Operations Manual

Thermal Jet Ink Jet System

SoloSeries 45

SoloSeries 90

FOXJET
AN ITW COMPANY

5780-329
Revision K

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Thermal Jet
Ink Jet System
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Ink Cartridge: The SoloSeries has been engineered and designed to work with Foxjet ink cartridges. The SoloSeries' **Smart Level Ink Detection System**, which provides ink level monitoring to ensure complete ink usage and product safety, will not be functional if used with non-Foxjet ink cartridges.

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Warranty:

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

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

For all warranty terms and conditions, contact Foxjet an ITW Company for a complete copy of the Limited Warranty Statement.

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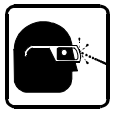
Section 1: Safety and Ink Cartridge Usage

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.

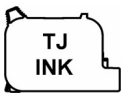
NOTE: (Will be followed by a brief comment or explanation.)

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.

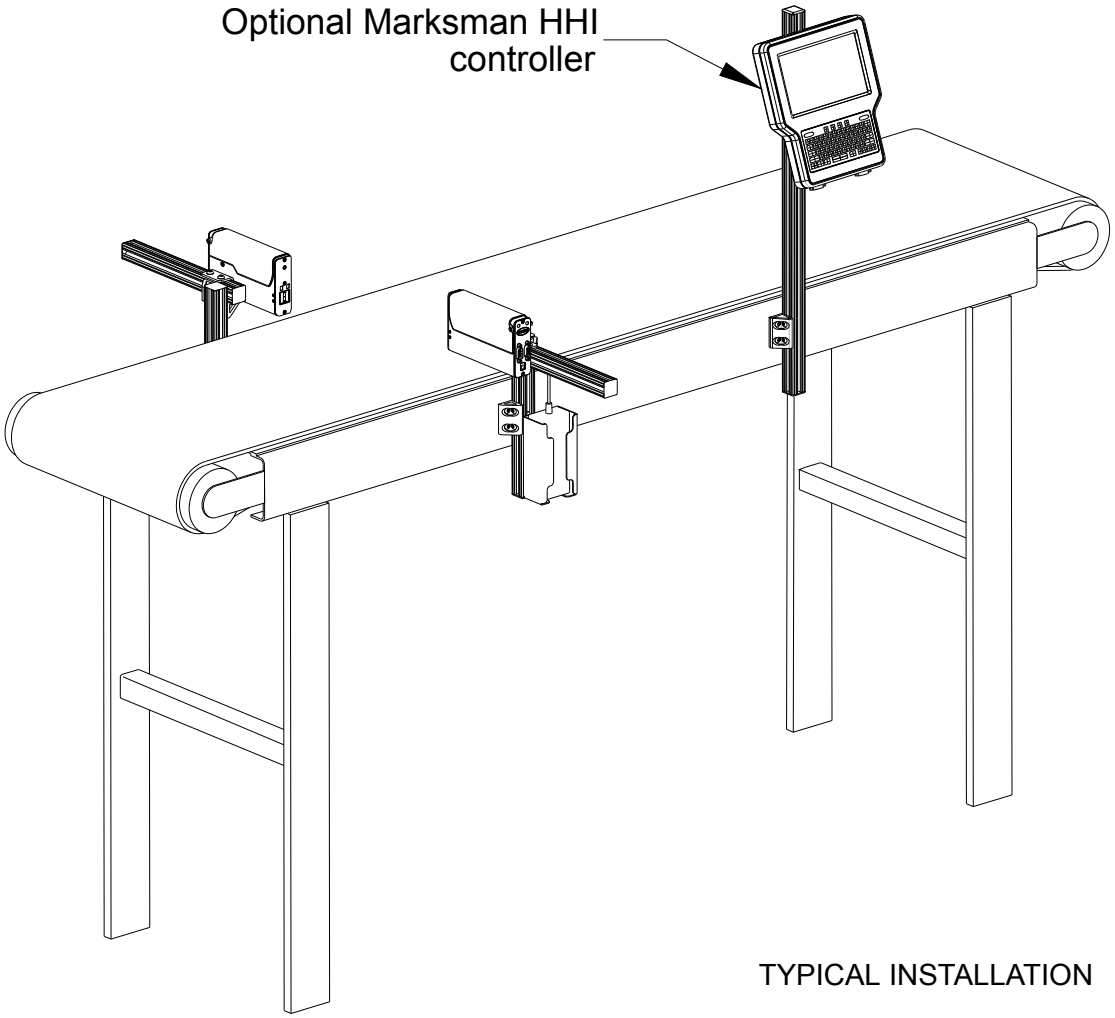
It is extremely important to:

- 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).



Ink Cartridge: The SoloSeries has been engineered and designed to work with Foxjet ink cartridges. The SoloSeriess' **Smart Level Ink Detection System**, which provides ink level monitoring to ensure complete ink usage and product safety, will not be functional if used with non-Foxjet ink cartridges.

Section 2: Quick Start

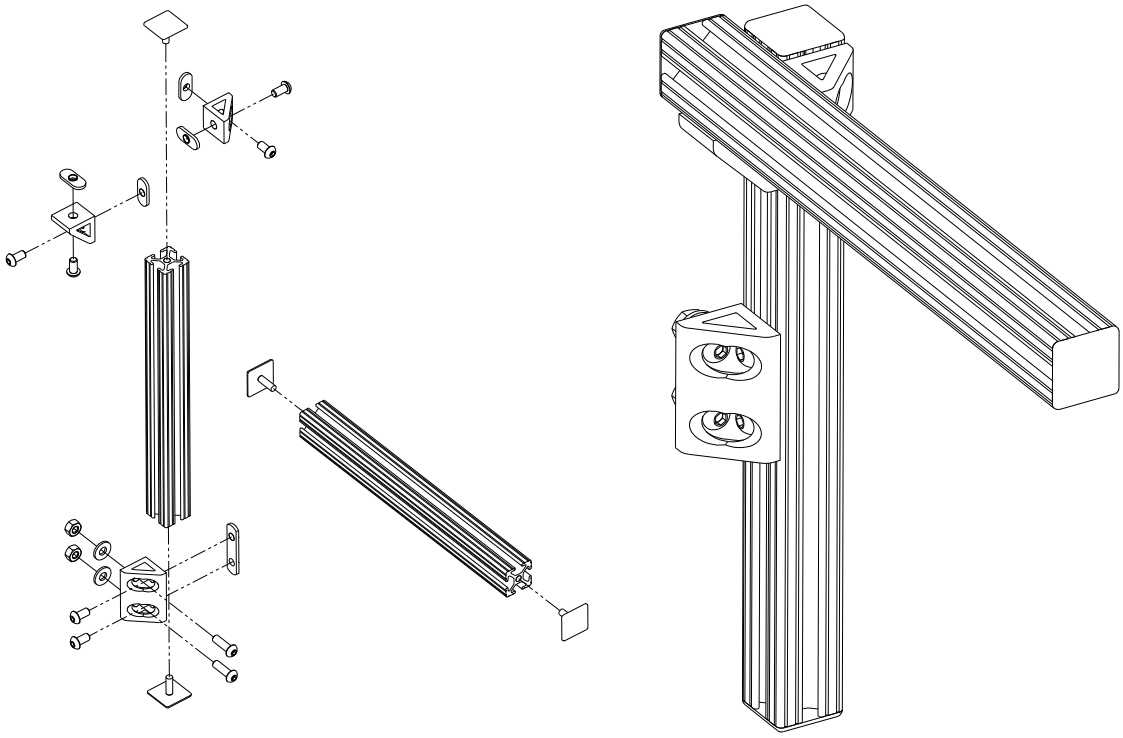


TYPICAL INSTALLATION

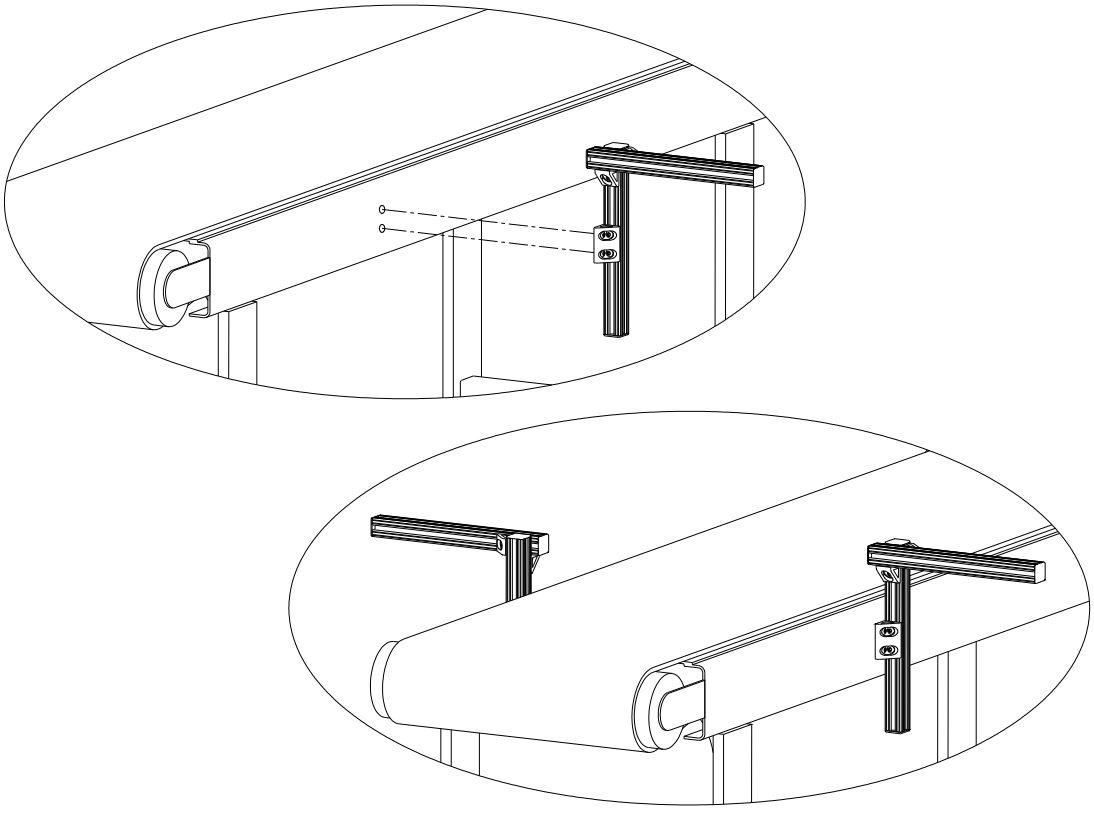
Contents:

- SoloSeries Print Head
- Bracketry Kit
- Power Supply, 15 V
- Power Supply Bracket
- Power Cord
- Software CD

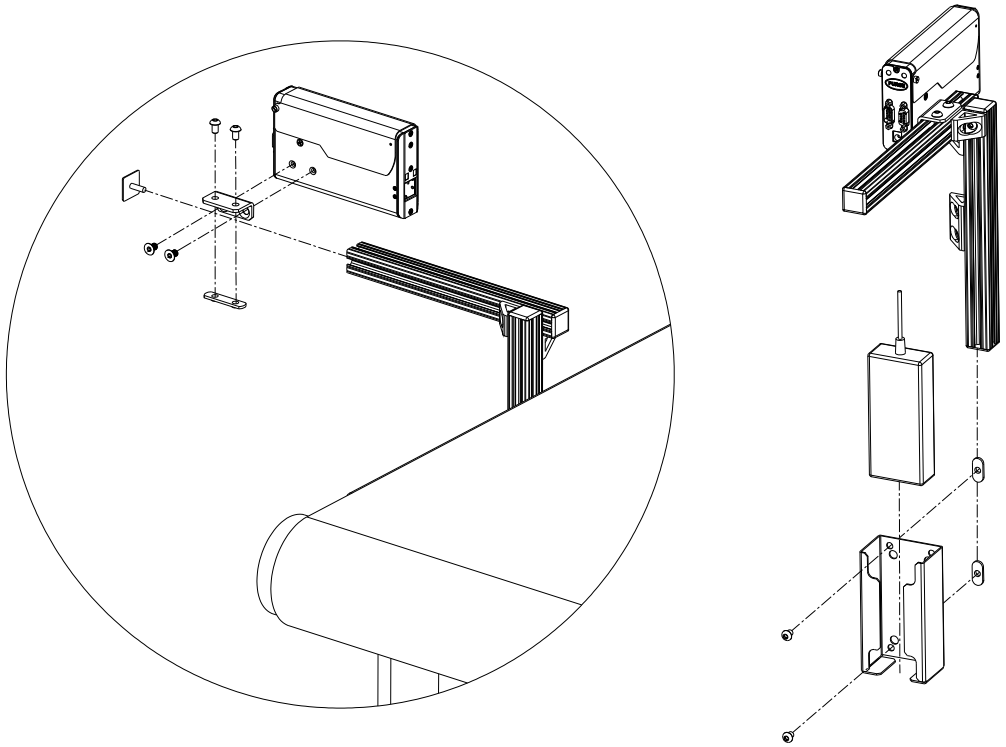
Step 1: Assemble Bracketry

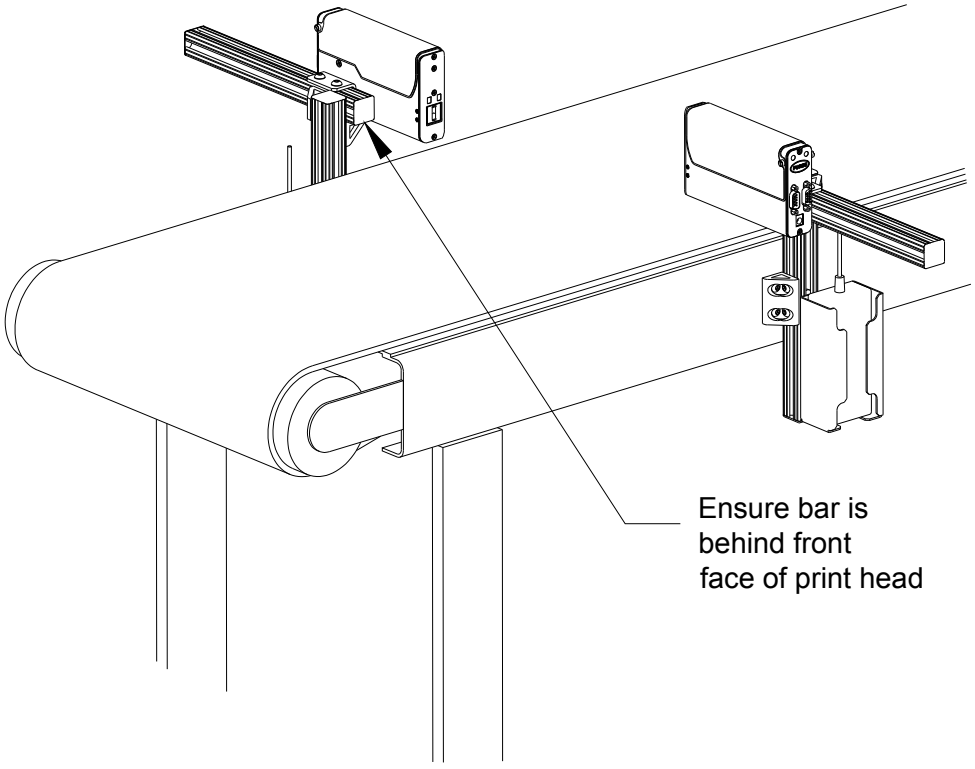


Step 2: Assemble Bracketry to Conveyor



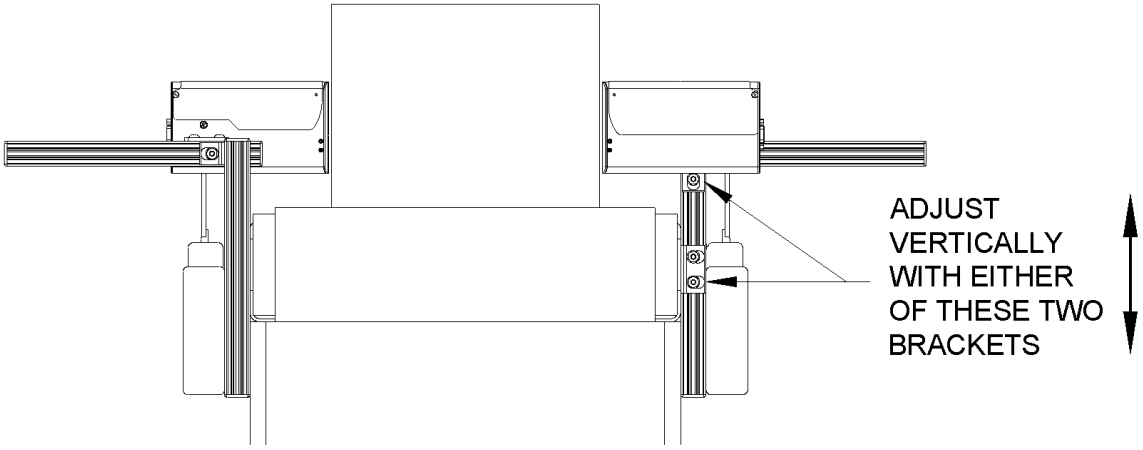
Step 3:Assemble SoloSeries Print Head and Power Supply to Bracketry



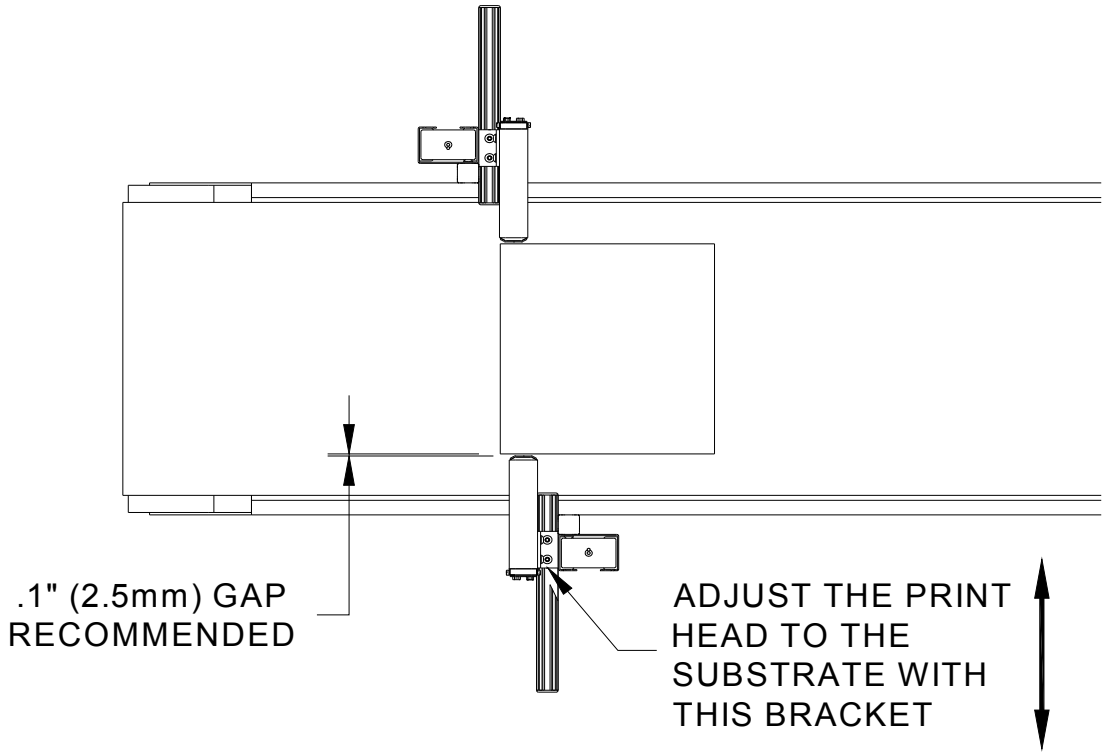


Step 4: Adjust SoloSeries Print Head to Substrate

Adjust print head vertically to meet requirement.

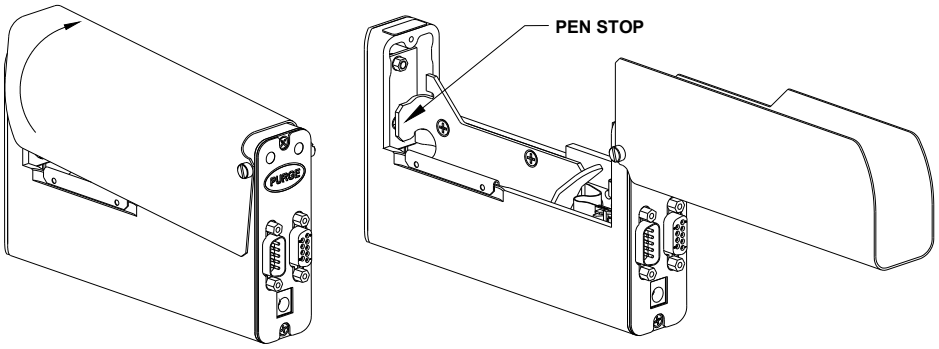


Adjust print head horizontally to set print gap.

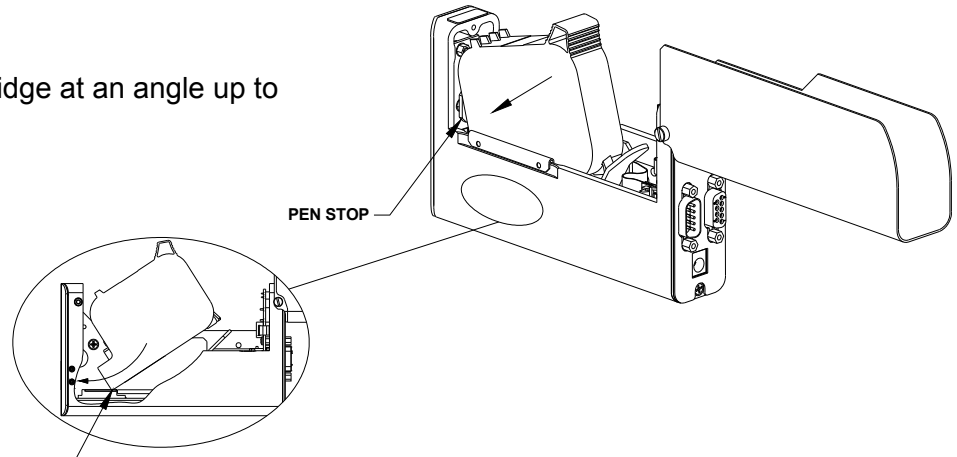


Step 5: Insert Pen Cartridge into Print Head

Rotate Cover Open



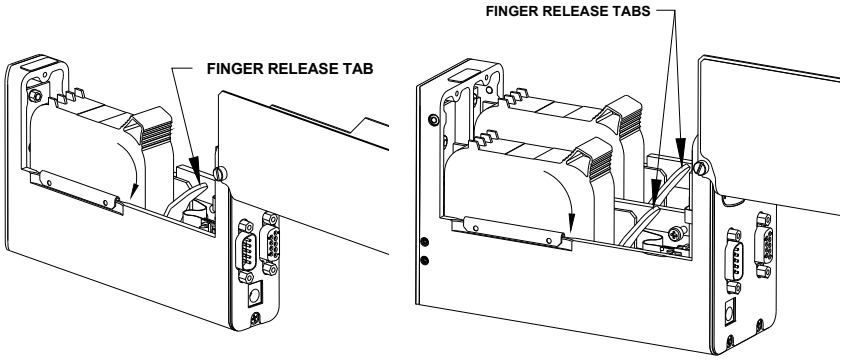
Insert Pen Cartridge at an angle up to Pen Stop



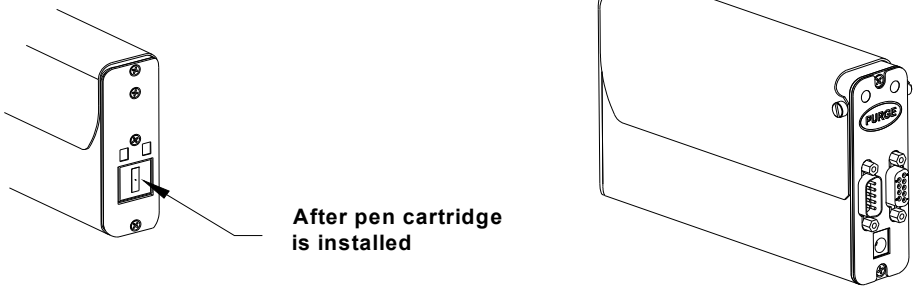
When inserting cartridge, aim nose at an angle towards black pogo pin component. Slide pen cartridge up to Pen Stop.

Rotate Pen Cartridge down until it snaps in place.

NOTE: The pen is released by pressing down on the Finger Release Tab and pulling up on the rear of the cartridge.



Close Cover



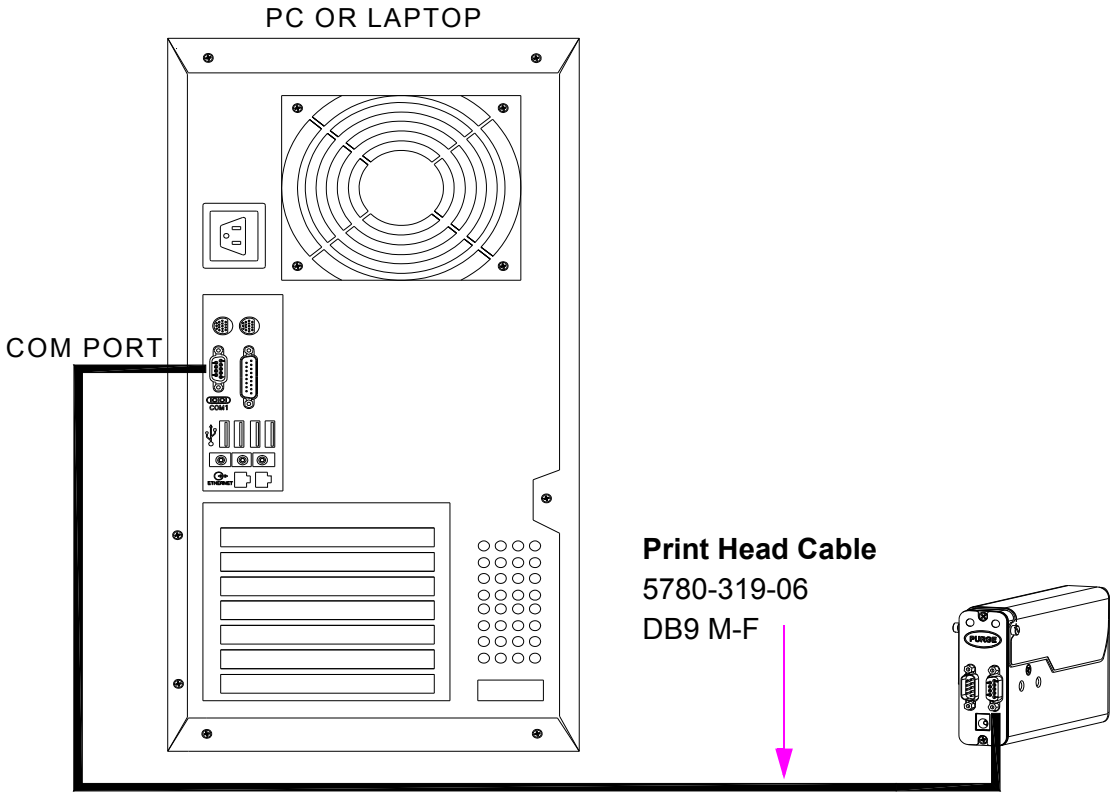
After pen cartridge is installed

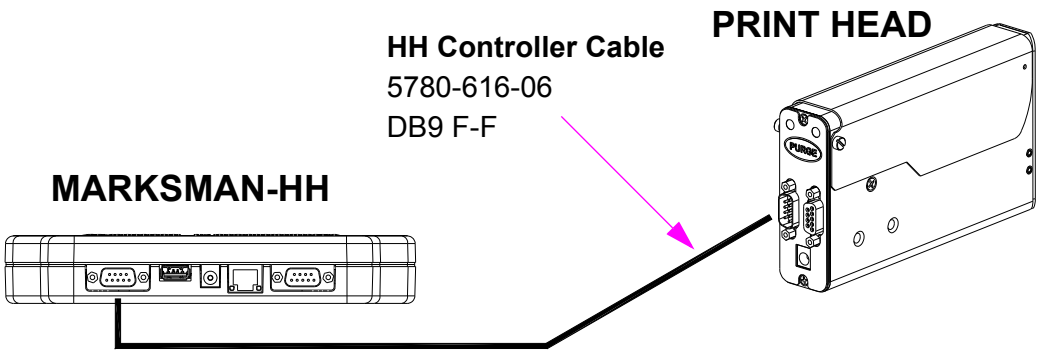
Step 6: Cabling, Power, and Serial Port Setup

Cabling

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

Print heads are controlled via a COM port from a PC or an Marksman HHI controller. One com port can control up to eight SoloSeries45 print heads, four SoloSerie90 print heads, or any combination of the two totalling eight print cartridges. Using the supplied serial cables, connect the print heads daisy chain style by connecting the output port of one print head to the input port of the next. Then connect the COM port of the PC or Marksman HHI to the daisy chain. A PC connects to the first head in the daisy chain, while a Marksman HHI connects to the last.

