Operations Manual

4000 Controllers

4000-HMI

4000-HH

5765-384
Revision E

1 Missouri Research Park Drive • St. Charles, MO 63304 • *Service Line* 1-800-526-2531

Operations Manual
4000 Controllers

5765-384
Revision E

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Warranty:

The 4000 controllers, including all components unless otherwise specified, carry a limited warranty.

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

Section 1: Safety

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

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

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

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

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

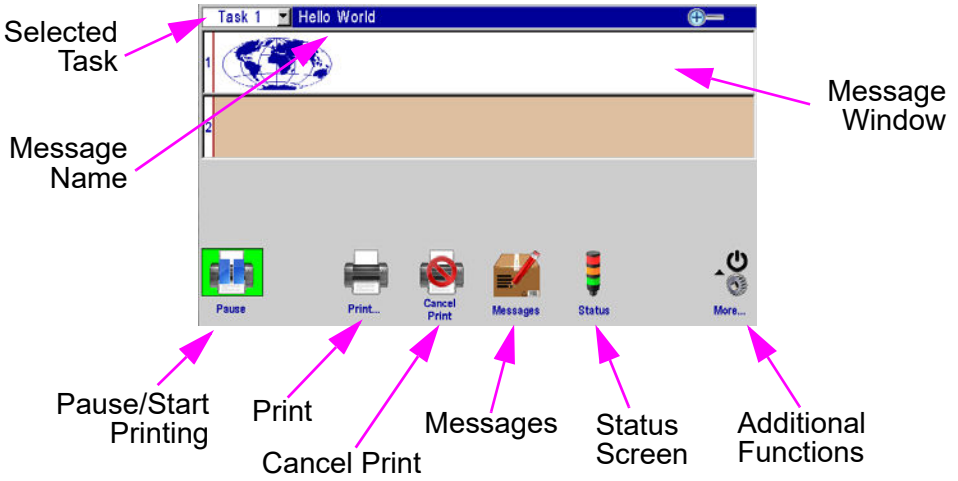
After service to the equipment is completed, replace all protective devices such as grounding cables and covers before operating the equipment.

It is extremely important to:

- Clean up all spills with the appropriate conditioner 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 conditioners under the recommended conditions found on the SDS (Safety Data Sheet).

Section 2: Controller Functions

Home Screen

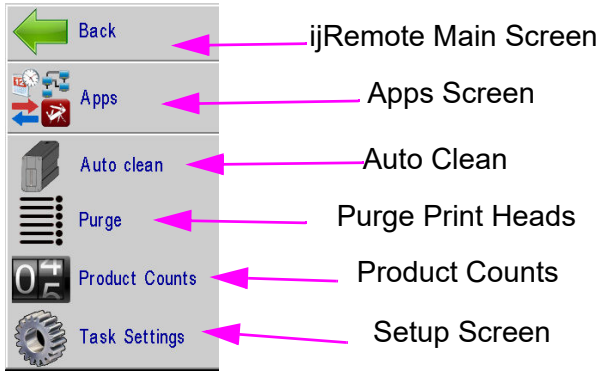


Message Window:

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

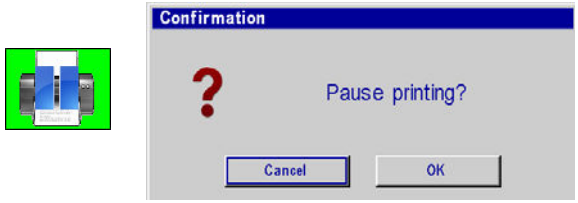
Task Select Drop-Down:

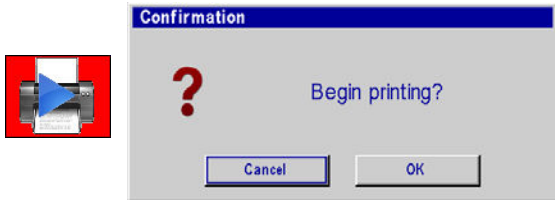
- Places focus on the selected task and allows the user to toggle between tasks. This allows one to view what is being printed on either task in the home screen. Additional menu items will vary from one task to the other, depending on print technology.



Print / Pause Button:

- Starts and Stops print after an operator response to a confirmation dialog.
- If a message is currently printing, pressing the pause button will discontinue printing after the message finishes printing.
- When paused, Pause button will change to Play button. If the Play button is pushed, print will resume on the next product detected.





Print Button:

