**Warranty:**

The Valve Jet system, including all components unless otherwise specified, carries a limited warranty.

The inks and conditioners used with the Valve Jet system carry a limited warranty.

For all warranty terms and conditions, contact the manufacturer for a complete copy of the Limited Warranty Statement.
# Integrated Valve

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Section 1: Safety and Ink Usage

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.

Wear safety goggles when performing the procedure described!

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.

It is extremely important to:

• Clean up all spills with the appropriate solvents immediately and dispose of all waste according to local and state regulations.
• Wear safety glasses and protective clothing, including gloves, when handling all inks and conditioners.
• Store inks and solvents under the recommended conditions found on the MSDS (Material Safety Data Sheet).
Contents:

- Print Head, 12 Dot Valve Jet
- Handheld Controller
- Pressurized Ink Can Delivery System
- Bracketry Kit
- Power Supply, 15 V
- Power Supply Bracket
- Power Cord
- Serial Cable
- Tubing
- Software

* Ink not included

TYPICAL INSTALLATION

OPTIONAL BULK INK SUPPLY
Step 1: Assemble Bracketry

Step 2: Assemble Bracketry to Conveyor
Step 3: Assemble Print Head and Power Supply to Bracketry

Ensure bar is behind front face of print head
Step 4: Install Pressurized Ink Can Supply and Controller

CAUTION: DO NOT INSTALL PRESSURIZED INK CAN YET. All tubing connections must be made first.
Step 5: Adjust Print Head to Substrate

Adjust print head vertically to meet requirement.

Adjust print head horizontally to set print gap.

.1" (2.5 mm) Print Gap Recommended

Adjust vertically with either of these two brackets

Adjust the print head to the substrate with this bracket
Step 6: Install Tubing

**CAUTION: DO NOT INSTALL PRESSURIZED INK CAN YET. All tubing connections must be made first.**

1. Install / route tubing per diagram below.
2. Insert quick-disconnect fittings at each open end of the tubing. One quick-disconnect fitting is supplied with the pressurized ink can system, and an additional fitting is supplied with each print head.
3. Remove plug from the exit port of the regulator.
4. Insert the tube / quick-disconnect fitting into the appropriate open ports on the ink supply and print head(s).
Step 7: Electrical Connections

CAUTION: Power should be disconnected from the controller prior to connecting or disconnecting any external device, including print head daisy chain cables or ancillary cables for a photocell, encoder, etc. Electrical arcing may occur if external cabling is connected or disconnected while power is supplied to the unit.

After making all other electrical connections, connect the included power supply to the AC mains (100V - 240 VAC). The controller will turn on and an LED light will show up on all print heads. After power and boot up, the controller will start on the home screen.
Step 8: Bleed Ink Lines and Print Heads

Insert can of ink into opening of Pressurized Ink Can supply down to the receiver. Rotate can clockwise until resistance is felt. System is now pressurized with ink.

**CAUTION:** Ensure that the shutoff valve on the effluent bottle system is closed prior to connecting to the last print head in the daisy chain.

Bleed Steps:

1. Insert effluent bottle system quick-disconnect fitting on exit (bleed) port of the last print head in the daisy chain.
2. Crack open the shutoff valve and observe ink flow through the ink lines from the pressurized ink supply. Ink will fill the lines.
3. When ink passes through this print head and out of the bleed port and into the effluent bottle, close the shutoff valve. Note that upstream print heads will not be bled.
4. Disconnect the effluent bottle system and connect to the next print head upstream in the daisy chain.
5. Again, crack open the shutoff valve until ink flows into the effluent bottle.
6. Repeat the print head bleed steps to all remaining print heads.
7. Hold and absorbent towel over the orifice plate at the front of any print head and press the purge button on the rear of the print head until ink is observed on the towel.
8. Repeat step 7. on all other print heads.

- Remove shipping tube / cap from the ink canister inlet side.
- Effluent Bottle
- Purge Button
- orifice Plate
- Bleed / Exit Port
- Ink Can Receiver
- CLOSE SHUTOFF VALVE
- OPEN SHUTOFF VALVE
Step 9: Configure the Print Head via Controller

Ensure the home screen menu is present on the controller via the **Hide Menu / Show Menu** button, and then press the **Control Panels** button.

Press the **System Setup** button. On the **Print Heads** page, press the **Redo Print Head Setup** button. Select the desired direction.

