**IOLINE™**

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# FlexJet Carriage upgrade

**ATTENTION**

OBSERVE PRECAUTIONS
FOR HANDLING
**ELECTROSTATIC
SENSITIVE DEVICES**

**Notices:**
*Warning!* *Ensure that all AC power cables are removed from the printer before attempting these procedures.*

*Attention!* *The discharge of static electricity may damage the carriage and logic board components. Use the included ground strap during all procedures. Keep plastic objects away from the carriage and logic board assemblies.*

*Warning!* *The FlexJet is heavy and could cause serious injury or death if it falls or rolls over. Make sure that a minimum of two people move it, especially when detached from the stand.*

Tools Required:
    Philips screwdriver
    9/64 (3.5mm) Allen wrench
    5/16 (8mm) open end wrench
    Small flat tipped screwdriver

**Included with the upgrade kit**
    1) Screws for mounting the new board (3)
    2) New daughter board
    3) Standoffs (2 short, 1 long)
    4) Flex cables (1 short, 4 long)
    5) Carriage assembly with flex cables
    6) Belt tensioner assembly
    7) Tyraps (8)
    8) Double stick foam tape
    9) Grounding wrist strap
    10) This procedure

**① Prepare the printer**
    a) Turn the FlexJet power off.
    b) Clear paper from around the carriage.
    c) Remove inkjet cartridges. Do NOT cover the cartridge heads with anything.
    d) Remove the AC power cable and any other cables connected to the rear of the printer.

**② Remove the end cover**
    a) Unplug the roll feed motor under the right end cover.
    b) Remove the 5 screws that hold the plastic end cover on to the right end of the printer. There are two on the flat surface of the endplate, one screw in the back, and 2 screws on the bottom.

**③ Loosen the Carriage Belt**
    a) Find the belt tensioner on the right side above the white cables.
    b) Loosen the carriage belt tensioner by rotating the 9/64" HEX screw 4 full counterclockwise turns.



Remove Cover



Loosen this screw
(9/64")
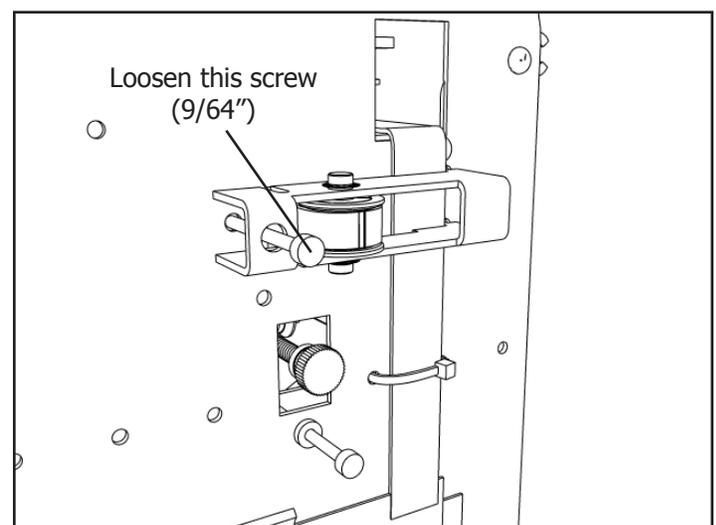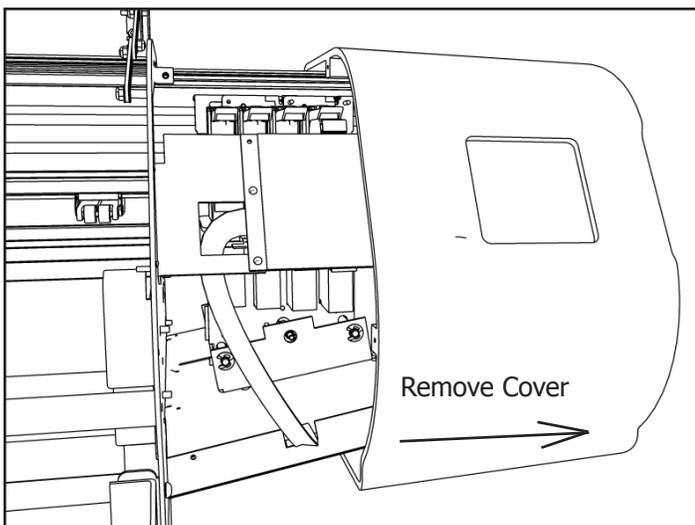
## 4 Remove the Logic Board Cover

***Attention!*** *The carriage and logic board components are sensitive to the discharge of static electricity. Attach one end of the ground strap (included) to your wrist and the other end to a bare metal portion of the printer like the frame the holds the service station. Keep plastic objects away from the carriage and logic board assemblies. Remove the wrist strap only after the new carriage is attached to the traverse, the cover is installed, and the metal cover is secured over the main logic board.*

a) Remove the 4 screws that hold the sheet metal logic board cover plate.

***Attention!*** *The cover will swing down when the last screw is removed. Make sure to support it with one hand and let it slowly rotate.*

Short Screw

Remove screws
2 - Front
2 - Rear (Shown)
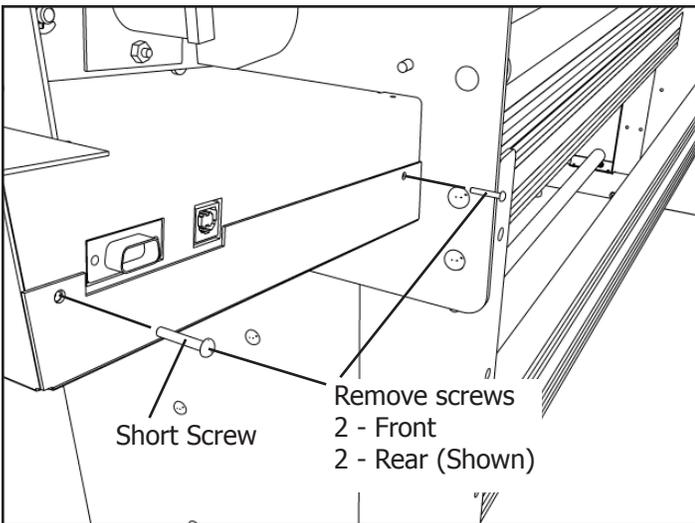
b) Unplug the roll feed motor power and encoder cables from the logic board then set the logic board cover aside.

Unplug Take-up wires from the logic board
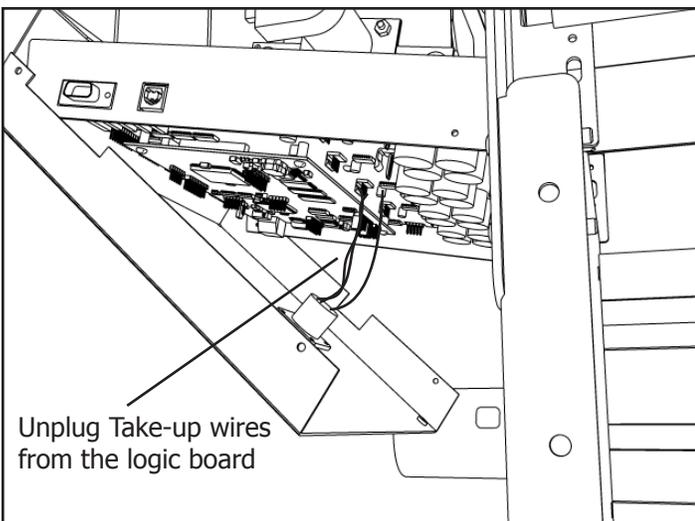
c) Find the white flex cable connections. Gently pull the locking clips on the connector shrouds down to unlock the flex cable connectors.

d) Remove all white flex cables from connectors.