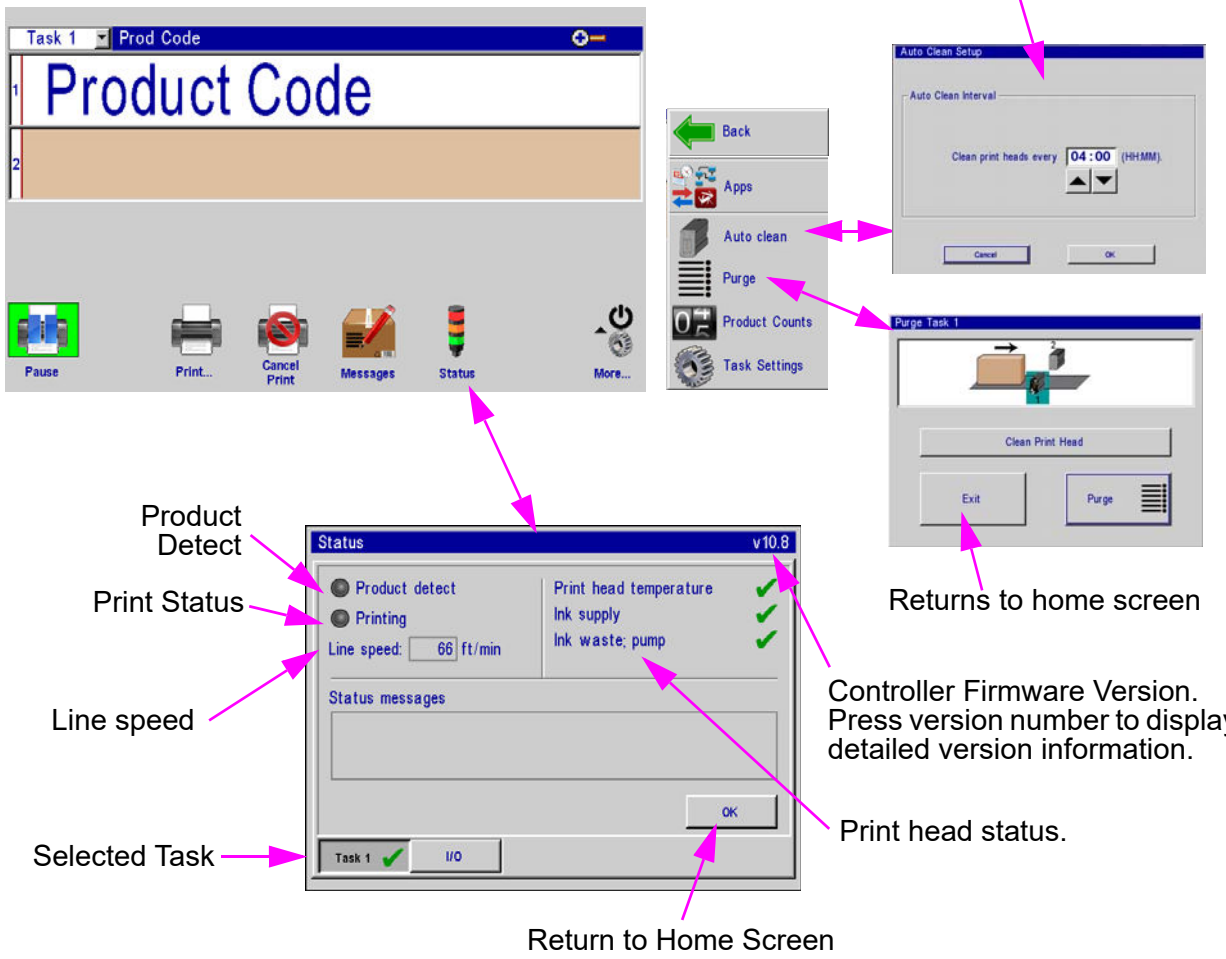
- Allows access to the **Print** dialog box.
- Select the desired message and press the **Print** button. The message will print at the next photocell trigger.

Purge Button:

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

Status Button:

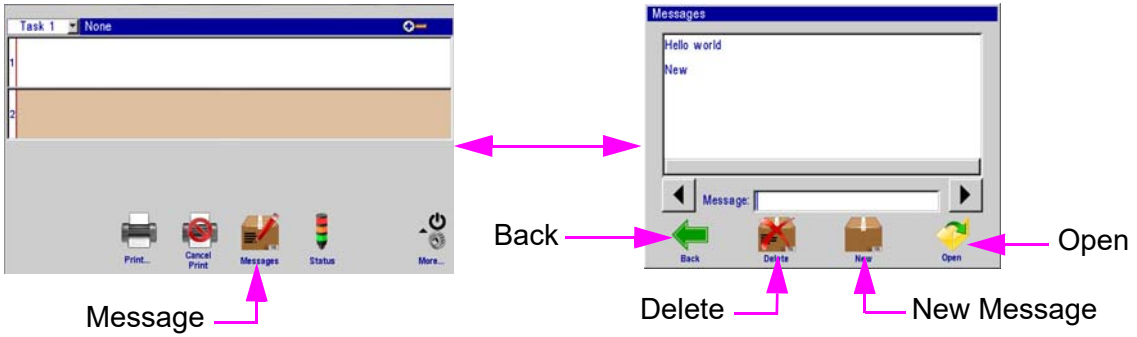
- Version of controller firmware is located in the upper right corner.
- Displays Product detect.
- Displays Printing or Paused status.