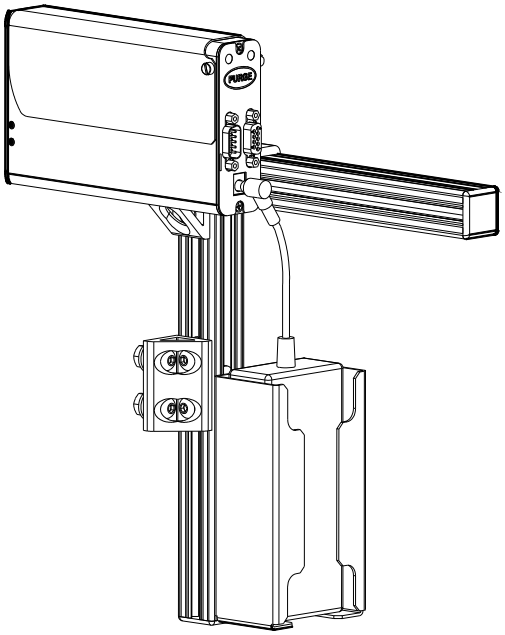




Power

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

Install the power plug from the previously mounted power supply into the power jack on the rear of each SoloSeries print head.



Press and hold the "PURGE" button on the rear of the print head while slowly moving a piece of paper, cardboard, or comparable material in front of the print cartridge. Print several purge images and validate that all channels are printing. If not, refer to “Section 4: Maintenance & Shutdowns” on page 26.

NOTE: Do not rub the print cartridge face with the print sample material as this will scratch the orifice array and affect print quality.

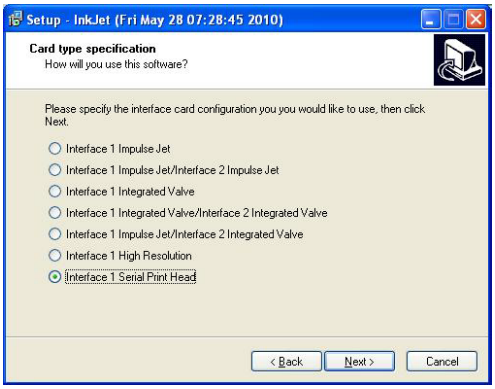
The power supply for the Marksman HHI or the computer may now be installed.

Serial Port Setup

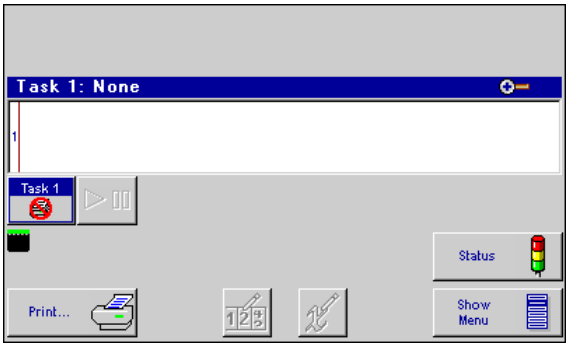
NOTE: Depending on GUI /Marksman HHIstatus, this step may already be complete.

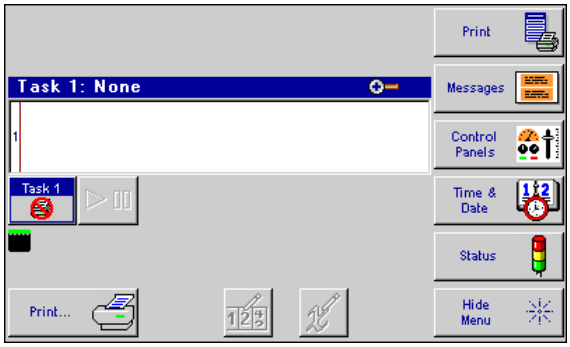
If a computer will be used, install the SoloSeries/ Marksman HHI GUI PC software using the CD included with the print head. Follow the installation prompts, and at this prompt, select "Interface 1 Serial Print Head".

After the GUI program has been installed, launch the program.

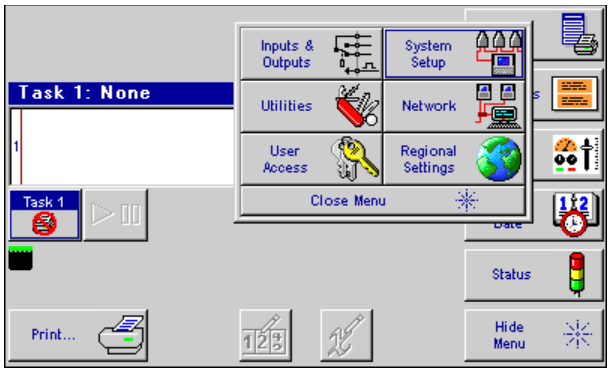


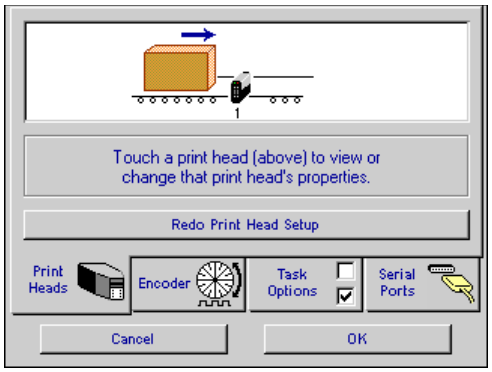
Ensure the home screen menu is present via the **Hide Menu** / **Show Menu** button, and then press the **Control Panels** button.



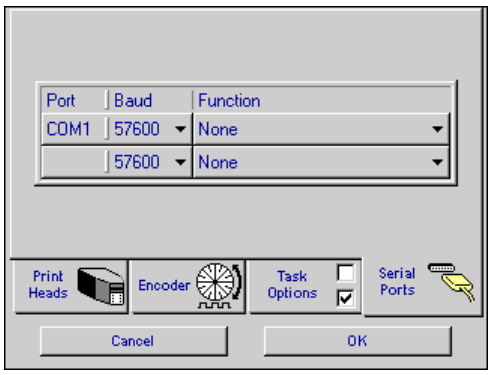


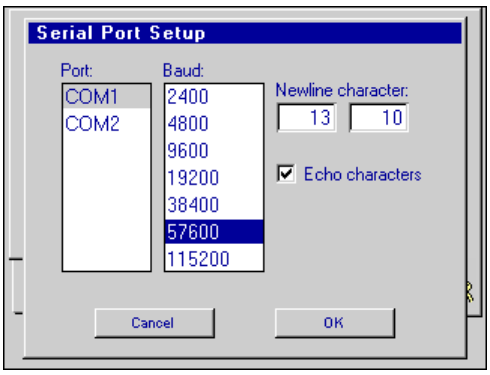
Press the **System Setup** button, and then the **Serial Ports** tab.



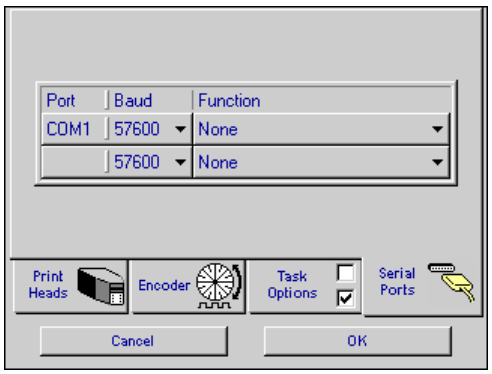


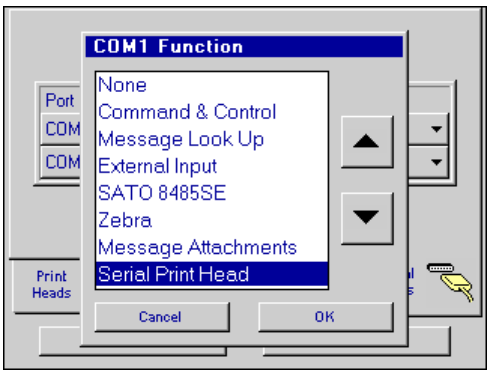
To ensure the baud rate is set for **57600,** press the button beneath the **Port/Baud** column and adjust if necessary. Press the **OK** button to exit the **Serial Port Setup** screen.





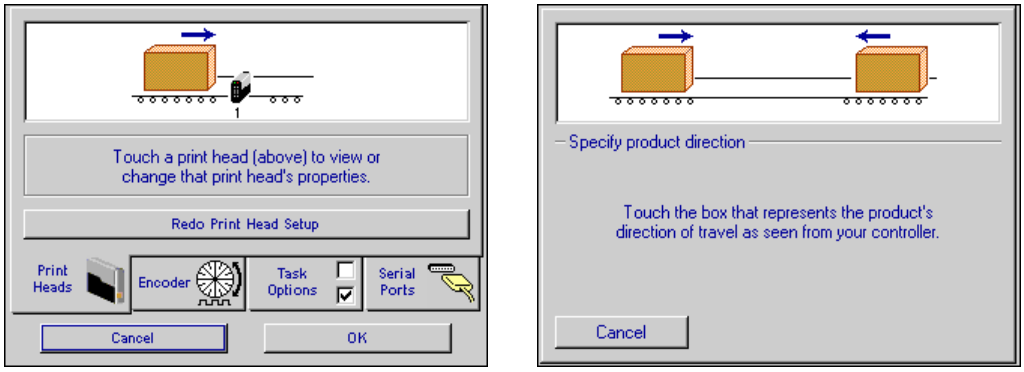
If "Serial Print Head: Task x" is not shown on theCOM1 **Function** button, press the button and select the **Serial Print Head** option. Press the **OK** button to exit the **COM 1 Function** screen. Press **OK** again to exit the **System Setup** screen.



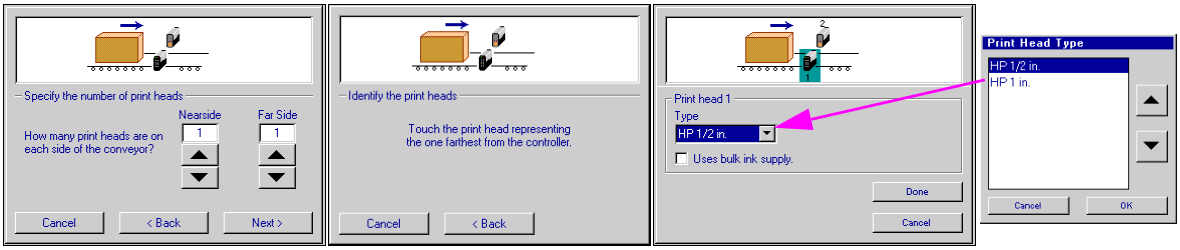


Step 7: Configure the Print Head

On the home screen, press the **Control Panels** button, and then press the **System Setup** button. On the **Print Heads** page press the **Redo Print Head Setup** button. Select the desired direction.



Select the number of print heads, identify their position relative to the controller, and select the appropriate print head type by touching each one and then the drop down box.

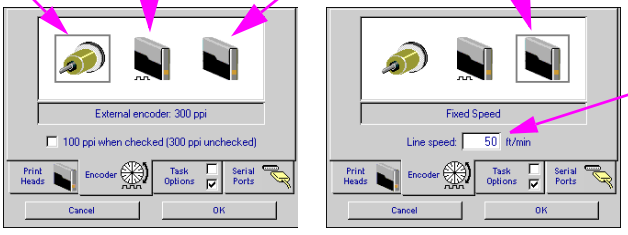


Print head setup complete. Next, select the Encoder tab, and choose the desired encoder type.

External Encoder:
Line speed measured by an externally mounted encoder and connected to the last print head in the daisy chain

Auto Speed Detect:
Line speed automatically detected via SoloSeries photocells

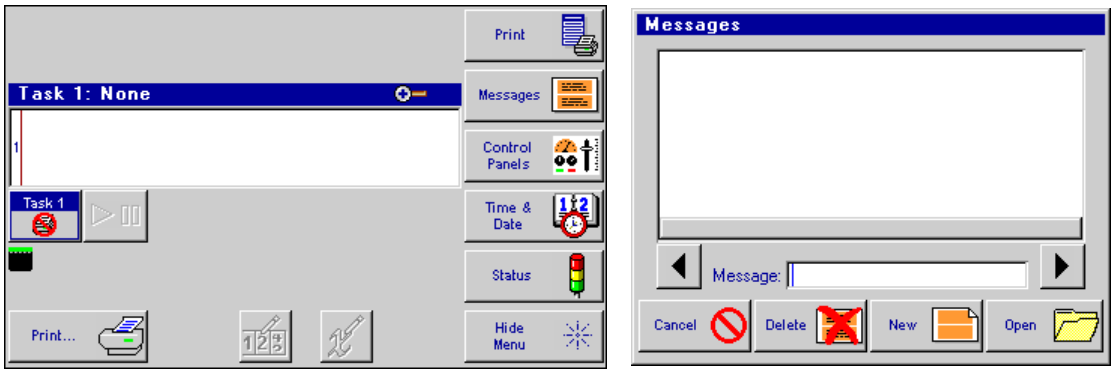
Fixed Speed:
User types in the desired line speed



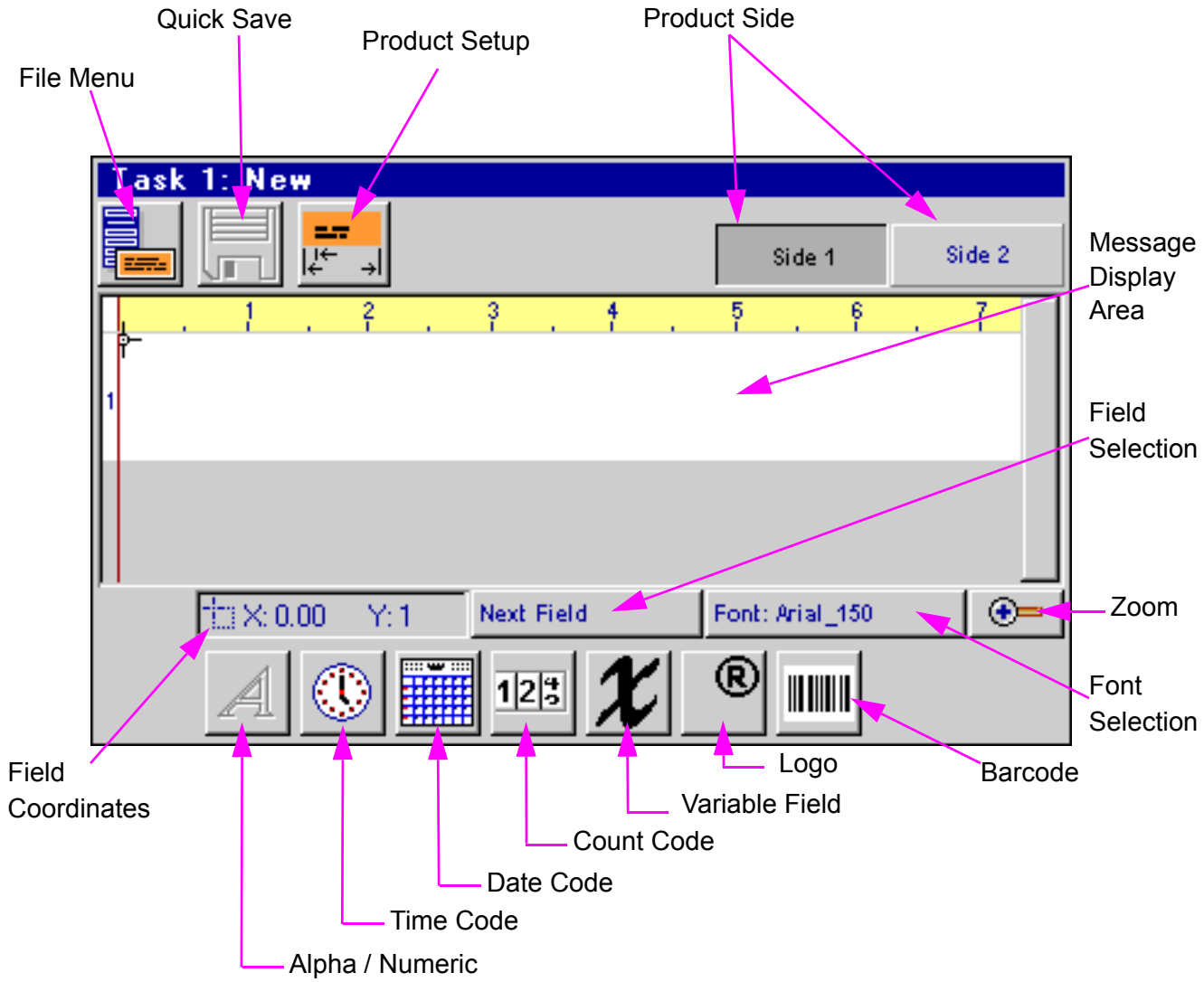
Touch this box, then type in the desired speed

Step 8: Create a Message

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

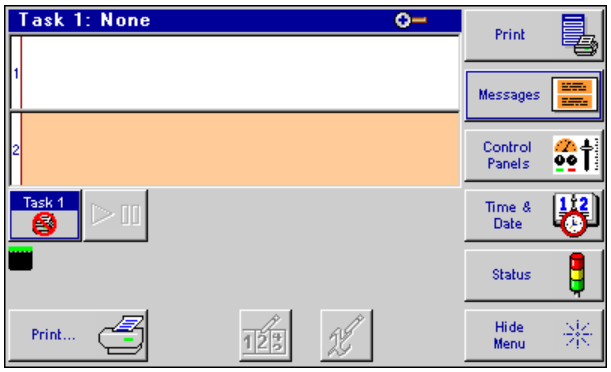


Create and save the message, and then exit the message editor.

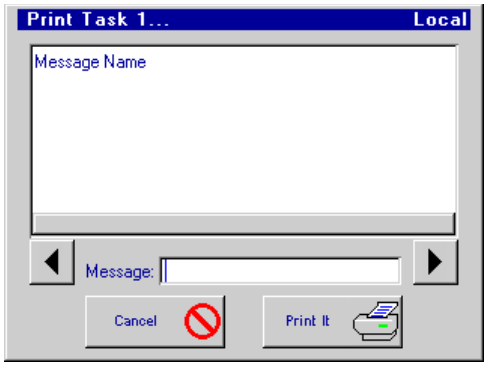


Step 9: Print a Message

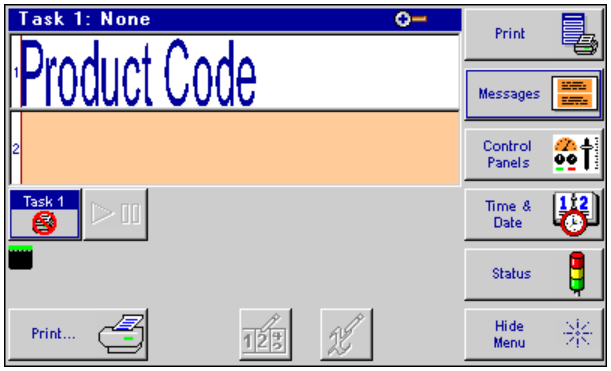
From the home screen, push the **Print** button.



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

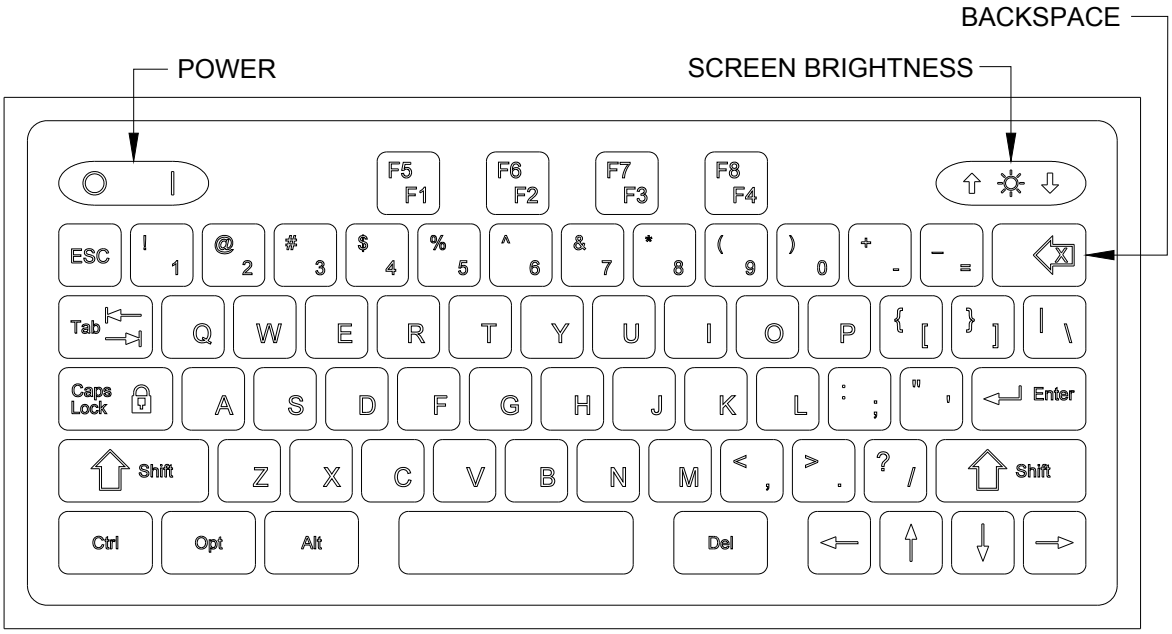


The message will print on the next photocell trigger.



Section 3: Marksman HHI or GUI Functionality

Keypad or Keyboard



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.

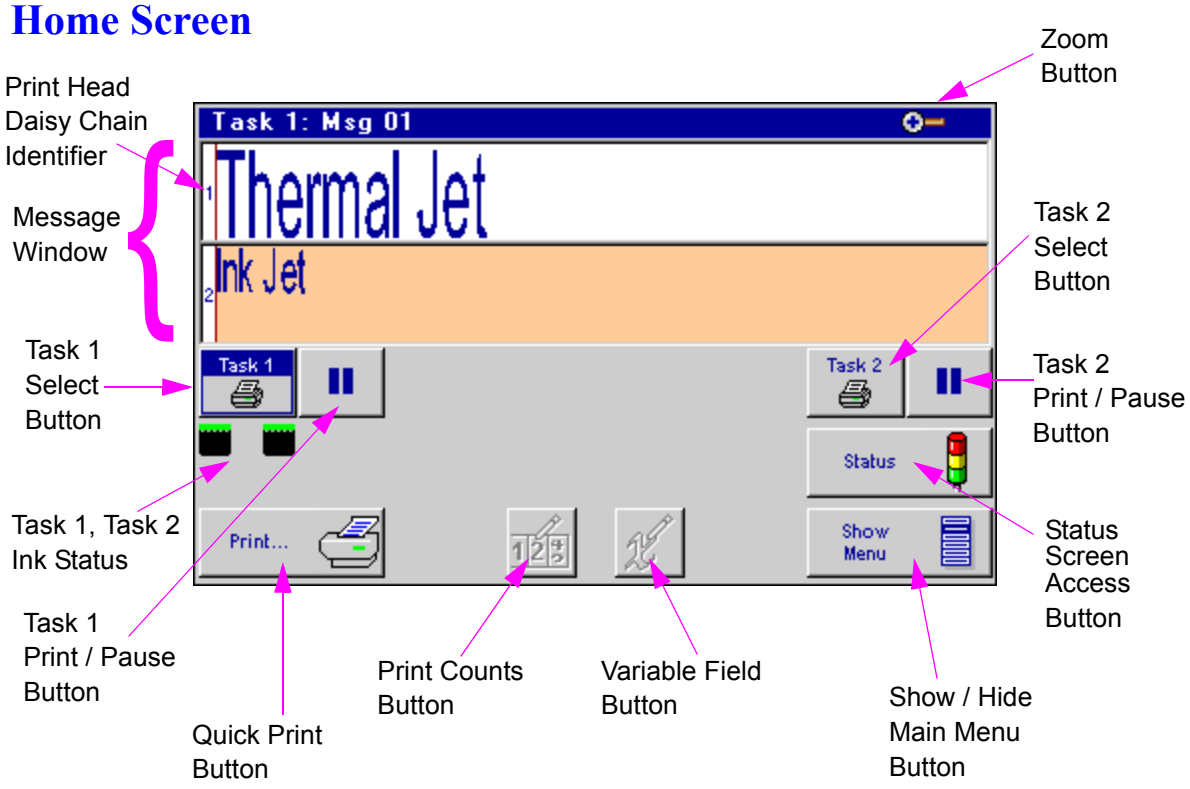
Ctrl (Control) in Message Editor:

- 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.

F4/F8:

The **F4**/**F8** key pulls up the extended characters dialog.

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:

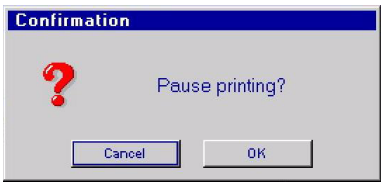
- Places focus on the selected task. This allows one to view what is being printed on either task in the home screen. Additionally, items in the main menu vary from one task to the other.

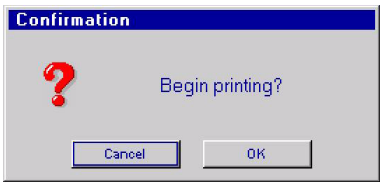
Task Print / Pause Button:

Play State
Press to Pause

- Starts and Stops print after an operator response to a confirmation popup dialog 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.