Unplug ribbon cables
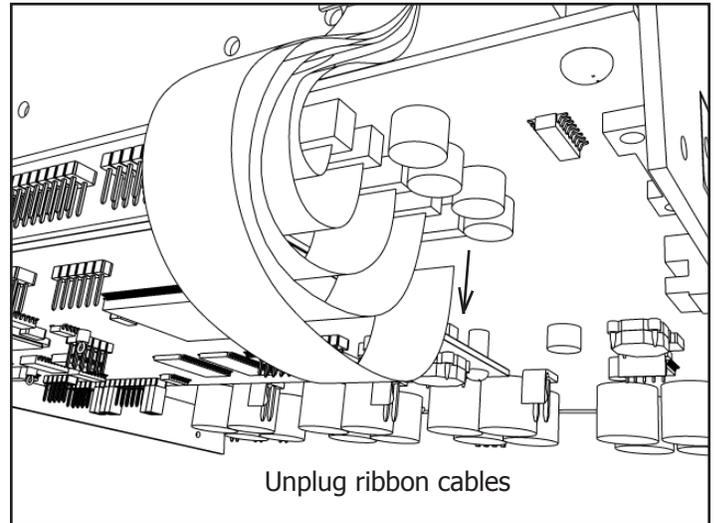
## 5 Remove the Old Flex Cables

a) With the carriage secured, clip the plastic ties that hold the white flex cables against the right side of the printer.
b) Pull the bundle of cables out of the grey clips (if present).
c) Pull the bundle away from the end plate if it secured with foam tape. Lift the carriage belt tensioner out of the way if necessary.
d) From the front of the machine, pull the bundle through the hole in the end plate.
e) Lift the cable bundle up and off the traverse moving toward the left side of the machine. Don't worry about the foam tape stuck to the traverse.

Ribbon Cable
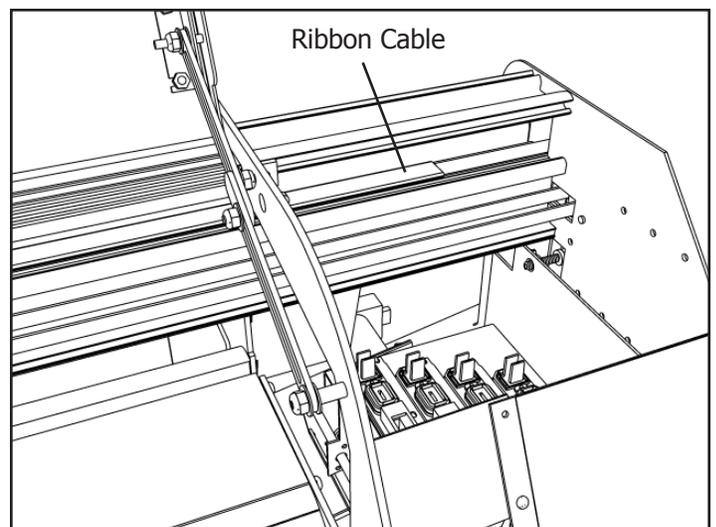
## 6  Remove the Old Carriage

a)  Remove the Phillips head screw at the right side of the carriage cover. This screw holds the carriage cover on.

b)  With one hand to each side of the carriage, gently pull the carriage cover tabs out that are located near where the carriage belts attach to the carriage and remove the cover.



Remove carriage cover screw
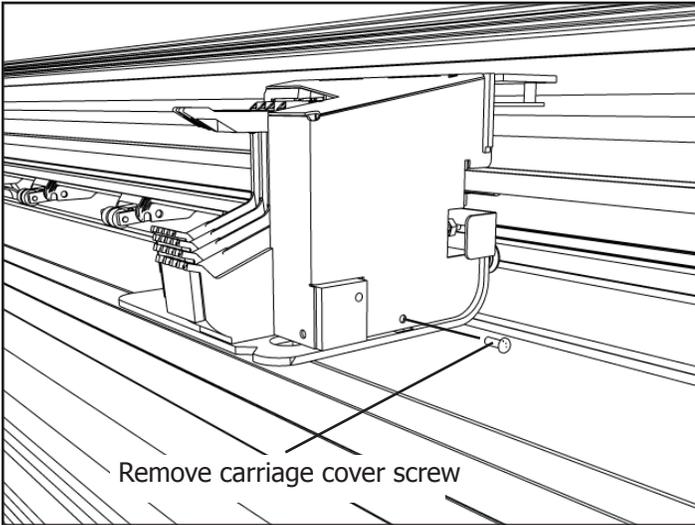
c)  Unclip the carriage belt ends at the left and right sides of the carriage base.



Belt Clips
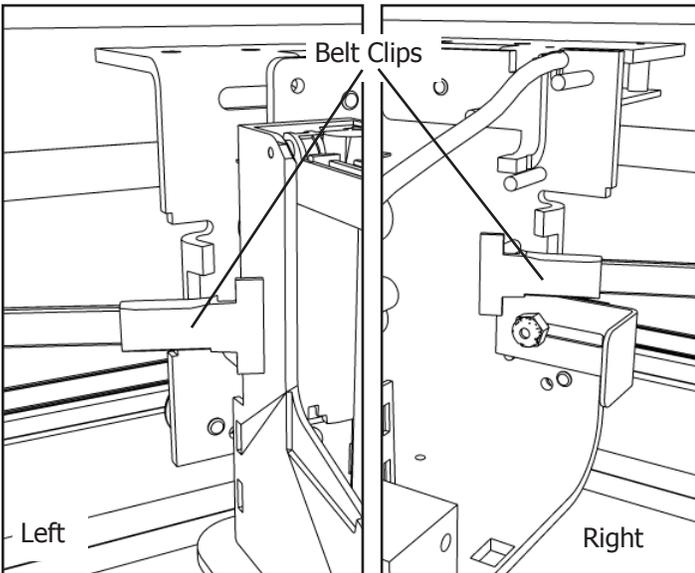
Left

Right

d)  Using a 5/16 (8mm) open end wrench loosen the #6-32 hex nut ½ turn under the RIGHT and LEFT swing arms until the washers and round spacers can move freely.



Loosen this nut
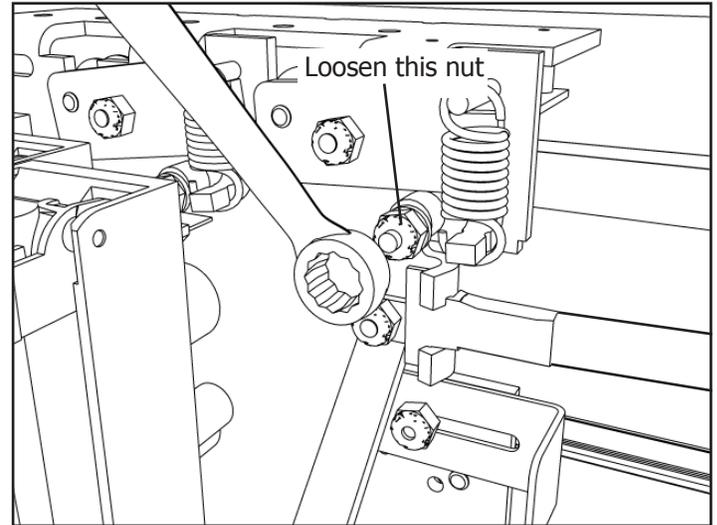
e)  Hold the carriage at the right and left side of the metal base with both hands.

**Important:** *Do not hold the carriage by the inkjet head stalls or the sensor.*

f)  Keeping the top two carriage v-wheels on the traverse, gently push the carriage down and rotate the bottom of the carriage towards the front of the machine until the lower v-wheels slip off of the lower traverse rail.

g)  Lift the carriage up and away from the machine. The long flex cable bundle should follow the carriage as you pull it off. Set the whole assembly aside.



Press down here and on the other side

Rotate bottom towards you
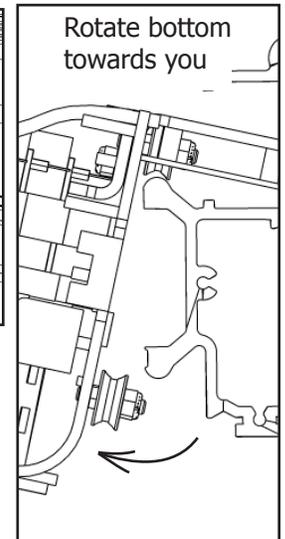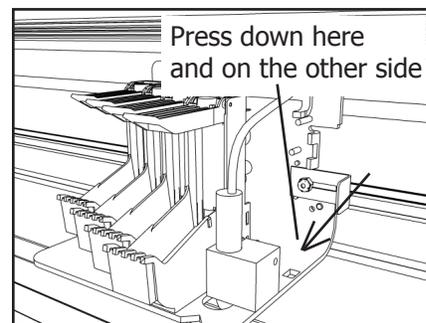
## 7. Attach the New Carriage to the Traverse

**Important:** *Please read the next steps fully before attempting to attach the carriage.*

a) Wipe the traverse rails with an isopropyl alcohol dampened cloth to remove dust. Perform this important maintenance step often, even every week depending on machine use.

b) While holding the carriage and ribbon cable bundle, insert the end of the bundle through the hole in the endplate at the right end of the traverse. Continue feeding about 20" of the bundle through the hole.

