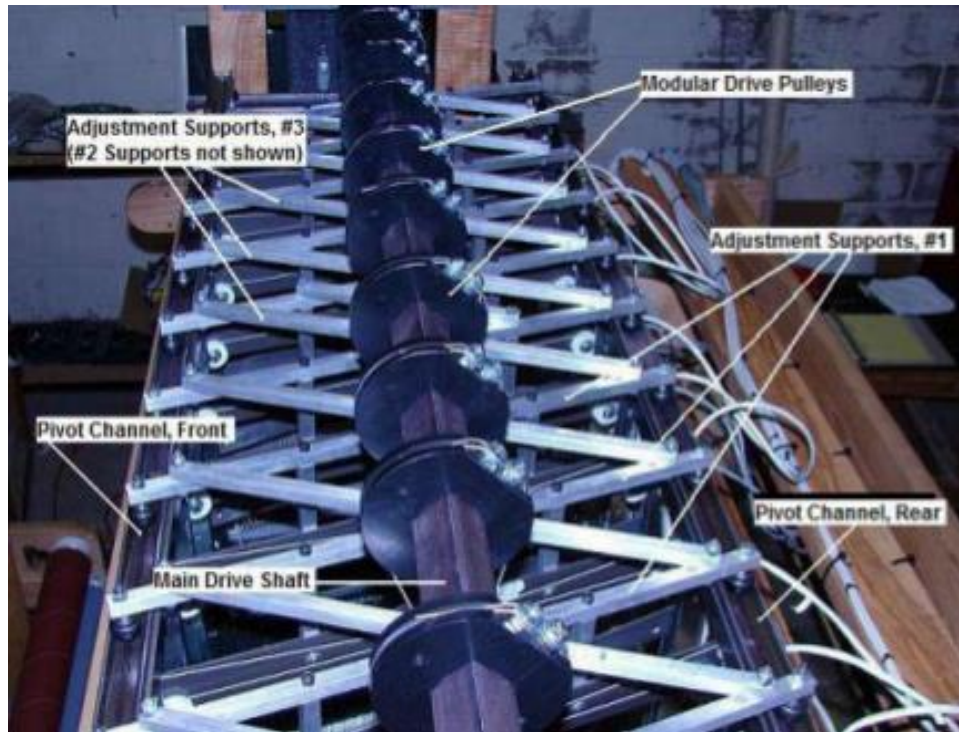


Figure 110 - Dial-A-Sett, upper detail



Figure 111 - Dial-A-Sett, upper assembly, rear view



Figure 112 - Dial-A-Sett, upper assembly, front view



Figure 113 - Dial-A-Sett, upper assembly

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 it is 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), or Pneumatic (A-Lift).

Once the Solenoids fire and the selection is made, if for any reason, the shed is not opened within 20 seconds, the Solenoids will deactivate. This is a safety feature that has been built 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.

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.

Warp Position	Description
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	<p>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.</p> <p>NOTE: The hooks should never be engaged when in this position; there should be no computer communication at this time.</p>

At Rest	The Slide Bars are separated, but the solenoids are deactivated. 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.
---------	---

E-LIFT OPERATION

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.

To initiate Shed Activation

- 1) Step on the Pedal. The first time the pedal is depressed the warp will rise off the race.

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.

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.

To Change from Double Action to Single Action

- 1) 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.
- 2) Only after all of this should you release the pedal. This will change the setting in the program.

To Change from Single Action to Double Action

- 1) 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.

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.

- 1) Create a Null Pick – this may be done either of three ways:
 - a. Use the Null Pick button in the Loom Control Window and press the foot pedal once more, to the Null Pick or
 - b. Press the "C" Key on your keyboard ("C" for Close) or close your file and pedal once more or
 - c. If you are in Double-Action Mode, switch to Single-Action Mode, wait 20 seconds for the solenoids to go into Rest Mode and press the foot pedal once more, to the Null Pick.
- 2) You will notice that the Drive Shaft Stop is positioned at the Home Sensor and you may safely turn off the power at the Control Box.

A-LIFT OPERATION

- 1) Connect your air source to the loom and test by depressing the foot pedal. The drive shaft should rotate full backwards then forwards.

Hold the drive shaft at rear of loom

Your system is also equipped with a toggle switch that will allow you, when it is activated, to have the system hold the drive shaft towards the rear of the loom.

- 1) Flip the switch and then step on the foot pedal. This will hold the drive shaft until the toggle is flipped back the other direction.

Note:

You will use the toggle switch during the module installation. However, during normal weaving, you will generally not use the toggle switch as it will slow your weaving.

STEPS FOR INITIAL SET-UP

Connect cables

Hook up all cords and cables as described in the following table.

Connection Type	Description
Driver Board Power Cables	These cords connect each frame to the power source and may be plugged into the Control Box in any sequence.
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.
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.
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-Lift Power Cable	(E-Lift only) This Cable connects the E-Lift unit contained in the Power Box with your Power Supply.
E-Lift Driver Cable	(E-Lift only) This Cable connects the E-Lift Driver Unit inside the Power Box to the E-Lift Motor.
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).
Serial Cable (Rs-232)	This is the 9-pin plug which connects the computer to the driver in the box.

Computer Connections	<p>There are three different methods for establishing connection between the Control Box and your computer:</p> <ul style="list-style-type: none">• Ethernet• USB• Serial <p>Note: When using the Ethernet connection, you must use a “crossover” CAT-5 cable between the PC and the Rabbit. These are available from AVL or a local computer store.</p>
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Connect through the software

- 1) In JacqPoint go to Weave\Jacquard Options and select the Ethernet connection.
- 2) Select “Set IP Address” and set the IP Address to 92.168.100.40 with the Port number of 23.