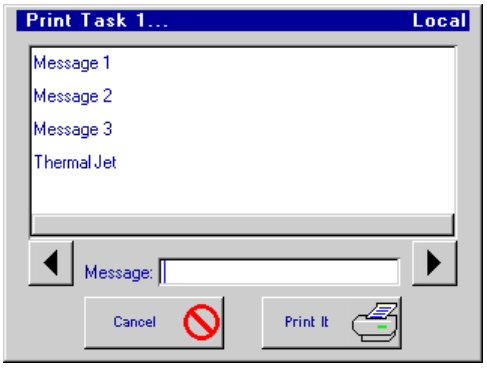
Pause State
Press to Print





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.



Zoom:

- Expands the message window to full screen and magnifies the print message so that fine details may be seen.
- **F1, F2, F5** and **F6** keys, or the **Arrow** keys, scroll the message left, right, up and down.
- Press the **Zoom** button or the **ESC** key to zoom back out.

Counter:

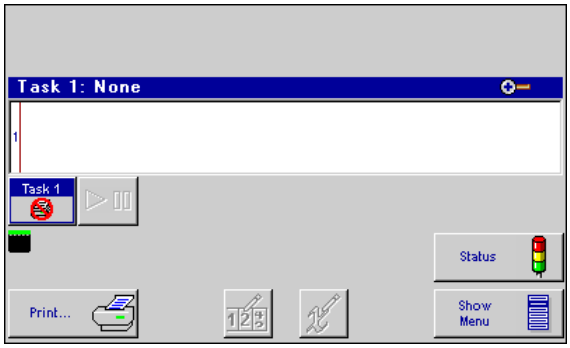
- Count codes are allowed, but one must select the "Print" button to adjust the count.

Variable Field:

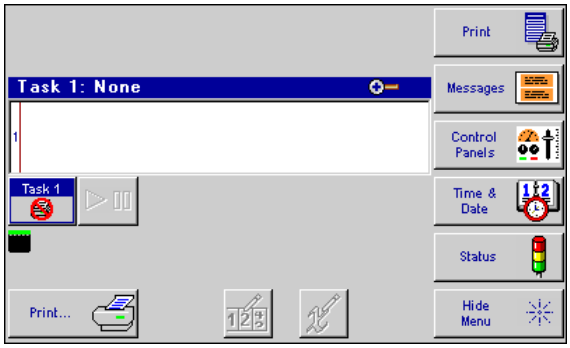
- Variable information fields are allowed, but one must select the "Print" button to change the information being printed.

Main Menu

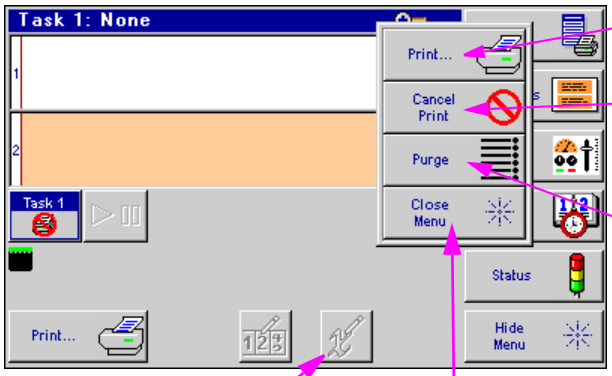
Main Menu Collapsed



Main Menu Expanded



Print Menu

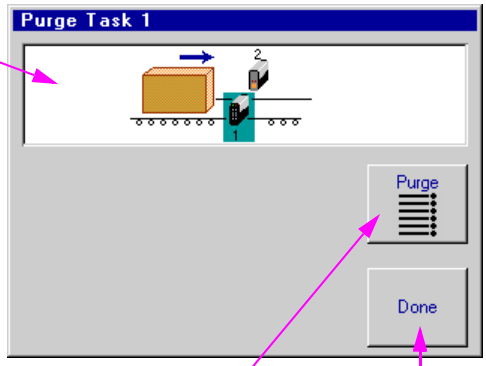


Print Menu Button

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.

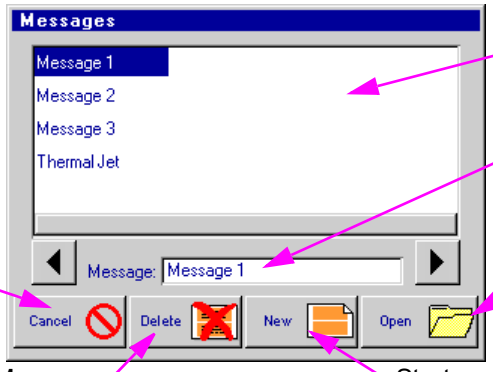


Fires all jets for a short period of time on the selected print head

Returns to Home Screen

Messages Dialog & the Message Editor

Messages Dialog



Message List

Selected Message

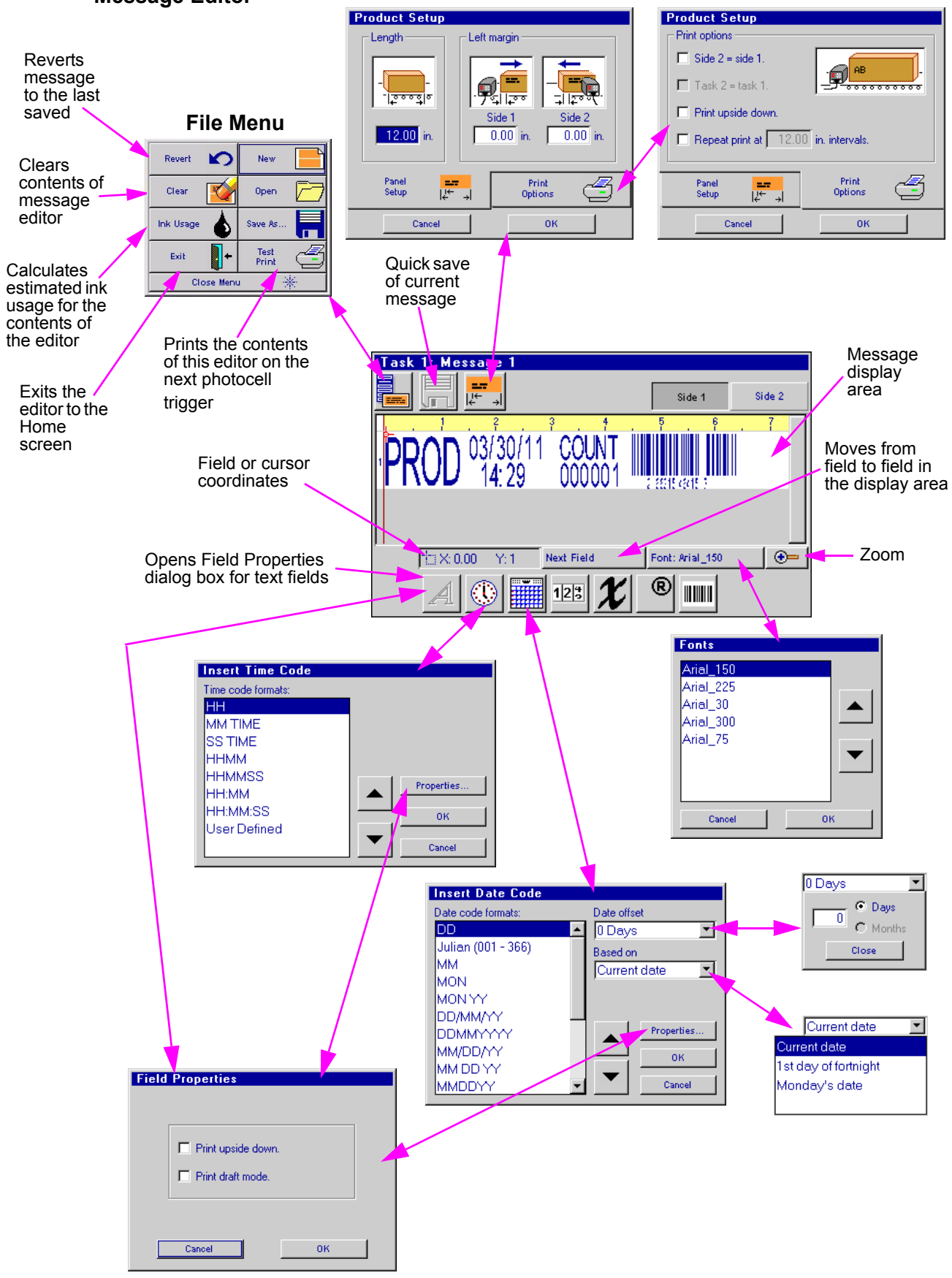
Returns to Home Screen

Opens Selected Message in the Editor

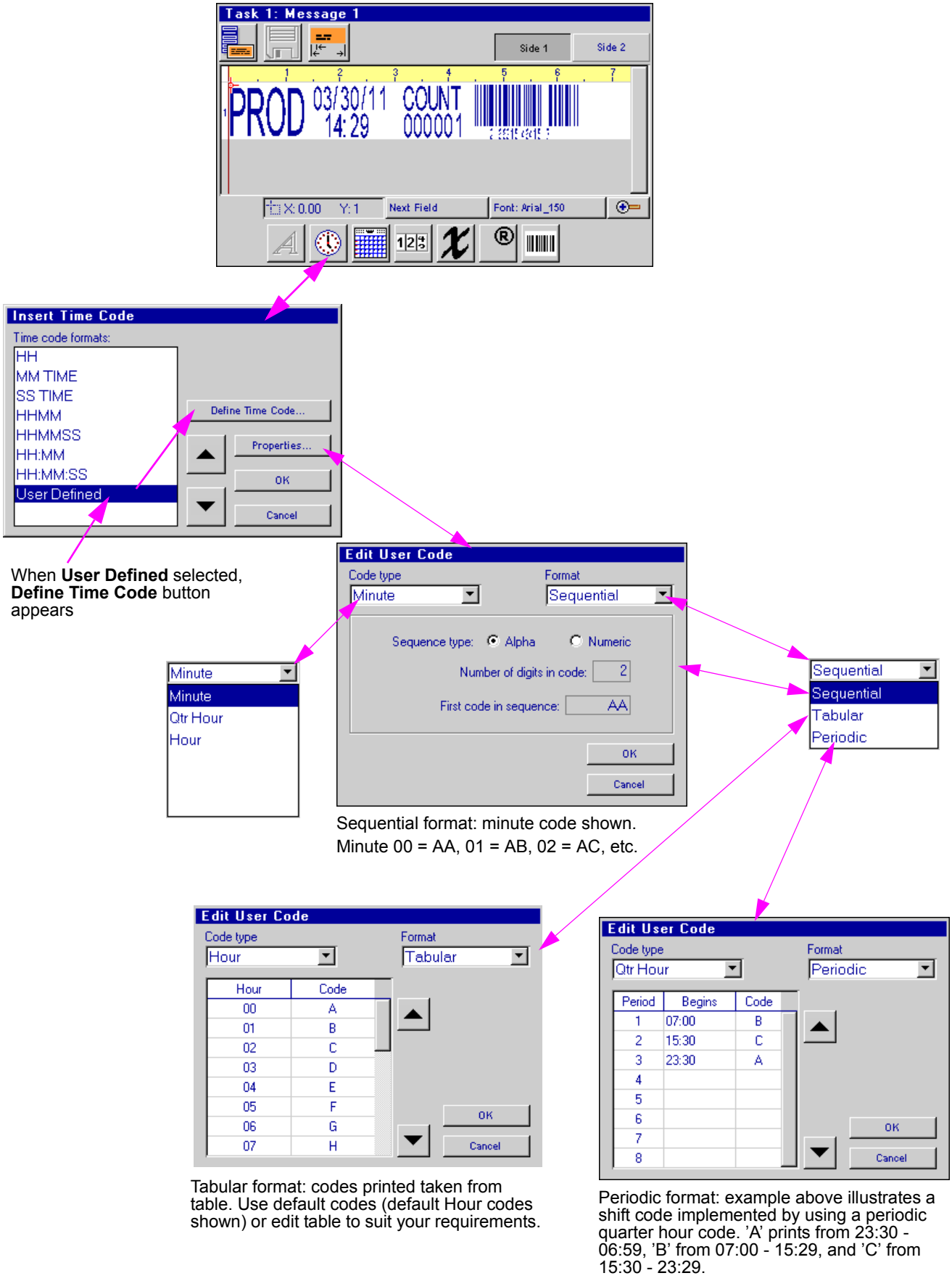
Deletes Selected Message

Starts a new message in the Editor

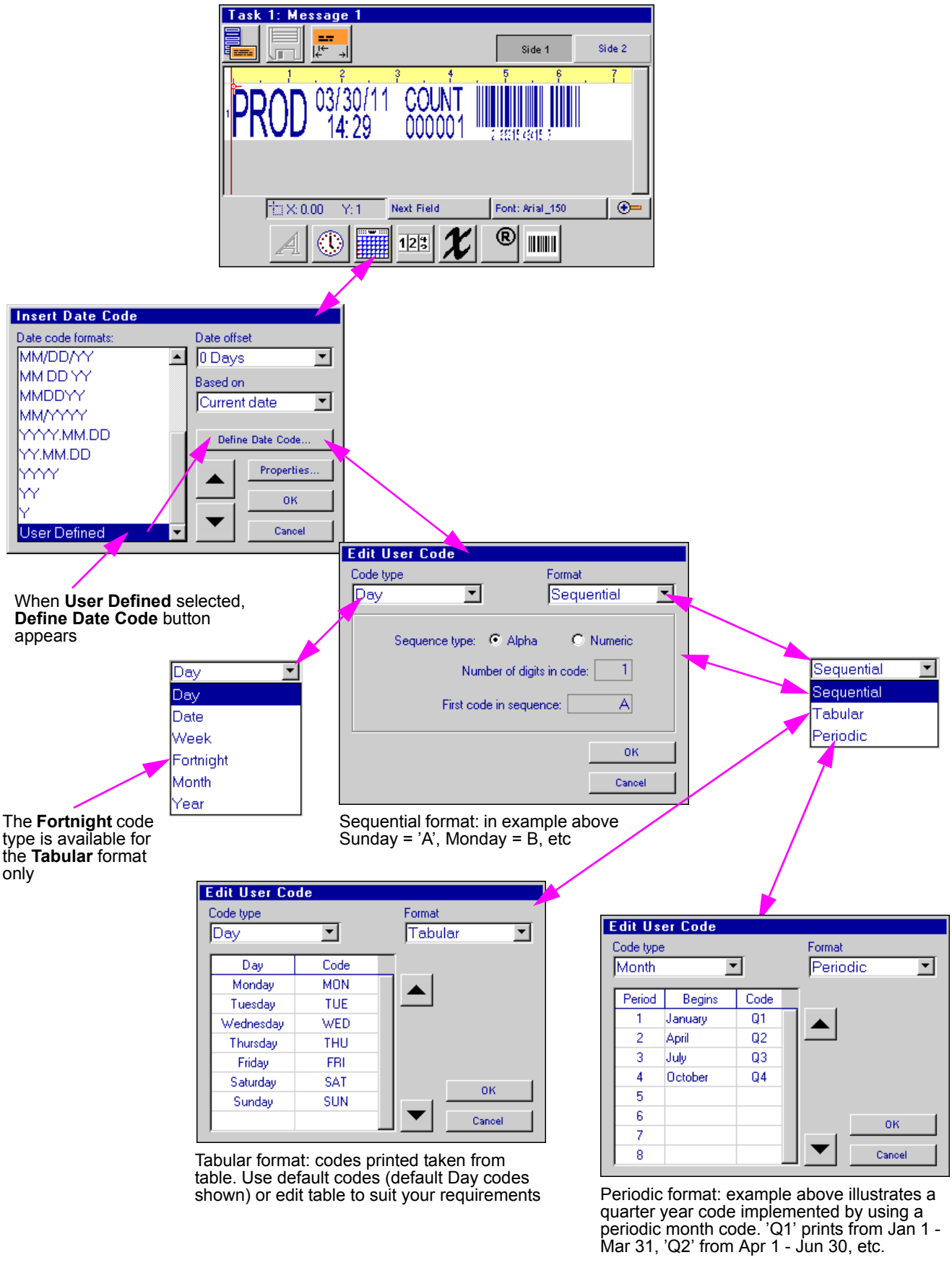
Message Editor



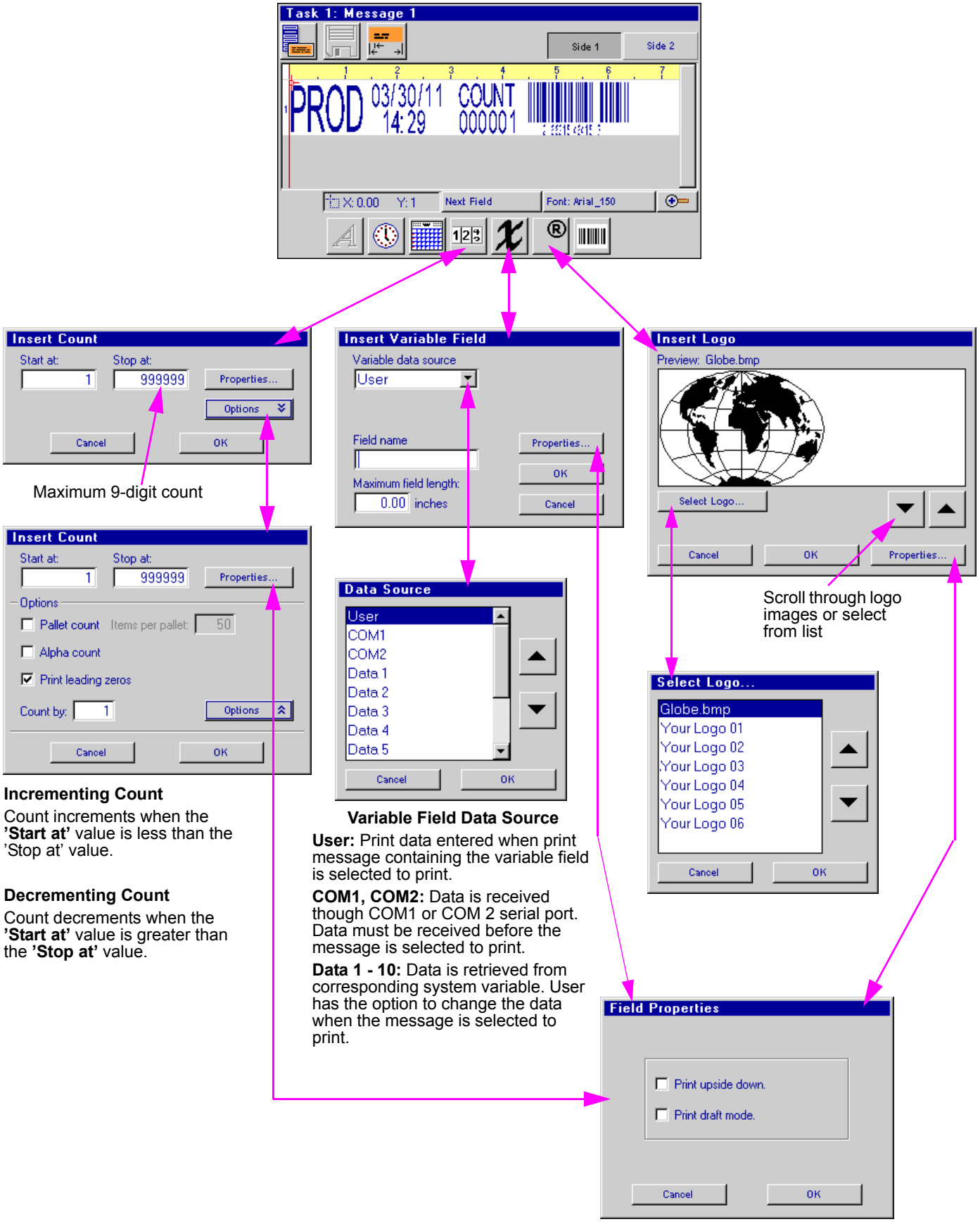
Message Editor continued: User Defined Time Codes



Message Editor continued: User Defined Date Codes



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

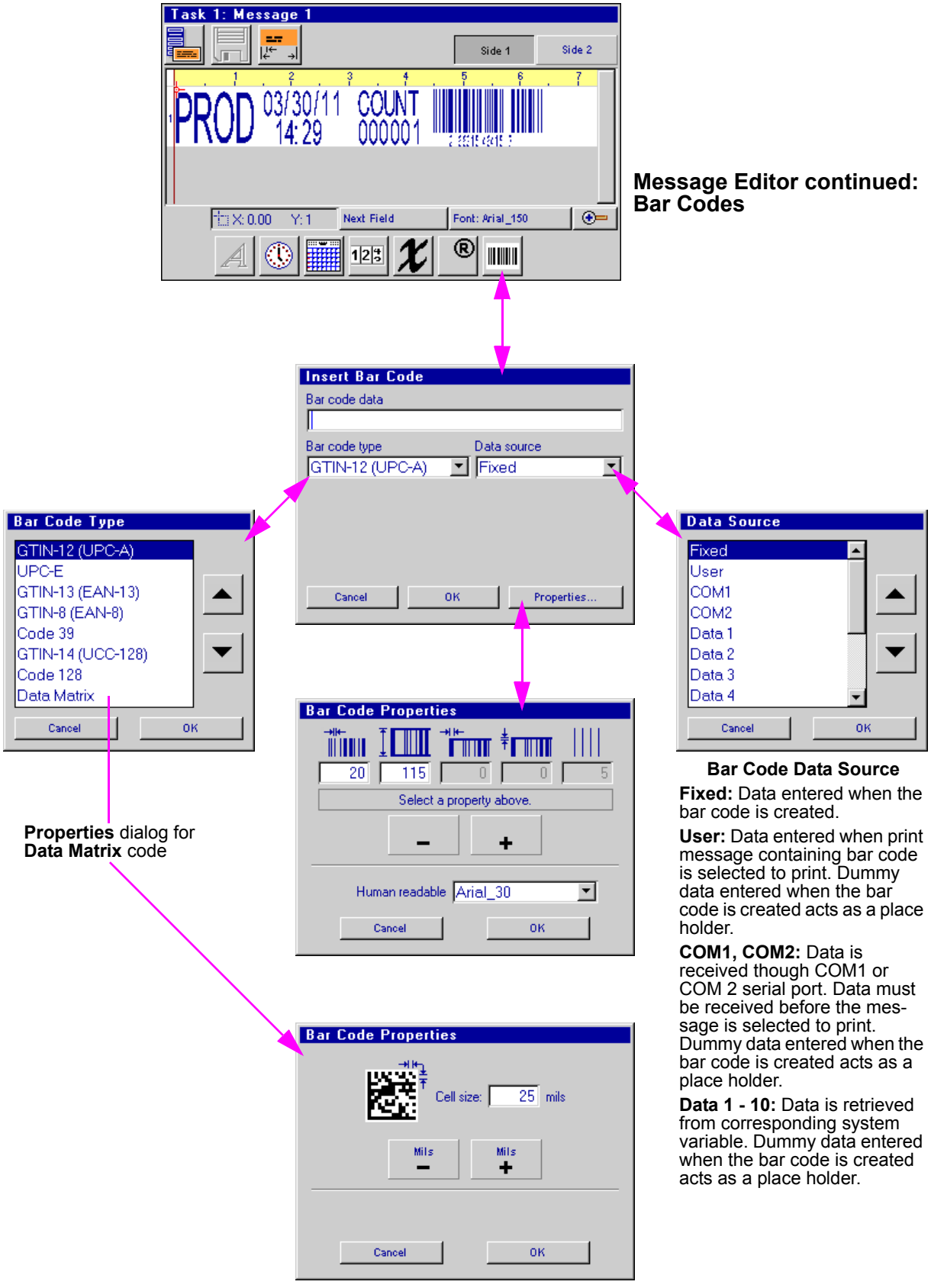
Count decrements when the **'Start at'** value is greater than the **'Stop at'** value.

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.



Properties dialog for **Data Matrix** code

Message Editor continued: Bar Codes

Bar Code Data Source

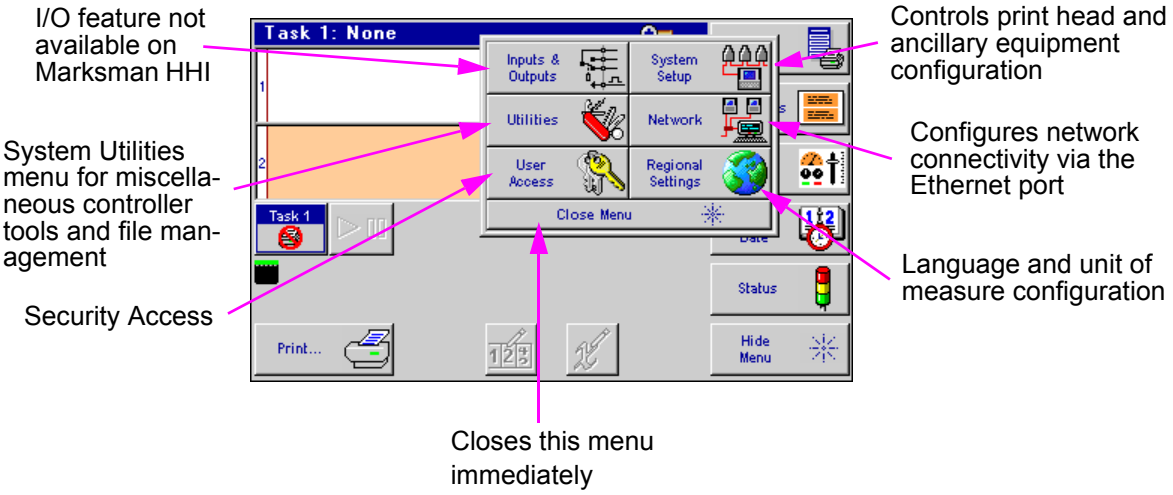
Fixed: Data entered when the bar code is created.

User: Data entered when print message containing bar code is selected to print. Dummy data entered when the bar code is created acts as a place holder.

COM1, COM2: Data is received though COM1 or COM 2 serial port. Data must be received before the message is selected to print. Dummy data entered when the bar code is created acts as a place holder.

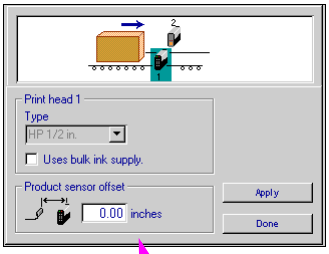
Data 1 - 10: Data is retrieved from corresponding system variable. Dummy data entered when the bar code is created acts as a place holder.

Control Panels Menu

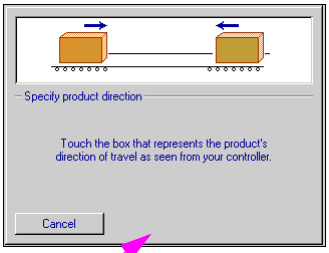


System Setup:

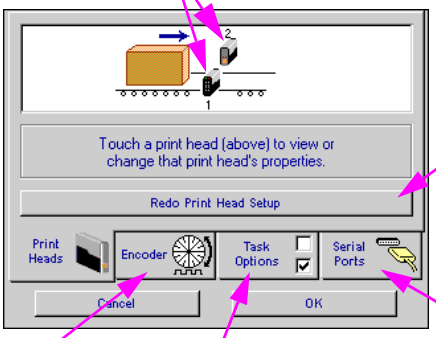
NOTE: The **Product sesnor offset** is only available when **External product sensor** is selected on the **Task Options** tab. In addition, **External encoder** or **Fixed Speed** must be selected on the Encoder tab.