Pull ribon cable through hole in right side
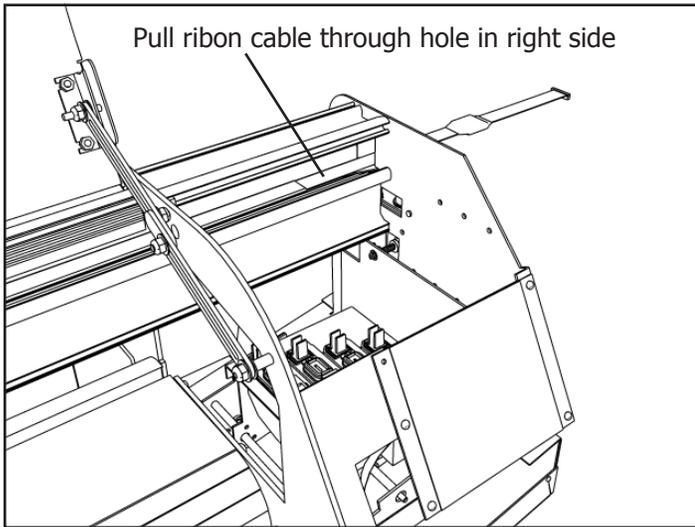
c) Move to the center of the machine and hold the new carriage up near the traverse with the blue lever(s) facing up and away from the machine.

Ribbon Cable loop
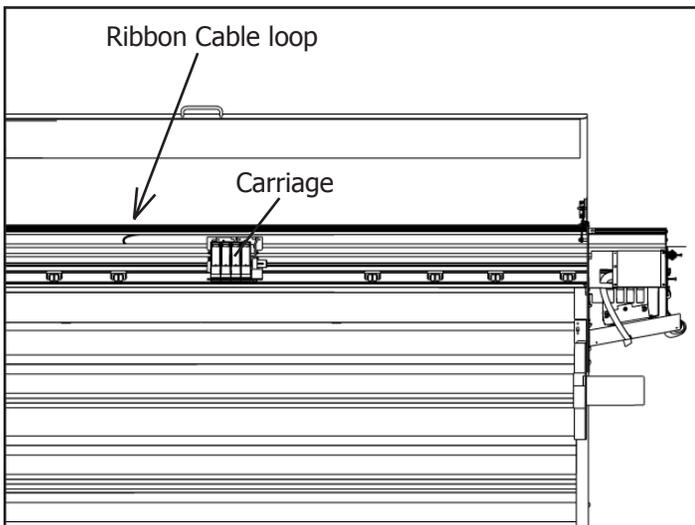
Carriage

**Attention!** *Do not hold the carriage by the cartridge stalls or the silver sensor assembly.*

d) Feed the new ribbon cable bundle into the channel in the traverse so that there is a loop to the left of the carriage. Lightly press the loop into the groove at the back of the traverse so that it is in the cable channel.
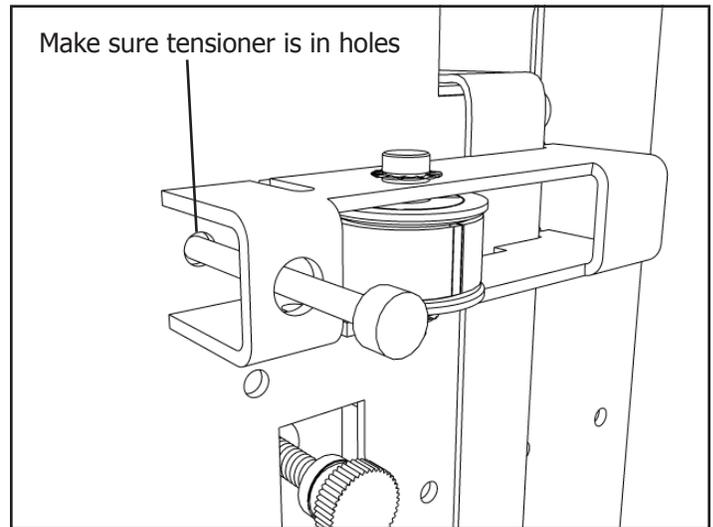
Ribbon Cable loop
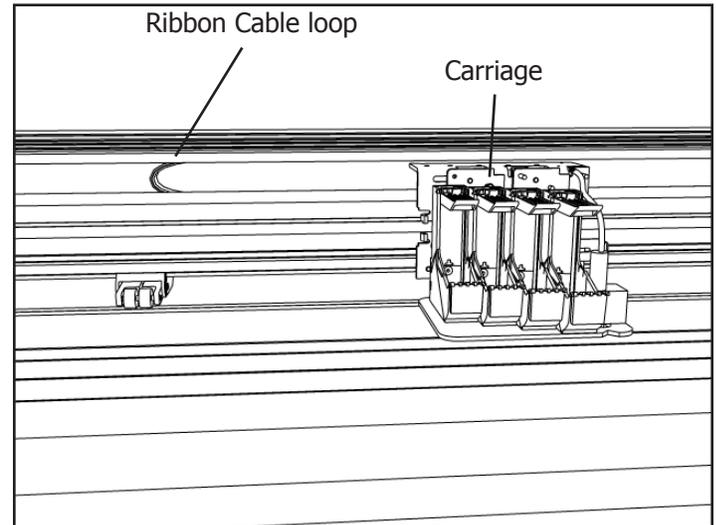
Carriage

e) Ensure that the black drive belt is between the traverse rails and behind the carriage base. Hold the carriage at the right and left side of the metal base with both hands and slip the top two carriage v-wheels over the top rail of the traverse.

f) Keeping the top two carriage v-wheels on the traverse, gently push the carriage down and rotate the bottom of the carriage towards the back of the machine until the lower v-wheels slip onto the lower traverse rail.

g) Gently move the carriage right then left to ensure that the wheels move smoothly.
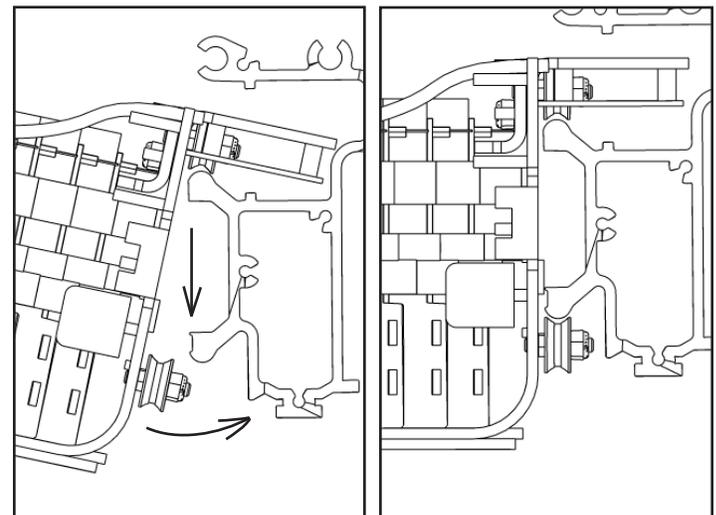
## 8. Tighten the Carriage Swing Arms

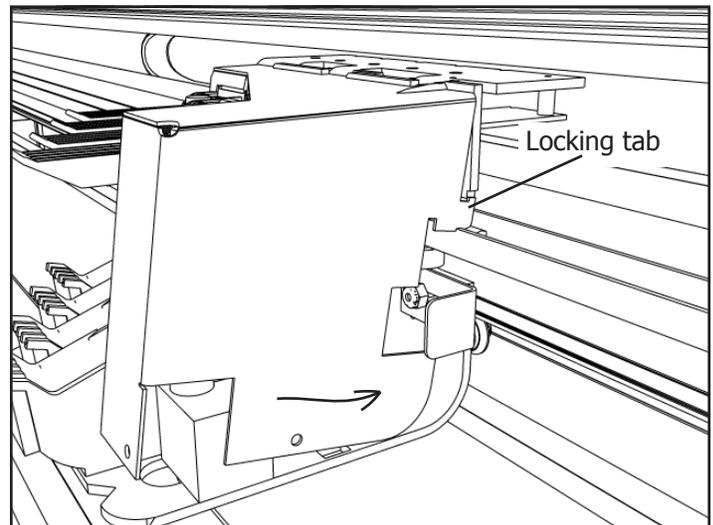a)  Gently hold the spacer up against the bottom of one of the upper v-wheel swing-arms. The spacer can be held up with a finger or a small screwdriver inserted from the right side of the carriage.

b)  While keeping gentle upward pressure on the spacer, securely tighten the nylock nut using a 5/16 (or 8mm) open end wrench.

c)  Repeat this process for the other swing arm on the carriage.