Note:

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

- 3) On your PC go to the Control Panel and select “Network Connections”.
- 4) Then select the “Local Area Connection” to bring up the “Properties” window.
- 5) Under the “General” tab scroll down until you can select the “Internet Protocol (TCP/ IP)”. Select it and then choose “properties” again.
- 6) Un-select the radio button that says “Obtain an IP address automatically”, and instead select the button that says “Use the following IP address”.
- 7) Then enter 92.168.100.4 for the IP address and 255.255.255.0 for the Subnet mask. Nothing else needs to be set.
- 8) Hit OK and the Ethernet connection from JacqPoint should be usable.

PROCEDURE FOR WARPING

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.

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.

Spread the hook frames to decrease the warp density. 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.

Remove the Beater 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.

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.

Replace the Beater and sley the reed, beginning from the center and working out to the selvages.

Adjust the frames into position for weaving. Follow instructions for increasing the warp density.

USING THE 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.

- 1) Open the JacqPoint program.
- 2) Select the desired pattern.
- 3) In the Weave Menu, select the correct Jacq Com Port. In the same window, disable the screen saver and select 20 Hook/Board System.
- 4) Also in the Weave Menu, select Loom Control. Select the Start and End Picks.
- 5) Hit Enter and the Jacquard Control Window will open.
- 6) The Jacquard Control Window will show:
 - a. Total Pick count.
 - b. Last Pick Woven.
 - c. Present Pick Number.
 - d. Next Pick Number.
- 7) You may also select to Reverse in the Jacquard control window.
- 8) When you leave the pattern, closing the Loom Control Window, your settings will be saved.

Caution:

When ready to begin weaving again, use the Resume Option on the Weave Menu. 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.

LUBRICATION

LUBRICATION SCHEDULE

The loom owner is responsible for monitoring the need for lubrication and adjusting the schedule as required. In general, the loom should be lubricated after every 320 hours of weaving. This would be about every two months if the loom is in constant use. Consider putting a reminder on your calendar at about the time you expect to have completed that much weaving. Depending on the unique conditions and environment of your weaving space, your loom may require lubrication more or less often than suggested here.

LUBRICANT TYPES

You will need two types of lubricant for your Jacq3G loom:

- Clear & Dry Spray Lubricant (we recommend RZ-50 brand)
- Clear Grease (we recommend Tri-Flow brand)

Tri-Flow is found at bicycle shops. RZ-50 is found in hardware stores.



Figure 114 - Dry Spray Lubricant (RZ-50)

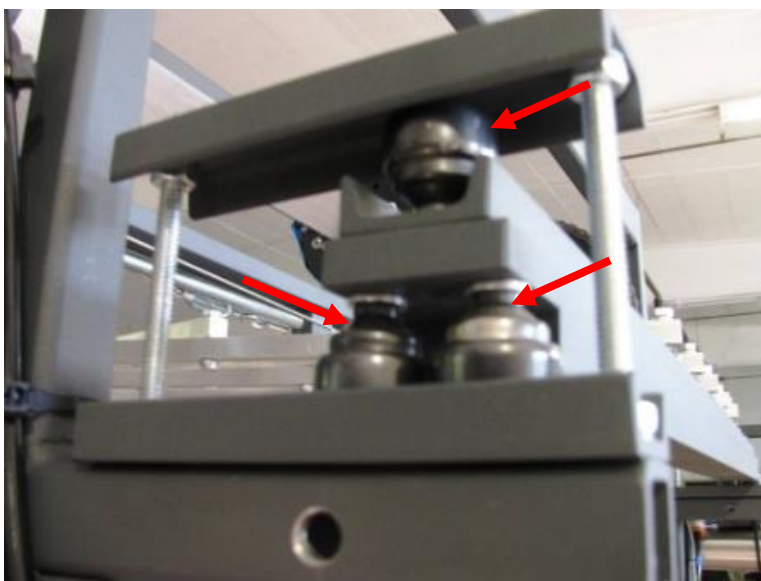


Figure 115 - Clear Grease (Tri-Flow)

PLACES TO USE DRY LUBRICANT:

The red arrows and circles in the following pictures indicate lubrication points.

Ball transfers



There are at minimum 24 of these on your loom. You want to spray down at where the roller ball touches the channel.

Drive Chain



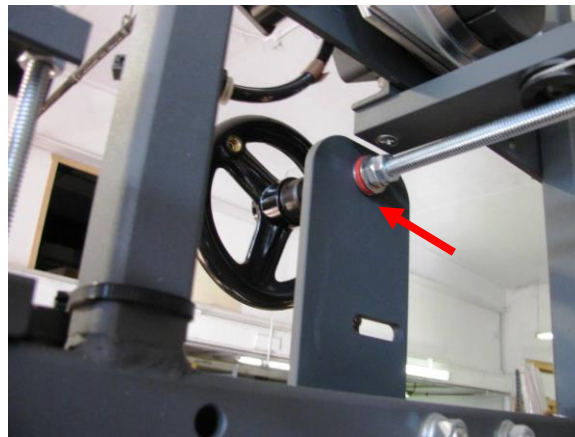
The chain and sprockets should be lubricated.

Dial-A-Sett (DAS chain)



The chain and sprockets should be lubricated.