Set print direction, number and type of print heads



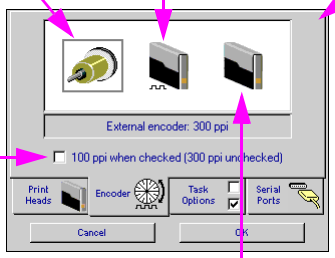
System Setup Screen

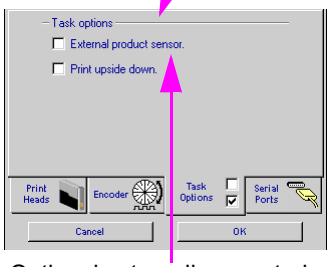


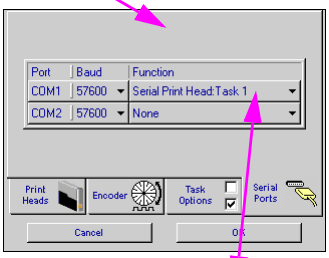
External Encoder:
Line speed measured by an externally mounted encoder and connected to the last print head in the daisy chain

Auto Speed Detect:
Line speed automatically detected via Solo-Series photocells (disables the external product sensor)

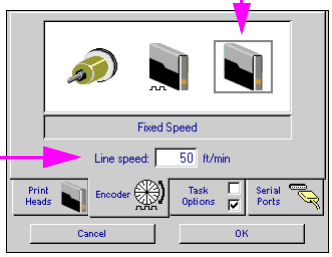
Check box for 100 ppi encoder selection



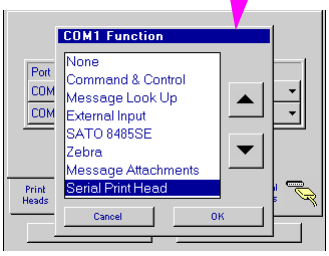




Fixed Speed:
Enter the desired line speed

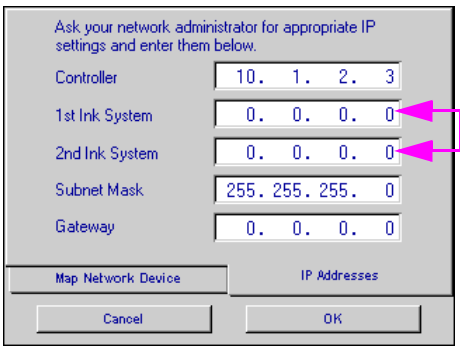


Optional externally mounted photocell connected to the last print head in the daisy chain (disables Auto Speed Detect)



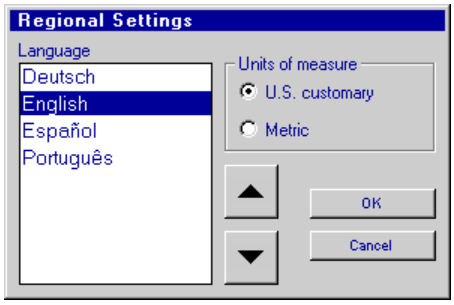
COM port configuration options

Network:



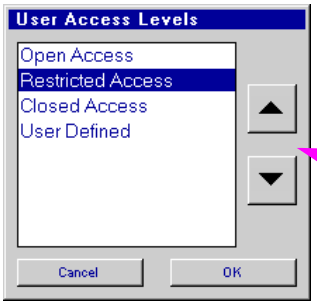
Does not apply to Thermal Jet print heads

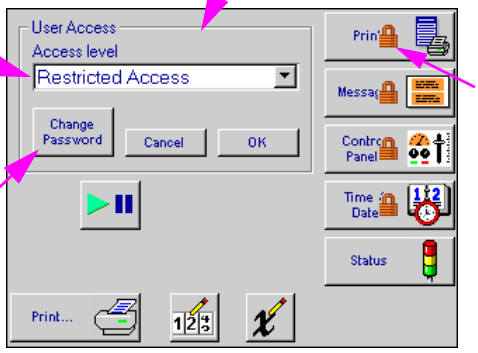
Regional Settings:



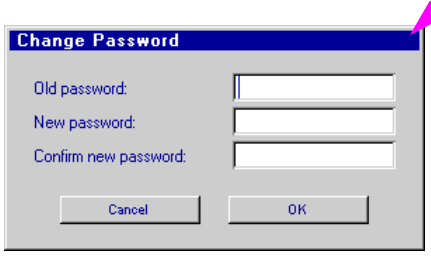
User Access:

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.





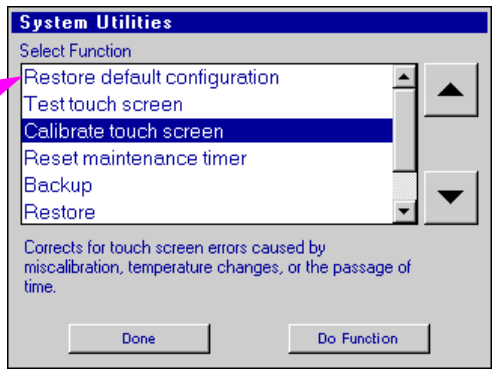
Padlock symbol indicates function is password protected



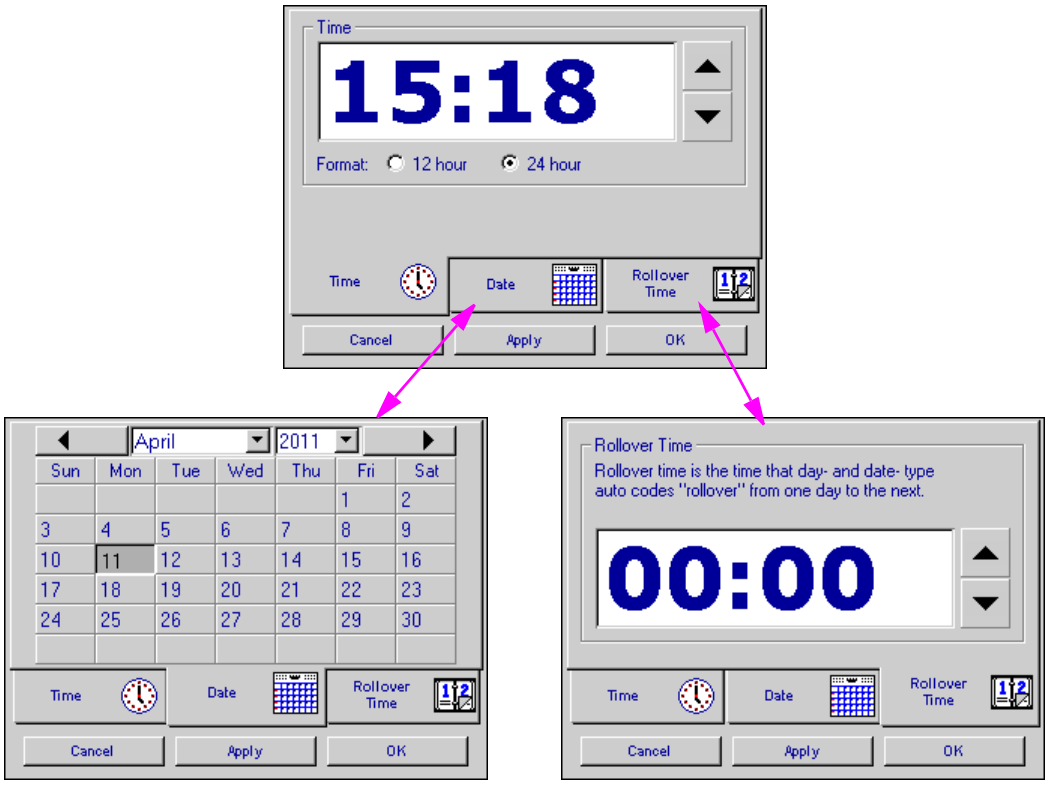
The factory set password is **Manager**. Passwords are case sensitive.

Utilities:

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

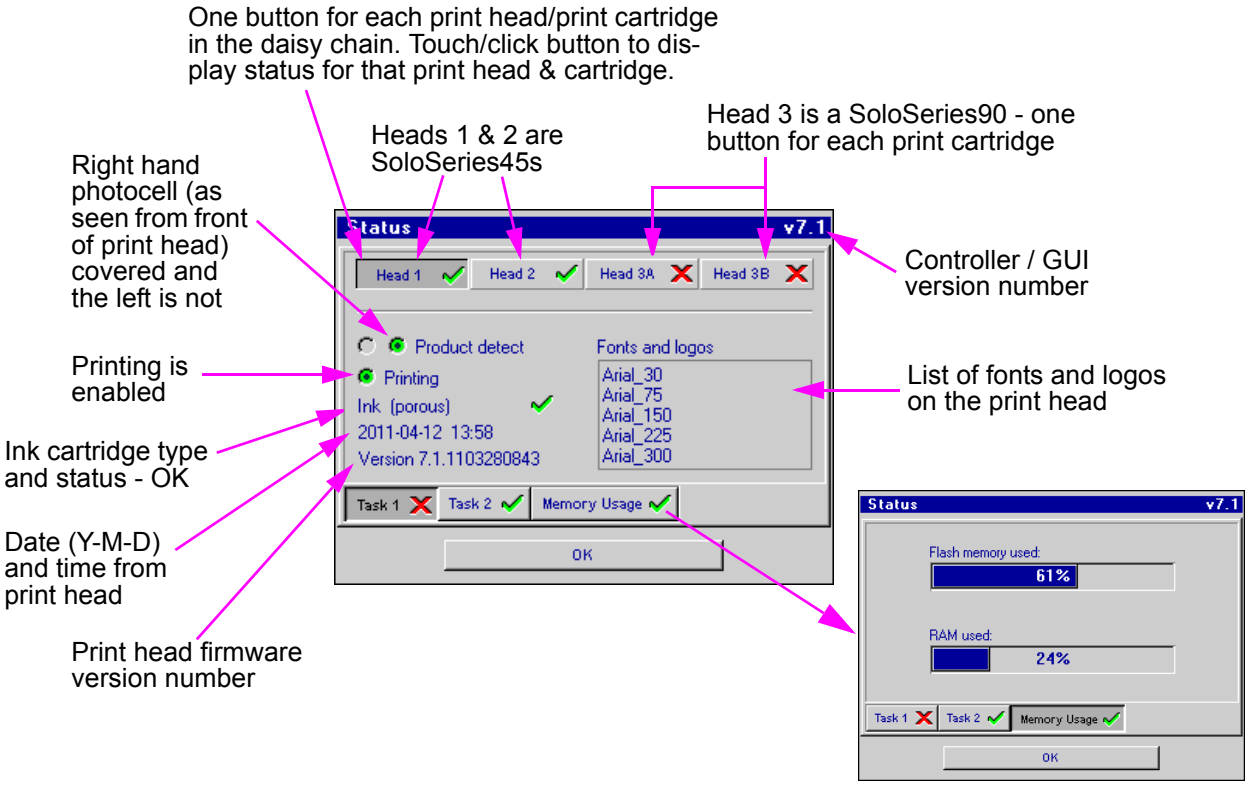


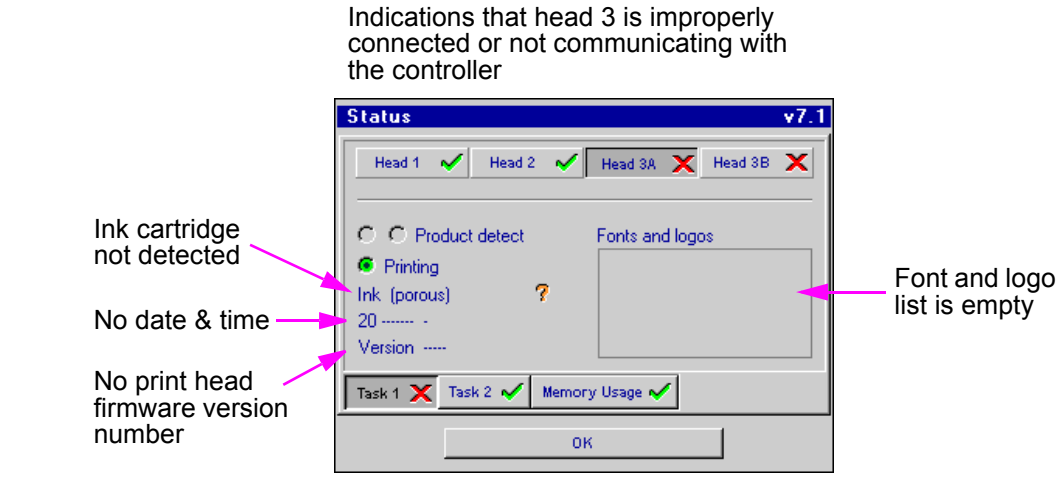
Time & Date Setting Screens



Status Screen

Note: This set of status screens represents three print heads, two SoloSeries45 and a SoloSeries90, setup in a daisy chain. The first two print heads (Head 1 & 2) are properly connected and detected. The third print head has not been properly connected to the daisy chain.





Section 4: Maintenance & Shutdowns

Daily Maintenance, Ink Cartridge

Prior to shift startup, the cartridge orifice array should be cleaned of any debris or ink build up.

Requirements:

- Deionized or distilled water (DO NOT USE TAP WATER) for **POROUS INK ONLY**
- Sponge Swabs (Foxjet p/n: 5760-832)

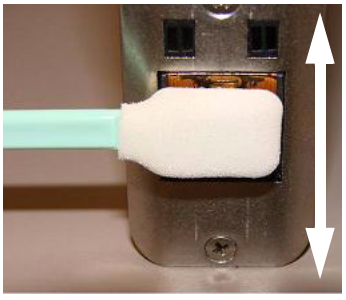
Procedure:

1. For **POROUS INK ONLY** cartridges, lightly dampen sponge swab with deionized water.
2. For **NON-POROUS INK ONLY** cartridges, hold sponge swab against orifice array of cartridge. Press and hold the purge button on the rear of the print head for at least ten seconds. This will fire all channels of the ink cartridge and dampen the swab with ink. The ink will act as its own solvent for cleaning.
3. Rub up and down across the orifice face with light force several times with one side of the sponge swab.
4. Turn the swab over and make one final light rub stroke top to bottom.
5. Immediately press and hold the PURGE button on the rear of the print head for 5-10 seconds to reprime the orifices. Because ink will eject during the channel purging, a piece of paper, cloth, or comparable material can be held in front of the orifice array.

Do NOT hold the ink catch material against the orifice array as print quality will be degraded.

6. If print quality becomes unsatisfactory during any shift repeat this procedure.

Before cleaning



Wipe pen cartridge face up and down several times. Immediately press and hold the purge button for 5-10 seconds.

After cleaning

Weekly to Monthly Maintenance, Print Head

Debris and ink build up on the print head enclosure / cover can be removed using a soft cloth lightly dampened with deionized water.

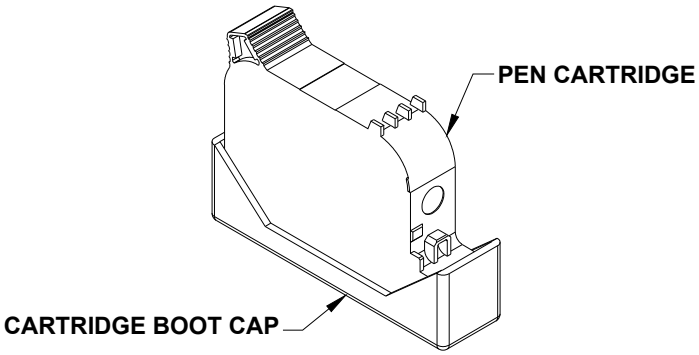
Take care NOT to wipe the cartridge orifice array.

Shutdowns Less Than 3 Days

The ink cartridge can remain in the print head uncapped. When restarting the print head, follow the Daily Maintenance procedure.

Shutdowns More Than 3 Days

For extended shutdowns, follow the Daily Maintenance procedure, remove the ink cartridge from the print head and store in the optional Cartridge Boot Cap (Foxjet Kit p/n: 5780-208).



Section 5: Troubleshooting

NO PRINT

System Symptom	Possible Cause	Actions
No print head power / green LED on rear of print head	• Power Supply • AC Source	• Check power supply light indicator. • Check for AC power source between power supply input limits.
PURGE button on rear of head does not appear to work	• Ink cartridge is damaged or empty • Print head Board	• Replace with new cartridge and repeat PURGE. • Replace print head printed circuit board or print head.
Print head purges but won't print desired message	• Loose or missing cables • Controller or PC software not configured for Serial Print Head • Encoder Malfunction • Product not triggering photocell.	• Tighten or install all cables. • Ensure print heads are configured as serial. See "Section 2: Quick Start", "Step 6: Cabling, Power, and Serial Port Setup" on page 7. • Ensure encoder is installed and plugged into the last print head in the daisy chain. • Ensure the product is within 1/4" of the front face of the print head. • If an external photocell is installed, then validate the setting from the Control Panels, System Setup, Task Options tab.

POOR PRINT QUALITY

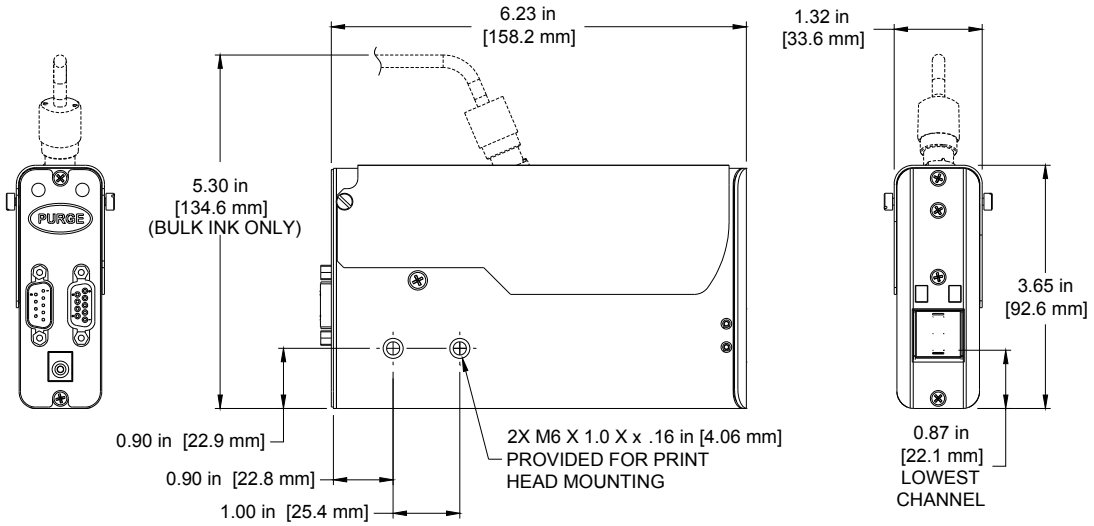
System Symptom	Possible Cause	Actions
Print is foggy or light	• Print head is mounted greater than an 1/8" away from the substrate • There are large air currents near the print head	• Adjust the print head according to "Section 2: Quick Start", See "Step 4: Adjust SoloSeries Print Head to Substrate" on page 5. • Locate print head in an area where there are minimal currents or provide wind barriers.
Print image is missing channels or has multiple fractures	• Pen cartridge face is dirty • Pen cartridge face is damaged at the orifice array • Pen cartridge is not properly seated in the print head	• Clean the pen face per "" on page 25. • Replace damaged pen cartridge with new. • Remover cartridge and reinsert according to "Section 2: Quick Start", "Step 5: Insert Pen Cartridge into Print Head" on page 6.

SoloSeries PRINT HEAD LED FUNCTIONALITY

System Symptom	Possible Cause	Actions
Red LED on steady	• Pen cartridge ink level is low.	• Ready the next pen cartridge for installation.
Red LED is flashing slowly	• Pen cartridge is out of ink and significant print degradation is imminent. • A non-Foxjet cartridge is installed.	• Prepare to install a new pen cartridge. • Install an original Foxjet cartridge.
Red LED is flashing fast	• Pen cartridge is missing from print head stall. • Print head is calibrating a new cartridge. • Print head is in thermal protection mode.	• Install or re-install the appropriate pen cartridge. • Allow the print head up to 30 seconds to calibrate a new pen cartridge. • Pen cartridge is out of ink and the print head is self-protecting against excessive heating. Replace the appropriate pen cartridge.

Appendix A: Specifications

SoloSeries45:



Weight: 1.3 lbs (.6 kg)

Enclosure: Anodized Aluminum and Stainless Steel

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

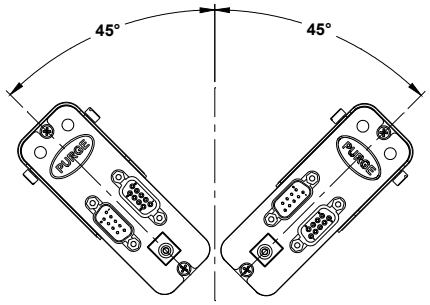
Print Speed: 200 fpm, 300 dpi continuous

Print Resolution: 300 dpi

Throw Distance:	**Porous Ink**	**Non-Porous Ink**
Recommended Gap:	.1 in (2.5 mm)	.08 in (2.0 mm)
Maximum Gap:	.25 in (6.3 mm)	.15 in (3.8 mm)

Print Head Orientation: From horizontal to straight down.

Print Head Tilt:
+/- 45° from vertical for standard print cartridge
+/- 90° from vertical for Bulk Ink print cartridge



PRINT HEAD TILT

Number of Print Fields:
Maximum 5 lines of print per print cartridge at any given point. Each print line may have at least 3 52-character print fields; number of fields per line increases as the number of characters per field decreases.

File Storage:
Twenty-seven 256kB sectors per print head are available for font and logo file storage. Files larger than 256kB use multiple sectors. Factory installed fonts occupy 12 of the 27 sectors.
Five factory installed fonts: Arial 30, 75, 150, 225, and 300 (0.1 in / 2.54 mm, 0.25 in / 6.35 mm, 0.5 in / 12.7 mm, 0.75 in / 19.05 mm, 1.0 in / 25.4 mm).
Bitmap (logo) files: 150 dots tall max (.5 in / 12.7 mm); 32,767 columns wide max (109 in / 2.79 m at 300 dpi).

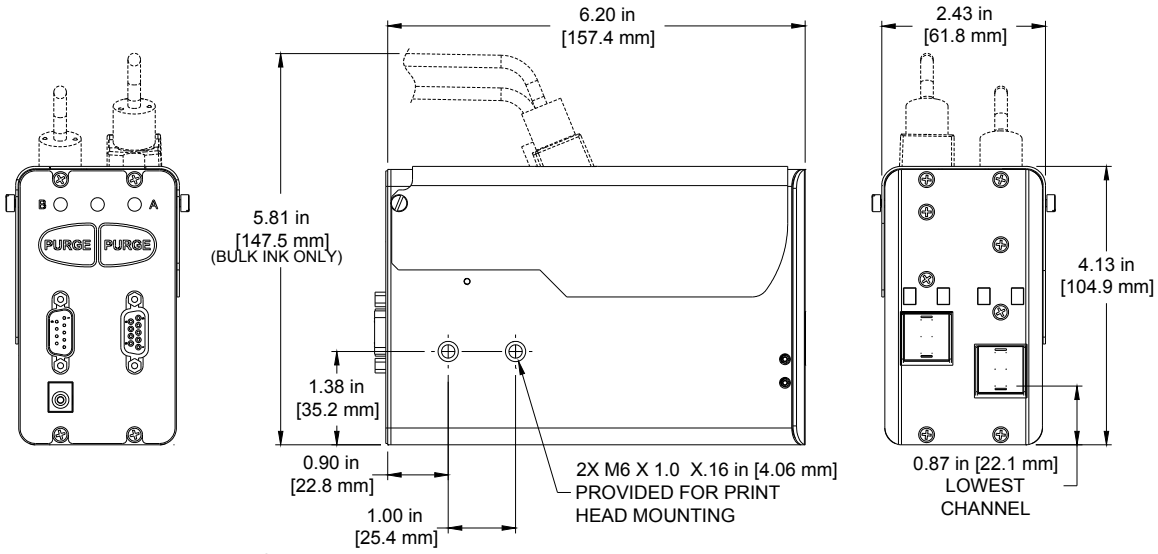
Environment:
Ambient operating temperature: 50°F to 104°F (10°C to 40°C); operating humidity: 10% - 80% RH

Ink Type: Dye, Pigmented, or Solvent base hp 45 cartridges

TJ INK

Ink Cartridge: The SoloSeries has been engineered and designed to work with Foxjet ink cartridges. The SoloSeries' **Smart Level Ink Detection System**, which provides ink level monitoring to ensure complete ink usage and product safety, will not be functional if used with non-Foxjet ink cartridges.

SoloSeries90:



Weight: 2.1 lbs (1.0 kg)

Enclosure: Anodized Aluminum and Stainless Steel

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

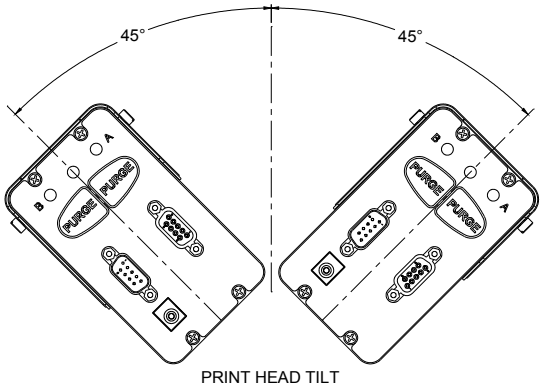
Print Speed: 200 fpm, 300 dpi continuous

Print Resolution: 300 dpi

Throw Distance:	Porous Ink	Non-Porous Ink
Recommended Gap:	.1 in (2.5 mm)	.08 in (2.0 mm)
Maximum Gap:	.25 in (6.3 mm)	.15 in (3.8 mm)

Print Head Orientation: Horizontal to straight down.

Print Head Tilt:
+/- 45° from vertical for standard print cartridge
+/- 90° from vertical for Bulk Ink print cartridge



PRINT HEAD TILT

Number of Print Fields:
Maximum 5 lines of print per print cartridge, 10 total for the print head, at any given point. Each print line may have at least 3 52-character print fields; number of fields per line increases as the number of characters per field decreases.

File Storage:
Twenty-seven 256kB sectors per stall are available for font and logo file storage. Files larger than 256kB use multiple sectors. Factory installed fonts occupy 12 of the 27 sectors.
Five factory installed fonts: Arial 30, 75, 150, 225, and 300 (0.1 in / 2.54 mm, 0.25 in / 6.35 mm, 0.5 in / 12.7 mm, 0.75 in / 19.05 mm, 1.0 in / 25.4 mm).
Bitmap (logo) files: 300 dots tall max (1.0 in / 25.4 mm); 32,767 columns wide max (109 in / 2.79 m at 300 dpi).