Tighten this nut

Push up on Cylinder

Flathead Screwdriver

5/16" box wrench

## 9. Replace tensioner and Attach the carriage belt.

a)  Guide the ribbon cable bundle under the carriage belt tensioner.

b)  Place the new belt tensioner next to the old one. Count the exposed screw threads on the old tensioner then rotate the screw in the new one to match the old one.

c)  Insert the belt through the new tensioner so that the belt teeth face the pulley.

d)  Guide both ends of the belt through the hole in the endplate and in front of the traverse.

e)  Hold the new carriage belt tensioner so that the 2 tabs and screw tip rest in the holes and detent in the right endplate. To the left of the Service Station area, hold both webs of the carriage belt to maintain slight belt tension so that the carriage belt tensioner doesn't move out of place.

f)  While maintaining tension on the carriage belt. Attach the carriage belt clips to each side of the carriage base.

Important: Make sure the belt is not twisted before attaching the clips.

g)  Tighten the carriage belt tensioner by rotating the 9/64" (3.5mm) screw 4 full clockwise turns.

Make sure tensioner is in holes

## 10. Install the Carriage Cover

a)  Install the carriage cover by aligning it with the base and pushing back until the tabs by the belt ends grab onto the carriage base.

b)  Press against the cover tabs to ensure that they 'snap' into the slots in the carriage base.

c)  Install the #6-32 screw at the right side of

Locking tab

## 11  Secure and Arrange the Ribbon Cable Bundle - Part 1

**Note:** The wrist ground strap can be removed now, but will need to be worn again later in this procedure.

**Important:** *This process is important for proper operation of the FlexJet. The sleeved ribbon cables require a firm connection to the traverse at the middle of the printer and at the right end of the traverse. Leave existing foam tape if the pieces are still sticky and not bunched up. Apply the included foam adhesive tape to the existing foam tape if necessary.*

a)  Hold the ribbon cable bundle out of the way and attach a 10 cm piece of the supplied double sided foam tape to the traverse channel to the right of the existing tape (if present) at the middle of the machine. Remove the tape backing so that the side facing up is exposed.

b)  Repeat this process near the right end plate but place the tape to the left of the existing tape (if present). Remove the tape backing so that the side facing up is exposed.

c)  Slide the carriage over to the left endplate and hold it in place. As the left side of the carriage just touches the small round bumpers, look at the ribbon cable bundle loop. It should leave a small gap between the sleeving and the left endplate (no further than .08" (2mm) away) as the carriage base touches the bumpers.



Ribbon Cable loop

Gap

d)  To the right of the carriage, hold the ribbon cable bundle down firmly in the traverse channel with the left hand.

e)  With the right hand, smooth the ribbon cable bundle beyond the tape at the middle of the traverse so that the black sleeving is stretched and lays relatively flat and taut.

f)  Firmly push the black sleeving into the tape at the middle of the traverse. If it does not stick, apply the supplied non-foam backed tape over the foam tape and repeat the process.

g)  Move the carriage to the right 10" then slide it back to the left end plate and ensure that the loop in the cable bundle is still not touching the left endplate.
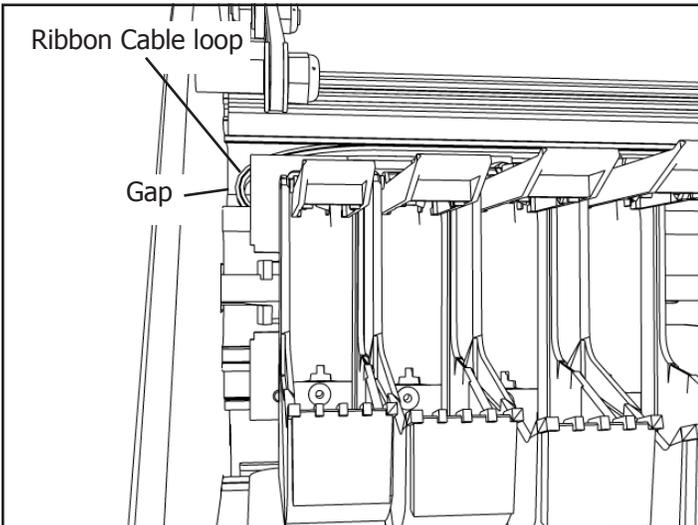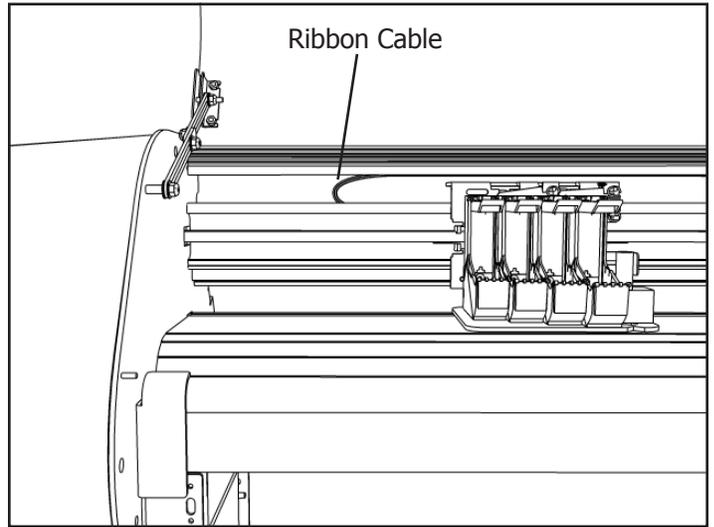


Ribbon Cable
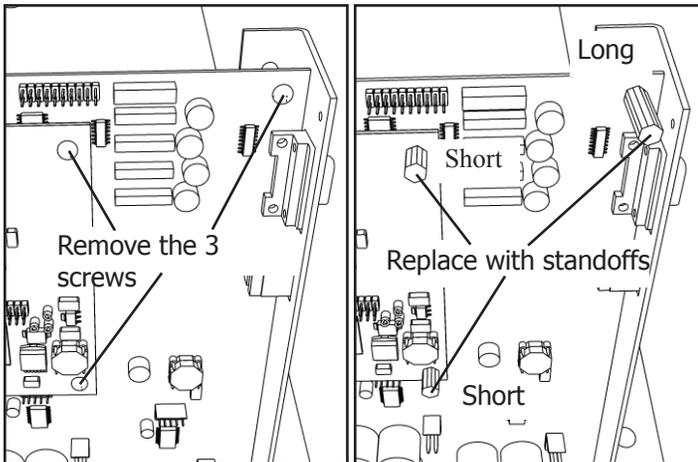
## 12  Secure and Arrange the Ribbon Cable Bundle- Part 2

a)  Continue to smooth the ribbon cable bundle toward the right end plate to stretch the black sheathing so that it lays relatively flat and taut.