DAS thrust bearings



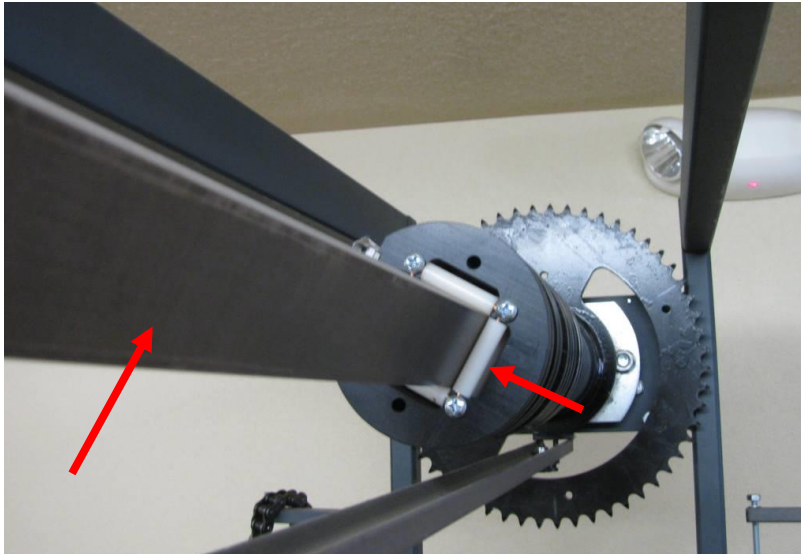
There are four of these (lower outer, lower inner, upper inner, upper outer)

DAS threaded rod and adjuster blocks



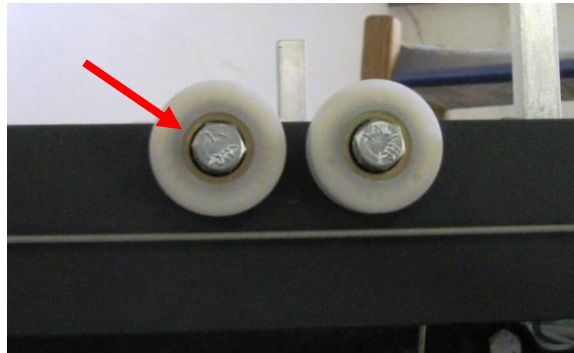
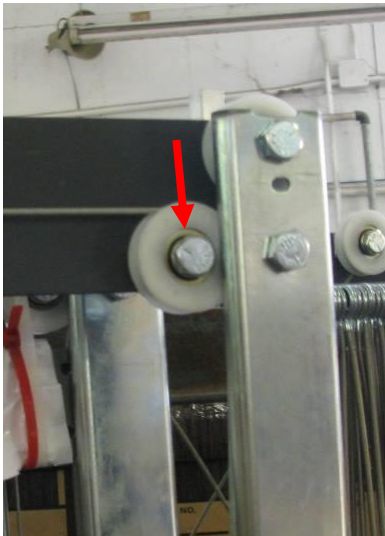
Make sure to lubricate both the upper and lower threaded rod and adjuster blocks.

Drive shaft and pulley rollers



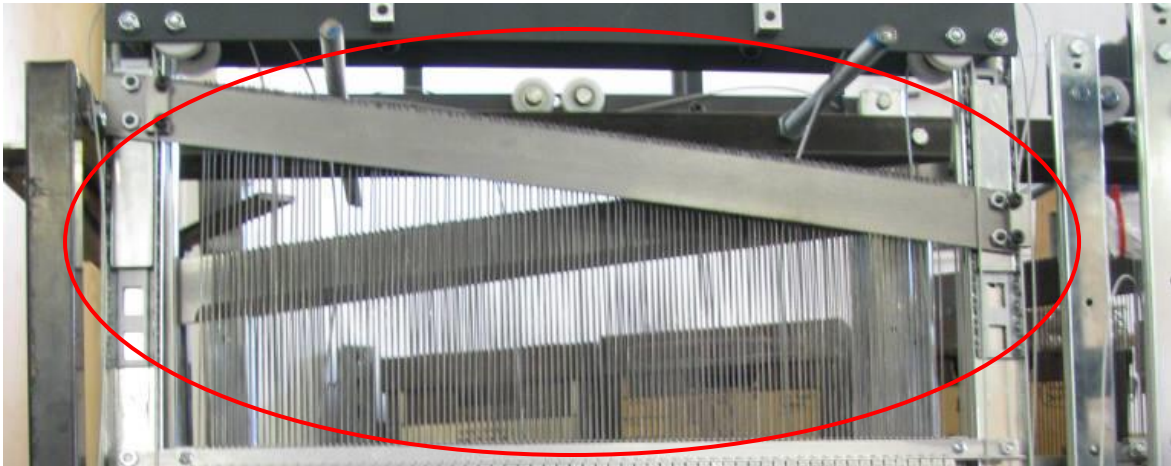
Lubricate all four sides and rollers.

Module pulley bearings



There are eight pulley bearings per module.