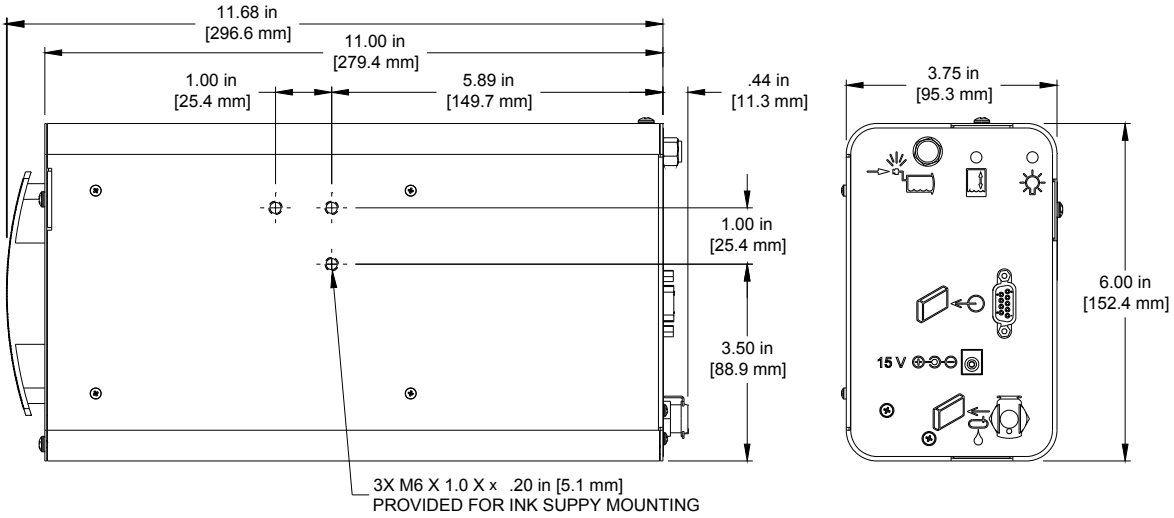
Environment:
Ambient operating temperature: 50°F to 104°F (10°C to 40°C)
Operating Humidity: 10% - 80% RH

Ink Type: Dye, Pigmented, or Solvent base hp 45 cartridges

TJ INK

Ink Cartridge: The SoloSeries has been engineered and designed to work with Foxjet ink cartridges. The SoloSeries' **Smart Level Ink Detection System**, which provides ink level monitoring to ensure complete ink usage and product safety, will not be functional if used with non-Foxjet ink cartridges.

SoloSeries IS:



Weight

4.2 lbs (1.9 kg) without ink cartridge

5.4 lbs (2.5 kg) with ink cartridge

Enclosure

Powder-coat painted steel

Mounting

Modular brackets included

Electrical

15 VDC from power supply to print head

Power Supply: 90-260 VAC, 50/60 Hz, 1.5 A max. (per power supply)

Normal Operating Pressure Range

4 psi to 5 psi

Cable Ports

(1) 15 VDC power supply jack

(1) Communications port

Plumbing Port

(1) Pressurized ink outlet to print heads

Environment

Ambient operating temperature: 50°F to 104°F (10°C to 40°C)

Operating Humidity: 10% - 80% RH

Tubing Limitations

Maximum horizontal tube length = 10 ft (3 m)

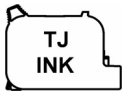
Maximum vertical tube length = 3 ft (1 m)

Print Head Limitations

Up to 8 print head cartridge stalls (eg: 8 SoloSeries45s; 4 SoloSeries90s; 4 SoloSeries45s with 2 SoloSeries90s, etc.)

Ink Type

Dye base



Ink Cartridge: The SoloSeries has been engineered and designed to work with Foxjet ink cartridges. The SoloSeries' **Smart Level Ink Detection System**, which provides ink level monitoring to ensure complete ink usage and product safety, will not be functional if used with non-Foxjet ink cartridges.

Marksman HHI:

Weight

1.8 lbs (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

Arial 30, 75, 150, 225, and 300 (0.1in / 2.5 mm, 0.25 in / 6.3 mm, 0.5 in / 12.7 mm, 0.75 in / 19.05 mm, and 1 in / 25.4mm).

Storage

128 MB flash memory

Print Speed

Up to 200 fpm

Maximum Lines of Print

5 per print cartridge through any given vertical line.

Print Fields per Line

At least 3 52-character fields per print line; more when fields have less than 52 characters.

Maximum Product Length

108 inches (2743 mm)

Maximum Repeat Print Distance

108 inches (2743 mm)

Maximum Number of Print Heads Per Controller

Up to 8 print cartridges per COM port in any combination (eg: 4 SoloSeries45s and 2 SoloSeries90s; 8 SoloSeries45s; 4 SoloSeries90s)

Ports

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

Electrical

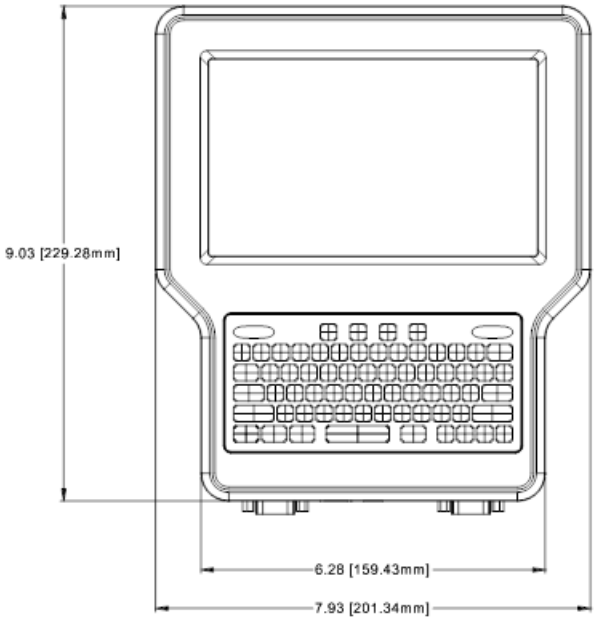
15 VDC from power supply to controller

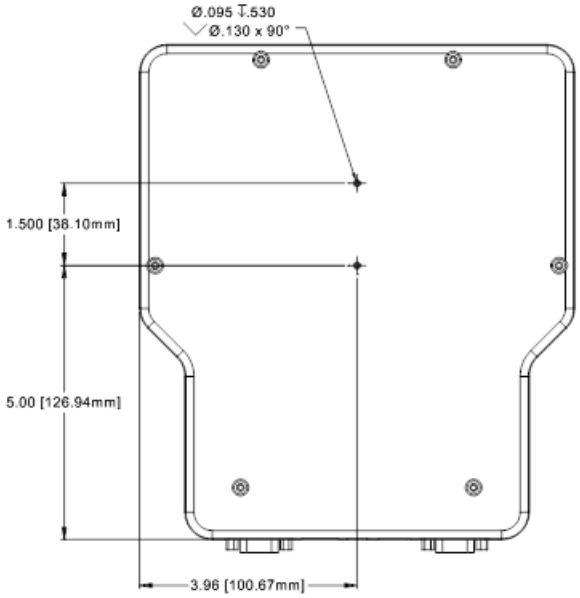
Power Supply: 90-260 VAC, 50/60 Hz, 1.5A max. (per power supply)

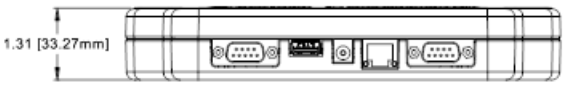
Environment

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

100 feet (30.5 m)

Bar Codes Supported

GTIN-12 (UPC-A), EPC-E, GTIN-13 (EAN-13), GTIN-8 (EAN-8), Code 39, GTIN-14 (UCC-128), Code 128, Data Matrix

Appendix B: Theory of Operation

SoloSeries Series Print Heads

TIJ Technology

The SoloSeries print head uses Thermal Ink Jet (TIJ) technology as implemented on the hp® 45A cartridge. TIJ technology works by rapidly heating the ink. As the ink heats it expands and is ejected from the print cartridge orifices. Because the individual orifices are very small, many more can be compacted in the same amount of space as conventional print technologies. With more orifices per vertical inch / millimeter, a much higher resolution image can be produced.

SoloSeries Inkjet Similarities and Differences

A SoloSeries print head can operate stand-alone or in concert with other SoloSeries print heads connected one to another in a daisy chain configuration. Up to eight SoloSeries45 or four SoloSeries90 print heads can be daisy chained. SoloSeries print heads can be controlled by the Marksman HHI controller, from a PC or labtop using the included GUI software interface program, or by a user developed application.

SoloSeries Series print heads can print up to five lines of print, using any combination of the various print field types supported, including fixed text, date/time codes, product counts, variable fields, logos, and a variety of bar codes, including Data Matrix 2-D codes.

Unlike other Foxjet inkjet technologies, the SoloSeries print heads store and process the currently printing message internally. This allows the print heads to be disconnected from the controlling device and operate "stand alone" once the print information has been uploaded to the heads. However, print head and print message status is unavailable to the the controlling device once the print heads are disconnected.

Ink Cartridge Ink Status

Each ink cartridge contains approximately 42 mL of ink and has been programmed at Foxjet so as to make full use of the SoloSeries **Smart Level Ink Detection System**. When a new cartridge is snapped into a SoloSeries print head it is given an identity code so that its ink level may be monitored. As the ink depletes to 10% ink remaining, an "Ink Low" condition occurs and the red LED on the rear of the print head turns on steady. The red LED changes to slow flashing, indicating "Ink Out", when there is minimal ink remaining, and significant print degradation is imminent. Ink status is reported back to the Marksman HHI controller or GUI software as long as they are connected to the print head daisy chain.

Marksman HHI

Functional Description

The Marksman HHI Ink Jet System prints text, autocodes (such as product counts or time and date stamps), bar codes, and/or graphics onto products as they travel by conveyor past stationary print heads. Print can be on any one of, or a combination of, the product's sides. Print speed is controller by a conveyor mounted encoder or a built-in fixed speed encoder. Products are detected using a photosensor. A graphical user interface with color LDC, touch screen, and 70-key QWERTY keypad provides for easy and intuitive system operation.

Power

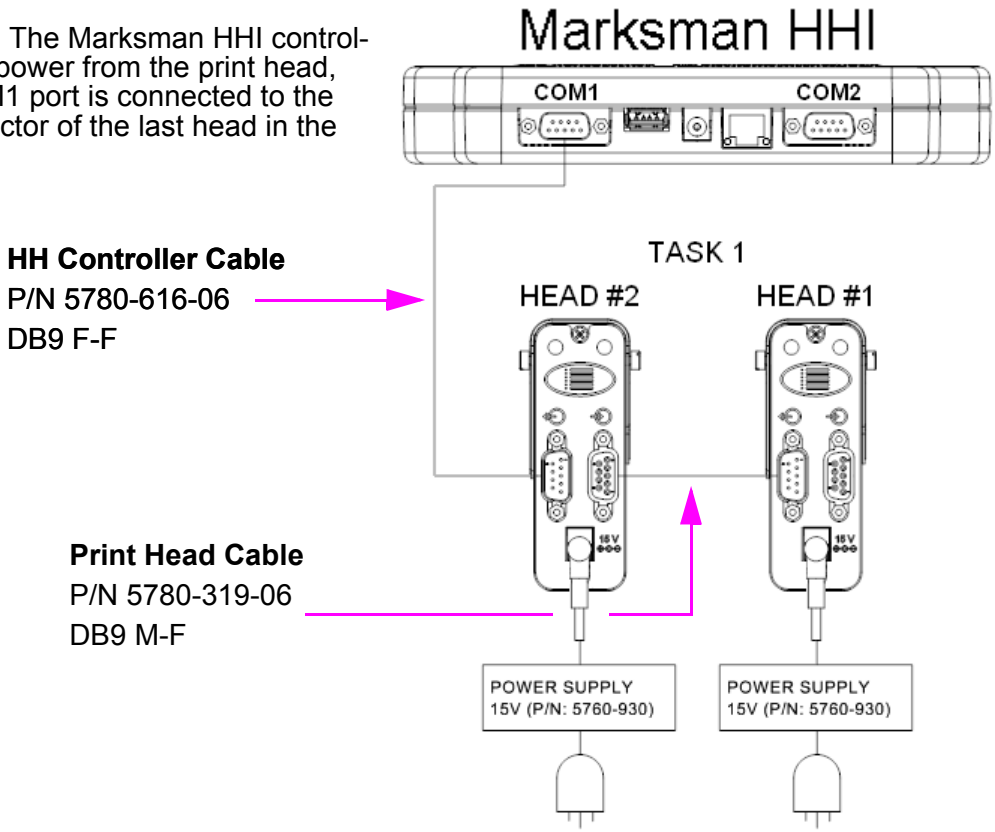
The Marksman HHI draws its power through either one of its serial port connectors, either from the print head directly attached to the port, or in applications where the optional accessory hub is used, from the hub. Alternately, with no print heads attached, the Marksman HHI may be powered by an optional 15VDC desktop power supply plugged into its power jack.

Battery Backup - A 3V battery on the CPU Board maintains the contents of system SRAM and keeps the real time clock running during power outages or when the Marksman HHI is not plugged into a power source.

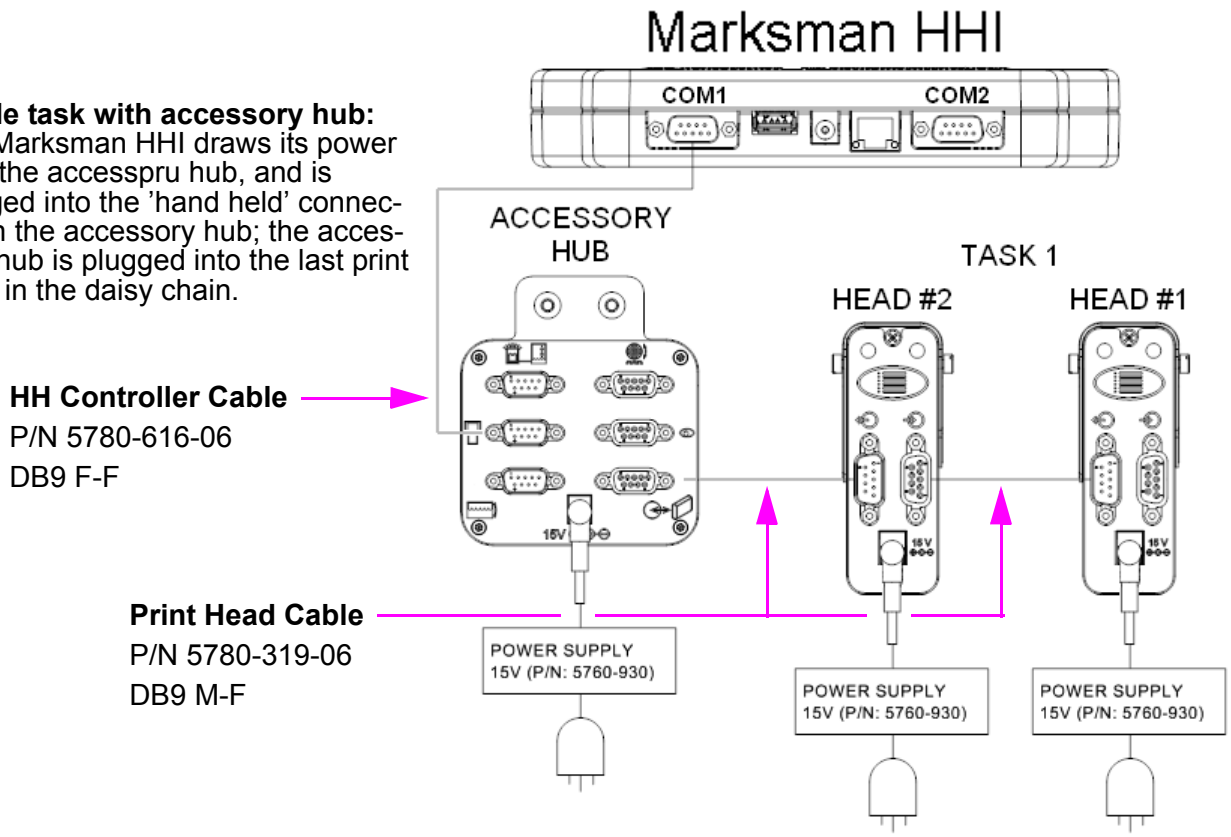
Please note that power is applied to the Marksman HHI even when it is "turned off." When turned off using the OFF button on the keyboard, the Marksman HHI enters a sleep mode where it responds to nothing but the ON button. All voltages are present while sleeping. The only way to completely remove power is to unplug the unit.

Marksman HHI Power Option Cabling Diagrams

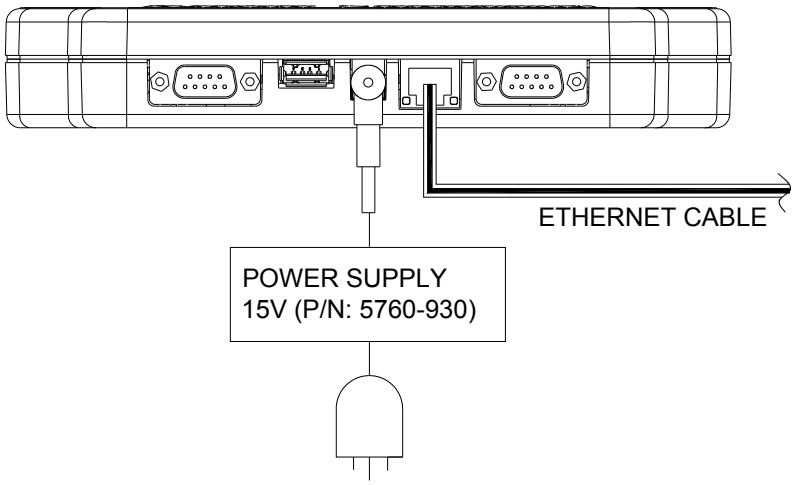
Single Task: The Marksman HHI controller draws its power from the print head, and the COM1 port is connected to the output connector of the last head in the chain.



Single task with accessory hub:
The Marksman HHI draws its power from the accesspru hub, and is plugged into the 'hand held' connector on the accessory hub; the accessory hub is plugged into the last print head in the daisy chain.

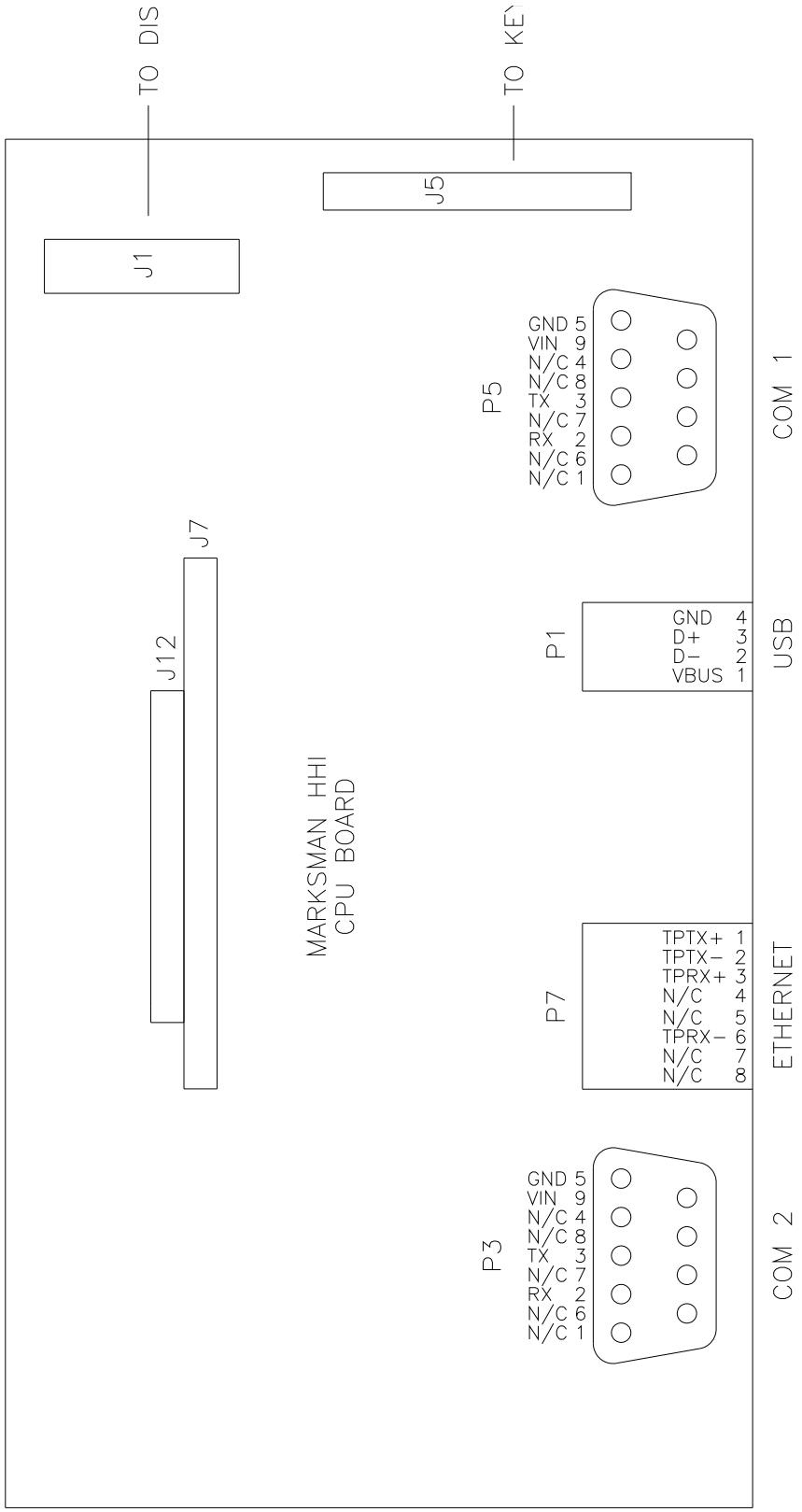


When using Ethernet to communicate directly to the Marksman HHI it must be powered by a separate desktop power supply plugged into its power jack.



Interconnect Diagram

Marksman HHI Controller CPU Diagram



Appendix C: Part Numbers - Consumables and Service Parts

Consumables

TJ INK

Ink Cartridge: The SoloSeries print head has been engineered and designed to work with Foxjet ink cartridges. The SoloSeries' **Smart Level Ink Detection System**, which provides ink level monitoring to ensure complete ink usage and product safety, will not be functional if used with non-Foxjet ink cartridges.

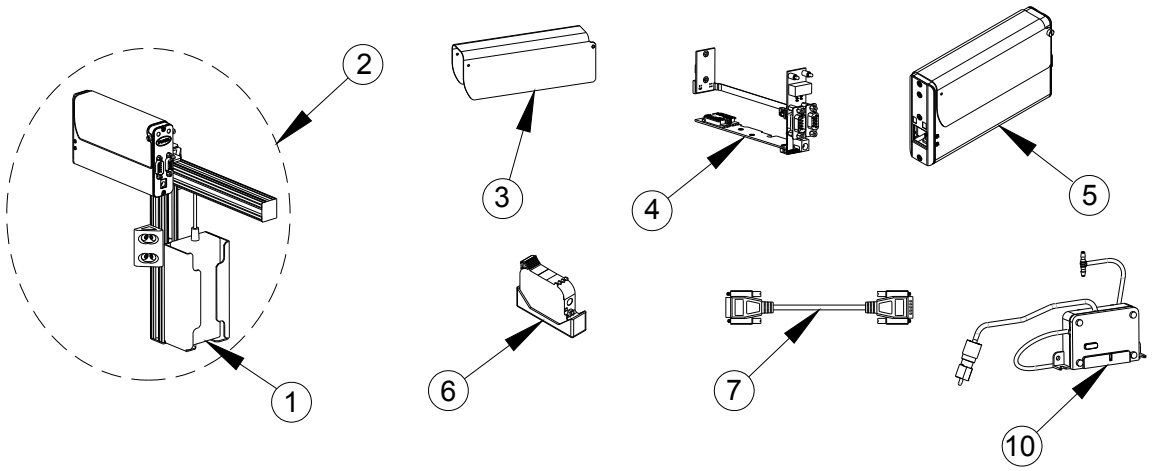
Inks

Part No.	Description	Package	Shelf Life
5780-201FX	Solo 100 Porous Media, Black	5 Cartridges	1 year
5780-201RFX	Solo 100 Porous Media, Red		
5780-202FX	Solo 200 Porous Media, Black, Extended Decap		
5780-212FX	Solo 300NP Non-Porous Media, Black		
5780-235FX	Solo 200 Barcode, Porous Media, Black		
5780-220FX	Solo 100 Porous Media, Bulk Ink, Black		
5780-219FX	Solo 100 Porous Media, Bulk Ink, Black	One 350ml Ink Cartridge	1 year

Service Parts

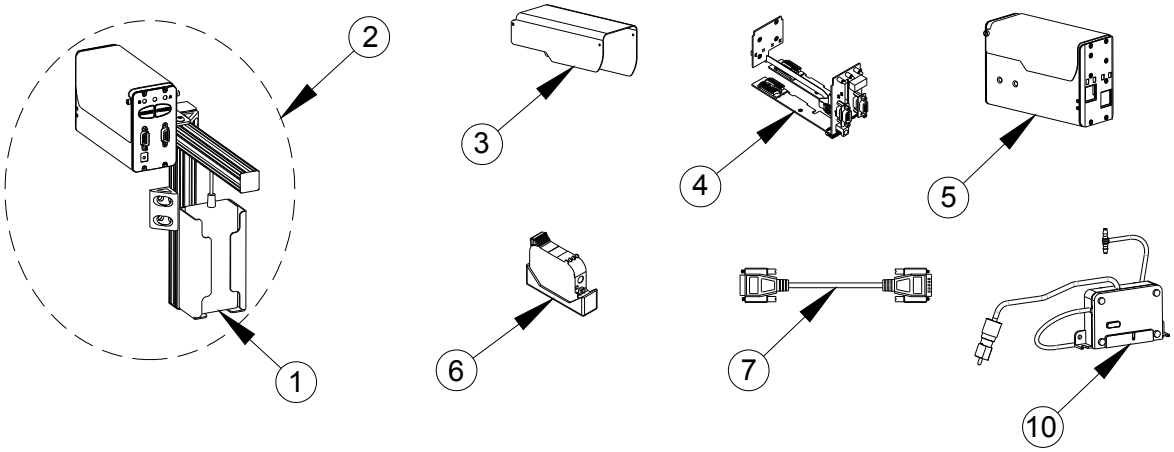
SoloSeries45

Item	Kit No.	Description
1	5760-302	Power Supply, Print Head
2	5780-002FX	SoloSeries45 Complete Print Head Kit with Mounting Bracketry, Power Supply, Data Cable, & PC Software
3	5780-203FX	Cover, Enclosure, Standard
	5780-203BIFX	Cover, Enclosure, Bulk Ink
4	5780-226FX	PCB Replacement Set
5	5780-205FX	Print Head Replacement, Standard
	5780-217FX	Print Head Replacement, Bulk Ink
6	5780-208	Boot, Cartridge Cap
7	5780-319-10	Cable, Print Head, 10'
8	2464-182-25	Extension Cable, Print Head, 25' (not shown)
9	2464-182-50	Extension Cable, Print Head, 50' (not shown)
10	5780-231	Regulator Replacement, Bulk Ink
11	5780-229FX	Upgrade Kit, Bulk Ink Print Head (Includes Item 3-bottom and Item 10)