Set the number of print heads and identify their positions relative to the controller.

Print head setup complete. Next, select the Encoder tab, and ensure the fixed speed encoder type is selected. Touch the speed input box and type in the line speed. If more precise line speed is desired, then an optional external encoder is available.

**Fixed Speed:** User types in the desired line speed

**Optional External Encoder:** Line speed measured by an externally mounted encoder and connected to the last print head in the daisy chain via an adaptor cable. See “Optional Equipment” on page 49.
Step 10: Create a Message

From the home screen, select the **Messages** button and then the **New** button to enter the message editor.

Create and save the message, and then exit the message editor.
**Step 11: Print a Message**

From the home screen, press the **Print** button.

Select the desired message to print, and press the **Print It** button.

The message will print on the next photocell trigger.
Section 3: Handheld Controller

Keypad

ESC (Escape):
- Closes the current window, a dialog box, or menu.
- Restores the original contents of any input entry box, if Enter has not been pressed.

Arrow Keys:
- Shifts focus between screen controls.
- Moves highlighted fields or the cursor around in the Message Editor.

Tab:
- Shifts focus between screen controls.
- Shifts focus between fields in the Message Editor.

Backspace in Message Editor:
- Normal functionality as QWERTY keyboard.
- Deletes a highlighted field.

Ctrl (Control) in Message Editor:
- Amplifies the movement of the arrow keys.
- Holding the Ctrl key while pressing the Enter key at the end of a text line enables paragraph functionality.
- Ctrl + C copies a highlighted field and has comparable behavior to a personal computer.
- Ctrl + X cuts a highlighted field and has comparable behavior to a personal computer.
- Ctrl + V pastes a previously copied or cut field and has comparable behavior to a personal computer.

Function Keys:
- F1 / F2 keys scroll the screen left and right on the Home screen and the Message Editor, respectively.
- The F4 / F8 keys pull up the extended characters dialog inside the Message Editor.
Home Screen

Message Window:
- Displays the current print message.
- Updated approximately every seven seconds, so it likely will not show each print.
- Long print messages can be viewed by using the F1 and F2 keys to scroll the message left and right, respectively.
- White or beige bars represent a print head in the daisy chain and are identified by their respective numbering.
- 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. Additionally, items in the main menu vary from one task to the other.

Task Print / Pause Button:
- Starts 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 completes printing.
- If the Play button is pushed, print will resume on the next product detected.
Quick Print Menu Button:

- Allows one to access the **Print** dialog box directly, even with Restricted User Access enabled.
- Simply select the desired message and press the **Print It** button. The message will print at the next photocell trigger.

Counter:

- Count codes are allowed, but one must select the "Print" button to adjust the count.

Variable Field:

- Variable information fields are allowed, but one must select the "Print" button to change the information being printed.

Ink Status:

- Reports the ink status as OK for pressurized ink cans only.
- Reports the ink status as Low / Empty for pressurized ink cans only.

**NOTE:** The optional bulk ink system does not report ink status through the controller. Bulk ink status is reported through its beacon.
Main Menu

Main Menu Collapsed

Main Menu Expanded

Print Menu

Print Menu Button

Cancels print immediately after a confirmation popup dialog box

Closes this menu immediately

NOTE: The Variable Field button is not available. In order to update a variable field, reselect the message to Print.

Messages Dialog & the Message Editor

Messages Dialog

Message List

Selected Message

Opens Selected Message in the Editor

Returns to Home Screen

Deletes a Selected Message

Starts a new message in the Editor

Fires all jets for a short period of time on the selected print head

Returns to Home Screen

Section 3: Handheld Controller

Message Editor

File Menu

- Reverts message to the last saved
- Clears contents of message editor
- Calculates estimated ink usage for the contents of the editor
- Prints the contents of the editor
- Exits the editor to the Home screen
- Quick save of current message

Prints the contents of this editor on the next photocell trigger

Message display area

Moves from field to field in the editor display area

Calculates estimated ink usage for the contents of the editor

Prints the contents of the editor

Exits the editor to the Home screen
Message Editor continued: User Defined Time Codes

When User Defined selected, Define Time Code button appears.

Tabular format: codes printed taken from table. Use default codes (default Hour codes shown) or edit table to suit your requirements.

Sequential format: minute code shown. Minute 00 = AA, 01 = AB, 02 = AC, etc.

