

# Calibrating the Ioline FlexJet

The FlexJet firmware will store and use custom calibration settings. It is normal for every machine to require adjustment of these values before plotting the first time. Once calibrated, the machine typically requires no additional changes. Adjustments are sometimes necessary if the paper type is changed, if the paper is highly sensitive to humidity, or to account for normal wear. Please remember that proper calibration depends on accurate measurements.

## Necessary Tools:

- Terminal program like Hyperterminal or TeraTerm.
- Text editor like Notepad.
- Working FlexJet and PC.

## Summary

1. Prepare the printer.
2. Prepare Hyperterminal.
3. Check FlexJet baud rate.
4. Send the calibration plot.
5. Align cartridges.
6. Set Velocity adjustment.
7. Set Size Calibration.

## Prepare to Calibrate the Printer

1. Load the printer with paper that is wider than 48". Ensure that the right paper edge is 4" or less from the right edge of the platen.
2. Starting from the right side of the carriage, install ink cartridges equal to the number required by the machine.
3. Power on the PC.
4. Ensure that the serial cable connects the PC to the FlexJet.
5. Run the file `calibrate_flexjet.exe` to install the calibration files. Ensure that they are stored in `C:\Ioline\Calibration`.

## Setup Hyper Terminal

1. Start Windows Hyper Terminal. This program is located in *Start>Programs>Accessories>Communications>Hyperterminal*.
2. Enter "Ioline" when prompted for a name and press 'OK'.
3. In the next window that appears, from the 'Connect Using' box choose the COM port used with the FlexJet.

4. In the Port settings window that appears, set 'Bits per Second' to 38400. Make sure the other settings match the following:
  - a. Data Bits: 8
  - b. Parity: None
  - c. Stop Bits: 1
  - d. Flow Control: Xon/Xoff
5. Press 'OK'.

## Determine the FlexJet Baud Rate

1. With Hyperterminal running, power on the FlexJet.
2. If, after 8 seconds, a message similar to the following appears:

*Waiting 8 seconds for code download  
Enter 'Y' to download:  
No download, jump to program*

*Print Task: Version 1.17 - Beta 14*

Then the FlexJet is set to run at 38,400 baud rate. *Proceed to the next section.*

If there is any garbage text in the message like:

*Waiting 8 seconds for code download  
Enter 'Y' to download:  
No download, jump to program*

*xO\_lkj"!\xqsm<sup>o</sup>,.17 - =\_jK#`~14*

Then the FlexJet is NOT set to the proper baud rate. *Proceed to step 3 in this section.*

3. Adjust the Hyperterminal baud rate by choosing *File>Properties*. Click on the *Configure* button.
4. Choose 115,200 from the baud rate menu. Choose 'Ok' twice to return to the main Hyperterminal menu.
5. Choose *Transfer>Send Text File* then select 38400.plt from C:\Ioline\Calibration folder.
6. Choose *Transfer>Send Text File* then select fj\_data.plt from C:\Ioline\Calibration folder.
7. A list of numbers will appear. '38400' should be in the list toward the bottom. If 115400 is still showing, send the 38400.plt file as described above.
8. Repeat steps 3-4 above BUT change the Hyperterminal baud rate back to 38400. **Important:** Cycle power on the FlexJet and the message shown in step 2 should appear in the terminal program with no garbage text. Proceed to the next section.

## Send the Calibration Plot:

1. Ensure that Hyperterminal is running.
2. Choose *Transfer>Send Text File* then select *calibration\_box\_flexjet.plt* from *C:\Ioline\Calibration* folder.
3. The printer will make a box 30" wide and 40" long.

## Review the Master Calibration File:

1. Use a text editor like Notepad (usually in *Start>Programs>Accessories>*).
2. Open the file *master\_cal.plt* in *C:\Ioline\Calibration* folder. The following is displayed on screen:

```
!PH0,0,0,0@  
!VC13@  
!MC1.0000,1.0000@
```

PH = Cartridge Alignment settings  
VC = Velocity adjustment  
MC = Size Calibration setting

3. To adjust the FlexJet; adjusting these numbers, save the file, then send it to the FlexJet. Details for adjustment are reviewed below.
4. Leave the *master\_cal.plt* file open in Notepad and proceed to the next section.

## Align the Cartridges (not necessary for a 1 cartridge FlexJet):

Examine the calibration box printed in above steps. Each time the carriage passed over the paper (called a scan), all cartridges squirted ink. The individual lines from each cartridge **within the scan** may not align with each other. Adjusting the numbers in the PH setting in *master\_cal.plt* (then sending the file to the printer) will correct for this misalignment.

