The IJ4000 controller, including all components unless otherwise specified, carries a limited warranty.

For all warranty terms and conditions, contact the manufacturer for a complete copy of the Limited Warranty Statement.
# IJ4000 Controller Operations Manual Rev A

**Section 1: Safety** ................................................................. 6

**Section 2: Controller Functions** ............................................. 7
  - Home Screen ................................................................. 7
  - Message Editor ............................................................ 9
  - Time and Date Codes .................................................... 11
  - Product Counts, Variable Fields, Logos ................................ 12
  - Barcodes, Product setup, & Menu ..................................... 13
  - Message Info Box ......................................................... 14
  - The Apps Screen .......................................................... 15

**Appendix A: Specifications** .................................................. 18
  - Stainless Steel Serial Controller .................................... 18
  - IJ4000 Connection - HUB ................................................. 19
  - System Interconnect Diagram .......................................... 20

**Appendix B: File System Backup and Restore** .............................. 26
  - Backup ........................................................................ 26
  - Restore ........................................................................ 26

**Appendix C: Configuring a PC to Controller** ................................. 27

**Appendix D: Controller and Print Head File Management** ................. 28
  - File Manager .................................................................. 28

**Appendix E: Creating Logo Files** ............................................. 29

**Appendix F: Transferring Logo and Font Files** ............................... 30

**Appendix G: ijRemote Application** ............................................ 31
  - Adding Multiple HUBs .................................................... 32

**Appendix I: Updating the HMI & HUB via USB** ............................... 34

**Appendix J: Updating the HMI & HUB From a PC via Ethernet** ............ 36

**Appendix K: Part Numbers** ..................................................... 37
  - System ........................................................................ 37
  - Service Parts .................................................................. 38
Section 1: Safety

Following is a list of safety symbols and their meanings, which are found throughout this manual. Pay attention to these symbols where they appear in the manual.

Caution or Warning! Denotes possible personal injury and/or damage to the equipment.

Caution or Warning! Denotes possible personal injury and/or equipment damage due to electrical hazard.

NOTE: (Will be followed by a brief comment or explanation.)

ESD protection should be worn when servicing internal printed circuit boards.

After service to the equipment is completed, replace all protective devices such as grounding cables and covers before operating the equipment.
Section 2: Controller Functions

Home Screen

Message Window:
- Displays the current print message
- Updated approximately every seven seconds.
- White and/or Beige bars represent the print heads in the daisy chain and are identified by their respective print head numbers.
- The Header displays the task number and file name of the message being printed, if no message is loaded to print, “None” is displayed.

Task Select Button:
- Places focus on the selected task. This allows one to view what is being printed on either task in the home screen. Additional menu items will vary from one task to the other, depending on print technology.

Task Print / Pause Button:
- Start and Stops print after an operator response to a confirmation dialog popup box.
- If a message is currently printing, pressing the pause button will discontinue printing after the message finishes printing.
- If the Play button is pushed, print will resume on the next product detected.
Quick Print Button:
- Allows access to the Print dialog box.
- Select the desired message and press the Printer button. The message will print at the next photocell trigger.

Purge Button:
- Fires all jets for a short period of time on the selected print head.

Status Button:
- Version of controller firmware is located in the upper right corner.
- Displays Product detect.
- Displays Printing or Paused status.
- Version of Controller firmware.
**Message Editor**

**Message Button:**
- Press the *Message* button on the Home Screen to bring up the Message dialog.
- To create a new message press the *New Message* button.
- To edit an existing message, select the message and then press the *Open* button.
- Editing a message or creating a new message will bring up the message editor.
- To delete a message, select the message and press the delete button.
On-Screen Keyboards & Numeric Keypads

Keyboard Button:
- Edit Screen only: Press once to show the keyboard; press again to hide it.
- All other screens and dialogs: Keypad or keyboard appears when text or numeric input box is touched.