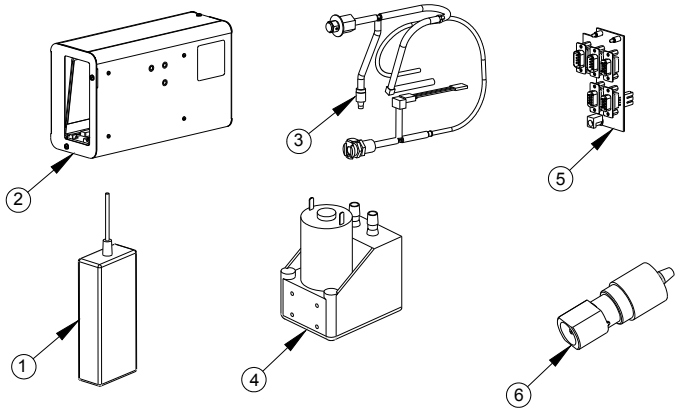
SoloSeries90

Item	Kit No.	Description
1	5760-302	Power Supply, Print Head
2	5780-007FX	SoloSeries90 Complete Print Head Kit with Mounting Bracketry, Power Supply, Data Cable, & PC Software
3	5780-225FX	Cover, Enclosure, Standard
	5780-225BIFX	Cover, Enclosure, Bulk Ink
4	5780-221FX	PCB Replacement Set
5	5780-215FX	Print Head Replacement, Standard
	5780-218FX	Print Head Replacement, Bulk Ink
6	5780-208	Boot, Cartridge Cap
7	5780-319-10	Cable, Print Head, 10’
8	2464-182-25	Extension Cable, Print Head, 25’ (not shown)
9	2464-182-50	Extension Cable, Print Head, 50’ (not shown)
10	5780-231	Regulator Replacement, Bulk Ink
11	5780-228FX	Upgrade Kit, Bulk Ink Print Head (Includes Item 3-bottom & 2 ea. Item 10)



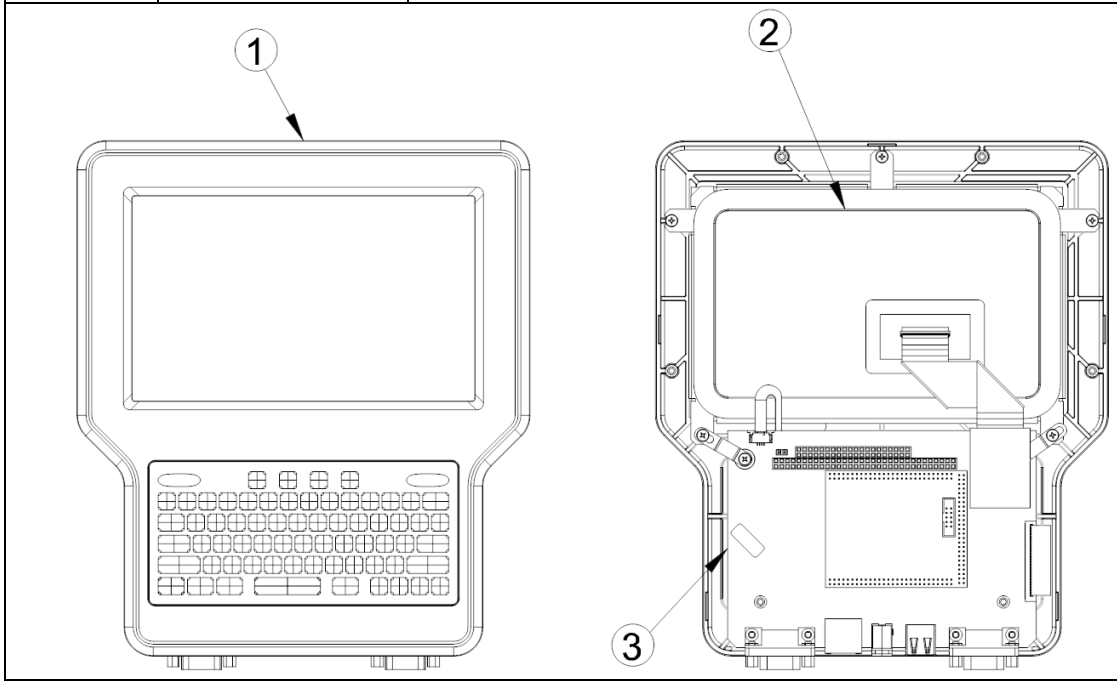
SoloSeries IS

Item	Kit No.	Description
1	5760-302	Power Supply, 15VDC, Bulk Ink Supply
2	5780-216FX	Replacement Bulk Ink Supply
3	5780-222	Internal Tubing and Fitting Replacement
4	5780-223	Vacuum Pump Replacement
5	5780-224	PCB Replacement
6	5780-209	Septum Fitting Replacement
7	5780-211	External Tubing and Fittings (not shown)



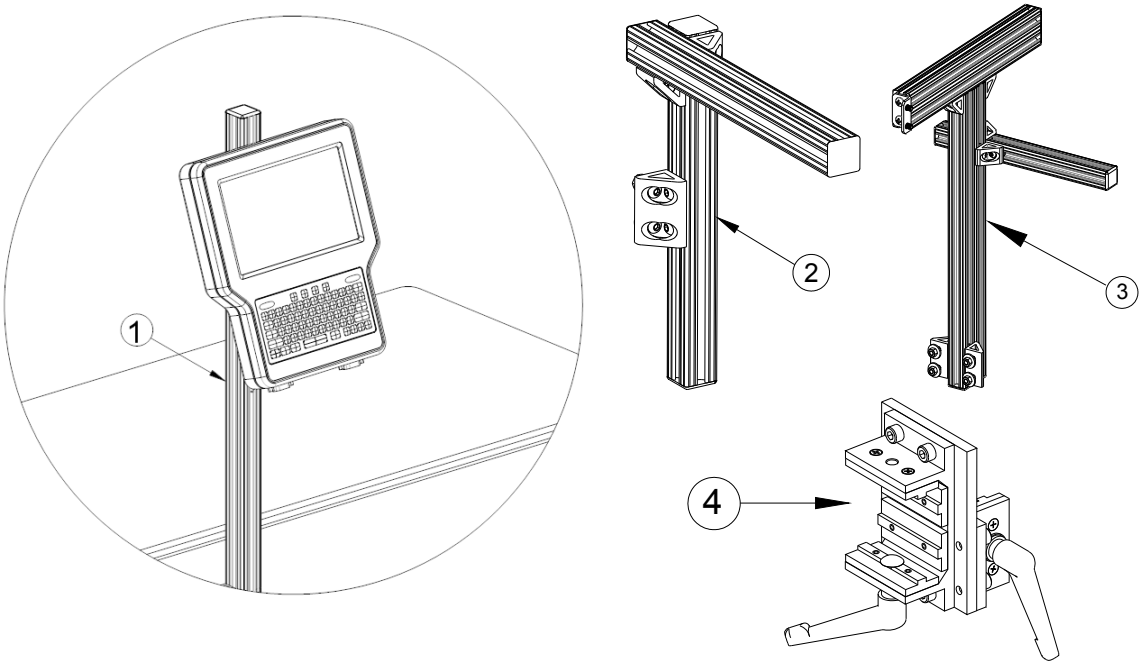
Marksman HHI

Item	Kit No.	Description
1	5780-015FX	Marksman HHI Controller
2	5780-232	Color Display Replacement
3	5780-233	CPU PCB Replacement



Bracketry

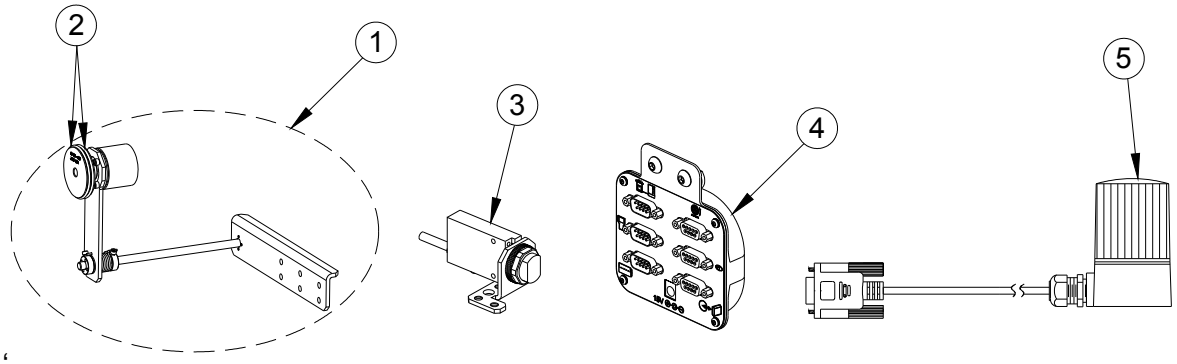
Item	Kit No.	Description
1	5780-234	Bracketry, Marskman HHI Mounting
2	5780-200	Bracketry, SoloSeries Print Head Mounting
3	5780-227	Bracketry, Print Down
4	5780-230	Bracket, Linear, Tool-less



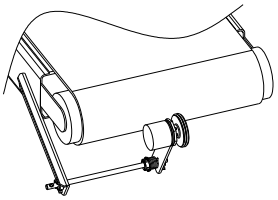
Optional Equipment

Encoder, Photocell, Accessory Hub, and Beacon

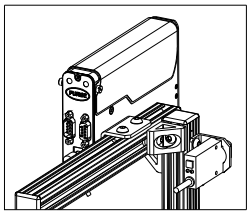
Item	Kit No.	Description
1	5760-820-IJ	Encoder Assembly with Mounting Bracket & 25’ Cable
2	5765-206	Encoder O-ring Replacement
3	5760-383	Photocell
4	5780-010FX	Accessory Hub with Power Supply
5	5780-214	Beacon



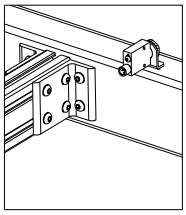
TYPICAL ENCODER MOUNTING ON OPEN AREA OF CONVEYOR BELT



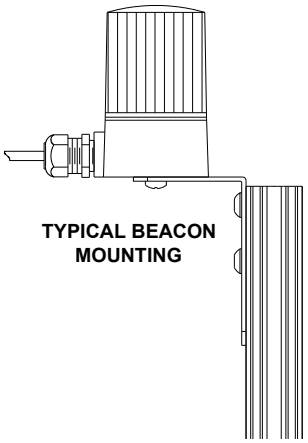
TYPICAL PHOTOCELL MOUNTING



BRACKETRY MOUNTING

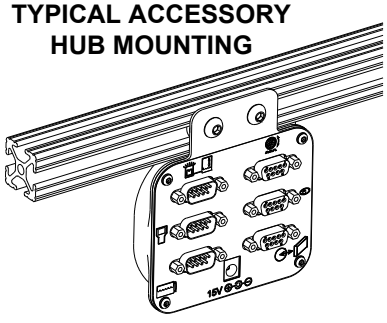


CONVEYOR MOUNTING

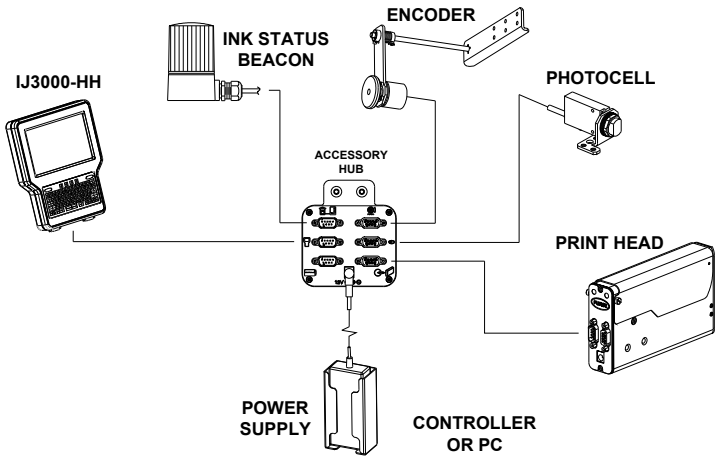


TYPICAL BEACON MOUNTING

TYPICAL ACCESSORY HUB MOUNTING

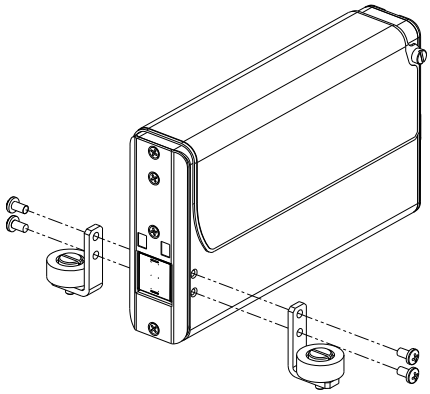


ACCESSORY HUB CONNECTIVITY

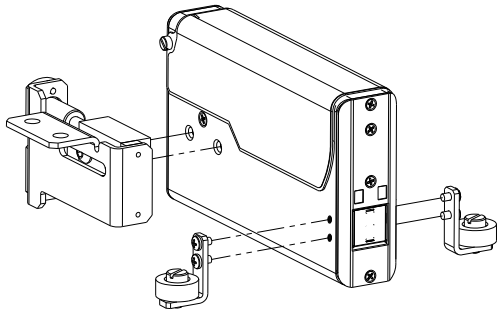


Roller & Retractor Bracketry

Item	Kit No.	Description
1	5780-206	Roller Bracket Only
2	5780-207	Roller and Retractor Bracket



Roller Bracket Only



Roller & Retractor Bracketry

Maintenance

Item	Kit No.	Description
1	1901-398	Hand Cleaner, Reduran
2	5760-832	Sponge Swabs, Qty. 100
3	6600-171	Lint-free Wipe Cloths

Appendix D: File Backup and Restore

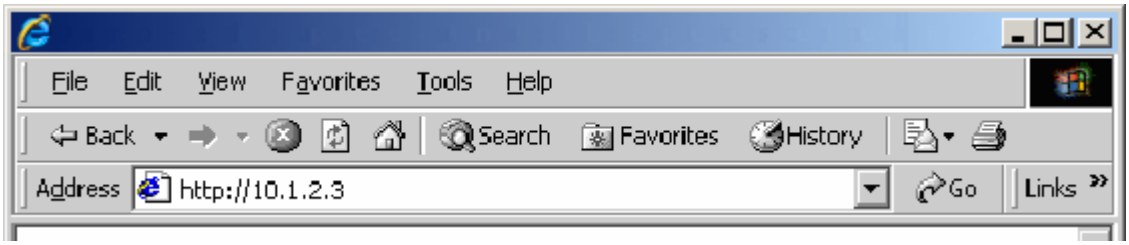
Use these procedures for making archival copies of the system configuration and print message files, and for preserving the system's configuration and print messages during firmware upgrades. File types saved during a backup are .cfg, .prd, .bmp and .alp. These are the system configuration files, message files, logo files and label files, respectively.

These instructions assume the Marksman HHI controller is already connected, via Ethernet, to a PC. If not, please refer to *"Appendix E: Configuring a PC to Communicate with Marksman HHI" on page 46*.

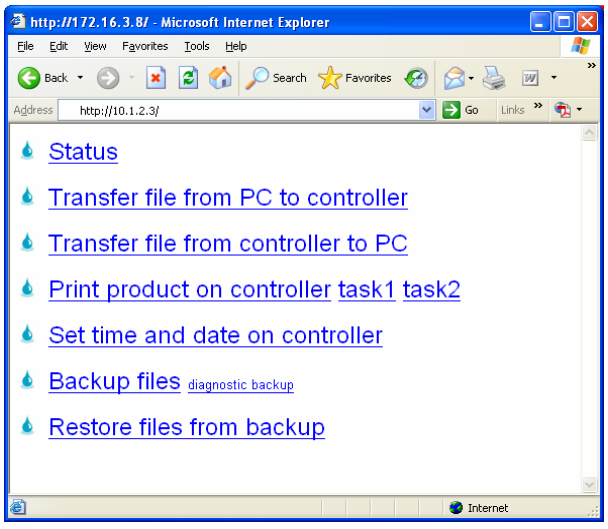
1. Obtain the Marksman HHI controller's IP address. Most Marksman HHI controllers have an IP address of **10.1.2.3**. It may be different if the controller is networked with other Marksman HHIs or other devices. If the IP address is unknown, go to the controller, and from the **Home Screen**:

- Touch the **Control Panels** button to open the Control Panels Menu.
- Touch the **Network** button on the Control Panels Menu to open the Network Setup Screen.
- Touch the **IP Addresses** tab to display the system's IP addresses.
- Record the Marksman HHI's IP address (it's the top one).

2. On the PC, start Microsoft Internet Explorer (must be version 3.2 or higher) or another web browser.
3. In the browser's address box type in "http://", followed by the controller's IP address. See the illustration below:

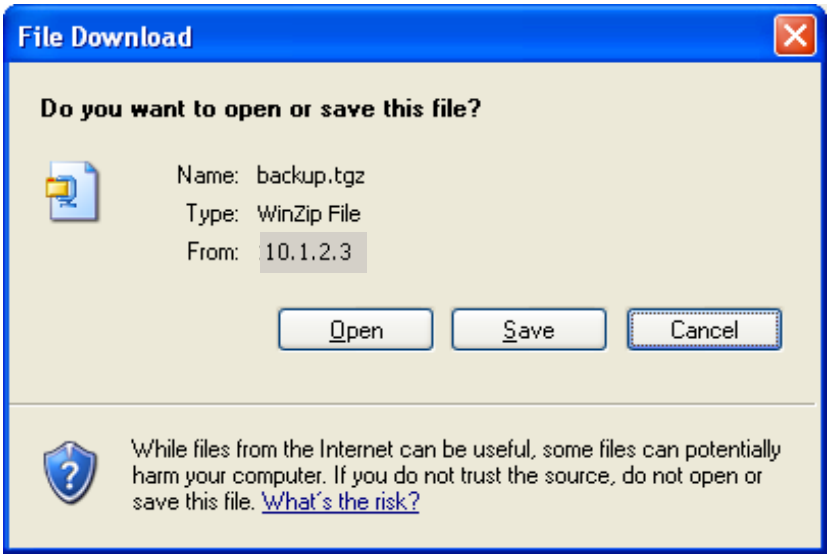


4. Press **Enter**. The web page shown below should appear.

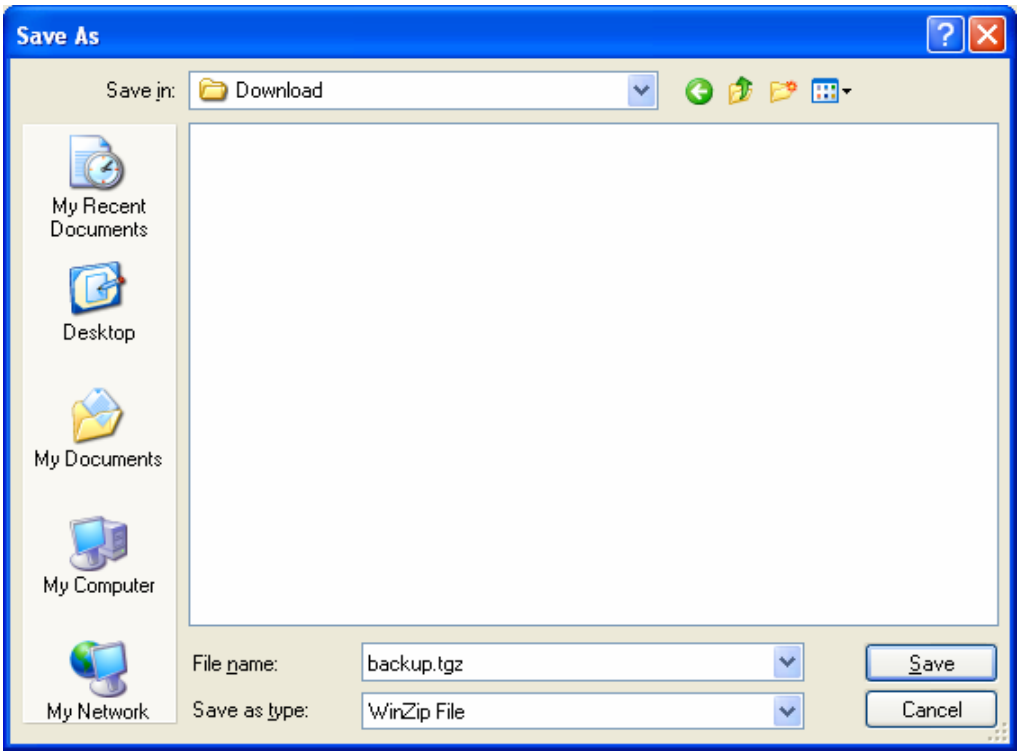


File Backup

To backup the system files, click the **Backup files** link. The dialog box shown at right (or a similar dialog box) will appear.



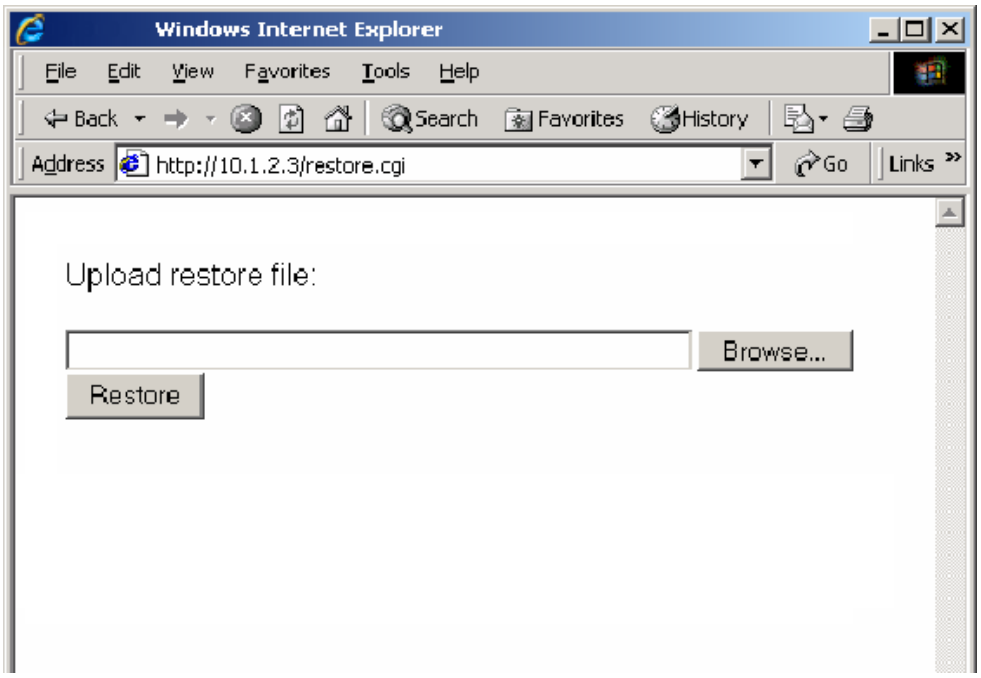
Click the **Save** button. A **Save As** dialog appears.



The Marksman HHI files backed up are compressed and put into a single file, and are given the default name and file extension **backup.tgz**. Following normal Windows® conventions, the backup file may be renamed and given any extension, and saved in any folder desired. To save the backup file with an extension other than .tgz, open the **Save as type** combo box and select **All Files**.

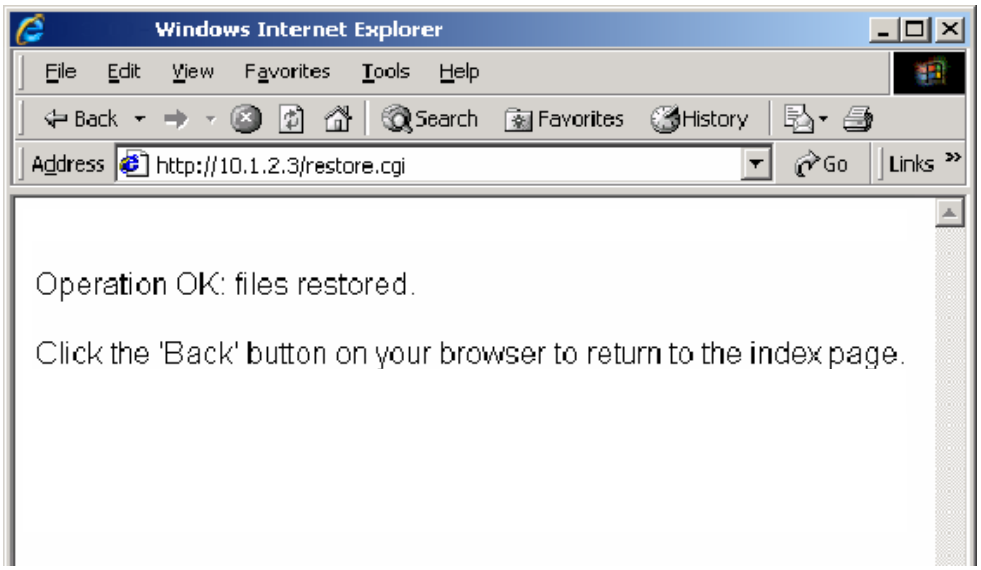
Restoring Backed-Up Files

To restore the controller's backed up system files, click the **Restore files from backup** link. The web page shown below appears.



Click the **Browse...** button to locate and select the backup file to be sent to the controller.

Click the **Restore** button to send the file to the controller. If the file transfer is successful, the web page shown below will be displayed.

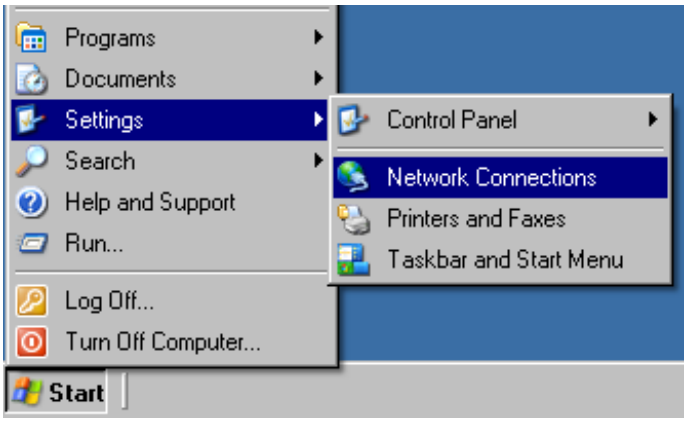


Appendix E: Configuring a PC to Communicate with Marksman HHI

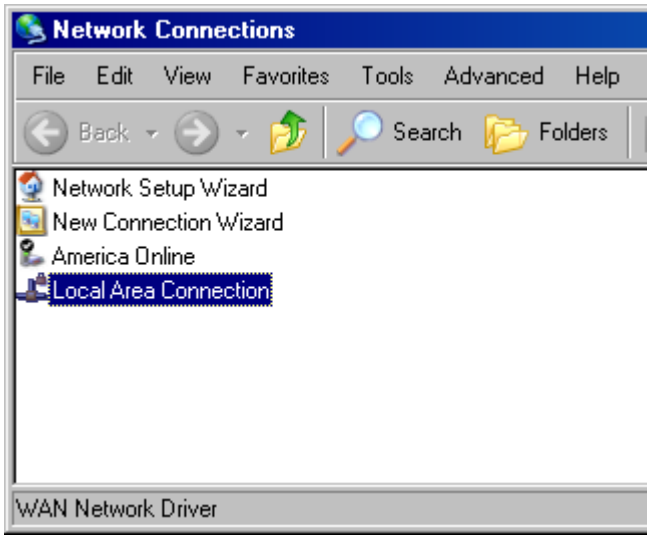
This appendix has instructions for setting the IP address and subnet mask of the PC so it can communicate with the Marksman HHI Controller. Included are instructions for Windows XP®, Windows 2000®, Windows 98®, and Windows 95®.