Hooks and knives

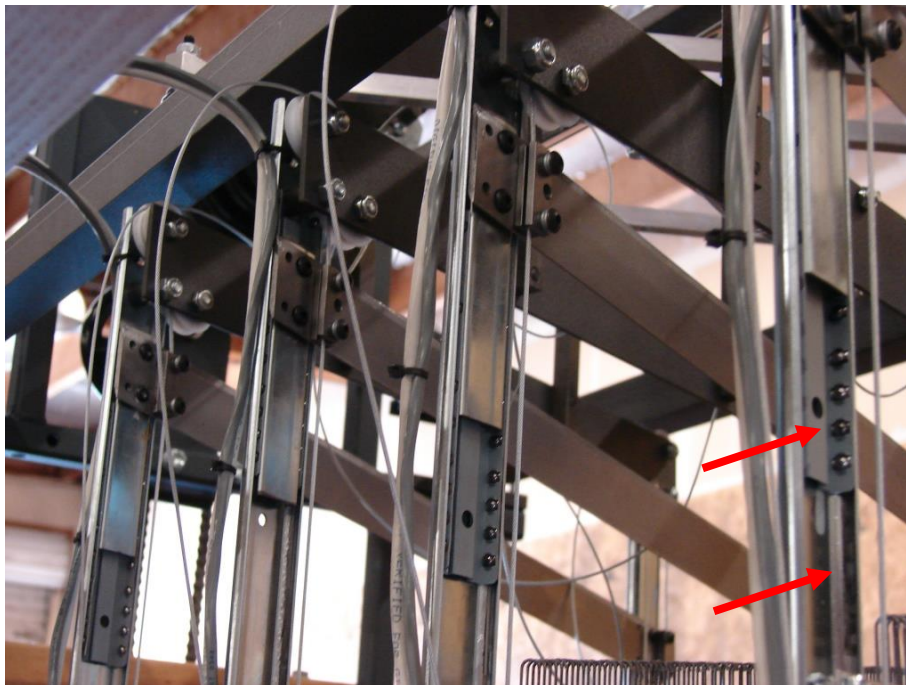


Spray these with lubricant for rust protection.

Caution:
DO NOT SPRAY LUBRICANT ONTO CIRCUIT BOARD!

PLACES TO USE GREASE:

Slide bearings and channels



Apply lightly in grooves and directly on ball bearings. Q-Tips work great for this work.

TROUBLESHOOTING

TROUBLESHOOTING

This document provides information regarding troubleshooting and adjustment of the Jacq3G hook modules. The points covered in this document address a very large percentage of potential issues and adjustments that the user may encounter. However, not all potential concerns are addressed by this guide. Please consult with your AVL technical support representative if you cannot solve your issue from this guide.

CAUTION:

The Jacq3G hook module has both pinch and electrical shock hazards. The pinch hazards include: bearing surfaces, between knives and module frame, and between cables and stationary frame. The electrical shock hazards are anywhere on the printed circuit board, at the solenoid connectors and at the power entry connection. Working around these areas while the loom is powered and mechanisms are moving requires special care. Keep hands and tools away from these areas to avoid injury. Power down the loom or disconnect power to the module to eliminate electrical shock hazard.

There are two primary causes for hook inaccuracy or weaving errors: threading errors and equipment issues. You might be surprised how often people have an issue with their warp – even with very experienced weavers. From our experience, it is by far the most common cause of weaving errors. We think this is partially due to the fact that Jacquard machines, whether it is an AVL or some other brand, are much more 'warp' sensitive than harness looms, requiring very high accuracy in warping, threading and slewing. Jacquard looms do not tolerate twisted threads behind or in front of the hooks, steep side-to-side angles coming off the beam or from the reed, or even large variations in thread tension across the warp. This is the place to begin your troubleshooting. Look for mis-threading, mis-slewing or thread crossover by weaving tabby and observing the opening shed. You want to be certain to solve any warp related issues before proceeding with equipment testing and fixes.

EQUIPMENT TESTS

We have put together the following tests to diagnose equipment issues. You will need to closely observe the equipment behavior to distinguish causes. Because you may not be accustomed to observing machinery, you may need to perform several iterations of the tests in order to really see what is occurring.

Test #1:

Observe the solenoid plunger without power to the loom. Tap on the plunger. Does it spring out quickly and easily? Does it stick in or move sluggishly? If it does not spring out easily, then you have a misalignment issue. Proceed to **Test 1a**.

Test #1a:

Check plunger action of the surrounding hooks. If the issue is isolated to a single hook, the individual solenoid may be misaligned. Verify by comparing with the surrounding solenoids. See page 158. If the issue seems to affect several solenoids, you have a guide alignment issue. See page 158.

Test #2:

Observe the solenoid plunger without power to the loom. Tap on the plunger. Does the spring feel stronger or weaker than those around it? If so, you have a bad plunger spring. See page 161.

Test #3:

Observe the solenoid plunger in action. Does the solenoid remain activated when treading a null pick, or never activate when it should? In either case, you have a bad solenoid. See page 165.

Test #4:

Observe the misbehaving hook at rest in center-shed position. Does the hook sit significantly closer to the upper knife than the others? If so, you have a bad plunger spring (see page 161) or a bad hook (see page 163).

Test #5:

Observe the rear most hooks at rest in center-shed position. Do the hooks clear the upper knife? If not, you have an upper knife alignment issue. See page 159.

Test #6:

Observe the misbehaving hook at open shed with all hooks down. Does it want to stay turned more than the other hooks? If you lightly run your finger drawing towards you along the short segment of the hooks, does the

misbehaving hook feel stiffer/offer more resistance? If yes, you have a short segment crossover. See page 159.

Test #7:

Observe the misbehaving hook in action. Is it frequently crossing over/under with a neighboring hook? Does it have abnormal movement side to side or front to back as it slides up and down through the guides? If so, it or possibly the adjacent hook is bad. See page 163.

Test #8:

Observe the hook in action and listen carefully. Are the hooks vibrating significantly on this module than on others? Are you hearing squeaking? The hooks and/or slide bearings need lubrication. See page 149.