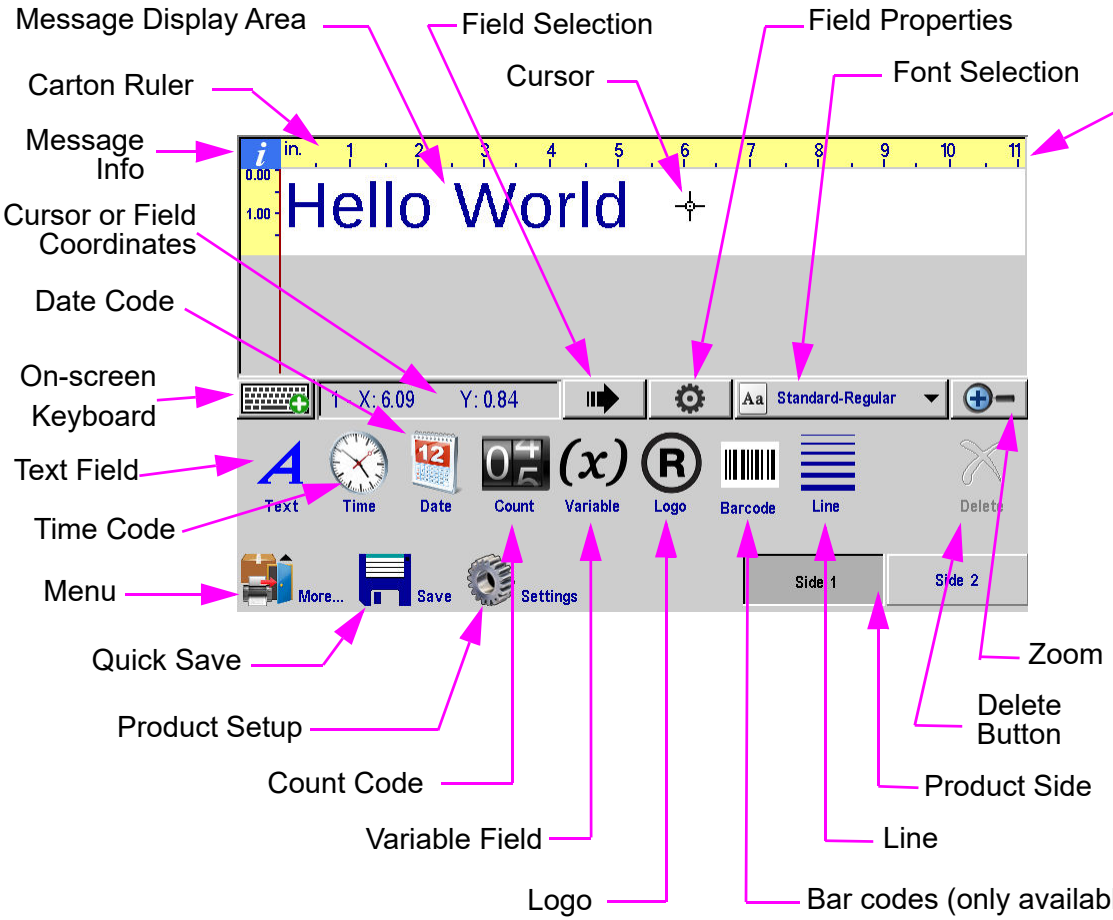


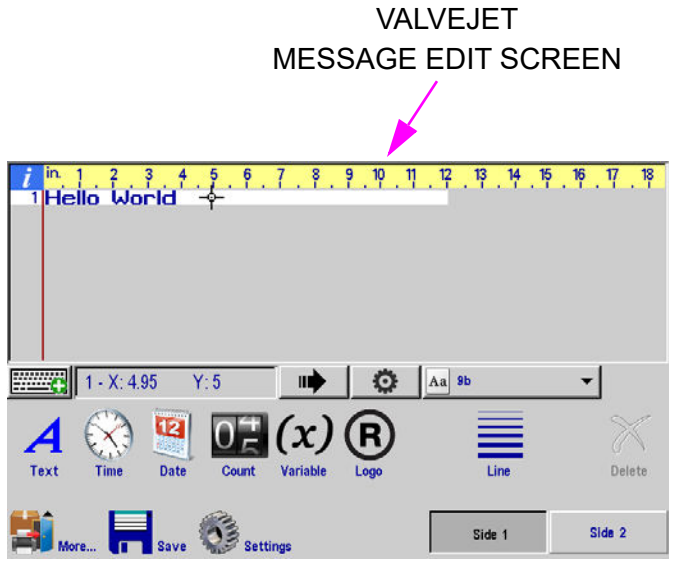
Message Editor

Message Button:

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







On-Screen Keyboards & Numeric Keypads

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

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

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

ESC (Escape):
- Undoes any changes made to any input entry box. If no changes have been made, hides the keypad or keyboard.
- Message Edit Screen: hides the keyboard.

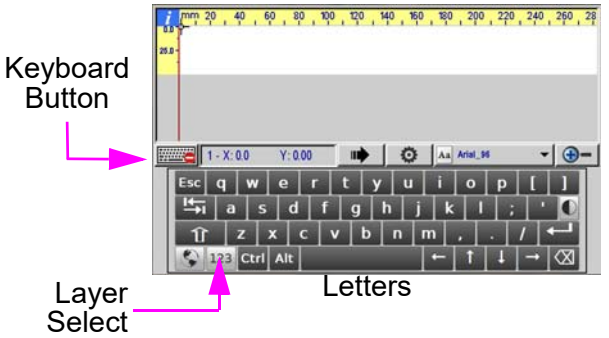
Arrow Keys:
- Moves active fields, or moves the cursor, if present.

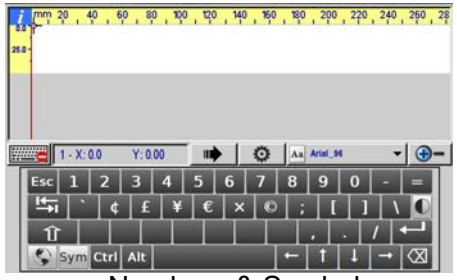
Tab:
- Switches focus between active fields in the Message Editor.

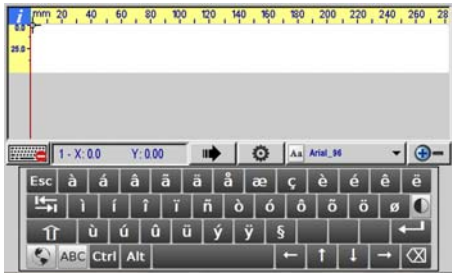
Backspace:
- Deletes the character to the left of the cursor.
- On the edit screen, deletes the active (red) field.

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

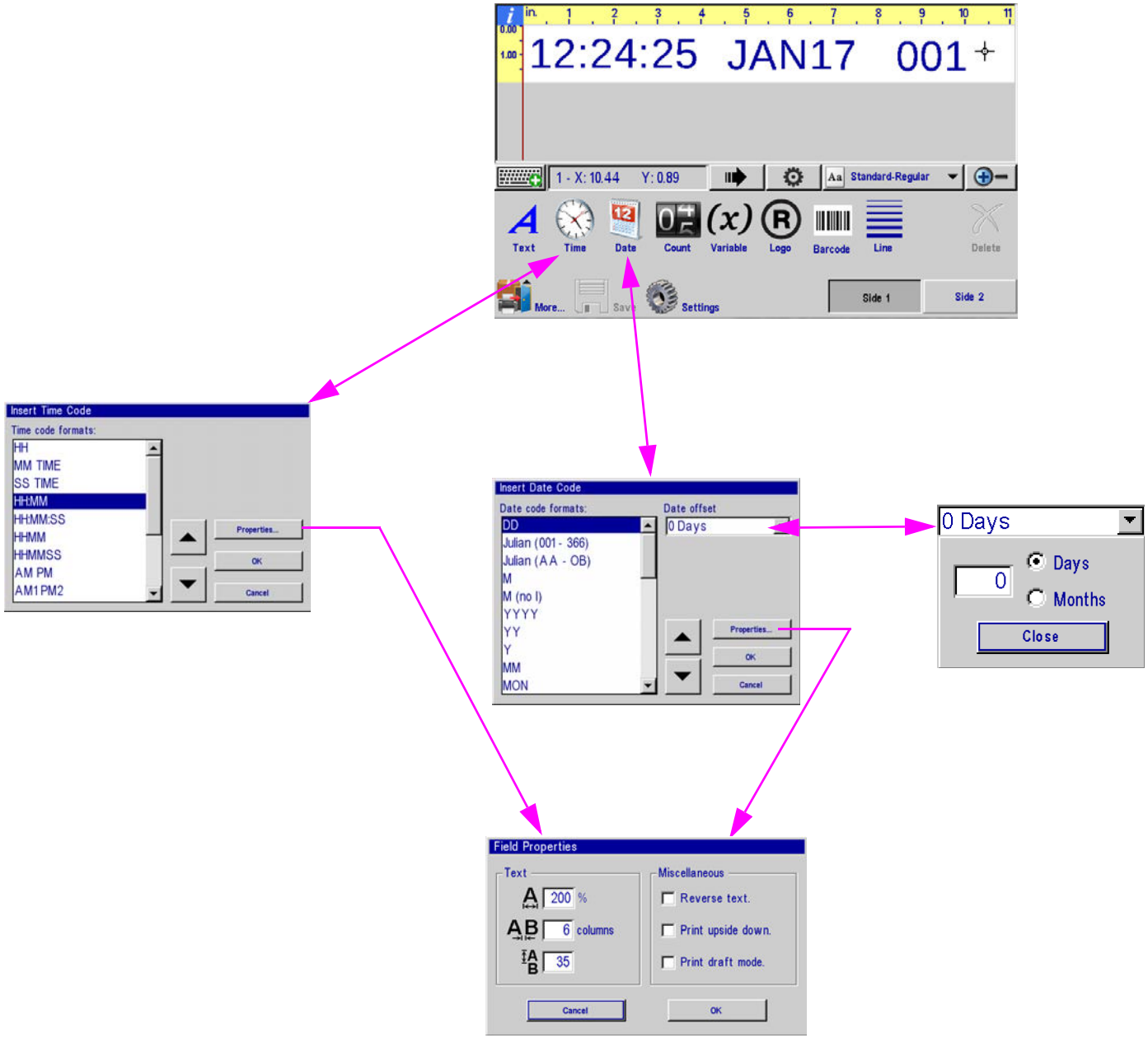
Shift:
- Press **Shift** once to make the next character upper case.
- Press Shift twice for shift lock. Press Shift again to exit shift lock.