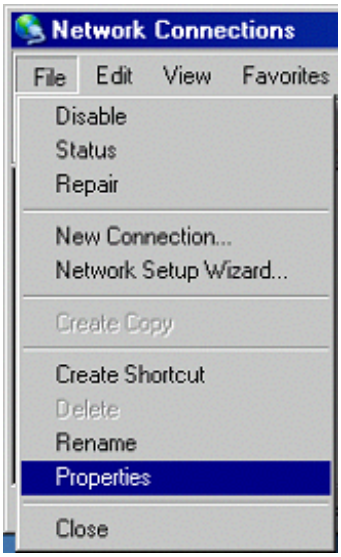
Windows XP®

1. Open the **Start** menu; select **Settings**, then **Network Connections**.

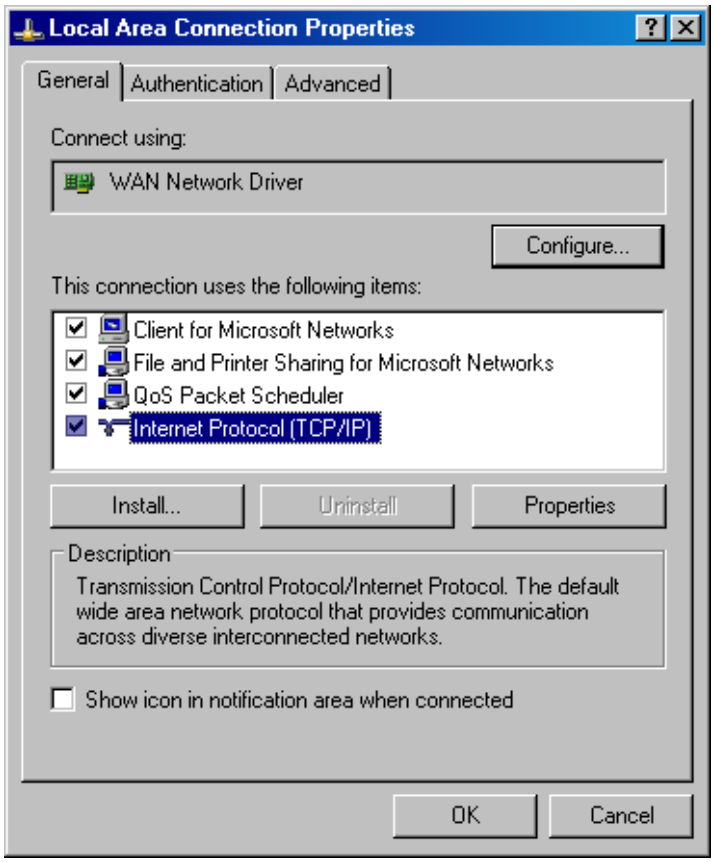


2. Click **Local Area Connection**, then open the **File** menu and select **Properties**.

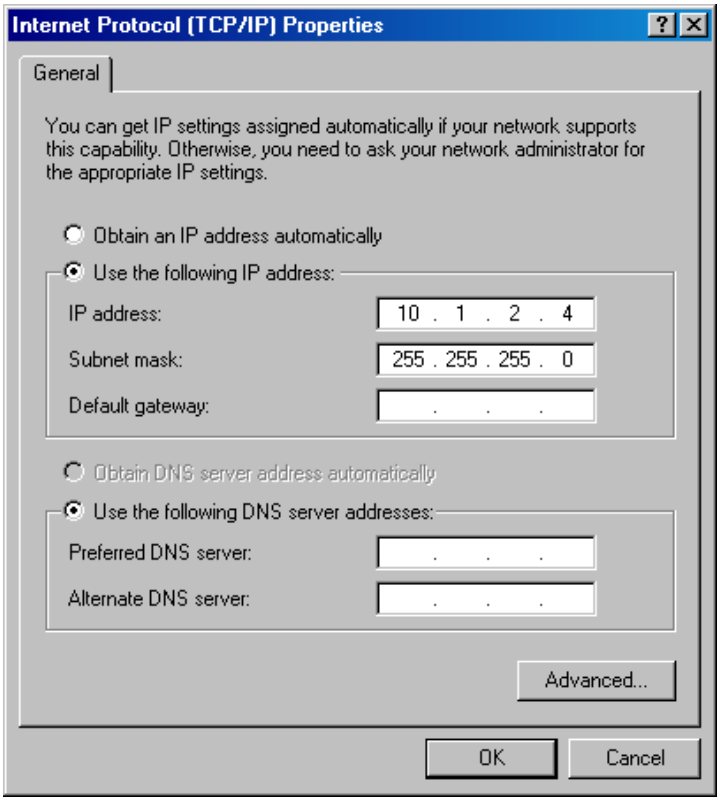




3. Select **Internet Protocol (TCP/IP)** then click the **Properties** button.

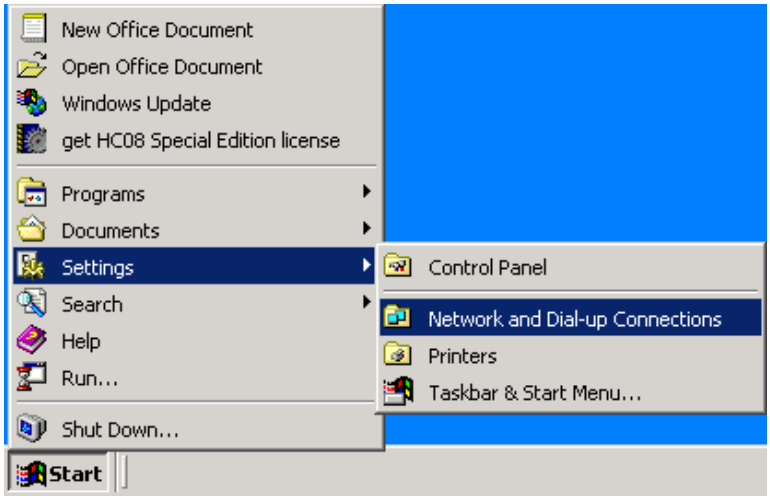


4. Click the **Use the following IP address** radio button. Enter an IP address of **10.1.2.4**, a subnet mask of **255.255.255.0**, and click the **OK** button.

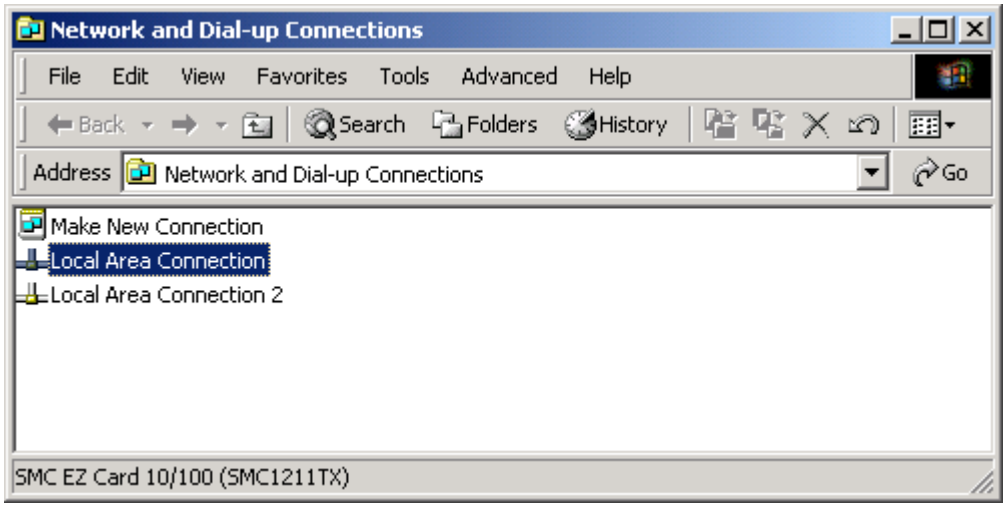


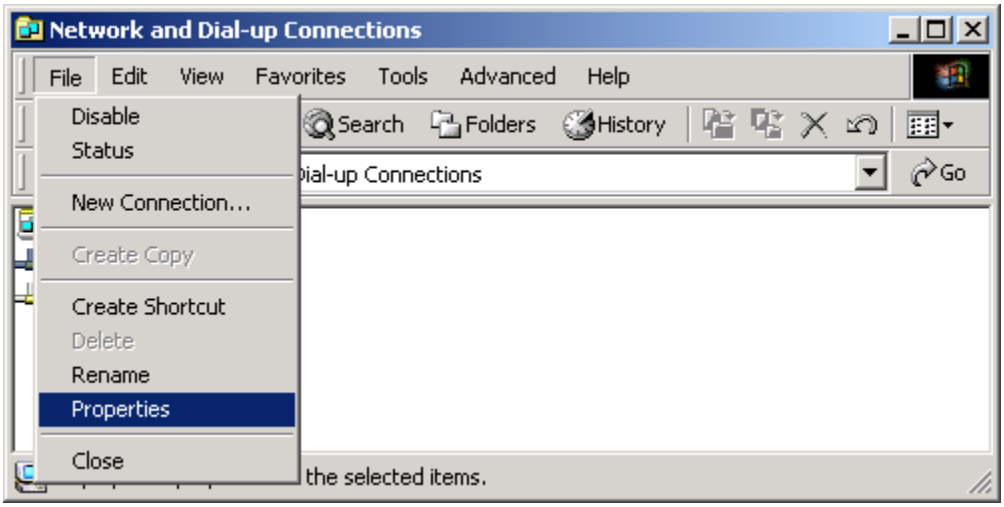
Windows 2000®

1. Open the **Start** menu; select **Settings**, then **Network and Dial-up Connections.**

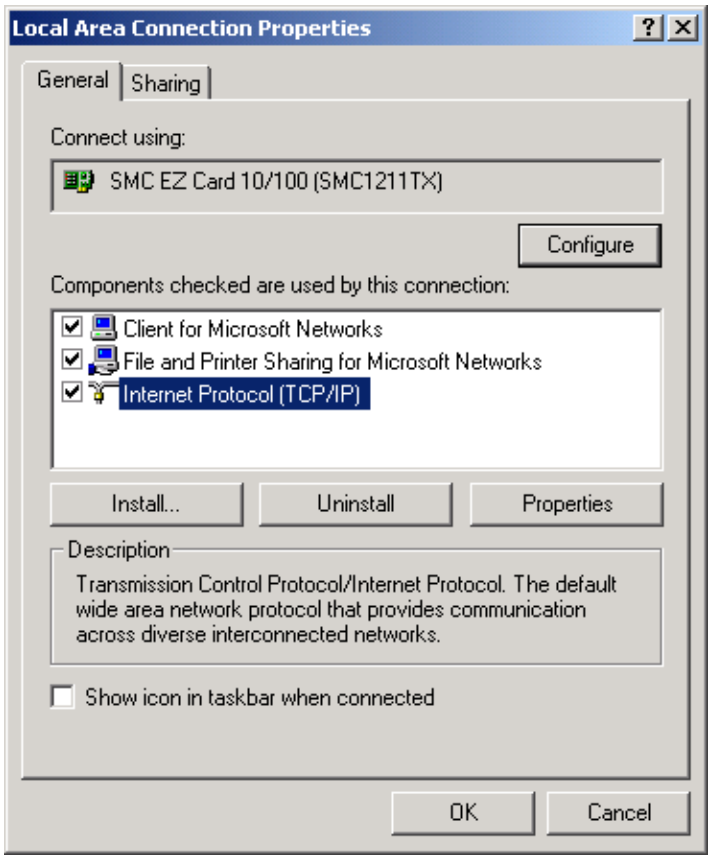


2. Click the desired connection, then open the **File** menu and select **Properties**.

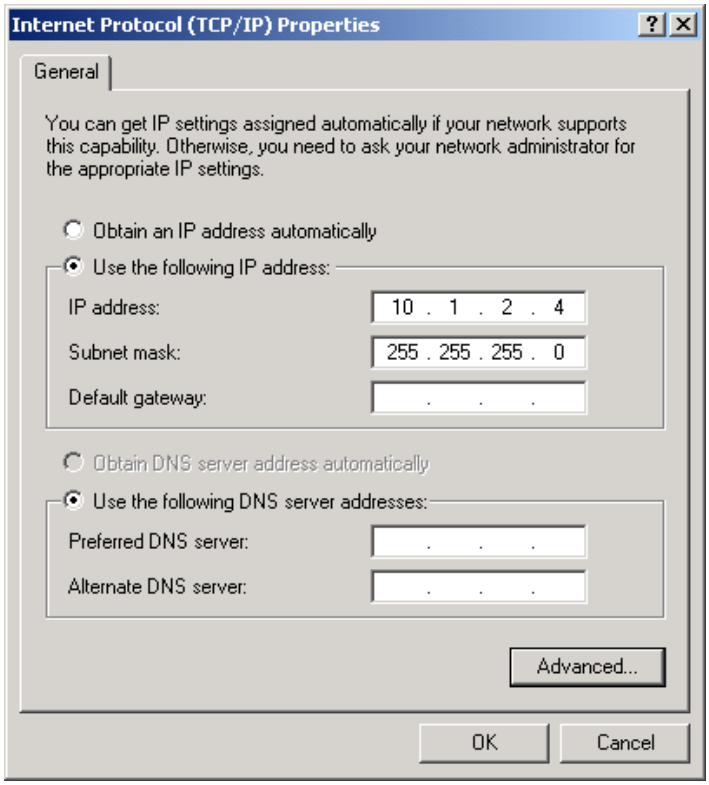




3. Select **Internet Protocol (TCIP/IP)** then click the **Properties** button.



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 F: Font Samples

Arial 30 - 1/10 in (2.54 mm):

AaBbCcDdEeFf
1234567890

Arial 75 - 1/4 in (6.35 mm):

AaBbCcDdEeFf
1234567890

Arial 150 - 1/2 in (12.7 mm):

AaBbCcDdEeFf

1234567890

For best results printing the next two fonts use an external encoder. The top images were printed with an external encoder. The lower images were printed using the "Auto Speed Detect" mode (without external encoder) from the controller or GUI software.

Arial 225 - 3/4 in (19.05 mm):

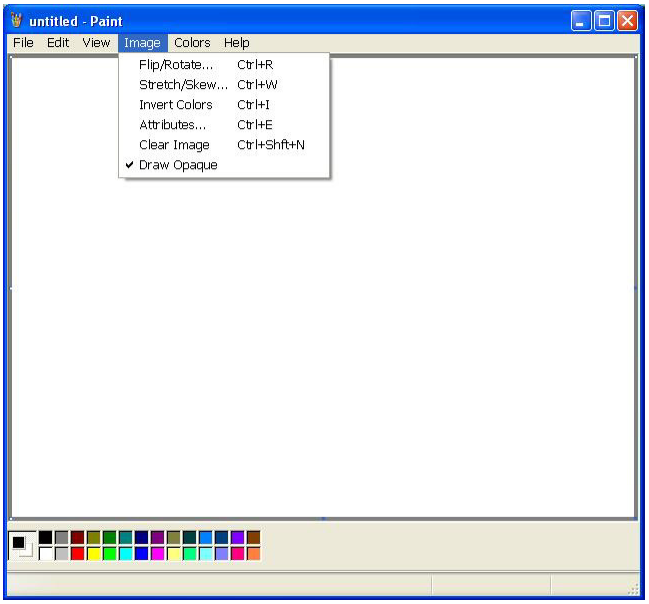
AaBbCcDdEe
AaBbCcDdEe

Arial 300 - 1 in (25.4 mm):

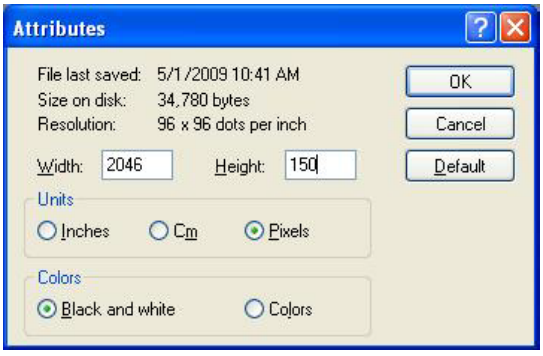
AaBbCcDd
AaBbCcDd

Appendix G: Creating Logo Files

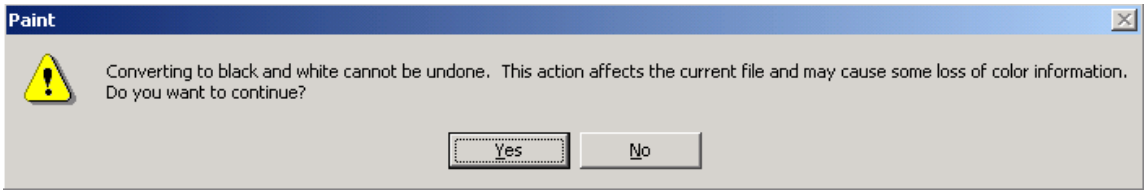
Open **Paint** from a PC by selecting **Start, Programs, Accessories,** and then **Paint.** Bring up the **Attributes** dialog box by selecting **Image** and then **Attributes**.



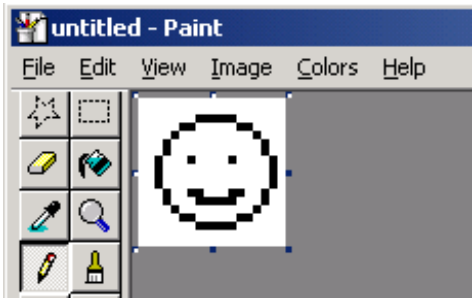
Enter the **Width** and **Height** of the logo in **Pixels**. For practical purposes the maximum height of a logo is150 pixels if the logo is prined with a SoloSeries45 print head, and 300 pixels if printed with a SoloSeroes90 print head. The absolute maximum logo height is 1200 pixels, but logos that 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 n when printed at 300 dpi.) Select **Black and white** for the Colors.



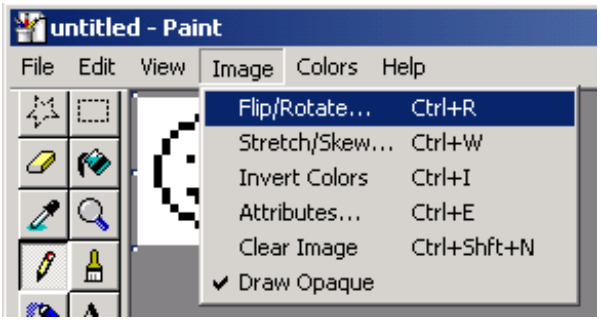
Choose **Yes** at the screen prompt to convert to black and white if applicable.



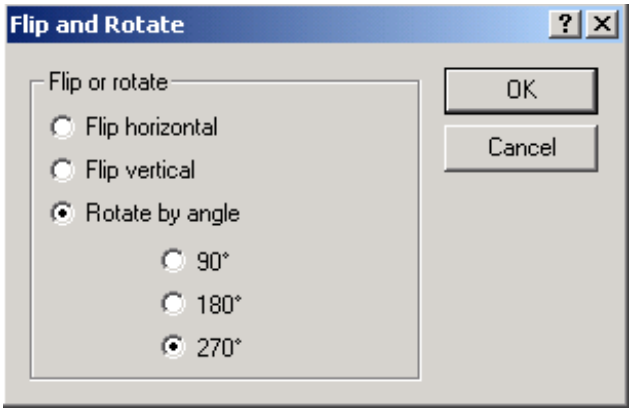
Define the pixels of the logo using the drawing tools, or copy and paste an image from another document.



Bring up the **Flip and Rotate** dialog by selecting **Image**, **Flip/Rotate**.



Select **Rotate by angle**, then **270°**. Click **Ok**.



From the **File Menu**, select **Save As** and save the logo in a directory location that you will remember.

NOTE: If the print heads are being controlled via a PC using the InkJet Demo software rather than an Marksman HHI controller, then store the logo in **c:\Program Files\Ink-Jet\bmps**.

Appendix H: Uploading Files to the Print Head and File Management

CAUTION: Power should be disconnected from the print head prior to connecting or disconnecting any external devise, including: PC, handheld, controller or print head daisy chain cables. Electrical arcing may occur if external cabling is connected or disconnected while power is supplied to the unit.

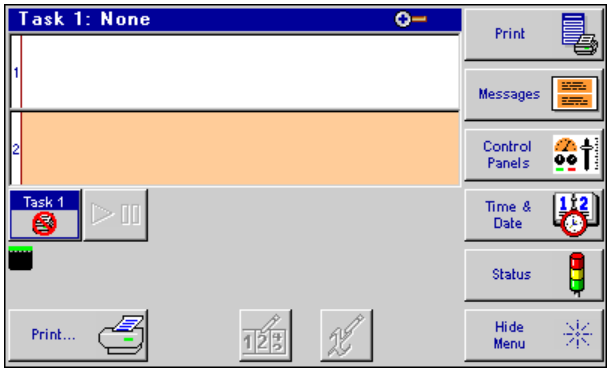
NOTE: Files can **not** be transferred while thermal jet print heads are printing. Pause print first.

Font and bitmap (logo) files are uploaded to the print head via the Marksman HHI controller or PC Inkjet Demo software using the File Manager on the System Utilities screen. In addition to uploading files, the File Manager also allows removal of files from the print heads; however, files cannot be copied from a print head. During the upload process, files are simultaneously added to or removed from all print heads on the daisy chain being addressed. Operations on an individual print head are possible only when it is the sole head on the daisy chain.

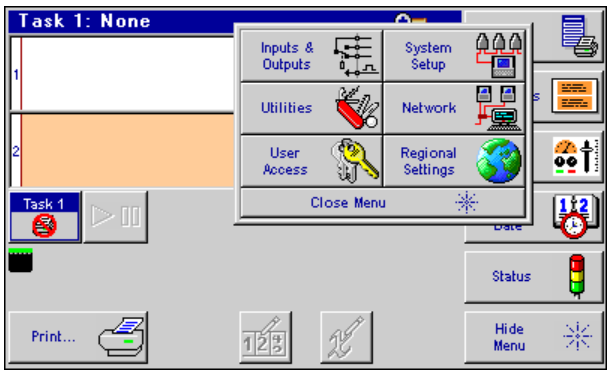
NOTE: A .bmp (logo) or .fnt (font) file must reside on both the controller and print head(s) to be correctly selected, displayed, and printed. Refer to “Appendix D: File Backup and Restore” on page 43, step 4. Select the "Transfer file from PC to controller" option. Browse the PC and locate the BMP. Select Ok to transfer the file to the controller.

To access the File Manager utility:

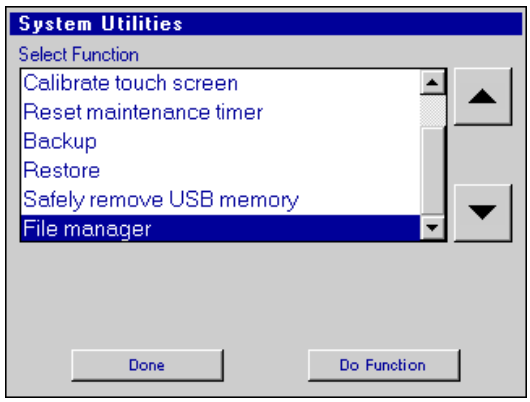
1. Touch the **Control Panels** button on the **Home** screen.



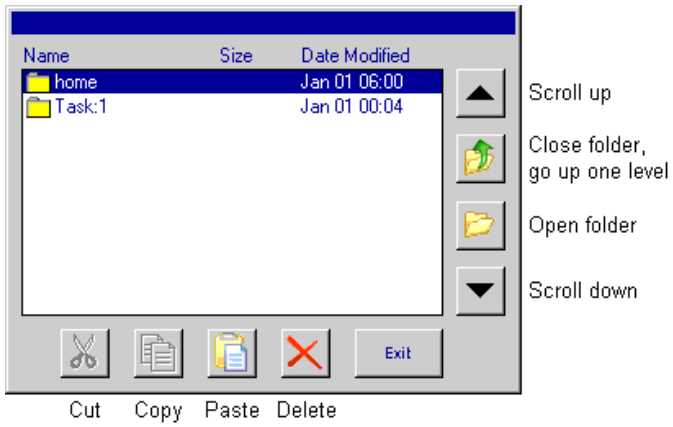
2. Touch the **Utilities** button; the **System Utilities** screen is displayed.



3. Scroll to the bottom of the utilities list and select **File manager**.



4. Touch the **Do Function** button; the **File Manager** screen is displayed.



The **home** folder contains all folders and files related to Marksman HHI operation; task folders, **Task:1** and **Task:2** (not shown), contain the font and logo files present on the print heads on their respective tasks. Task folders are present only when one or both of the controller's serial ports are configured for serial print heads. Not shown above are folders **usb0** and **usb1**, which are displayed when USB drives are plugged into the one or both of the Marksman's USB ports. The Marksman HHI controller will show only **usb0** as it has only one USB port. USB folders are not displayed when running the PC InkJet Demo program.

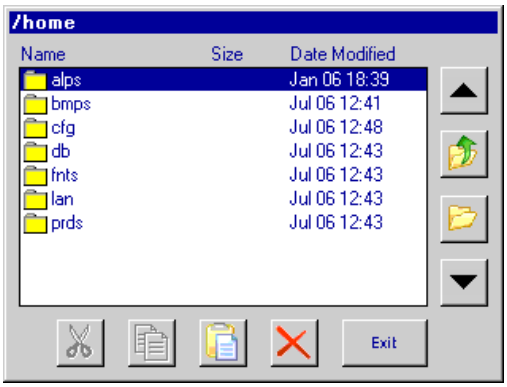
Adding Logo and Font Files

So that they may be correctly selected, displayed, and printed, logos and fonts must be stored on both the controller and the print head(s).

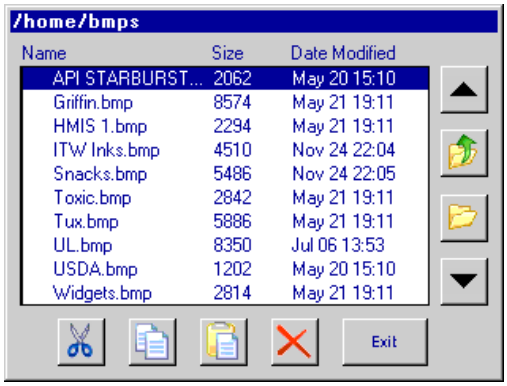
On the controller, logos are stored in the folder **/home/bmps**, and fonts are stored in the folder **/home/fnts**. Files are automatically placed in the correct folders when transferred to the controller from a PC using a web browser; they must be manually placed in the correct folder when being transferred from a USB drive using the copy-and-paste method.

Uploading a file to a print head loads the file on all print heads on the task. A step-by-step example of uploading a logo file to task 1 print heads follows. The example assumes the file being uploaded is already on the controller.