Test #9:

Compare upper and lower knives on all modules at open shed with all hooks down. Are they the same heights and angles? An observable angle difference is a red flag, which must be corrected immediately or it will result in bearing failure. Small variations in knife heights of less than 3/4" are not of concern. Larger knife height variations mean that you have a knife alignment issue. See page 159.

If you pass these tests but still have a problem, you have a solenoid bar placement issue. See page 160

EQUIPMENT FIXES

Solenoid alignment:

See if you can identify which direction the solenoid is cocked. Loosen solenoid screws, carefully turn the solenoid into the proper alignment then retighten the screws.

Middle guide alignment:

In the center shed position, loosen the three middle guide screws. Adjust the middle guide until the short and long hook segments are perfectly in alignment. Check this alignment at front, back and middle of the module, then retighten the screws.

Upper guide alignment:

If the hooks show any forward or rearward lean, adjust hex nuts for the upper guide until the hooks are vertical. Loosen the outer hex nuts, then cycle hooks up & down with null picks.

Looking down from above while at open shed and hooks down (null pick), observe the hook alignments in relation to each other and the upper guide. If the hooks appear paired, the solenoid mount bars are misaligned from front to back.

Determine which solenoid mount bar is incorrect by observing hook leaning forwards or backwards, loosen its hex nuts, slide the solenoid mount bar until the hooks are no longer paired, then retighten the solenoid mount bar hardware.

Loosen the outer hex nuts for the upper guide. Recycle the hooks up & down with null picks. Align the upper guide with slightly more gap between the hooks and guide towards the back of the loom. Retighten hardware.

Short segment crossover:

If you examine a bare hook, you see that it has a longer and shorter segment both terminating in short u-bends, with the two segments joined by a u-bend. The short segment can become trapped behind the long segment or adjacent hook long segments. When this occurs, the hook will have a strong tendency to turn. Observation and fixing at a tight sett can be difficult, so opening the sett may be required. To fix, simply move the short segment from behind to its proper position.

Knife alignment:

Knife angle: If the angle of a knife is observably different from the neighboring modules it must be remedied before any further loom use. Failure to do so will cause bearing failure. The knife angle and knife height alignment procedures are the same -- see below.

Knife height: Knife alignment procedure requires that the heddle springs be released from the anchors at the bottom of the loom and that the loom be at center shed. Once complete, reconnect the springs and reset the shedding programming to double shed.

Upper knife angle adjustment: Loosen the button head cap screws for the drive cable clamps mounted to the knife. The upper knife should slide

smoothly without damaging the cable sheathing. Slide the knife until the front and rear inner bearing carriers are in contact with the hardware at the bottom of it bearing travel. If the outer bearing carrier touches the hardware first, apply additional force to overcome the inner to outer carrier force until the inner bearing carrier is in the correct position. Retighten the button head cap screws.

Lower knife angle adjustment: Loosen the button head cap screws for the drive cable clamps mounted to the knife. The lower knife should slide smoothly without damaging the cable sheathing. Slide the lower knife until the front and rear inner bearing carriers are $\frac{3}{4}$ " from the hardware at the top of it bearing travel. If the outer bearing carrier is hitting the hardware and preventing the inner carrier from reaching the measurement, apply additional force to overcome the inner to outer carrier force until the inner bearing carrier is in the correct position ($\frac{3}{4}$ " from the hardware at the top of it bearing travel). Retighten the button head cap screws.

Solenoid bar placement:

Incrementally adjust/test the solenoid mount bar until issue goes away. Incremental adjustment is typically $\frac{1}{2}$ -1 turn of the nut; test with tabby with alternately activates the upper and lower solenoid bars.

Adjustment can be made independently at front and back hardware, however it is a good idea to loosen both front and back before making the adjustment to avoid binding/bowing of the solenoid bar.

Pick the side that is closest to the bad hook. If the bad hook is relatively centered, adjust both sets of hardware.

Adjust the solenoid mount bar away from the knife if the hook is lifting when it should not; in when the hook does not lift.

Adjustment Of Slide Bars

Symptom –

Hooks at rear of Module are not engaging with the slide bar in a consistent manner. After insuring that the solenoids in question are working properly, this failure to lift may be indicative of a need to adjust the position of the slide bars. The cables that control the movement of the bars can stretch, initially, before stabilizing. The process by which the bars are adjusted is described here.

Required Tools:

- Pliers
 - 5/32" Allen Wrench
- 1) Situate the slide bars so the warp is positioned in the center of the reed. This is not a normal or desirable position during the weaving process, as it can lead to damage of the solenoids, so care must be taken at this step.
 - a. Perform a lift without a weave program. Exit Weave Mode.
 - b. Operate the e-Lift in Single Mode. Pedal until the slide bars are closest together. If the loom is warped, this will seat the warp in the center of the reed.
 - 2) With the slide bars now in their closest proximity, you will notice that the pulleys on the drive shaft have turned so the Socket Head Cap Screws (SHCS) that hold the cables are facing to the rear of the loom.
 - 3) Release the Module springs from the lower DAS hooks.
 - 4) Locate the cable that rises up the outside, rear edge of the Module, up and over to the Drive Pulley. It will pass under the pulley, to the front of the loom, before coming over the top of the pulley to be secured under the retainer and four SHCS.
 - 5) Using the pliers, grasp the tip of the cable that leaves the retainer, holding tension while you loosen the four SHCS with the 5/32" allen wrench. You do not need to remove the SHCS, simply loosen them enough to allow movement of the cable.
 - 6) Maintaining tension on the cable, watch the first (lowest) hook on the Module and pull the cable until the hook clears the slide bar by 1/2" to 3/4" inch.
 - 7) Hold the cable in this position while re-tightening the four SHCS on the pulley.