Periodic format: example above illustrates a shift code implemented by using a periodic quarter hour code. 'A' prints from 23:30 - 06:59, 'B' from 07:00 - 15:29, and 'C' from 15:30 - 23:29.
Message Editor continued: User Defined Date Codes

When User Defined selected, Define Date Code button appears.

The Fortnight code type is available for the Tabular format only.

Sequential format: in example above, Sunday = 'A', Monday = 'B', etc.

Tabular format: codes printed taken from table. Use default codes (default Day codes shown) or edit table to suit your requirements.

Periodic format: example above illustrates a quarter year code implemented by using a periodic month code. 'Q1' prints from Jan 1 - Mar 31, 'Q2' from Apr 1 - Jun 30, etc.
Message Editor continued: Product Counts, Variable Fields, Logos

**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 though COM1 or COM 2 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.

**Field Properties**
- Print up side down
- Print dot mode

**Maximum 9-digit count**

**Scroll through logo images or select from list**
Control Panels Menu

System Setup:

NOTE: The **Product sensor offset** is only available when **External product sensor** is selected on the **Task Options** tab. NOTE: Product sensor offset equals 2.7 in (68.6 mm) if mounted to the side of the print head.

Optional External Encoder:
Line speed measured by an externally mounted encoder and connected to the last print head in the daisy chain via an adaptor cable. See “Optional Equipment” on page 49.

Fixed Speed:
Enter the desired line speed

Optional externally mounted photocell: Connect to the last print head in the daisy chain via an adaptor cable. See “Optional Equipment” on page 49.
Network:

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.

Regional Settings:

User Access:

Does not apply to Serial print heads

Padlock symbol indicates function is password protected
Utilities:

After performing the Restore default configuration function, the serial port must be reconfigured for a serial print head.

**Time & Date Setting Screens**

[Images of Time & Date Setting Screens]
Status Screen

Note: This set of status screens represents two print heads setup in a daisy chain. The first print head is properly connected and detected. The second print head has not been properly connected to the daisy chain.

One button for each print head in the daisy chain. Press button to display status for that print head & cartridge.

Right hand photocell (as seen from front of print head) covered and the left is not

Printing is enabled

Ink can - OK

Date (Y-M-D) and time from print head

Print head firmware version number

Indications that head 2 is improperly connected or not communicating with the controller

No date & time

No print head firmware version number

Controller / GUI version number

List of fonts and logos on the print head

Font and logo list is empty
Section 4: Print Head Functionality

Home Screen:

- LED Power Indicator
- Enter Button: executes a command
- Up Arrow: Scrolls up a list or increases pulse width
- Down Arrow: Scrolls down a list or decreases pulse width

Pressure Screen:

- Pressing the Enter button from the Home Screen displays the ink pressure in psi on the inside of the print head (e.g. 7.0 psi)
- After 30 seconds, the display returns to the Home Screen.

Print Head Purge:

- Press and hold the Purge button for 1 second at the above Pressure screen and all channels will fire dots for 2 seconds if the Purge button is released.
- Holding the Purge button continuously will fire all channels until released.
- If the Enter button is pushed from the Pressure screen, then an individual channel is displayed (e.g. channel 1).
- Individual channels can be selected using the up and down arrows. Pressing the Purge button will only eject ink for the individual channel selected.
- To return to the Home screen, press the down arrow until the "Pr" (Pressure) screen is reached, and then press the Enter button.

Pulse Width (Printed Dot Size) Adjustment:

- From the Home or Pressure screen, simultaneously press the Up an Down arrows. The last active channel will display (e.g. channel 1).
- Select the desired channel to change the pulse width using the Up and Down arrows.
- Press the Enter button.
- The current pulse width value is displayed (e.g. 41).
- Use the Up and Down arrows to increase or decrease the pulse width.
- Press the Enter button to save the change. If the Enter button is not pressed within 30 seconds, then the pulse width is not changed.
Section 5: Maintenance & Shutdowns

The following are the recommended maintenance procedures to keep the ink jet system printing cleanly and efficiently.

System Maintenance

Intermittent (as required):
5. Be sure the photosensor is clean and free of debris.
6. Be sure the O-rings on the encoder wheel are present and not worn (cracked and/or chipped).
7. Be sure the nuts and bolts holding the bracketry in place remain tight.
8. Equipment may be cleaned utilizing the appropriate conditioner for the ink. See “Consumables” on page 47.