Layer Select:
- Pressing the Layer Select button cycles through; letters, numbers & symbols, and extended characters.

Language Select Button:
- Changes keyboard layout to that of the language selected. Changes keyboard layout only; user interface language does not change.

ESC (Escape):
- Undoes any changes made to any input entry box. If no changes made, hides the keypad or keyboard.
- Edit screen full keyboard: always hides the keyboard.

Arrow Keys:
- Moves highlighted fields or the cursor around in the Message Editor.

Tab:
- Switches focus between highlighted fields in the Message Editor.

Backspace:
- Deletes the character to the left of the cursor.
- On the edit screen, deletes a highlighted (red) field.

Ctrl (Control) in Message Editor:
- Amplifies the movement of the arrow keys.
- Press Ctrl-Enter to insert a new line in a text field.
- Can use ctrl-c then ctrl-v to copy and paste fields.

Shift:
- Press Shift once to make the next character upper case.
- Press Shift twice for shift lock. Press Shift again to exit shift lock.
Time and Date Codes

Insert or edit text.
Product Counts, Variable Fields, Logos

Maximum 9-digit count

Incrementing Count
Count increments when the 'Start at' value is less than the 'Stop at' value.

Decrementing Count
Count decrements when the 'Start at' value is greater than the 'Stop at' value.

Variable Field Data Source
User: Print data entered when print message containing the variable field is selected to print.
COM1, COM2: Data is received through COM1 or COM2 serial port. Data must be received before the message is selected to print.
Data 1-10: Data is retrieved from corresponding system variable. User has the option to change the data when the message is selected to print.

Scroll through logo images or select from list
Barcodes, Product setup, & Menu

- Reverts message to the last
- Clears contents of message editor
- Calculates estimated ink usage for the contents of the editor
- Exits the editor to the home screen
- Prints the contents of the editor on the next photocell trigger

Quick save of current message

Prints the contents of the editor on the next photocell trigger

Increase or decrease Barcode width

Increase or decrease barcode height

Increase or decrease value of selected property

Bleed Factor (Default = 2)
**Message Info Box**

- **Message Info Icon**
- **Task number & message name**
- **Estimated Ink usage for the current message**
- **Product length & left margin settings**

![Message Info Icon Diagram]

**Direct Entry of Cursor or Field Position**

**Direct Entry Box**

**Field**: Selecting the Direct Entry Box while having a field selected will allow the user to manually input the X & Y location of the selected field.

**Cursor**: When no fields are selected the Direct Entry Box will allow the user to manually input the X & Y location of the cursor.

![Direct Entry Box Diagram]

**Print Head Number**
The Apps Screen

Apps Button

Return to the Home Screen
Time, Date, Shifts, and Rollover Time Screen

Set the controller’s time and time format. Press "Ok" to return to the Apps Screen.

User Access

Controls within this box set the user access level. Buttons outside the box mirror the Home Screen and indicate which functions are password protected and which are open.

The factory set password is Manager. Passwords are case sensitive.

Note: Users can either select a pre-defined access level from the list or they can select "User Defined" and customize their Access settings by selecting icons on the User Access screen.
**User Codes**

User Codes are user-defined time and date codes for printing hour, minute, date, month, and week of the year information.

- **Code type**:
  - Hour
  - Qtr Hour
  - Minute
  - Day
  - Date
  - Week
  - Month
  - Year

- **Apply** allows the user to save and apply changes without exiting the User Codes screen.