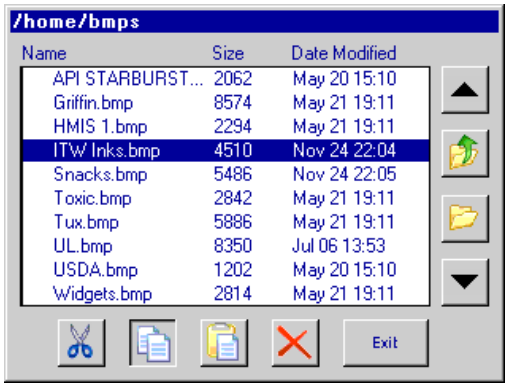
1. Open the **home** folder. The display shows the available folders and files:



2. The display shows a list of available files. Highlight the **bmps** folder with the up / down arrows and open it:



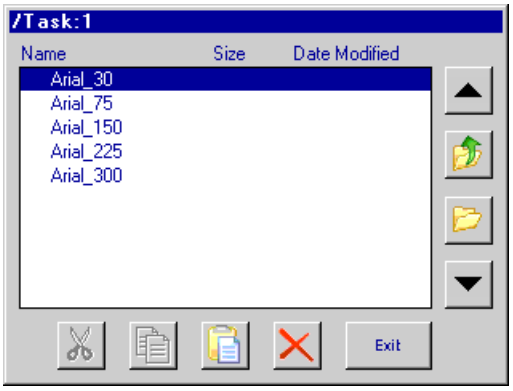
3. Select the file to be uploaded to the print head(s), and then touch the **Copy** button.



4. Close the **bmps** folder, returning to the **home** folder level.

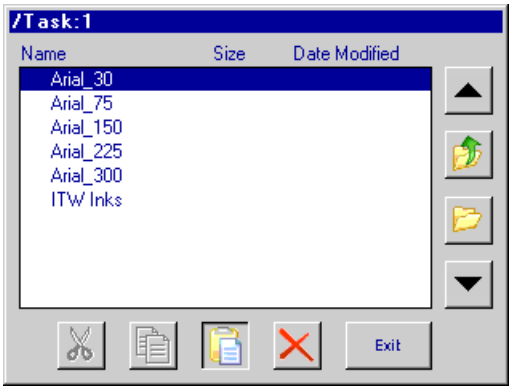
5. Close the **home** folder, returning to the top level.

6. Select and open the **Task:1** folder. The display shows a list of all files on print head #1 only; it is assumed that all print heads have the same files.



Open

7. Touch the **Paste** button. The file is uploaded to all print heads on the task, after which the file list is updated, showing the newly added file.



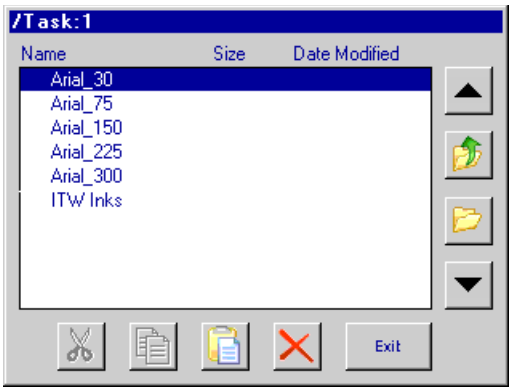
Paste

While the file is uploading an hourglass is displayed, and the red LED on the back of each of the print heads on the task's daisy chain blinks.

Removing a File

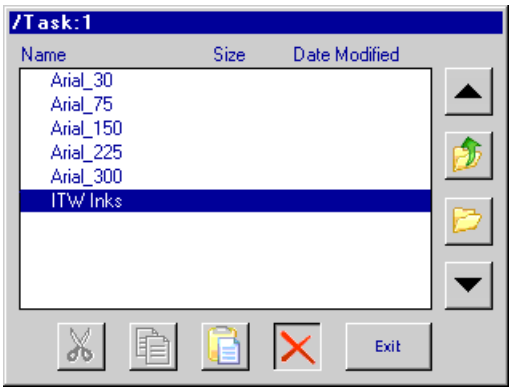
To remove a file from all print heads on a task:

1. Select and open the task folder.



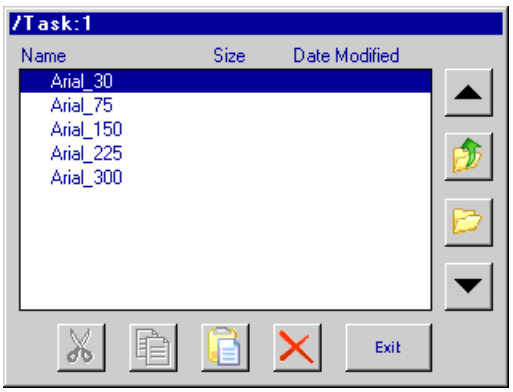
Open

2. Select the file to be deleted, and then touch the **Delete** button.



Delete

3. The file is deleted and the file list updated:



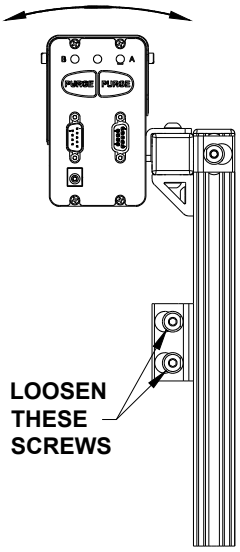
Appendix I: Communicating Directly to the Print Head

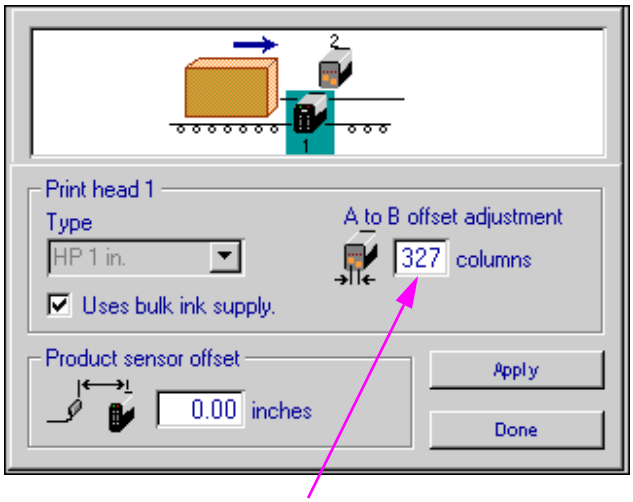
The 1/2" (12.7 mm) and 1" (25.4 mm) print heads can be controlled by direct serial communication. Refer to the serial protocol document 5780-316N when communicating directly to the print head without the use of a controller or the pc GUI software interface.

Appendix J: Aligning the 1" (25.4 mm) Print Head

NOTE: This procedure assumes that the user has already installed the equipment per the installation procedure (See “Section 2: Quick Start” on page 2.). In addition, an encoder should be used for the best horizontal alignment between both print cartridges.

1. Ensure the front face of the print head is perpendicular to the substrate being printed.
2. Create a message using the Arial 300 font and run a print sample with the actual product.
3. Observe the vertical overlap or gap between the two cartridges. If there is significant overlap, loosen the mounting screws and rotate the print head bracketry counter-clockwise. If there is a gap between the halves, rotate the bracketry clockwise.
4. Snug the mounting screws and run another print sample. If the overlap or gap is not acceptable, then repeat the previous step.
5. Repeat the previous two steps until the two cartridges are matched vertically.
6. Fully tighten the mounting hardware.
7. Now observe the horizontal alignment of the characters.
8. Horizontal misalignment can be compensated electronically through the controller or GUI software program by navigating to the **Control Panels** from the **Home Screen**, pressing **System Setup**, and then touching the print head in question.
9. An adjustment box, labeled as **A to B offset adjustment,** is available to compensate for any horizontal mis-alignment. Increase or decrease the number in the box and press **Apply**. The next print will have adjusted the alignment one way or the other. Repeat this step until the desired horizontal alignment is achieved.

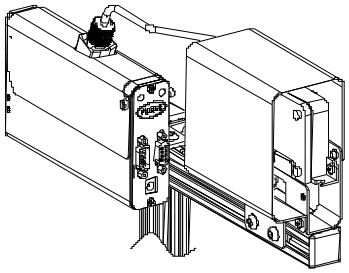




Press on this box to highlight, and then type in an adjustment value

Appendix K: Bulk Ink Supply

Wear safety goggles when working with industrial inks and solutions!



WARNING: Disconnect power during installation.

CAUTION: Sudden impact to the installed print head (caused by moving the conveyor with the print system attached or moving the print system from one location to another) can cause ink to seep out the front of the print cartridge. To keep this from happening disconnect septum fitting, remove print cartridge, and depressurize the bulk ink supply before moving the print system.

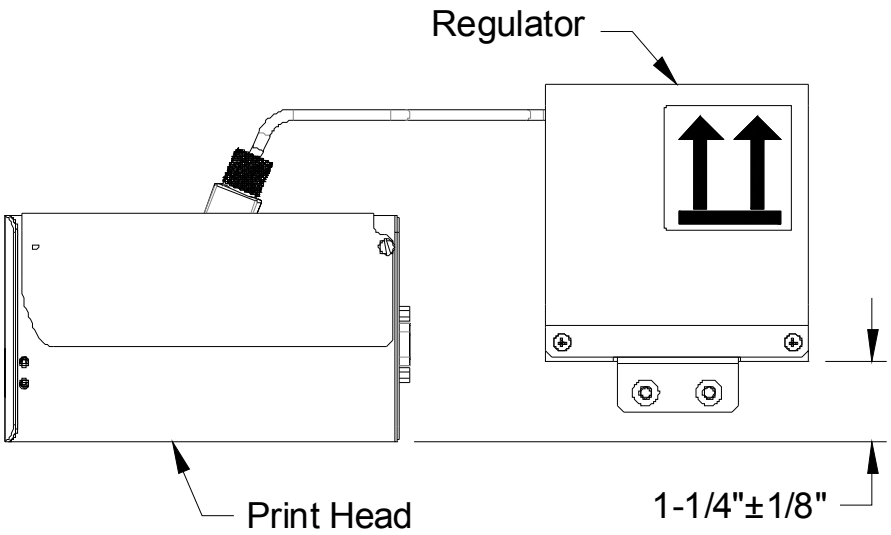
CAUTION: Failure to properly bleed the air from the ink lines before connecting the septum fitting to the print cartridge could damage the print cartridge.

System Components

- Print Head
- Regulator
- Bulk Ink Supply
- Controller or PC (Marksman HHI controller requires the optional Hub (below))
- Beacon (optional)
- Hub (optional)

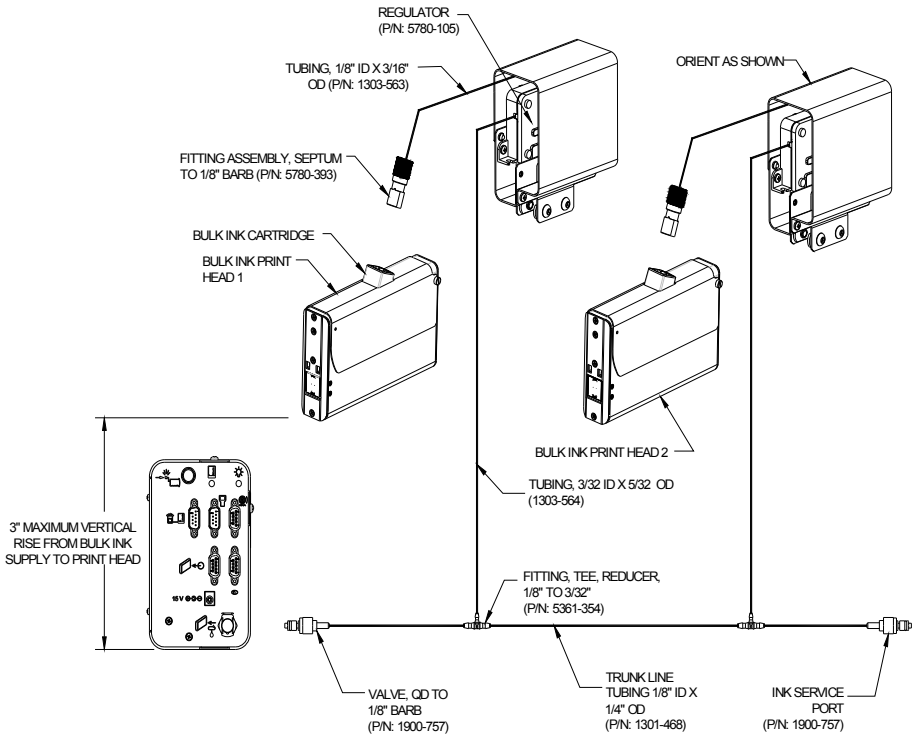
Installation

1. Mount the print head(s), bulk ink supply, and controller (if applicable). Note: The bulk ink supply can be a maximum of three feet above or below the print head(s). The regulator must be mounted on the same horizontal bar as the print head. See page 64 for print down application.



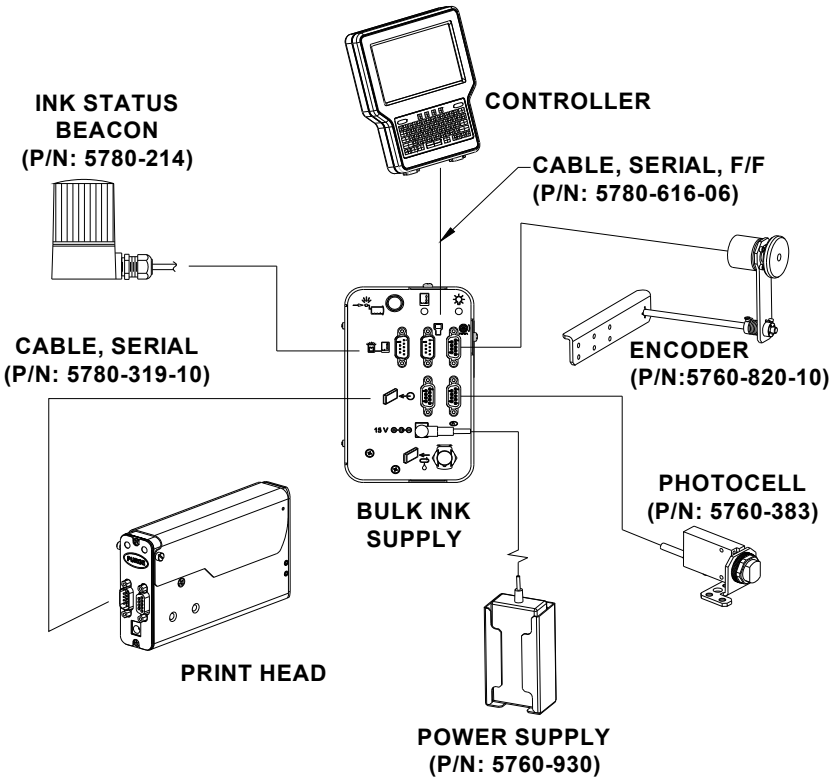
For the system to function properly it is critical that the regulator be positioned appropriately in relation to the print head as shown.

2. Make ink line connections from the bulk ink supply to the regulator per the diagram below; the trunk line should be made as short as practical. (CAUTION: Do not connect septum fitting to the print cartridge at this time.)



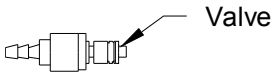
3. Make all electrical connections as shown, including all power connections per the

BULK INK CONNECTIVITY

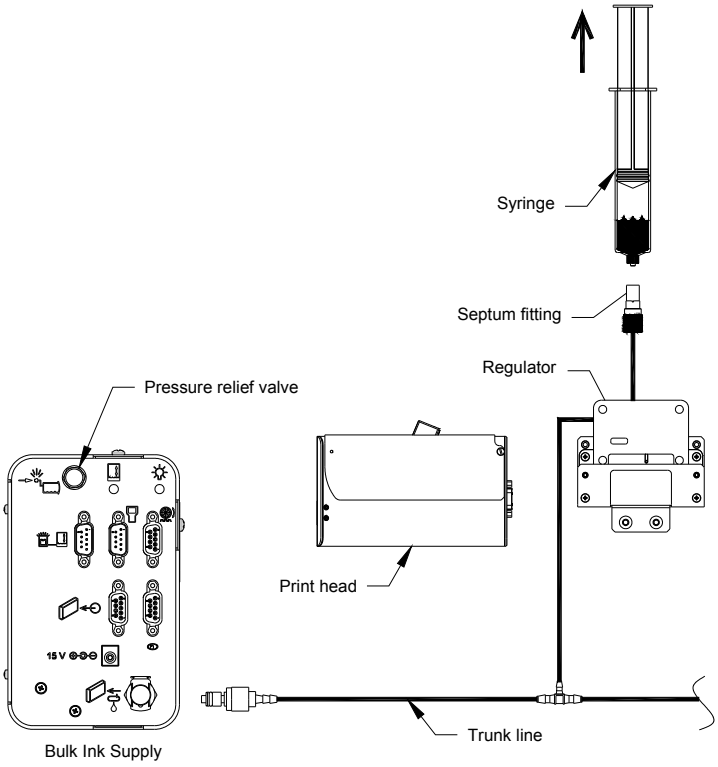


4. Insert print cartridges into the print heads and a 350 ml ink cartridge in the bulk ink supply.
5. Bleeding air out of the ink lines:

   a) At the ink service port of the trunk line, depress the valve of the fitting in short spurts into a rag or trash can. Continue this until all air has been bled out of the main trunk line.

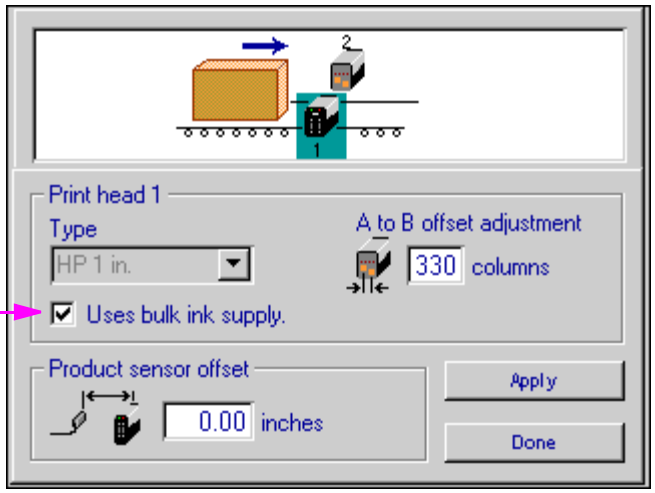


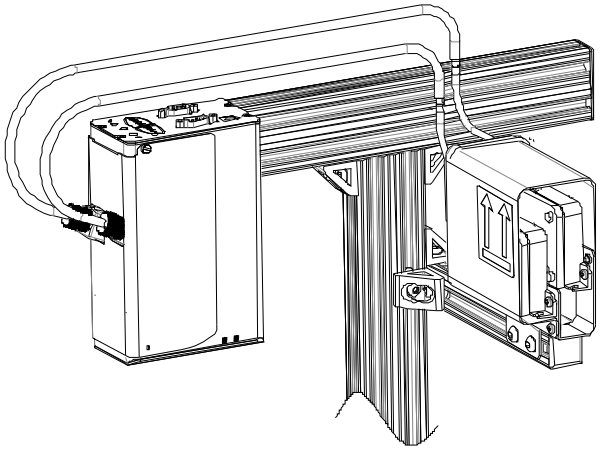
   b) Connect the syringe (2466-166, supplied with the bulk ink system) to the septum fitting. While holding the syringe and tubing above the regulator, slowly draw the air out of the ink line. Once all of the air is out of the ink line and a small amount of ink is drawn into the syringe, disconnect the syringe and plug the septum fitting into the print cartridge. Repeat for each regulator.



Configuring system for bulk ink supply

At the controller (or PC software) in the print head setup, select the "Uses bulk ink supply" check box for each print head in the daisy chain.

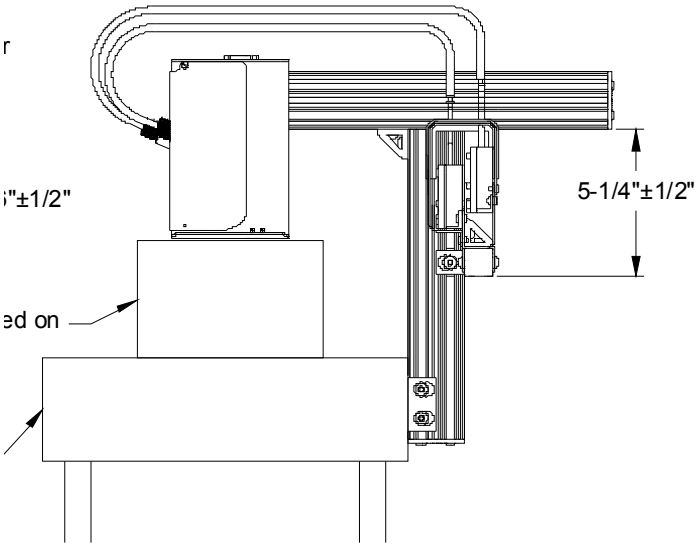




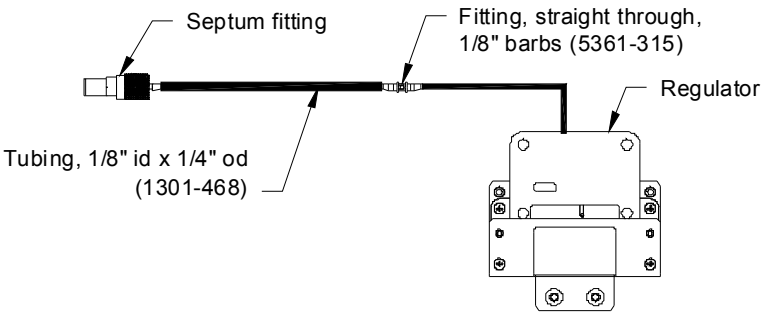
Setup for print down application

The bracketry that comes standard with the print head does not accommodate a print down setup. A separate bracket kit (5780-227) is available to allow for a print down setup. This kit includes tubing and fittings for extending the tubing between the regulator and print head. If only the tubing and fittings are needed then tubing kit 5780-211 can be used. This kit includes enough tubing and fittings to accommodate five half inch print heads or two one inch print heads.

1. Mount the print head and regulator. The regulator must be positioned appropriately in relation to the print head (see figure). If the regulator is positioned too high with respect to the print head then ink may seep out of the print head. If this occurs simply lower the regulator until it is positioned properly.



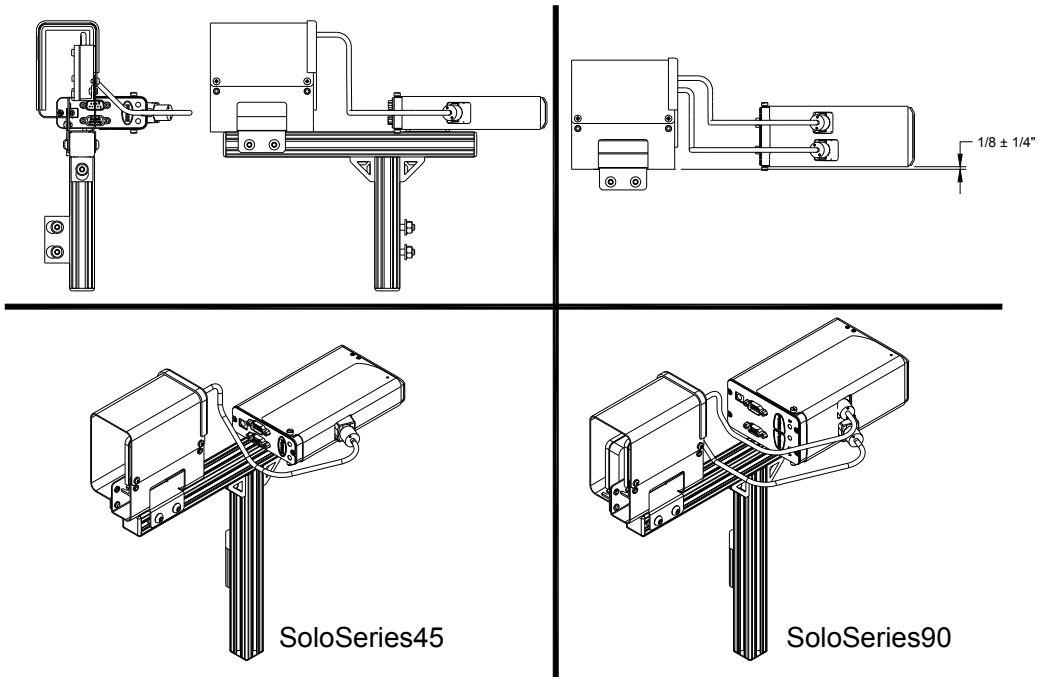
2. It will be necessary to splice in a length of tubing between the regulator and print head (see image below). This should be done



before bleeding air out of the ink lines.

90° Tilt Setup

The bulk ink supply allows the print head to be tilted 90° from vertical versus the 45° limitation with a standard print cartridge. The relative positioning between the reservoir and print head needs to be maintained for the print head to function properly. Standard bracketry may be used to mount the print head in this orientation, however it may be necessary to extend the tubing between the reservoir and print head (reference the print down setup for instructions).

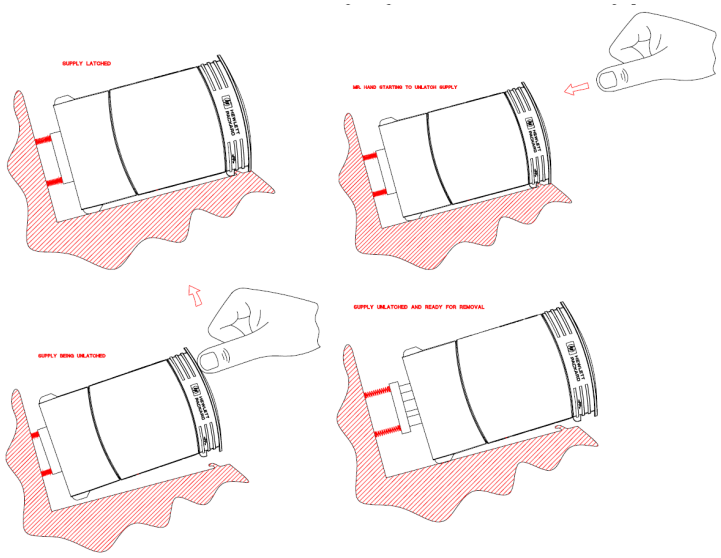


Operation

- Operating pressure of the bulk ink supply is 4-5 psi. Once pressure drops below 4 psi the air pump will turn on and pressurize the ink supply up to 5 psi.
- If the pump can not achieve 5 psi after running for 15 seconds the system goes into an "Ink Low" state (beacon will turn on solid) indicating the 350 ml ink cartridge is empty. The print

heads will continue to print because there is still ink in the print head cartridges; this allows ample time to change the 350 ml ink cartridge.

- Changing the 350 ml bulk ink cartridge:
  - Press the pressure relief valve on the back of the bulk ink system to depressurize the ink cartridge.
  - Push in and up slightly on the cartridge to release it from the holster.
  - Insert the new cartridge. The system will detect the new cartridge and begin pressurizing automatically.



- Maximum print heads per ink system: Four 1" print heads, eight ½" print heads, or any combination of the two totalling eight print cartridges.

- A red LED on the rear panel of the SoloSeries IS, and an optional beacon, indicate the system's operational status:
  - LED/beacon is off - system is operating normally.
  - LED/beacon is on steady - normal system operating pressure (5 psi) was not achieved after 15 seconds of continuous pressure pump operation and the pump has shut down. It indicates that the ink cartridge is empty and needs to be replaced. The pump will automatically restart when the cartridge is replaced or power is cycled off and on.
  - LED/beacon is blinking rapidly - the system has experienced a rapid loss of pressure, possibly due to a break in an ink line, and has shut down.
  - The LED repeatedly blinks rapidly for one second, then goes out for one second, blinks for one second, goes out for one second, etc.; the beacon continuously blinks rapidly with one second "off" periods - indicates a missing ink cartridge or the cartridge is not being detected by the system.