To Remove And Replace A Solenoid Spring

No special tools are required. The entire hook will need to be removed in order to free the plunger and provide access to the spring for replacement. It is recommended that, either the Cloth Storage Apron or some large paper

(i.e., newspaper), be spread under the loom to catch any plungers (small) or springs (very small) that may fall during this procedure.

Remove the Hook

- 1) Be sure the loom is turned off.
- 2) Unhook the small, black clip between the hook and the heddle.
- 3) Gently lift the hook vertically, until the bottom of the hook has cleared both Lower and Middle Guides, but is still engaged in the Upper Guide. Avoid entanglement with neighboring hooks or bending by keeping the hook in vertical alignment with adjacent hooks. When the Lower Hook encounters the Upper Solenoid Bracket, gently spread the hook by pulling the free end (with the Lower Hook) slightly outward and continue the upward path.
- 4) When the hook has cleared the Middle Guide you can begin to pull the hook down, pulling it out and toward you at a slight angle to clear the Middle Guide.
- 5) When the hook is out far enough that the Upper Hook is just above the Upper Guide, at the Upper Solenoid Bracket, locate the Solenoid Plunger and Spring Assembly, attached to the hook. Use the thumb and forefinger of your free hand to firmly pinch the plunger, spring, and hook. (Do not use any type of pliers or grasping tool for this, as you may damage the plunger, spring, or hook). It may be necessary to gently push in adjacent Plungers/Hooks to allow room for your fingertips; this will not harm these units.
- 6) While maintaining a gentle but firm hold on the Plunger/Spring/Hook, you may need to turn the Upper Hook slightly in order for it to clear the Upper Guide. Now pull down and bring the hook free of the Upper Guide.
- 7) Do not release your pinch on the Hook Assembly until the hook is laying on a work surface. (This is the best way to avoid losing that tiny spring). Holding the assembly on a work surface, release your hold and the spring will simply fall off the plunger. The plunger will remain on the hook.

Install the New Spring on the Hook/Plunger Assembly

- 1) Keeping the plunger near the Upper Hook, turn the hook away from you and the plunger towards you. Place the new spring on the

plunger, near the Top Hook, and pinch all to keep in place on the hook, in the same manner you used to remove the Hook above.

Reinstall the Module Hook

- 1) With the plunger and new spring pinched in place on the hook, approach the Upper Guide from underneath and reinsert the Upper Hook into its correct space in the Upper Guide. Be sure the Upper Hook is facing the same direction as the other Upper Hooks. Once the hook is clear of the Upper Guide, find the little hole in the Solenoid and gently press the plunger, with the newly mounted spring, into the hole. Use a finger on one hand to apply slight pressure to the plunger in order to keep the Plunger/Spring in place, until the hook has been stabilized in the Middle Guide.
- 2) With the other hand, move the hook up until the bottom of the hook has cleared the Middle Guide.
- 3) Lower the hook through its space in the Middle Guide.
- 4) You can now release your hold on the plunger and continue the downward movement until the hook can be dropped into the space on the Lower Guide and the Lower Hook will rest on the Lower Slide Bar.
- 5) Reconnect the hook to the heddle with the small, black clip, taking care to avoid any twisting in the hook or entanglement with adjacent hooks, heddles, or springs.

To Remove/Replace A Module Hook

No special tools are required.

To Remove the Module Hook

- 1) Be sure the loom is turned off. It is recommended that, either the apron or some large paper (i.e., newspaper), be spread under the loom to catch any plungers (small) or springs (very small) that may fall during this procedure.
- 2) Unhook the small, black connection hook between the Module hook and the heddle.
- 3) Gently lift the hook vertically, until the bottom of the hook has cleared both Lower and Middle Guides, but is still engaged in the

- Top Guide. Avoid entanglement with neighboring hooks or bending by keeping the hook in vertical alignment with adjacent hooks.
- 4) When the Lower Hook encounters the Upper Solenoid Bracket, gently spread the hook by pulling the free end slightly toward yourself and continue the upward path.
 - 5) When the hook has cleared the Middle Guide you can begin to pull the hook down, pulling it out and toward you at a slight angle to clear the Middle Guide.
 - 6) When the hook is out far enough that the Top Hook is just above the Upper Guide, at the Upper Solenoid Bracket, locate the Solenoid Plunger and Spring Assembly, attached to the hook. Use the thumb and forefinger of your free hand to firmly pinch the Plunger, Spring, and Hook. (Do not use any type of pliers or grasping tool for this, as you may damage the Plunger, Spring, or Hook). It may be necessary to gently push in adjacent Plungers/Hooks to allow room for your fingertips; this will not harm these Units.
 - 7) While maintaining a gentle but firm hold on the Plunger/Spring/Hook, you may need to turn the Top Hook slightly in order for it to clear the Upper Guide. Now pull down and bring the hook free of the Upper Guide.
 - 8) Do not release your pinch on the Hook Assembly until the hook is laying on the work surface. (This is the best way to avoid losing that tiny spring). Holding the assembly over a work surface, release your hold and the spring will fall off the plunger.

To Reassemble the Hook/Plunger Assembly

- 1) Slide the plunger along the hook shaft to remove it from the hook and slip it onto your replacement hook. Point the Upper Hook away from you and the plunger towards you. Place the spring on the plunger, near the Top Hook, and pinch all to keep in place on the hook.