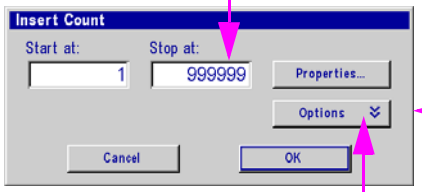
Time and Date Codes

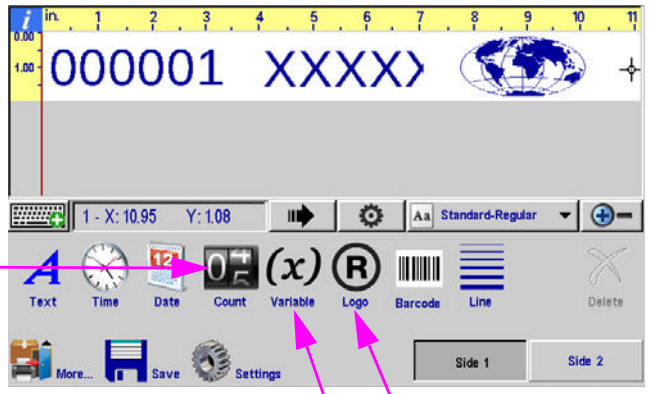


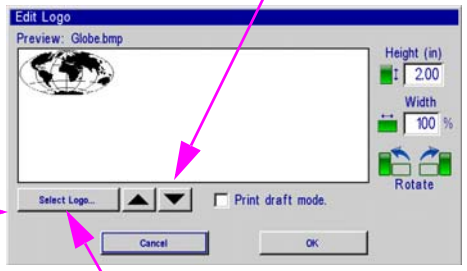
Product Counts, Variable Fields, Logos

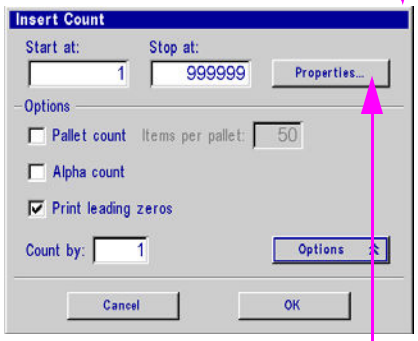
Maximum
9-digit count

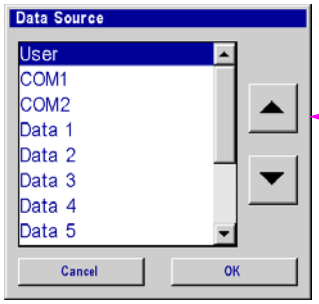
Scroll through
logo images or
select from list