CAUTION: Do not spray conditioner on, or wipe off, exposed electrical connections.

Annually:
1. Replace encoder O-rings (refer to “Optional Equipment” on page 49).
2. Recalibrate Touch Screen.

Print Head Maintenance

Daily Startup

Wear safety goggles when working with industrial inks or solutions!
1. Clean print head faceplates with the appropriate conditioner for your ink system. Spray conditioner on a lint-free wipe and wipe the faceplate in a circular motion to remove ink from the orifices. Maintenance sprays are conveniently packaged in pressurized cans. See “Consumables” on page 47.
2. Inspect lines and connections for leaks. Make repairs if needed.
3. Inspect all electrical connections and cabling for damage, and replace as necessary.

Preventative Maintenance at 2000 Hours

- Thorough cleaning of print head
- Solenoid and pulse-width adjustment for optimal dot size
Shutdowns of Seven Days or Longer

For extended shut down periods, it is recommended that the print head(s), regulator(s) and the optional ink delivery system be thoroughly flushed with appropriate conditioner. In order to perform this procedure, an adequate supply of conditioner and an additional cap assembly for the optional ink delivery system are required. Refer to “Consumables” on page 47.

1. Remove the ink.
2. Install the can of conditioner / solvent.
3. Connect an effluent bottle system as discussed in “Section 2: Quick Start”.
## Section 6: Troubleshooting

### NO PRINT

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>No print head power / red LED on rear of print head</td>
<td>• Power Supply</td>
<td>• Check power supply light indicator.</td>
</tr>
<tr>
<td></td>
<td>• AC Source</td>
<td>• Check for AC power source between power supply input limits.</td>
</tr>
<tr>
<td>Pressure is low indicated by an &quot;Ink Low&quot; or &quot;Ink Out&quot; on the controller</td>
<td>• Ink can is empty</td>
<td>• Replace with new can of ink.</td>
</tr>
<tr>
<td></td>
<td>• Regulator is set low or malfunctioning</td>
<td>• Refer to “Ink Regulator Adjustment” on page 34.</td>
</tr>
<tr>
<td>Print head purges but won’t print desired message</td>
<td>• No print message on print head</td>
<td>• Ensure the desired print message appears on the controller home screen. If not, reselect message to print.</td>
</tr>
<tr>
<td></td>
<td>• Controller or PC software not configured for Serial Print Head</td>
<td>• Configure task to serial print head. Refer to “Appendix B: Serial Port Setup” on page 40.</td>
</tr>
<tr>
<td></td>
<td>• Encoder Malfunction</td>
<td>• Ensure encoder is installed and plugged into the last print head in the daisy chain.</td>
</tr>
<tr>
<td></td>
<td>• Product not triggering phot cell.</td>
<td>• Ensure the product is within 1/4” of the front face of the print head.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If an external photocell is installed, then validate the setting from the Control Panels, System Setup, Task Options tab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure print head photocells are clean.</td>
</tr>
</tbody>
</table>