- **Restore all user codes to the factory default settings**
Appendix A: Specifications

Stainless Steel Serial Controller

**Size**
- Weight: 2.18kg [4.6lb]
- Height: 196.1mm [7.72in]
- Width: 330.7mm [13.02in]
- Depth: 41.3mm [1.62in]

**IP Rating**
- IP34 (estimated)

**Enclosure**
- Stainless Steel

**User Interface**
- Graphical User Interface with on screen keyboard

**Fonts**
- Unicode

**Display**
- 10.2in [259.08mm] LCD with touch screen, 800 x 480 pixels

**Storage**
- 512 MB flash memory

**Ports**
- (2) RS-232 ports, 1 USB port,
- (1) 100 Base-T Ethernet port

**Electrical**
- 15 VDC from power supply to controller, power supply: 90-260 VAC, 50/0 Hz, 1.5A max.

**Environment**
- Ambient operating temperature: 5°C to 40°C (40°F to 104°F)
- Operating humidity: 10% - 90%, non condensing
IJ4000 Controller

IJ4000 Connection - HUB

Size
Weight: 5.22kg [11.50 lb]
Height: 335.0mm [13.19in]
Width: 309.4mm [12.18in]
Depth: 119.1mm [4.69in]

IP Rating
IP54 (estimated)

Enclosure
Stainless steel

Fonts
Unicode

Storage
512 MB flash memory

Ports
(2) RS-232 Ports, (1) USB Port
(1) 100 base-T Ethernet Port

Electrical
24 VDC, 100W, Internal Power Supply.
90-260 VAC, 50/60 Hz, 1.5A max.

Environment
Ambient operating temperature: 5°C to 40°C (40°F to 104°F)
Operating humidity: 10% - 90%, non condensing
System Interconnect Diagram

IJ4000 Connection HUB wiring diagram
IJ4000 Connection Hub CPU Board

Test Points:
- TP1: 12VDC, power for display backlight. Turns on/off with soft powerswitch.
- TP2: 5VDC, power for 5V logic. Also supplies the input voltage to the 3.3V regulator.
- TP3: 3.3VDC, power for 3.3V logic. Also supplies the input voltage to the 1.8V regulator.
- TP4: 1.8VDC, power for the CPU core.

LEDs:
- D1: Ethernet connector, Green. Flashes to indicate network traffic.
- D2: Ethernet connector, Green. Indicates valid network connection.
- D1: Yellow, flashes when the CPU is running. (On CPU module)
- D4: Green, indicates 3.3V is present.
- D2: Green, indicates 3.3V is present. (On CPU module)
IJ4000 Connection Hub CPU Board cont...
IJ4000 Print Head Interface Board

Test Points:

TP1: 5VDC.
TP2: 3.3VDC.
TP3: 2.5VDC.
TP4: GND.
TP5: (FPGA) PROGRAM; pulses low to initiate FPGA programming.
TP6: (FPGA) INIT; goes LOW to indicate an FPGA programming error.
TP7: (FPGA) DONE. LOW when the FPGA is being programmed. High when FPGA programming is complete.
TP8: CIDS error signal, active low.
TP9: Print head vacuum signal, active high.
TP10: CIDS ink low signal, active low.
TP11: Print head pump signal, active high.
TP12: CIDS ink out signal, active low.
TP13: Print head at temperature signal, active low.
TP14: CIDS vacuum signal, active low.
TP15: Print head ink out signal, active high.
TP16: CIDS pump signal, active low.
TP17: DC power in (24V).
TP18: Print head CLOCK signal.
TP19: Print head DATA2 signal.
TP20: Print head DATA signal.
TP21: Print head LATCH signal.
TP22: PHOTORESPONSENOR signal, active high.
TP23: External ENCODER signal.
IJ4000 Controller Operations Manual Rev A
Appendix B: File System Backup and Restore

Backup
1. Insert a USB jump drive into the USB port on the HMI.
2. From the home screen touch Apps Button then Utilities.
3. From the Utilities screen select Backup.
4. Enter a file name at the Backup dialog popup. "backup" is the default name. This creates a "backup.tgz" file.
5. From the System Utilities screen select Safely remove USB memory.

Restore
6. Insert a USB jump drive containing a "backup.tgz" file into the USB port on the HMI.
7. From the home screen touch Apps Panel then Utilities.
8. From the Utilities screen select Restore.
9. Select the appropriate backup file from the Restore dialog popup.
10. From the System Utilities screen select Safely remove USB memory.
Appendix C: Configuring a PC to Controller.