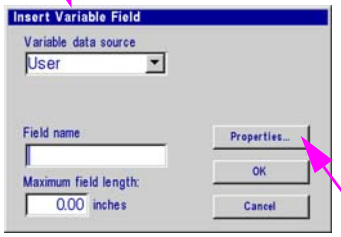


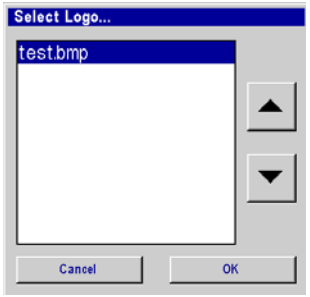


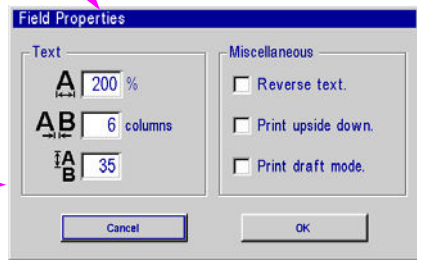












Incrementing Count

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

Decrementing Count

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

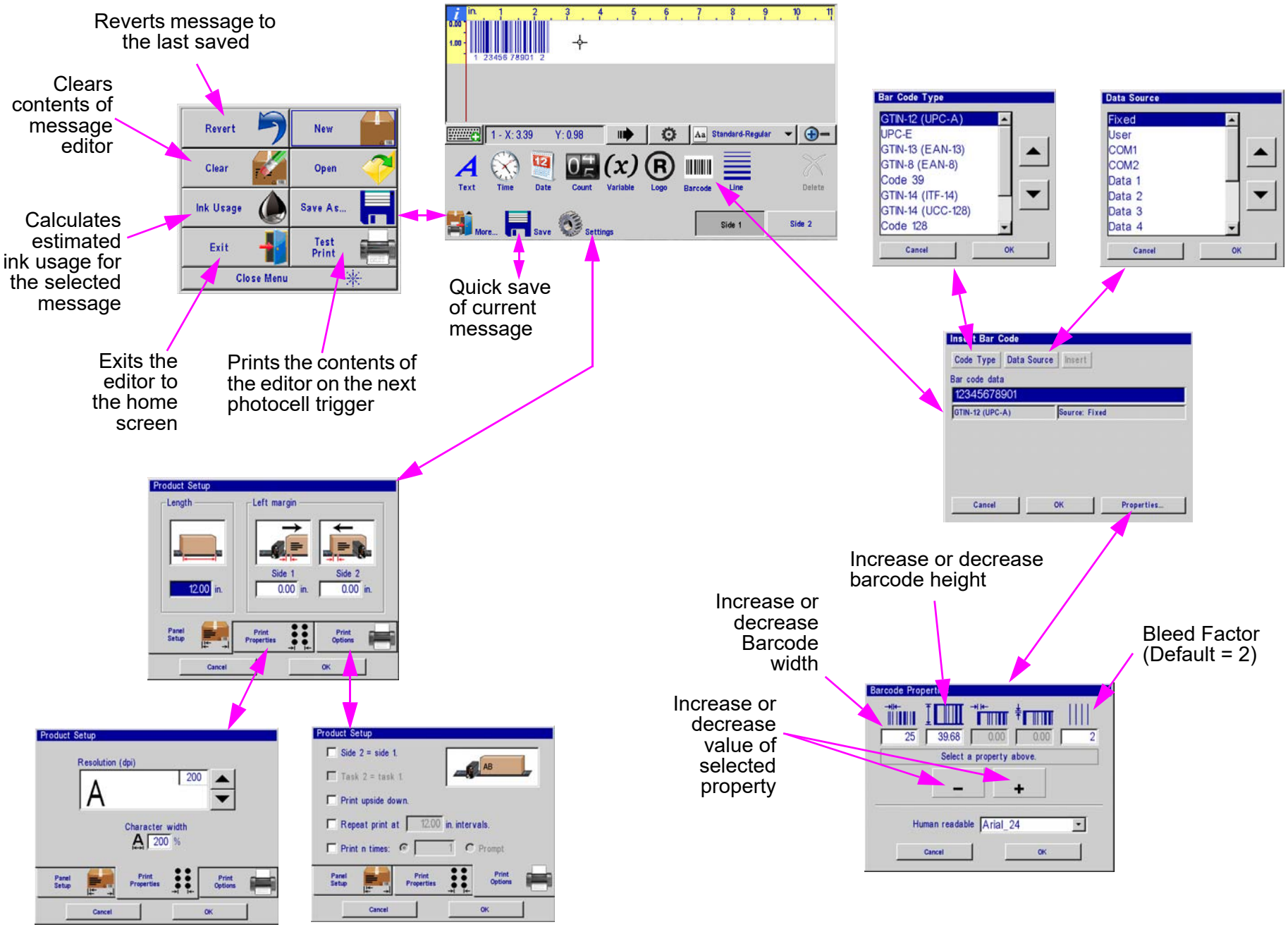
Variable Field Data Source

User: Print data entered when print message containing the variable field is selected to print.

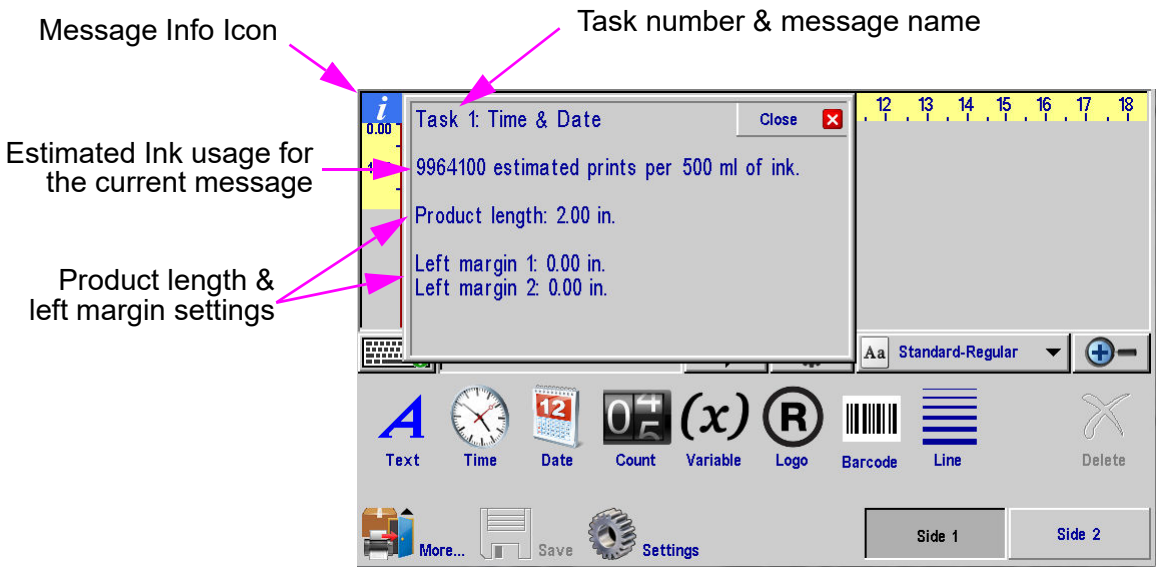
COM1, COM2: Data is received through COM1 or COM2 serial port. Data must be received before the message is selected to print.

Data 1-10: Data is retrieved from corresponding system variable. User has the option to change the data when the message is selected to print.