### POOR PRINT QUALITY

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible Cause</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print is splattered or excessive satellites</td>
<td>• Print head is mounted too far away from the substrate</td>
<td>• Adjust the print head to within specifications. See “Step 5: Adjust Print Head to Substrate” on page 11.</td>
</tr>
<tr>
<td></td>
<td>• Pulse width(s) are set too high</td>
<td>• See “Print Head Purge:” on page 30 of “Section 6: Troubleshooting”.</td>
</tr>
<tr>
<td></td>
<td>• Print head pressure set too high</td>
<td>• Refer to “Ink Regulator Adjustment” on page 34.</td>
</tr>
<tr>
<td>Dot columns are out of alignment</td>
<td>• Product speed and print speed are not matched</td>
<td>• From the controller Home Screen, press the Control Panels button, System Setup button, the Encoder tab, and then make sure the Fixed Speed matches the actual line speed.</td>
</tr>
<tr>
<td></td>
<td>• External encoder malfunction</td>
<td>• Ensure the encoder wheel is properly tracking the belt and not bouncing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensure encoder o-rings are not worn, cracked, or broken.</td>
</tr>
<tr>
<td>Dot size variation or missing dots</td>
<td>• Regulator is set low or malfunctioning</td>
<td>• Refer to “Ink Regulator Adjustment” on page 34.</td>
</tr>
<tr>
<td></td>
<td>• Pulse width set too high or low</td>
<td>• Refer to “Pulse Width (Printed Dot Size) Adjustment:” on page 30.</td>
</tr>
<tr>
<td></td>
<td>• Clogged or covered orifices</td>
<td>• Clean the orifice plate (See “Daily Startup” on page 31), and broach any orifice as necessary. See “Tools and Maintenance” on page 49 for broach kit.</td>
</tr>
<tr>
<td>Static seepage (ink seeping out of orifices when not printing)</td>
<td>• High ink pressure</td>
<td>• Refer to “Ink Regulator Adjustment” on page 34.</td>
</tr>
<tr>
<td></td>
<td>• Incorrect pre-load</td>
<td>• See “Adjusting Solenoid Pre-load” on page 34.</td>
</tr>
<tr>
<td>Dynamic seepage (ink seeping out of orifices during print)</td>
<td>• Pulse width set too low</td>
<td>• Refer to “Pulse Width (Printed Dot Size) Adjustment:” on page 30.</td>
</tr>
<tr>
<td></td>
<td>• Low ink pressure</td>
<td>• Refer to “Ink Regulator Adjustment” on page 34.</td>
</tr>
<tr>
<td></td>
<td>• Incorrect pre-load</td>
<td>• See “Adjusting Solenoid Pre-load” on page 34.</td>
</tr>
<tr>
<td></td>
<td>• Expired ink</td>
<td>• Replace ink and bleed new ink through system (see “Step 8: Bleed Ink Lines and Print Heads” on page 14).</td>
</tr>
</tbody>
</table>
Ink Regulator Adjustment

NOTE: The regulator installed inside the pressurized ink can system comes from the factory adjusted to the correct pressure. However, occasionally it may need to be adjusted for a change in pressure or has drift issues. DO NOT adjust the regulator for the purpose of increasing any or all dot sizes. The regulator should always be set to 7.0 +/- .3 PSI while not printing.

1. Remove the controller from the Pressurized Ink Can enclosure and place on a nearby stable object so it won’t be damaged.
2. Remove the four screws holding the enclosure cover in place. The regulator is now exposed. Loosen the screw locking the regulator cap in place.
3. Connect an effluent system bottle to a nearby print head bleed port (see “Step 8: Bleed Ink Lines and Print Heads” on page 14) and ensure the shutoff valve is closed.
4. Open the shutoff valve and immediately turn the regulator knob clockwise fully (regulator full pressure).
5. Immediately turn the regulator knob counterclockwise fully until flow is shutoff.
6. Repeat steps 4. through 5. two more times.
7. Close the shutoff valve and remove the effluent bottle.
8. Adjust the operating pressure to 7.0 +/- .3 psi. Press the purge button on the rear of the print head. Observe the pressure on the rear of the print head after it has stabilized.
9. Make small adjustments until the correct operating pressure is achieved. The purge button must be pushed after each regulator adjustment.
10. If the regulator pressure never stabilizes, then it must be replaced. Refer to “Appendix H: Part Numbers” on page 47.

Adjusting Solenoid Pre-load

1. If any of the orifices are seeping statically (not printing) or dynamically (while printing), then the appropriate channel pre-load may need to be adjusted.
2. Ensure the print head is powered and ink line connected.
3. Remove the enclosure cover, exposing the solenoid mounting block and adjustment nuts.
4. The regulator pressure should be set to 7.0 +/- .3 psi while not printing. Refer to the previous section, “Ink Regulator Adjustment” if it is not.
5. Thoroughly clean the front, orifice, plate with a clean non-abrasive cloth and maintenance spray, and then dry.
6. Hold a clean and absorbent cloth up to the front face of the print head and press the purge button until all channels fire.
7. Wipe the orifice plate with a clean cloth and maintenance spray. Dry the orifice plate.
8. Observe the orifice plate for ink seepage over 30 seconds. Per the below diagrams, identify which orifice is leaking and its associated solenoid adjustment nut.
9. Turn the solenoid nut a very small amount counterclockwise (more preload) with a solenoid adjustment tool (see “Appendix H: Part Numbers”).
10. Repeat steps 6. through 9. until the seepage stops.
11. If there are any nuisance valves that do not stop seeping, then the print head will have to be returned to the factory for refurbishment.
Appendix A: Specifications

System

A typical system consists of the above components:
- Controller
- Print Head
- Pressurized Ink Can System
- Power Supply and Mounting Bracketry
- System Mounting Bracketry

* Ink purchased separately

NOTE: The system mounting bracketry is shown in a typical configuration. Bracketry and print head orientation is left to the user to fit the application.