To Reinstall the Module Hook

- 1) Returning to the loom, reinsert the Top Hook into its correct space in the Upper Guide. Once the hook is clear of the Upper Guide, find the little hole in the solenoid and gently press the Plunger/Spring into the hole. Use a finger on one hand to keep the Plunger/Spring in place, until the hook has been stabilized in the Middle Guide.

- 2) With the other hand, move the hook up until the bottom of the hook has cleared the Middle Guide.
- 3) Lower the hook through its space in the Middle Guide.
- 4) You can now release your hold on the plunger and continue the downward movement until the hook can be dropped into the space on the Lower Guide and the hook will rest on the Lower Slide Bar.
- 5) Reconnect the hook to the heddle with the small black connector hook, taking care to avoid twisting in the Module Hook or entanglement with adjacent hooks, heddles, or springs.

To Remove And Replace A Solenoid

The entire hook will need to be removed in order to free the plunger, hook and spring, to provide access to the solenoid for replacement. It is recommended that, either the Cloth Storage Apron or some large paper (i.e., newspaper), be spread under the loom to catch any plungers (small) or springs (very small) that may fall during this procedure.

Remove the Hook

- 1) Be sure the loom is turned off.
- 2) Unhook the small, black clip between the hook and the heddle.
- 3) Gently lift the hook vertically, until the bottom of the hook has cleared both Lower and Middle Guides, but is still engaged in the Upper Guide. Avoid entanglement with neighboring hooks or bending by keeping the hook in vertical alignment with adjacent hooks.
- 4) When the Lower Hook encounters the Upper Solenoid Bracket, gently spread the hook by pulling the free end (with the Lower Hook) slightly outward and continue the upward path.
- 5) When the hook has cleared the Middle Guide you can begin to pull the hook down, pulling it out and toward you at a slight angle to clear the Middle Guide.
- 6) When the hook is out far enough that the Upper Hook is just above the Upper Guide, at the Upper Solenoid Bracket, locate the Solenoid Plunger and Spring Assembly, attached to the hook. Use the thumb and forefinger of your free hand to gently pinch the plunger, spring,

- and hook. (Do not use any type of pliers or grasping tool for this, as you may damage the plunger, spring, or hook). It may be necessary to gently push in adjacent Plungers/Hooks to allow room for your fingertips; this will not harm these units.
- 7) While maintaining a gentle but firm hold on the Plunger/Spring/Hook, you may need to turn the Upper Hook slightly in order for it to clear the Upper Guide. Now pull down and bring the Hook free of the Upper Guide.
 - 8) Do not release your pinch on the Hook Assembly until the hook is laying on a work surface. (This is the best way to avoid losing that tiny spring). Holding the assembly on a work surface, release your hold and the spring will simply fall off the plunger. The plunger will remain on the hook.

Replace the Solenoid

- 1) Carefully snip the black tie-downs that hold the bundled white solenoid wires together.
- 2) Gently, with a vertical pull, remove the black, rectangular connector from its pins.
- 3) Remove the two small Phillips head screws that hold the solenoid to the Solenoid Mount Bracket.
- 4) Follow the selected pair of wires down to the connector and notice that each pair of white wires enters the topside of the connector. The small silvery tips of the wires are visible through small openings in either side of the connector.
- 5) Partially covering each opening is a small-hinged plate that clips the wire tips into place.
- 6) Insert a small, flat screwdriver into one opening at the silvery tip and just under the little plate. Very gently lift this little plate up only far enough to allow the wire to be pulled out. If too much force is used, the plate will break and will lose function, requiring replacement of the entire connector.
- 7) Repeat for the second wire, on the other side, opposite the first one.

- 8) With the old wires out, you can now insert the two wires of your replacement solenoid. There is no need to manipulate the plates at this time. Simply push the silvery tip into the hole until it is no longer visible, and is flush with the top of the connector. Polarity is not an issue, so either wire can be inserted into either hole.
- 9) Using the two small screws removed, install the new solenoid to the Mount Bracket. Tighten until secure, but do not over tighten; it is easy to strip the threads.
- 10) Align the black connector over the pins, making sure the connector has not been flipped and there is no twist in the white wires. Be sure the pins are aligned properly and not bent during this step. Gently push down from the top to re-seat the connector. You might wish to hold firm the bottom of the Module to provide enough pressure.
- 11) Using the little plastic tie-downs, re-wrap the bundle of wires in both places. This ensures the wires remain relatively flat on the surface, to avoid interaction with the adjacent Module.

Reinstall the Module Hook

- 1) With the plunger and spring pinched in place on the hook, approach the Upper Guide from underneath and reinsert the Upper Hook into its correct space in the Upper Guide.
- 2) Be sure the Upper Hook is facing the same direction as the other Upper Hooks. Once the hook is clear of the Upper Guide, find the little hole in the solenoid and gently press the plunger, with the newly mounted spring, into the hole. Use a finger on one hand to apply slight pressure to the plunger in order to keep the Plunger/Spring in place, until the hook has been stabilized in the Middle Guide.
- 3) With the other hand, move the hook up until the bottom of the hook has cleared the Middle Guide.
- 4) Lower the hook through its space in the Middle Guide.
- 5) You can now release your hold on the plunger and continue the downward movement until the hook can be dropped into the space on the Lower Guide and the Lower Hook will rest on the Lower Slide Bar.