Barcodes, Product Setup, & Menu



Message Info Box

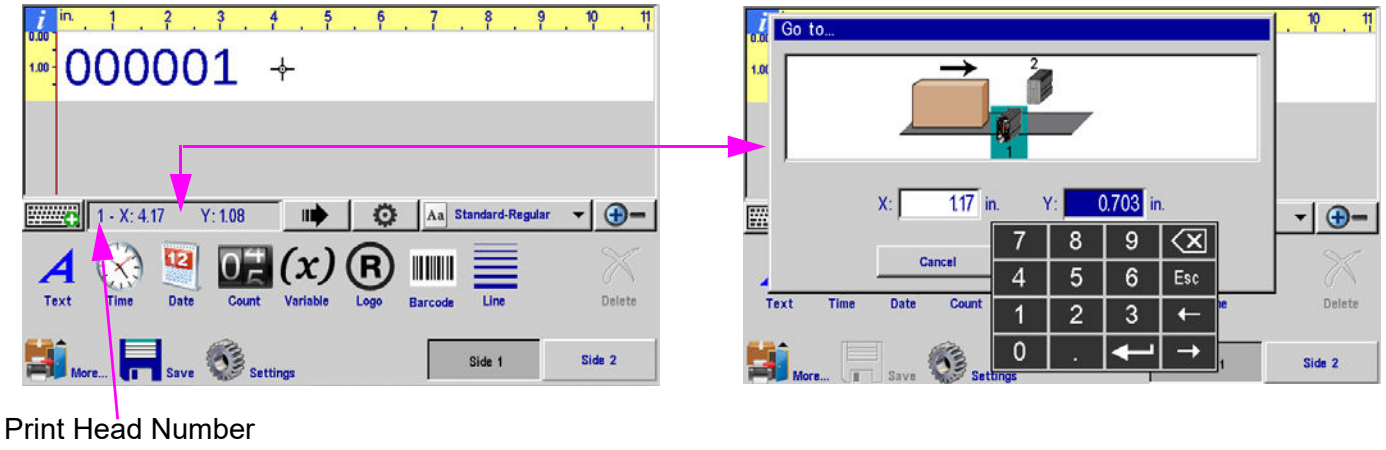


Direct Entry of Cursor or Field Position

Direct Entry Box

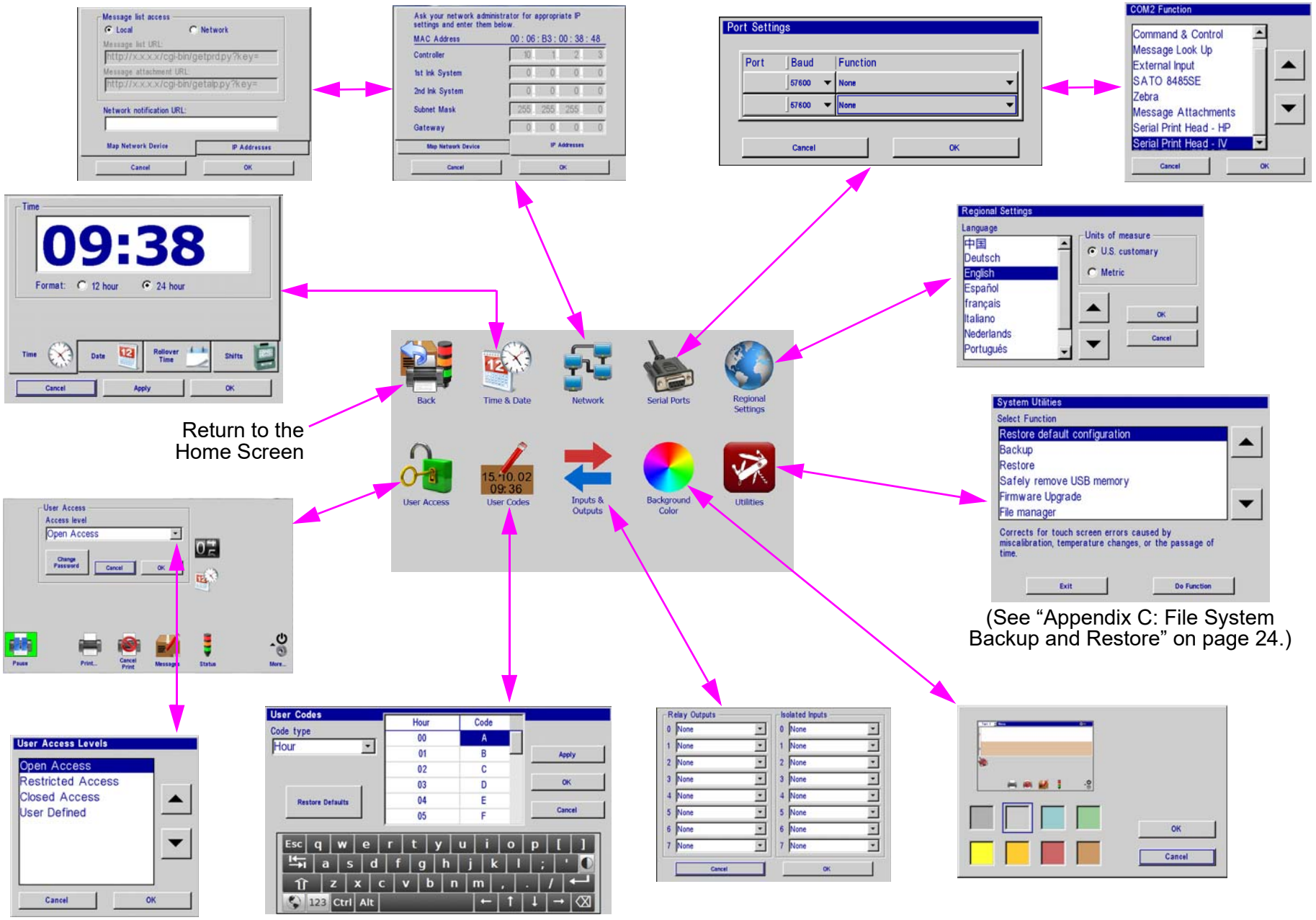
Field: Selecting the Direct Entry Box while having a field selected will allow the user to manually input the X (horizontal) & Y (vertical) location of the selected field

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



The Apps Screen

Apps Button



(See “Appendix C: File System Backup and Restore” on page 24.)