Window 7®

1. Open the Start Menu; select Control Panel; then Network and Sharing Center.

2. Click Local Area Connection, then click the Properties button.


4. Click Use the following IP address radio button. Enter an IP address of 10.1.2.4, a subnet mask of 255.255.255.0, and click the OK button.
Appendix D: Controller and Print Head File Management

File Manager

1. If logo or font files are to be transferred, place them on a portable USB storage device and insert it into the HMI USB port.

2. Touch the Apps button on the Home screen menu, and then select the Utilities button.

3. Scroll to the bottom of the Select Function list and select File manager. Press the Do Function button; the File manager screen is displayed.

The home folder contains all folders and files related to controller operation.

The usb0 folder contains all folders and files resident on the USB storage device.

NOTE: Cut, Copy, Paste, and Delete function the same way as any software. Navigate to any file in any of the folders and perform the desired function.
Appendix E: Creating Logo Files

Note: Logos are not currently available for laser product.

Open **Paint** from a PC by selecting **Start, All Programs, Accessories**, and then **Paint**.

Navigate to the **Image Properties** dialog box via the drop down menu.

**12 Dot Valve Jet**: Enter the **Width** and **Height** of the logo in **Pixels**. For practical purposes the maximum height of a logo is 12 pixels if the logo is printed with a single print head. Maximum logo width is 5000 pixels, or print columns (200 in / 5.1 m when printed at 25 dpi.)

**Thermal Jet**: Enter the **Width** and **Height** of the logo in **Pixels**. For practical purposes the maximum height of a logo is 150 pixels if the logo is printed with a 1/2" print head, and 300 pixels if printed with a 1" print head. The absolute maximum logo height is 1200 pixels, but logos that cross print head boundaries will likely exhibit registration problems when printed. Maximum logo width is 32,767 pixels, or print columns (109.22 in / 2.77 m when printed at 300 dpi.)

Select **Black and white** for the **Colors**.

Draw the pixels of the logo using the drawing tools. See the example below.

From the **File Menu**, select **Save As** and save the logo with a convenient name and directory location.

**NOTE:** If this logo is imported from another document or software, make sure that the first step taken is to **Save As a Mono-chrome Bitmap (bmp)**, and then **Resize** to the appropriate height.

Next, click the **Rotate button**; **Rotate Left 90° (CCW 90°)**.
NOTE: Files cannot be transferred to the print head while printing. Pause print first.

1. As shown in the “File Manager” section, make sure USB storage device is installed and the File manager selection screen is present on the controller.
2. Select the usb0 folder and press the Open Folder icon button.
3. Navigate to a previously saved file, highlight the file and press the Copy button. The file is now stored in temporary memory. In this example, a logo file will be transferred.
4. Press the Close Folder, then the Go Up One Level button until the File manager selection screen is present.
5. Select the home folder, press the Open Folder button, and select the bmps folder.

6. Press the Paste button. The logo (bmp) file will appear in the bmps folder.
7. When all desired file transfers are complete, press the Exit button.
8. From the System Utilities menu, press the Safely remove USB memory button, and the Done.
9. The file is now available for message creation in the message editor.
Appendix G: ijRemote Application

The ijRemote application allows the user to connect remotely from their desktop to the IJ4000 system located at the point of printing. An Icon will be located on your Desk top after installing IJ4000 GUI software on your PC.

Connects to the selected IJ4000 Connection Hub

Save any changes made to the list of Connection Hubs.

Undo any unsaved changes.

Adds another IJ4000 Connection Hub to the list.

Edit existing IJ4000 Connection Hub in the list.

Deletes an IJ4000 Connection Hub from the list.

Shows the current firmware version of the HMI.