- 6) Reconnect the hook to the heddle with the small, black clip, taking care to avoid any twisting in the hook or entanglement with adjacent hooks, heddles, or springs.



THE FINE PRINT

AVL CUSTOMER SERVICE

AVL offers free technical support to the original owner of all our looms. This means if you ever have a problem, you can call, fax, or e-mail us and we'll help you find a solution. Please take advantage of this service; your satisfaction is extremely important to us.

Customer Service Phone: (530 893-4915)

Fax: (530) 893-1372

E-Mail: sales@avlusa.com

AVL WARRANTIES

Limited Warranty: The benefits of this warranty accrue solely to the original purchaser of AVL Looms, Inc. products, as defined below.

Your warranty covers:

New Looms: AVL Looms, Inc., a California corporation ("AVL") warrants to the original purchaser of any AVL loom (each, a "Product") that the Product will be free from defects in materials and workmanship during the limited warranty period described herein. The limited warranty coverage begins (a) the day the Product is installed if installed by a professional from AVL, or (b) on the date of shipment from AVL to the original purchaser if the Product is not installed by AVL (the "Effective Date"). Except as set forth under the section entitled "What is Excluded?" below, AVL will, for a period of two (2) years from the Effective Date (the "Original Warranty Period"), repair or replace the defective part(s) of the Product with a repaired, renewed, or comparable part (whichever is deemed necessary or proper by AVL) if it becomes defective or inoperative or fails to perform according to AVL's specifications. Any repair during the Original Warranty Period will be carried out without charge to you for parts (except applicable taxes, if any). You will be responsible for all labor in connection with installation of the parts and service upon the Product, as well as the cost of shipping involved.

New Accessories, Loom Upgrade Parts, and Replacement Parts: Subject to the limitation contained in subsection (i) under the section entitled "What is Excluded?" below, AVL warrants to the original purchaser of any accessory, loom upgrade parts, or loom replacement parts (the "Additional Part") that are sold by AVL that such Additional Part will be free from defects in materials and workmanship for ninety (90) days from the date of purchase. In the event that any Additional Part is physically damaged or physically defective and if such defective Additional Part is returned to AVL within ninety (90) days of the date of purchase, AVL will provide a replacement Additional Part at no charge. The sole remedy for this warranty shall be limited to the replacement of the defective Additional Part. You are responsible for all shipping charges (including applicable taxes) incurred with returning the defective Additional Part.

All New Products and their components (including replacement Product and its components) are covered only for the Original Warranty Period. When the warranty on the original Product expires, the warranty on any replacement Product, or components also expires. After two (2) years from the Effective Date, you pay for any replacement or repair, including all parts, all labor and shipping charges (including applicable taxes).

Your warranty does not cover:

- 1.Labor charges for installation or set-up of the Product, as well as any labor charges required to install, disassemble, troubleshoot, or reassemble the Product.
- 2.Any taxes imposed on AVL for Product replacement or repair under this warranty.
- 3.Installation, performance of, or repair of: cabling, electrical, or accessory attachments used with the Product.
- 4.Product replacement or repair because of misuse, accident, repair by any party other than AVL, or other cause not within the control of AVL. Please note that removing any parts from the Product for any reason voids the warranty.
- 5.Incidental or consequential damages resulting from the Product.
- 6.A Product that has been modified or adapted to enable it to operate in any country other than the United States or any repair of Products damaged by these modifications.
- 7.Electrical and pneumatic components, each of which carries a one (1) year warranty from the Effective Date.
- 8.Jacquard components function beyond 98%. A Jacquard module is considered to be operating within specification if 98% of all hooks are operating as commanded.
- 9.Computing equipment, such as a Personal Digital Assistant or a Personal Computer, which are manufactured by a third party(ies) and which may be under warranty through the original manufacturer. AVL is not responsible for any warranty coverage that may be offered concerning these products and you must contact those manufacturers directly regarding any available warranty coverage.

The performance or functionality of any software that is sold either together or separate from the Product. The AVL warranty covers only defects in the Software Media, namely the CD-ROM media such as a broken CD-ROM or a defect in the CD-ROM that would prevent the CD-ROM from being read by your personal computer's CD-ROM drive. .

AVL Returns Policy

Any order that has left AVL in transit to the customer is considered fulfilled. Parts and accessories not covered under warranty must be returned to AVL within 60 days from the date of shipment from AVL. The purchase price of the item(s) is refundable less a 15% re-stocking fee based on the total purchase price. No refunds will be given on shipping or handling. The buyer is responsible to return the merchandise in "as new" condition at their expense. Any item received showing wear or damage is not eligible for return and will be promptly returned to the customer COD unless some other arrangement is made. Looms and custom-made items, special order items, parts made for pre-1998 looms, used and reconditioned items are not eligible for return.

NOTICE TO USERS IN THE EUROPEAN UNION

Products bearing the CE mark are in conformity with the protection requirements of EC Council directives 2004/108/EC, 2006/95/EC, 1999/5/EC, and 2009/125/EC on the approximation and harmonization of the laws of the Member States relating to electromagnetic compatibility, safety of electrical equipment designed for use within certain voltage limits, radio equipment and telecommunications terminal equipment and on the ecodesign of energy-related products.

Compliance is indicated by the CE marking.



The manufacturer of this product is: AVL Looms, Inc., 2360 Park Avenue, Chico, CA 95928 USA. A declaration of conformity to the requirements of the Directives is available upon request from the Authorized Representative. This product satisfies the Class B limits of EN 55022 and safety requirements of EN 60950.