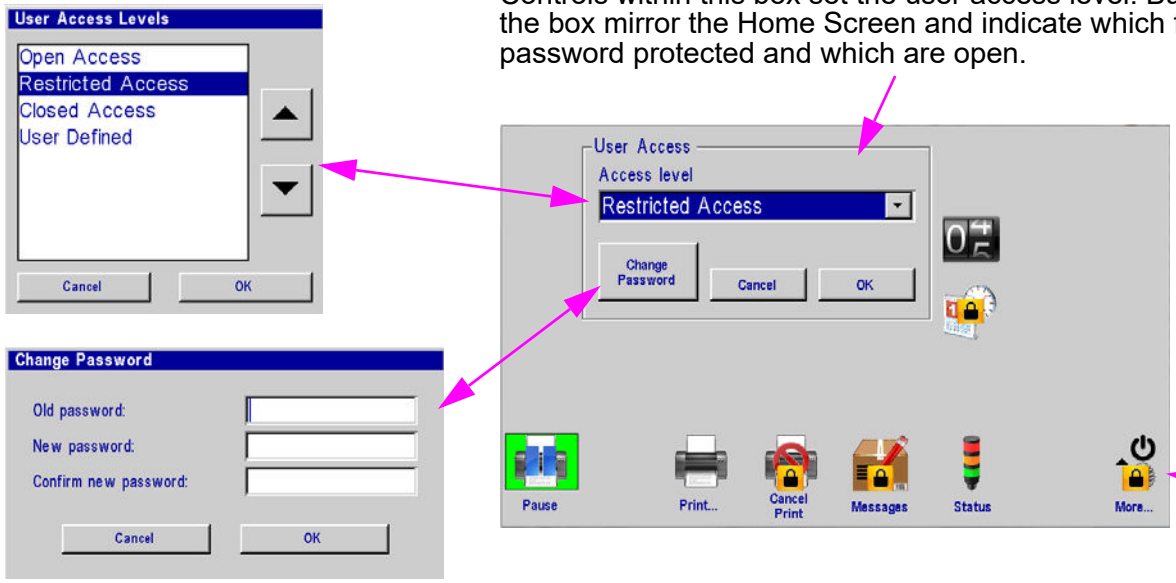
Time, Date, Shifts, and Rollover Time Screen

Set the controller's time and time format

Press "Ok" to return to the Apps Screen

User Access

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



Padlock symbol indicates function is password protected.

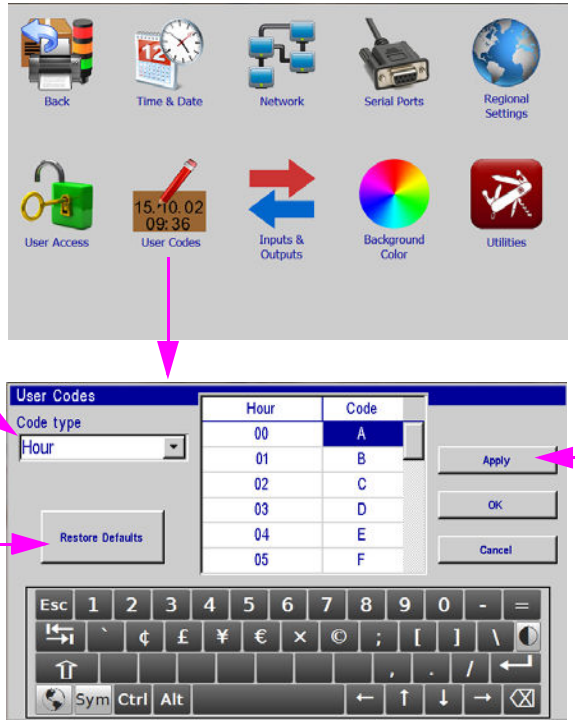
The factory set password is **Manager.**
Passwords are case sensitive.

NOTE: For installs utilizing InkJet Network Software, controller access passwords must be set from within the Network Software. Changing the access password from the controller will result in the Network Software being denied access.

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

User Codes

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

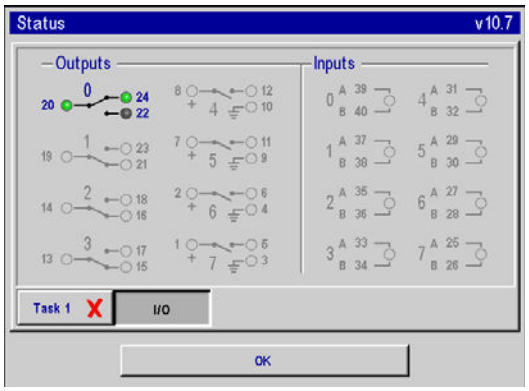


Restore all user codes to the factory default settings

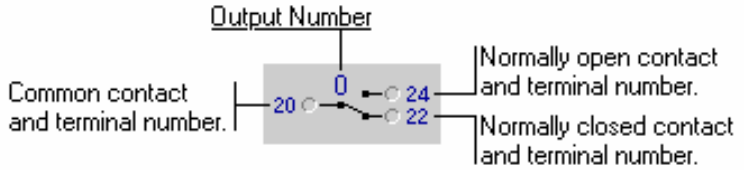
Apply allows the user to save and apply changes without exiting the **User Codes** screen.

I/O (Inputs and Outputs) Status

The I/O Status Screen becomes available when a function is assigned to one or more of the I/O channels. (See the **I/O Board Kit Installation Instructions**, 5760-392N, included in the I/O Board Kit, for directions on setting up the I/O card.) Indicators on the I/O Status screen show the current state of the I/O card's relay outputs and isolated inputs, and are updated every two seconds.

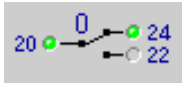


Relay Output Indicators:



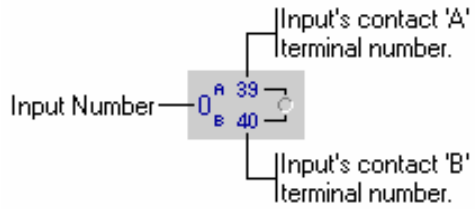
Indicates the output function is undefined, or "None".

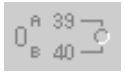
Indicates the relay is de-energized (common contact and normally closed contact are red).



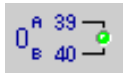
Indicates the relay is energized (common contact and normally open contact are green.

Input Indicators:

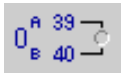




Indicates the input function is undefined, or "None".



Indicator is on (green); the input signal is active.