b)  Firmly push the sleeving into the tape at the right end of the traverse. If it does not stick, apply the foam backed tape over the foam tape and repeat the process.
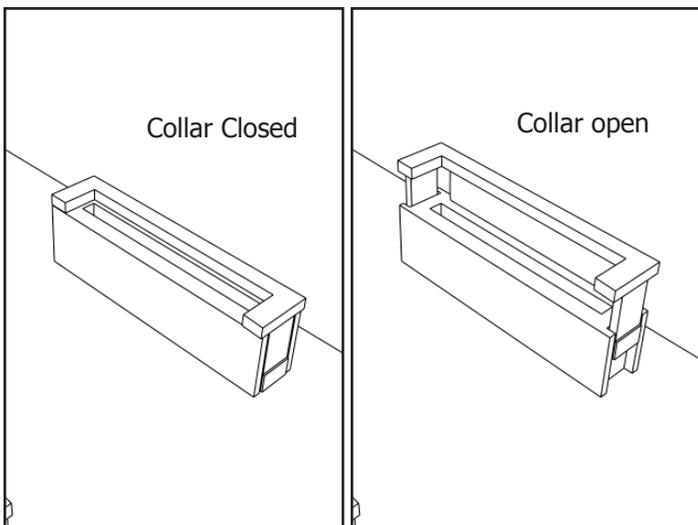


Place tape here
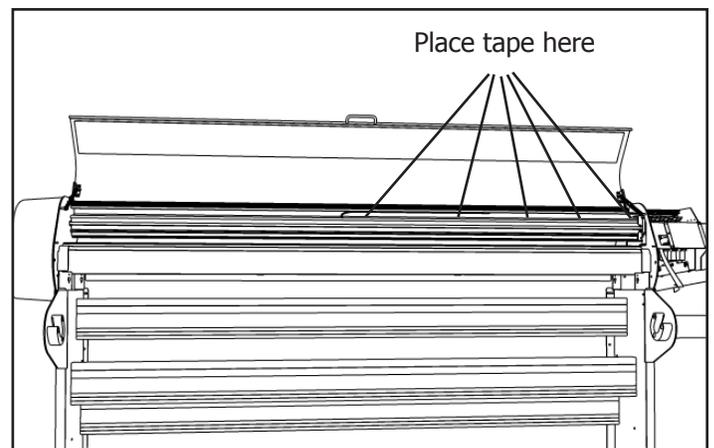
## 13 Prepare the Daughter Card

**Attention!** *Attach one end of the ground strap (included) to your wrist and the other end to a bare metal portion of the printer like the frame the holds the service station. Keep plastic objects away from the carriage and logic board assemblies.*

a) Remove the three screws indicated.
b) Install the included long spacer in the hole in the corner of the lower logic board as shown.



Remove the 3 screws

Long

Short

Replace with standoffs

Short

g) Insert the four longer flex cables into the daughter card connectors.

**NOTE:** *It is very important that the conductive side of the cables align with the conductive pads in the connector.*

h) Press the locking collar back down after each cable is inserted.
i) Insert the shorter flex cable into the white connector on the bottom of the daughter card as shown. It is very important that the conductive side of the cable aligns with the conductive pads in the connector.



Short

Long

Notch
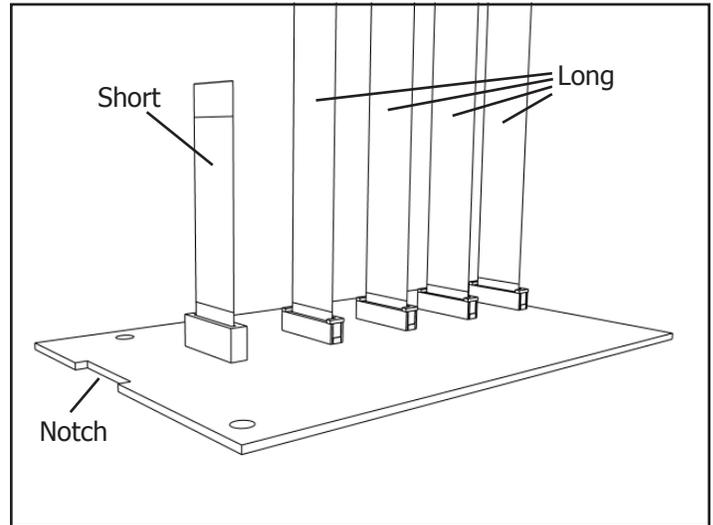
## 14 Attach the Daughter Card

a) Lift the locking collars up from the white ribbon cable connectors on the motor control logic board as shown. (long cables only).
b) Align the holes in the small daughter card with the holes in the spacers as shown.

c) Install the two short spacers in the holes in the upper logic board as shown.
d) Install the long ribbon cables in the daughter card
e) Lift the locking collars up from the white ribbon cable connectors on the bottom of the daughter card
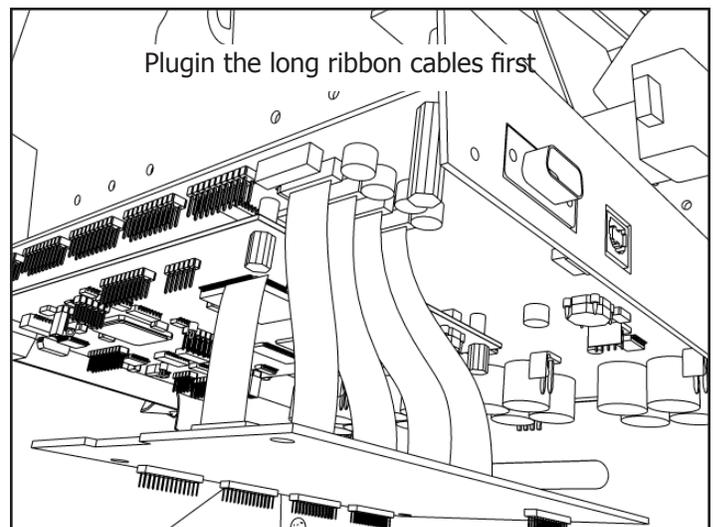f) Insert the ribbon cables into the connector and press down on the collar to the "closed" position.



Collar Closed

Collar open



Plugin the long ribbon cables first

**Note:** *The black or blue ends at the end of the long cables should face the middle of the machine.*

c)  Insert all five ribbon cables into their corresponding white sockets on the main logic board.

d)  Press the locking collars back down after each cable is inserted (long cables only).

e)  Gently fold the cables toward the center of the machine then press the board down toward the main logic boards.

f)  Insert and tighten the screws removed in step 1 above to secure the daughter board. Extra screws are included in the upgrade kit.



Daughter board installed

## (15) Attach the Ribbon Cables

Attention! The ribbon cable connectors are small. Make sure that the connector is correctly aligned with the header pins before inserting.

a)  Pull the ribbon cables out straight from the right endplate and pull them toward the bottom edge of the board.

b)  The connector numbers can be seen next to the connector by looking up at the logic board (with your head under the machine).



Head 4
Head 3
Head 2 Sensor
Head 1

Open

Closed

c)  Make 90 degree folds in the cable ends as shown then connect them to the daughter card.

d)  Topmost (longest) cable - plug into connector J9 (PWR/SENS) with the blue cable edge facing the center of the printer.

**Important:** *Make sure the cable plugs into the connector correctly and are not shifted by a row or column of pins.*

e)  Next cable in the bundle - plug into connector J1 (PRT 1) with the blue cable edge facing away from the printer.

f)  Continue attaching cables in the order that they are stacked making sure that the connectors are folded as shown.



Connect the ribbon cable ends with folds

g)  Attach the ribbon cable bundle to the end plate with cable ties as shown. A small fold in the bundle is required to take up slack in the cables. Slide the black ferrite beads along the cable to position them as needed.

h)  Check all of the cable connections and hardware to ensure that the machine is ready to test.