Typical Print Head and Bracketry
Print Head:

**Weight**
5.1 lb (2.3 kg)

**Enclosure**
Anodized Aluminum and Stainless Steel

**Operating Pressure**
7.0 psi (48.3 kPa)

**Electrical**
15 VDC input from controller

**Print Speed (Print Resolution Dependent)**
Up to 650 ft/min (200 m/min)

**Vertical Print Resolution**
24 dpi

**Horizontal Print Resolution**
Varies up to 33 dpi

**Throw Distance**
Recommended Gap: .1 in (2.5 mm) or less
Maximum Gap: .5 in (12 mm)

**Print Head Orientation**
Any

**Environment**
Ambient operating temperature: 50°F to 104°F (10°C to 40°C)
Operating humidity: 10% - 90% non-condensing

**Ink Type**
- Porous (Water Based)
- Non-Porous (Solvent Based)

**Number of Print Fields**
Maximum 2 lines of print per print head at any given point. Each print line may have at least three 52-character print fields; number of fields per line increases as the number of characters per field decreases.

**File Storage**
**Sectors:** Twenty-seven 256 kB sectors per print head are available for font and logo file storage. Files larger than 256 kB use multiple sectors. Factory installed fonts occupy 9 of the 27 sectors.

**Fonts:** Nine factory installed; 5s (5 dot tall single), 7sf (7 dot tall single, fixed character spacing), 7b (7 dot tall bold), 9s (9 dot tall single), 9b (9 dot tall bold), 9bf (9 dot tall bold, fixed character spacing), 12s (12 dot tall single), 12b (12 dot tall bold), and 18b (18 dot tall bold).

**Bitmap (logo) files:** 12 dots tall max (.5 in / 12.7 mm); 5000 columns (dots) wide max (200 in / 5.1 m at 25 dpi).
Handheld Controller with Valve Jet Technology:

**Weight**
1.8 lb (0.82 kg)

**User Interface**
Type: Graphical User Interface
Keyboard: 70-key, QWERTY style, elastomeric keyboard
800 X 480 color LCD with touch screen, 7.0" (177.8 mm) diagonal

**Fonts**
5s (5 dot tall single), 7sf (7 dot tall single, fixed character spacing), 7b (7 dot tall bold), 9s (9 dot tall single), 9b (9 dot tall bold), 9bf (9 dot tall bold, fixed character spacing), 12s (12 dot tall single), 12b (12 dot tall bold), and 18b (18 dot tall bold)

**Storage**
512 MB flash memory

**Print Speed**
Up to 650 ft/min (200 m/min)

**Maximum Lines of Print**
2 per print head

**Print Fields per Line**
At least (3) 52-character fields per print line; more when fields have less than 52 characters.

**Maximum Product Length**
200 in (5.1 m)

**Maximum Repeat Print Distance**
200 in (5.1 m)

**Maximum Number of Print Heads Per Controller**
4 (Up to 2 print heads per COM port)

**Ports**
(2) RS-232 ports, (1) 10/100Base-T Ethernet port, (1) USB port

**Electrical**
15 VDC from power supply to controller
Power Supply: 90-260 VAC, 50/60 Hz, 1.5A max. (per power supply)

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

**Maximum Distance Between Controller and Farthest Print Head in Daisy Chain**
20 feet (6.1 m)
Pressurized Ink Can System

**Weight**
2.7 lb (1.2 kg)

**Enclosure**
Stainless Steel

**Mounting Orientation**
3 sides

**Ink Capacity**
13 fl oz (385 mL) screw top cans

**Regulator**
Factory set to 7.0 psi (48.3 kPa)

**Maximum Number of Print Heads Capacity**
4

NOTE: For more print heads, an optional pumping ink delivery system is available. See “Appendix H: Part Numbers” on page 47.
System Interconnect Diagram

Handheld Controller CPU Diagram

Print Head Diagram
Appendix B: Serial Port Setup

Ensure the home screen menu is present via the Hide Menu / Show Menu button, and then press the Control Panels button.

Press the System Setup button, and then the Serial Ports tab.