Sets the Network settings of a HMI or Connection Hub using the device’s MAC address.
Adding Multiple HUBs

To add additional HUBs to the system, access the ijRemote application. If the application is not open, access it from the Home Screen by selecting More, Apps, Network, and then the IP Addresses tab.

- Record the MAC Address for later use.
- Press Cancel, then press Back on the Apps Menu.
- From the Home Screen, select More and then Back on the More Menu to access the ijRemote application.
1. Set the IP Address of the HUB using **Network Settings** button.
2. Using the MAC Address of the HUB, set the IP, Subnet Mask and Gateway IP (optional) of HUB. Click **Send**.

3. Add the HUB to the list using the **Add** button. Click **OK**.

4. Save the list using the **Save** button.

Repeat Steps 1 through 4 for additional HUBs.

5. When all HUBs have been added, transfer the **vnc.cfg** file to the HMI using a web browser.

6. Reboot the HMI by cycling power.
Appendix I: Updating the HMI & HUB via USB

Download the firmware and save it to a location of your choice.
Launch the firmware program and select **Run**. Click **Yes** at the security screen pop-up and click **Next** on the Welcome screen.

Insert a USB memory device into your PC, select **Create an .img file for upgrade via USB device** and click **Next**. Select **Browse**, select your USB drive, click **OK**, then click **Next**.

Accept the license agreement and click **Next**. Click **Finish** when the installation is complete.
Appendix I: Updating the HMI & HUB via USB

Remove the USB device from our computer and plug it into the HMI

On the controller screen, touch the More... button and select the Apps button. Select the Utilities button.

![Image](image1.png)

Scroll through the list, select Firmware Upgrade, then press the Do Function button. Select OK to Upgrade the controller firmware. Select Upgrade and press OK. Firmware update complete for the HUB.

![Image](image2.png)

**Update the HMI**

On the controller screen, touch the More... button and select the green back arrow button. Press the red utility icon and select firmware Upgrade (version) and then Do Function. Firmware update on the HMI is complete.

![Image](image3.png)
Appendix J: Updating the HMI & HUB From a PC via Ethernet

**Updating the IJ4000-HMI Controller Firmware**

Step 1: Download the latest version of Firmware.
Step 2: Disconnect the Ethernet cable that runs from the IJ4000-HUB to the IJ4000-HMI at the HMI.
Step 3: Connect to the IJ4000-HMI from a PC using an Ethernet crossover cable.
Step 4: Run the IJ4000 firmware upgrade program.
Step 5: When the upgrade is complete, disconnect the Ethernet cable from the PC and reconnect to the IJ4000-HMI.

**Updating the IJ4000 Connection HUB Firmware**

Step 1: Download the latest version of Firmware.
Step 2: Disconnect the Ethernet connected to the IJ4000-HMI and plug it into the PC.
Step 3: Run the IJ4000 firmware upgrade program.
Step 4: When the upgrade is complete, disconnect the Ethernet cable from the PC and reconnect to the IJ4000-HMI.
### Major Components

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<th>Item</th>
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<th>Description</th>
<th>Item</th>
<th>Kit No.</th>
<th>Description</th>
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<td>IJ4000-HMI, Controller</td>
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## Service Parts

### Print Head Cables

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<td>Cable, IJ4000 Connection HUB to Print Head, 10’</td>
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### Display, Power Supply, and PCBs

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<tr>
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<td>Kit, Replacement, CPU, IJ4000-SS</td>
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<td>3</td>
<td>5760-392</td>
<td>Kit, I/O Board</td>
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<td>Kit, Replacement &amp; upgrade, Power Supply, IJ4000 Hub</td>
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<td>Kit, Replacement, Impulse Jet Interface Board</td>
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<td>6</td>
<td>5765-381</td>
<td>Kit, Replacement, CPU</td>
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</table>

![IJ4000 Stainless Steel](image1.png)

IJ4000 Stainless Steel

![IJ4000 Connection HUB](image2.png)

IJ4000 Connection HUB