Tyraps
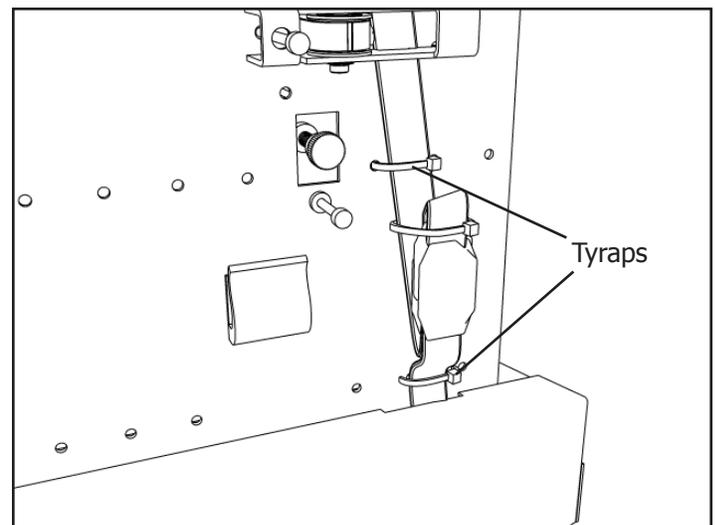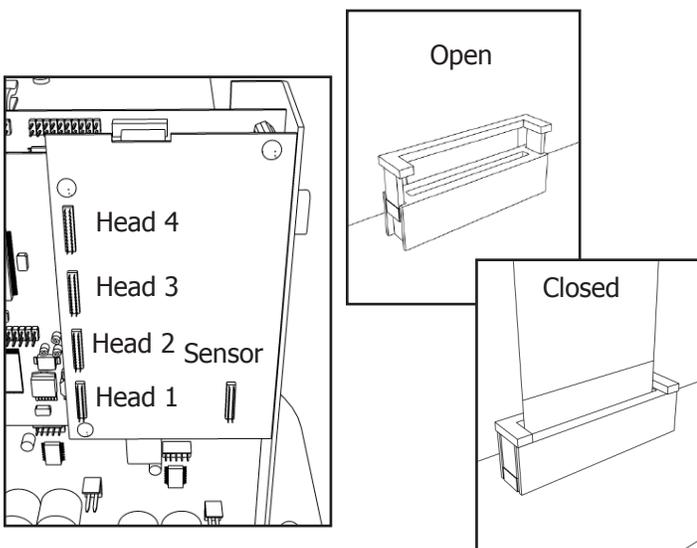
**(16)** **Attach the Logic Board Cover and Tighten the Carriage Belt**

   a)   Hang the metal logic board cover over the end of the service station frame. NOTE: Make sure the logic board cover edges are OUTSIDE of the service station frame on the front and back.

   b)   Make sure the ribbon cable bundle fits through the slot at the end of the cover and in the daughter card. If needed shift the cables to the side to avoid pinching them.

   c)   Connect the take up motor power and encoder cables as shown in.



Plug in Take-up wires
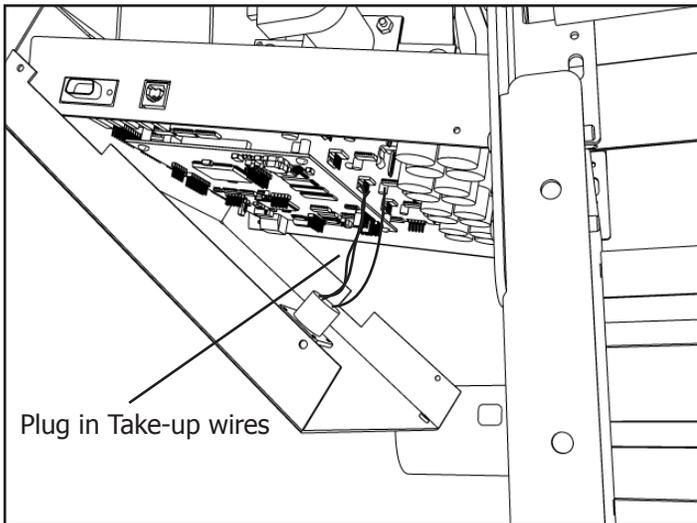
# Procedure: Firmware update for the Ioline FlexJet

## ① Updating the firmware

**Prepare the FlexJet to Update the Firmware**

**Determine what version of firmware you have**
1. Power on the PC and FlexJet.
2. Ensure that the serial cable connects the PC to the FlexJet.
3. Make sure there is a green light on the keypad of the FlexJet and open the FlexJet Control Center.
4. The main screen shows the current firmware version in the upper right corner.
5. If the firmware version is not shown, please check connections to the printer. Call Ioline Customer Service for help resolving communication issues.
6. If firmware is a lower number than version 253.2, use the "Manual firmware update" procedure

## Set the initial Y Fine Adjustment number

1) Turn on the FlexJet and let it initialize.
2) Open the "FlexJet Control Center" software.
3) When the window opens press Ctrl-Alt-B. You should see the "Service Station" window.
4) Click the "Move carriage out from SS" button. The carriage will move out of the Service Station.
5) Change the "Y fine adjust" number to -1000 and click the "Set fine adjust" button.
6) Click on the "Return carriage to SS" button. The carriage will move back into the Service Station.

## ② Auto Updating the Firmware
**Note:** Follow this procedure if your current firmware version is 253.2 or higher.

1. Make sure the firmware file has been saved in the Ioline folder. Choose File>Download Firmware from the menu.
2. Press the Select Firmware button.
3. Follow the onscreen directions that explain how to restart the printer so that it will accept new firmware. Press OK when the printer is ready (four yellow lights on the keypad.)
4. Use the window to browse to the location where the firmware file is stored (usually xxxxx.mot, where xxxxx is the version number).
5. A window will appear that shows the transfer progress.
6. The printer will go through the initialization process when the firmware is finished. When finished, the OK light will turn red and the Square light will turn green.
7. Press the Done button when the process is complete.
8. Follow steps for the next procedure "Y fine adjustment for the service station".

## ② Manually Updating the firmware
**Note:** Use this procedure if your current firmware is lower than version 253.2

**Prepare to Update the Firmware**

1. Power on the PC and FlexJet.
2. Ensure that the serial cable connects the PC to the FlexJet.
3. Copy the firmware file to a folder like c:\Ioline\Firmware or another location that is easy to remember. If it is a ZIP archive, make sure it is decompressed before sending it to the FlexJet.

**Setup TeraTerm**

1. Start TeraTerm. Please contact Ioline if you need a copy. It is included on the FlexJet CDROM in the X:\tools (where X is the CDROM drive letter) folder.
2. When the "New Connection" window appears, click on the circle next to 'Serial' then select the COM port that connects the printer to the PC.
3. In the main TeraTerm window menu, click on Setup>Serial Port.
4. Change the 'Baud rate' to 38400. Make sure the other settings match the following:
a. Data: 8 bit
b. Parity: None
c. Stop: 1 bit
d. Flow Control: Xon/Xoff
e. Transmit Delay: 0/0
5. Press 'OK'.

IMPORTANT NOTE: FlexPlot version 1 requires revision 1 of the FlexJet firmware (229.0) or later. Please contact customer service for a free firmware upgrade.

**Update Firmware**

1. Press the CAPS LOCK key on the keyboard so that the CAPS LOCK light is lit.
2. With TeraTerm open, turn FlexJet power off then back on. A message should appear in the TeraTerm window.
3. Within 8 seconds of turning on power, press the 'Y' key on the keypad. This prepares the FlexJet to accept new software. The carriage should NOT move after pressing the 'Y' key.
4. In TeraTerm, choose File>Send File.
5. Use the window to browse to c:\Ioline\Firmware and double click on the firmware file (usually xxxxx.mot, where xxxxx is the version number). A window will appear that shows the transfer progress.
6. When the transfer window closes, press the 'Z' key. The FlexJet will finish updating the firmware for approximately 2 minutes. A few messages will appear indicating progress.
7. When the process is complete, the carriage will go through the power on sequence then enter the service station. TeraTerm will show that the new software is installed by displaying the version number.

**Reset Calibration Values**

1. Turn power off on the FlexJet.
2. Manually pull the carriage out of the storage position to the middle of the machine.
3. Copy the factory calibration values from the white sticker inside the service station opening. If no sticker is present, recalibrate the machine using the procedure available in the FlexJet User Guide.
4. Press and hold the Unroll key on the keypad then turn FlexJet power on.
5. When the OK light turns red, release the key.
6. Use the FlexJet Control Center software to re-enter the calibration values copied from the sticker OR perform the calibration using the directions in the FlexJet User Guide.
7. Turn power off then back on to ensure the new calibration values take affect.
8. Follow the procedure "Y fine adjustment for the service station".