Select the device type under the Function heading. It may be set to "None". Scroll down the list and select "Serial Print Head - IV". Ensure the baud rate is set for 57600 and press the OK button to exit the Serial Port Setup screen.
Appendix C: File System Backup and Restore

Backup

1. Insert a USB jump drive into one of the USB ports on the controller.
2. From the home screen touch Control Panels then Utilities.
3. From the Utilities screen select Backup.
4. Enter a file name at the Backup dialog popup. "backup" is the default name.
5. From the System Utilities screen select Safely remove USB memory.

Restore

1. Insert a USB jump drive into one of the USB ports on the controller.
2. From the home screen touch Control Panels then Utilities.
3. From the Utilities screen select Restore.
4. Select the appropriate backup file from the Restore dialog popup.
5. From the System Utilities screen select Safely remove USB memory.
Appendix D: Configuring a PC to Communicate with the Handheld

Window 7®

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

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


4. Click the 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 E: Creating Logo Files

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.

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.)

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 Monochrome Bitmap (bmp), and then Resize to the appropriate height (12 dot maximum for one print head).
Appendix F: Controller and Print Head File Management

File Manager

NOTE: A .bmp (logo) or .fnt (font) file must reside on both the controller and print head(s) to be correctly selected, displayed, and printed. Ensure the file names are less than 15 characters long.

1. If logo or font files are to be transferred, place them on a portable USB storage device in a convenient location and insert it into the controller USB port.
2. Touch the Control Panels button on the Home screen, 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 the controller operation.
The Task:1 and / or Task:2 folders contain all font and logo files resident on the print head(s) in that daisy chain.
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. In addition, however, files are not allowed to be copied from any task (the print heads).
Transferring Logo and Font Files

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 usbo folder and press the Open Folder icon button.
3. Navigate to a previously saved file, highlight the file and press the Copy icon button. The file is now stored in temporary memory. In this example, a logo file will be transferred.
4. Press the Close Folder, Go Up One Level icon button until the File manager selection screen is present.
5. Select the home icon, press the Open Folder button, and highlight the bmps folder. Store logos in the bmps folder.

6. Press the Paste icon button. The logo (bmp file will appear in the bmps folder.
7. Because the file is still resident in memory, it can be easily transferred to the print head(s). Navigate back to the file manager home screen. Highlight the Task:1 or Task:2 icon and press the Open Folder icon button.
8. Finally, press the Paste icon button, and the file appears on Task:1 or Task:2. If the file is desired on the opposite task (daisy chain), navigate back and repeat the process. Note that the available fonts are listed in the Task folder too.
9. When all desired file transfers are complete, press the Exit button.
10. From the System Utilities menu, press the Safely remove USB memory button, and the Done.
11. The file is now available for message creation in the message editor.
Appendix G: Communicating Directly to the Print Head

The print heads can be controlled by direct serial communication. Refer to the serial protocol document 5780-316N when communicating directly to the print head without the use of a controller or the pc GUI software interface.
Appendix H: Part Numbers

System

<table>
<thead>
<tr>
<th>Item</th>
<th>Kit No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5770-010P</td>
<td>Pressurized Ink Can System for Porous Inks</td>
</tr>
<tr>
<td>2</td>
<td>5770-010NP</td>
<td>Pressurized Ink Can System for Non-Porous Inks</td>
</tr>
<tr>
<td>3</td>
<td>5770-012P500</td>
<td>Valve Jet Print Head with Bracketry, Plumbing, and Serial Cable for Porous Inks</td>
</tr>
<tr>
<td>4</td>
<td>5770-012N500</td>
<td>Valve Jet Print Head with Bracketry, Plumbing, and Serial Cable for Non-Porous Inks</td>
</tr>
<tr>
<td>5</td>
<td>5780-015V</td>
<td>Handheld Controller</td>
</tr>
<tr>
<td>6</td>
<td>5780-236D</td>
<td>Power Supply and Bracketry</td>
</tr>
</tbody>
</table>

Consumables

Inks, Conditioners, and Maintenance Sprays

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Package</th>
<th>Shelf Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>5750-242</td>
<td>Conditioner Flush, Porous, Cans</td>
<td>2 / case</td>
<td>1 year</td>
</tr>
<tr>
<td>5750-243</td>
<td>Ink, Porous, Black, Cans</td>
<td>6 / case</td>
<td></td>
</tr>
<tr>
<td>5750-249</td>
<td>Maintenance Spray, Porous, Cans</td>
<td>2 / case</td>
<td></td>
</tr>
<tr>
<td>5750-650</td>
<td>Conditioner Flush, Non-Porous, Cans</td>
<td>2 / case</td>
<td></td>
</tr>
<tr>
<td>5750-651</td>
<td>Ink, Non-Porous, Black, Cans</td>
<td>6 / case</td>
<td></td>
</tr>
<tr>
<td>5750-657</td>
<td>Maintenance Spray, Non-Porous, Cans</td>
<td>2 / case</td>
<td></td>
</tr>
</tbody>
</table>

* Optional inks available with optional bulk ink supply.