1. PH has 4 numbers separated by commas. Each number represents the adjustment for one cartridge. The left most number is for cartridge 1, the next is cartridge 2, etc. If the FlexJet only has 2 cartridges, the 3<sup>rd</sup> and 4<sup>th</sup> numbers are ignored. Cartridge 1 is the reference and is always 0.
2. Changing the PH value by +/- 1 moves the cartridge alignment about 1/2 line width either direction. **Note:**
  - a. + numbers move the lines right.
  - b. - numbers move the lines left.
3. Example (using the first cartridge as reference):
  - a. Lines from the second cartridge must shift one line width (=2 PH units) left to align with the first cartridge.
  - b. Edit the PH line in *master\_cal.plt* to look like the following:

!PH0,-2,0,0@

- c. Save master\_cal.plt.
- d. Choose *Transfer>Send Text File* then select *master\_calt.plt* from C:\Ioline\Calibration folder.
- e. Choose *Transfer>Send Text File* then select *calibration\_box\_flexjet.plt* from C:\Ioline\Calibration folder.
- f. The printer will make a box 30" wide and 40" long.
- g. Examine the cartridge alignment **in the scan**. The lines will align closer. Repeat these steps until the alignment is correct.

## Adjust the Velocity:

Examine the edge of the printed calibration box closest to the center. There is typically misalignment **between each scan**. Adjusting the number in the VC setting in master\_cal.plt (then sending the file to the printer) will correct for this misalignment.

1. VC has one number for adjustment. The default value is 13.
2. Changing the VC value moves the second scan, created when moving from left to right. **Note:**
  - a. Increasing the number move the second scan left.
  - b. Decreasing the number move the second scan right.
3. Example:
  - a. Lines from the second scan shift left to align with the first scan.
  - b. If the original value for VC was 13, edit the VC line in master\_cal.plt to look like the following:

!VC14@

- c. Save master\_cal.plt.
  - d. Choose *Transfer>Send Text File* then select *master\_calt.plt* from C:\Ioline\Calibration folder.
  - e. Choose *Transfer>Send Text File* then select *calibration\_box\_flexjet.plt* from C:\Ioline\Calibration folder.
  - f. The printer will make a box 30" wide and 40" long.
  - g. Examine the alignment **between scans**. The lines will align closer. Repeat these steps until the alignment is correct.
4. There is typically a slight misalignment at the printed lines near the right paper edge. This is a known issue and will have a correction in future firmware updates.

## Send the Calibration Plot Again:

1. Ensure that Hyperterminal is running.
2. Choose *Transfer>Send Text File* then select *calibration\_box\_flexjet.plt* from *C:\Ioline\Calibration* folder.
3. The printer will plot a box 30" wide and 40" long.
4. Remove the plotted box from the FlexJet.

## Calculate the Size Adjustment:

The last adjustment ensures that the plotted image exactly matches the intended size. Adjusting the numbers in the MC setting in *master\_cal.plt* (then sending the file to the printer) will correct the size of the output. These steps require that the printed box is removed from the FlexJet and measured.

1. MC has two numbers for size adjustment. The first adjusts the X (paper movement) and the second adjusts the Y (carriage movement). The default values are both 1.0000. **Note:** Changing the MC values changes the size of the printed image.
2. Precisely measure all four sides of the box removed above. Write the measurements next to each line. Better accuracy in measurement equals better calibration.
3. Take the average of the 30" (Y) values by adding them together and dividing by 2.
4. Repeat this procedure for the 40" (X) values.

### Example:

If  $X1 = 39.750$  in. and  $X2 = 39.700$  in.

The sum is 79.450 in. ( $39.750$  in. +  $39.700$  in. =  $79.450$  in.).

The average X measurement is 39.725 in. ( $79.450$  in. /  $2 = 39.725$  in.)

5. Calculate the calibration value by dividing the intended size by the measured average of the box sides for both X and Y. Round the number to 5 decimal places.

### Example:

If the average of X = 39.7250 in.

The X calibration value =  $40$  in./ $39.725$  in. = 1.00692

If the average of Y = 30.100 in.

The Y calibration value =  $30$  in./ $30.100$  in. = 0.99668

## **Edit the Size Adjustment in the Master Calibration File:**

1. Edit the MC values to include the calculated X and Y calibration values from above. X is first number and y is the second with values separated by a comma.

Example:

**Default calibration text:** !MC1.00000,1.00000@;

If X calibration = 1.00692 and Y = 0.99668 then,

**Modify the text to read:** !MC1.00692,0.99668@

2. Save master\_cal.plt.
3. Choose *Transfer>Send Text File* then select *master\_cal.plt* from C:\Ioline\Calibration folder.
4. Choose *Transfer>Send Text File* then select *calibration\_box\_flexjet.plt* from C:\Ioline\Calibration folder.
5. The printer will make a box 30" wide and 40" long.
6. Remove the printed image and measure them to ensure that the new size adjustments were accurate. Make small adjustments to the value and repeat steps 2-5 to increase accuracy.

### **Important Note:**

The calibration data ***are saved*** when the power is turned off. The FlexJet will continue to use the values sent in master\_cal.plt until they are changed.