# Procedure: Y fine adjustment for the Service Station.

**\*\*Note:** This procedure is only required if your firmware is older than version 264.0

**ATTENTION**
OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES
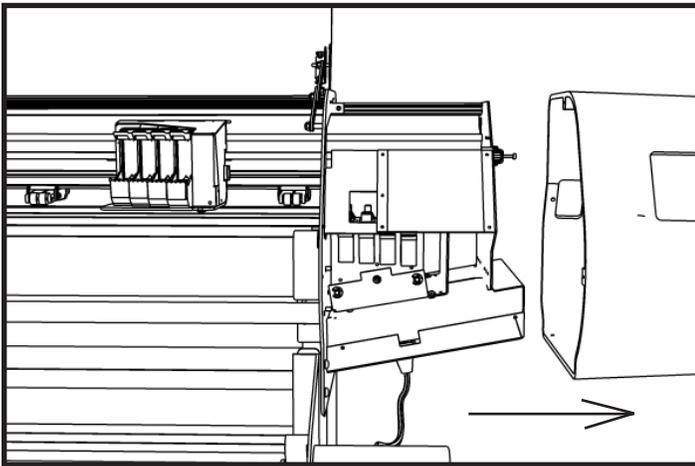
**Notices:**

**Attention!** *The discharge of static electricity may damage the keypad and components. Use the included ground strap during all procedures. Keep plastic objects away from the keypad and logic board assemblies.*
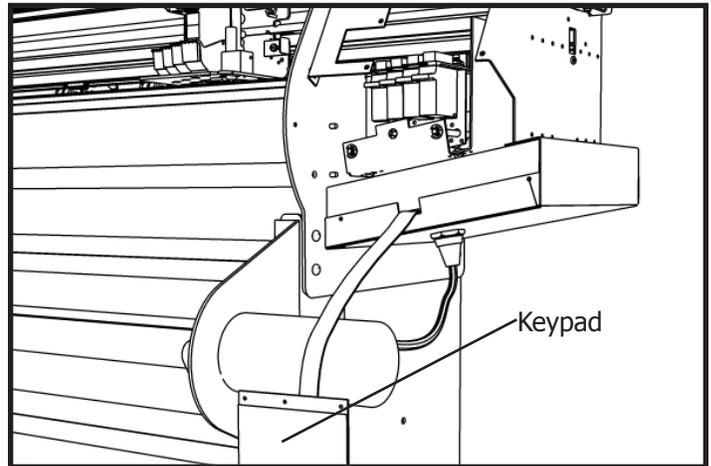
## Tools Required:
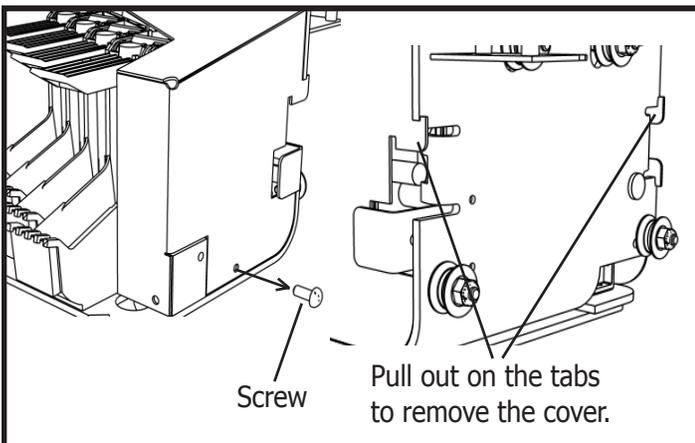Scotch Tape

## ① Service Station centering

1) Remove the right side cover of the machine.

2) Remove the (four) Phillips screws that hold the keypad on. Let the keypad hang. Make sure both ends are still plugged in.
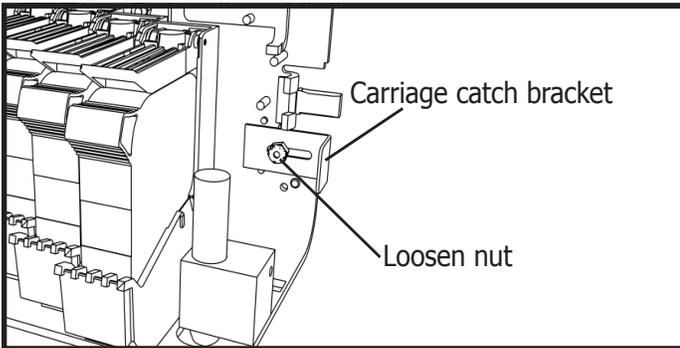
Keypad

3) Remove the carriage cover. (One screw on the right side, un-clip the back right and left sides).

Screw

Pull out on the tabs to remove the cover.

4) Make sure the ink cartridges are installed and power the machine on.
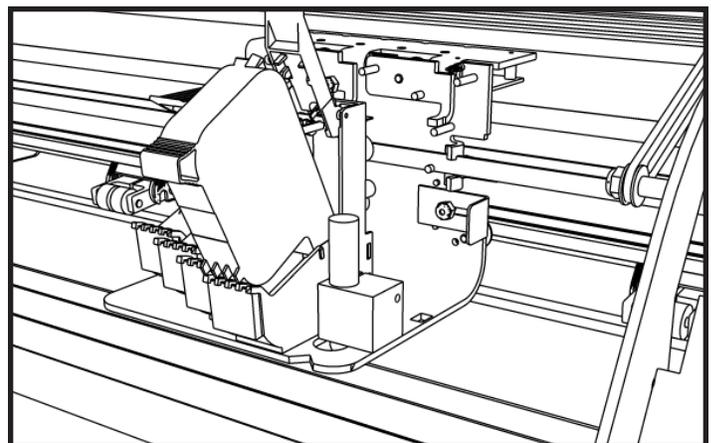
5) Loosen (do not remove) the carriage "catch bracket".



Carriage catch bracket

Loosen nut

6) Place a piece of scotch tape on the service station spit wells.



Tape covering the holes in the spit wells
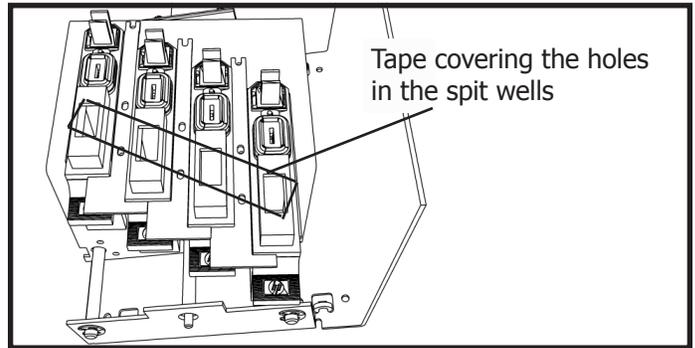
7) Press the "Clean" button on the keypad. You should see two lines in the middle of the spit well holes.



Lines on the tape
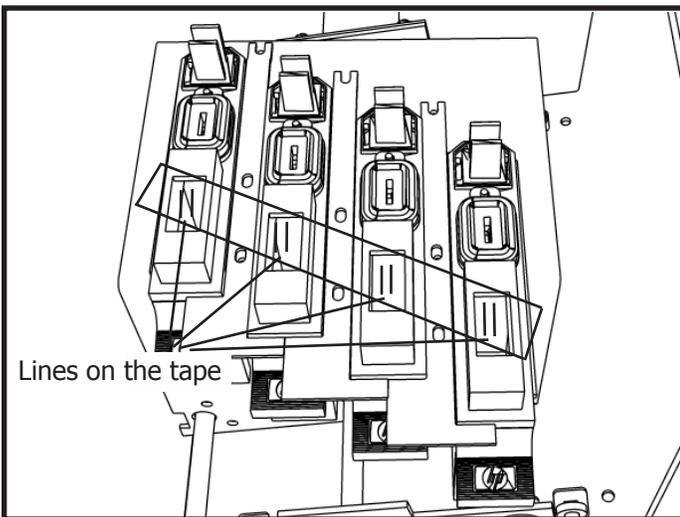
8) If the lines don't appear in the middle of the holes, turn the plastic thumbscrew on the side of the service station (clock-wise if the lines are to the right. Counter-Clockwise if the lines are to the left.)