Service Parts

12 Dot Valve Jet Print Head

<table>
<thead>
<tr>
<th>Item</th>
<th>Kit No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5770-239P500</td>
<td>Print Head Replacement, Porous Ink</td>
</tr>
<tr>
<td>2</td>
<td>5770-239N500</td>
<td>Print Head Replacement, Non-Porous Ink</td>
</tr>
<tr>
<td>3</td>
<td>5770-242P</td>
<td>PCB Replacement for Porous Print Heads (all boards included)</td>
</tr>
<tr>
<td>4</td>
<td>5770-242N</td>
<td>PCB Replacement for Non-porous Print Heads (all boards included)</td>
</tr>
<tr>
<td>5</td>
<td>5770-243</td>
<td>Internal Tubing and Fitting Replacement (not shown)</td>
</tr>
<tr>
<td>6</td>
<td>5770-451-010</td>
<td>Cable, Print Head, 10’</td>
</tr>
</tbody>
</table>
### Handheld Controller

<table>
<thead>
<tr>
<th>Item</th>
<th>Kit No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>5780-015</td>
<td>Handheld Controller</td>
</tr>
<tr>
<td>2</td>
<td>5780-232</td>
<td>Color Display Replacement</td>
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<tr>
<td>3</td>
<td>5780-233</td>
<td>CPU PCB Replacement</td>
</tr>
</tbody>
</table>

### Bracketry

<table>
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<tr>
<th>Item</th>
<th>Kit No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>2464-561</td>
<td>X-Y Linear Print Head Adjustment, Tool-less</td>
</tr>
<tr>
<td>2</td>
<td>5760-821</td>
<td>Print Head, Pressurized Ink Can, and Power Supply Mounting</td>
</tr>
</tbody>
</table>
Optional Equipment

Encoder, Photocell, Accessory Hub, and Beacon

<table>
<thead>
<tr>
<th>Item</th>
<th>Kit No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5760-820-IJ</td>
<td>Encoder Assembly with Mounting Bracket &amp; 25’ Cable</td>
</tr>
<tr>
<td>2</td>
<td>5765-206</td>
<td>Encoder O-ring Replacement</td>
</tr>
<tr>
<td>3</td>
<td>5760-383</td>
<td>Photocell</td>
</tr>
<tr>
<td>4</td>
<td>5770IV12DPB</td>
<td>Bulk Ink Delivery System, Domestic (115 VAC), Porous Inks</td>
</tr>
<tr>
<td>5</td>
<td>5770IV12DNB</td>
<td>Bulk Ink Delivery System, Domestic (115 VAC), Non-Porous Inks</td>
</tr>
<tr>
<td>6</td>
<td>5770IV12EPB</td>
<td>Bulk Ink Delivery System, International (230 VAC), Porous Inks</td>
</tr>
<tr>
<td>7</td>
<td>5770IV12ENB</td>
<td>Bulk Ink Delivery System, International (230 VAC), Non-Porous Inks</td>
</tr>
<tr>
<td>8</td>
<td>5780-339</td>
<td>Adaptor Cable, Encoder &amp; Photocell</td>
</tr>
</tbody>
</table>

Tools and Maintenance

<table>
<thead>
<tr>
<th>Item</th>
<th>Kit No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1901-398</td>
<td>Hand Cleaner, Ink (not shown)</td>
</tr>
<tr>
<td>2</td>
<td>5770-244</td>
<td>Broach, Orifice</td>
</tr>
<tr>
<td>3</td>
<td>5750-503</td>
<td>Effluent Bottle Kit</td>
</tr>
<tr>
<td>4</td>
<td>5770-201</td>
<td>Solenoid Pre-load Adjustment</td>
</tr>
</tbody>
</table>