Spit well centering thumb screw
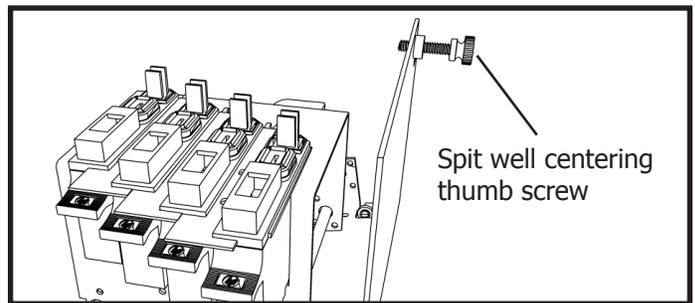
9) Turn the power off and remove the ink cartridges.
**WARNING:** After removing the ink cartridges lower the blue ink doors before continuing.

# ② Y Fine Adjustment

The purpose of the Y fine axis adjustment is to get the bottom of the carriage as close as possible to the ink wells without leaving a gap or pressing too hard. Also, proper adjustment assures the inkjet heads will be capped so the heads do not dry out.

1) Turn on the FlexJet and let it initialize.
2) Open the "FlexJet Control Center" software.
3) When the window opens press Ctrl-Alt-B. You should see the following window.



4) Look at the gap between the bottom of the carriage and the service station. With the Y fine adjust set there will be a large gap between the top of the grey ink wells and the bottom of the carriage.
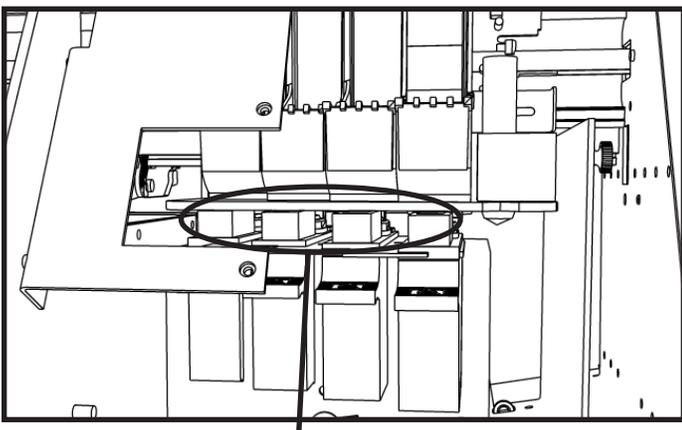


Look at the gap between the carriage and service station.

5) Click the "Move carriage out from SS" button. The carriage will move out of the Service Station.
6) Change the "Y fine adjust" number to -800 and click the "Set fine adjust" button.
7) Click on the "Return carriage to SS" button. The carriage will move back into the Service Station.
8) Follow steps 4 thru 6 again adding 100 to the "Y fine adjust" number each time until the bottom of the carriage is just close to touching the grey ink wells.

WARNING: Do not let the bottom of the carriage "Press" against the ink wells. This can cause failure of the machine to initialize.

9)  Reduce the gap further by adding smaller numbers.
**Note:** A Y fine adjust change of 25 mils results in a gap change that is equivalent to the thickness of a piece of paper.
10) Press and hold the "UP" arrow on the keypad of the plotter. While holding the button turn the machine back on. When the carriage starts to move let go of the button.
11) Once the carriage is back in the service station check the gap one more time to make sure they are touching.

## ③ Final screw adjustment

1) If you are happy with the spacing between the carriage and the service station turn the service station stop screw on the side of the machine until it just touches the service station.
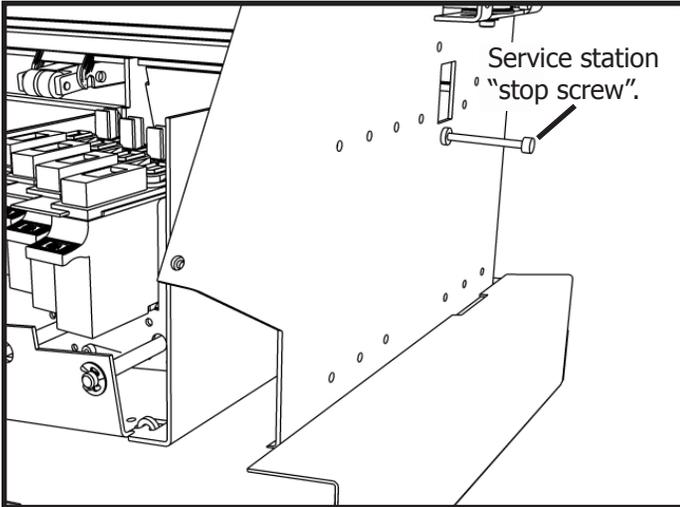
2) Back the screw off one half turn until you can see a little bit of light between the screw and the service station. Apply Lock-Tite or Super-Glue to the screw so it won't back out while the machine is running.



Service station "stop screw".



Very small gap
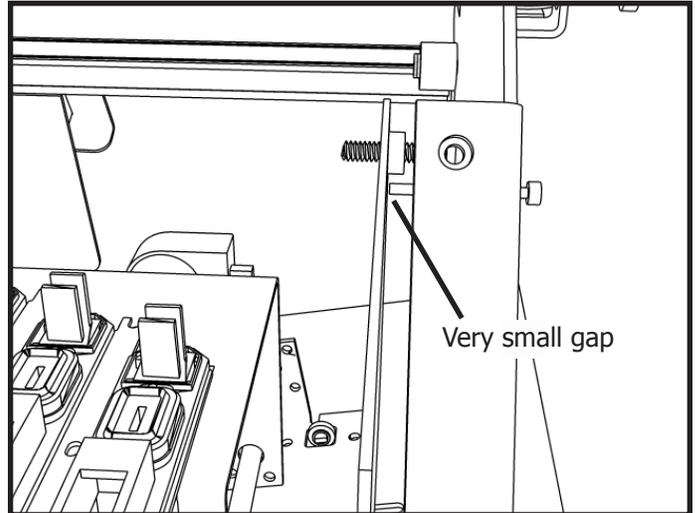
3) Move the carriage catch bracket until it hits the magnet. Tighten the nut to hold the stop bracket. Note: It's best to use a nut driver that can reach the nut while the carriage is in the service station. Otherwise tighten the nut enough to hold the bracket and move the carriage out of the service station to
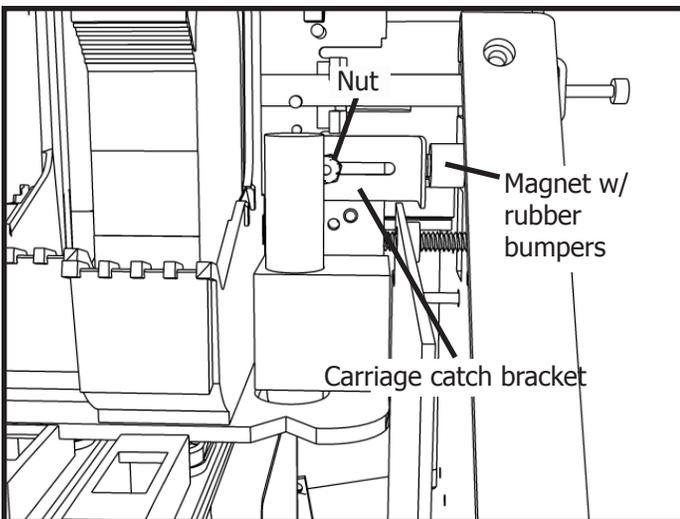
4) If you are happy with all the adjustments, turn the power off on the machine.
5) Let the FlexJet sit for 10 seconds, then turn the power back on while holding the "Up" arrow on the keypad. When the carriage starts to move let go of the button.
6) When the carriage initializes into the service station check all the gaps and stop brackets to make sure the adjustments are still right.
7) Re-install the keypad. Run a test plot to the machine before putting the covers back on.
8) If problems arise contact Ioline Tech Support.



Nut

Magnet w/ rubber bumpers

Carriage catch bracket