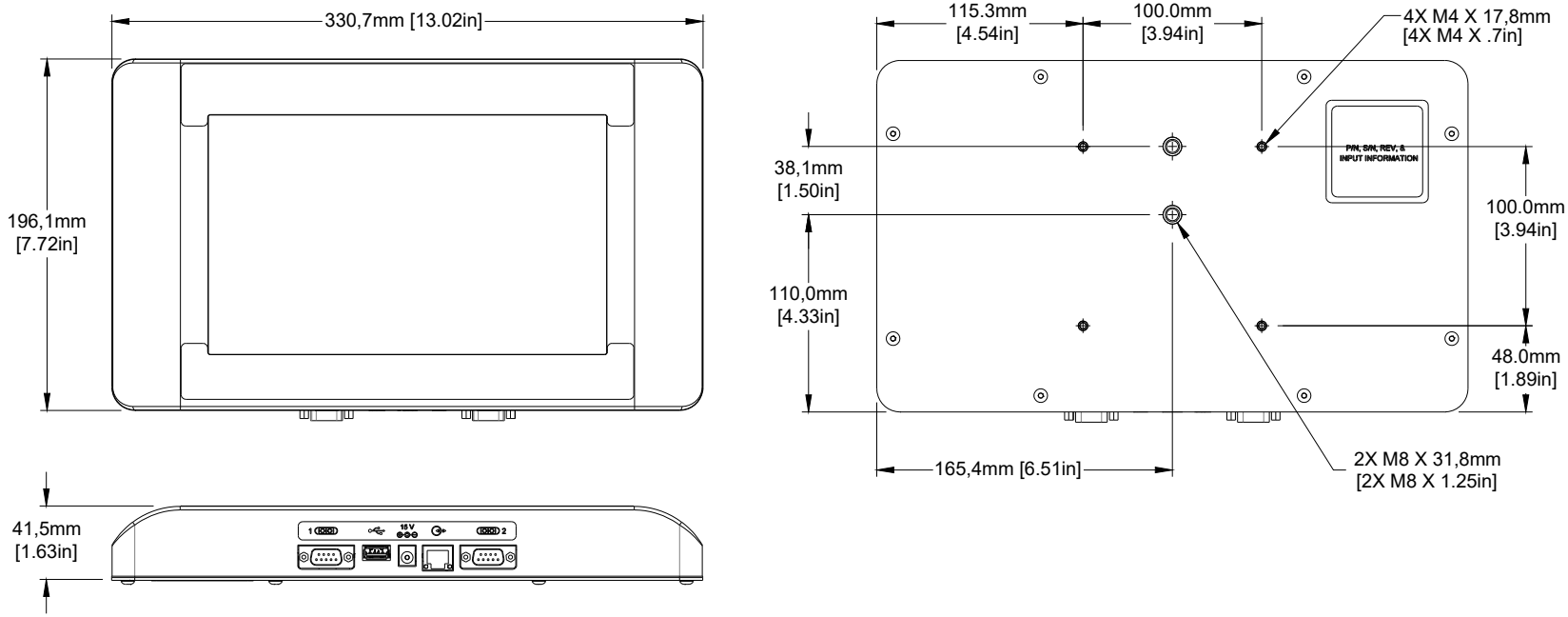
Indicator is off (gray); the input signal is inactive.

Manual Control of Relay Outputs

An ouput relay assigned the **Manual On/Off** function may be manually energized and de-energized from the I/O Status screen by touching the relay's on-screen indicator. Touch it once to energize the relay; touch it again to de-energize it.

Appendix A: Specifications

HMI Controller (High Resolution)



Size

Weight: 2.18kg [4.6lb]

Height: 196.1mm [7.72in]

Width: 330.7mm [13.02in]

Depth: 41.3mm [1.62in]

IP Rating

IP34 (estimated)

Enclosure

Stainless Steel

User Interface

Graphical User Interface with on screen keyboard

Fonts

Unicode

Display

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

Storage

512 MB flash memory

Ports

(2) RS-232 ports, 1 USB port,

(1) 100 Base-T Ethernet port

Factory set IP Address: 10.1.2.6

Electrical

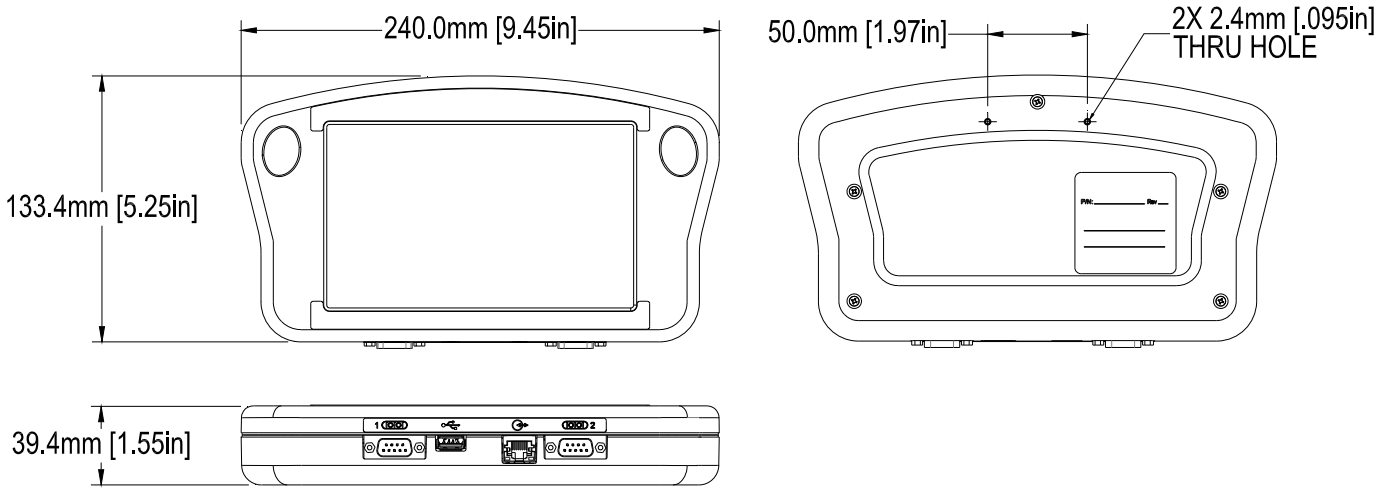
15 VDC from SMART-IDS to controller. Power supply: 90-260 VAC, 50/0 Hz, 1.5A max.

Environment

Ambient operating temperature: 5°C to 40°C (40°F to 104°F)

Operating humidity: 10% - 90%, non condensing

HH Controller (ValveJet)



Size
Weight: .50kg [1.1lb]
Height: 133.4mm [5.25in]
Width: 240.0mm [9.45in]
Depth: 39.4mm [1.55in]

Enclosure
Black ABS Plastic

User Interface
Graphical User Interface with
on screen QWERTY keyboard

Fonts
Unicode

Display
178mm [7in] LCD with touch screen,
800 x 480 pixels

Storage
512 MB flash memory

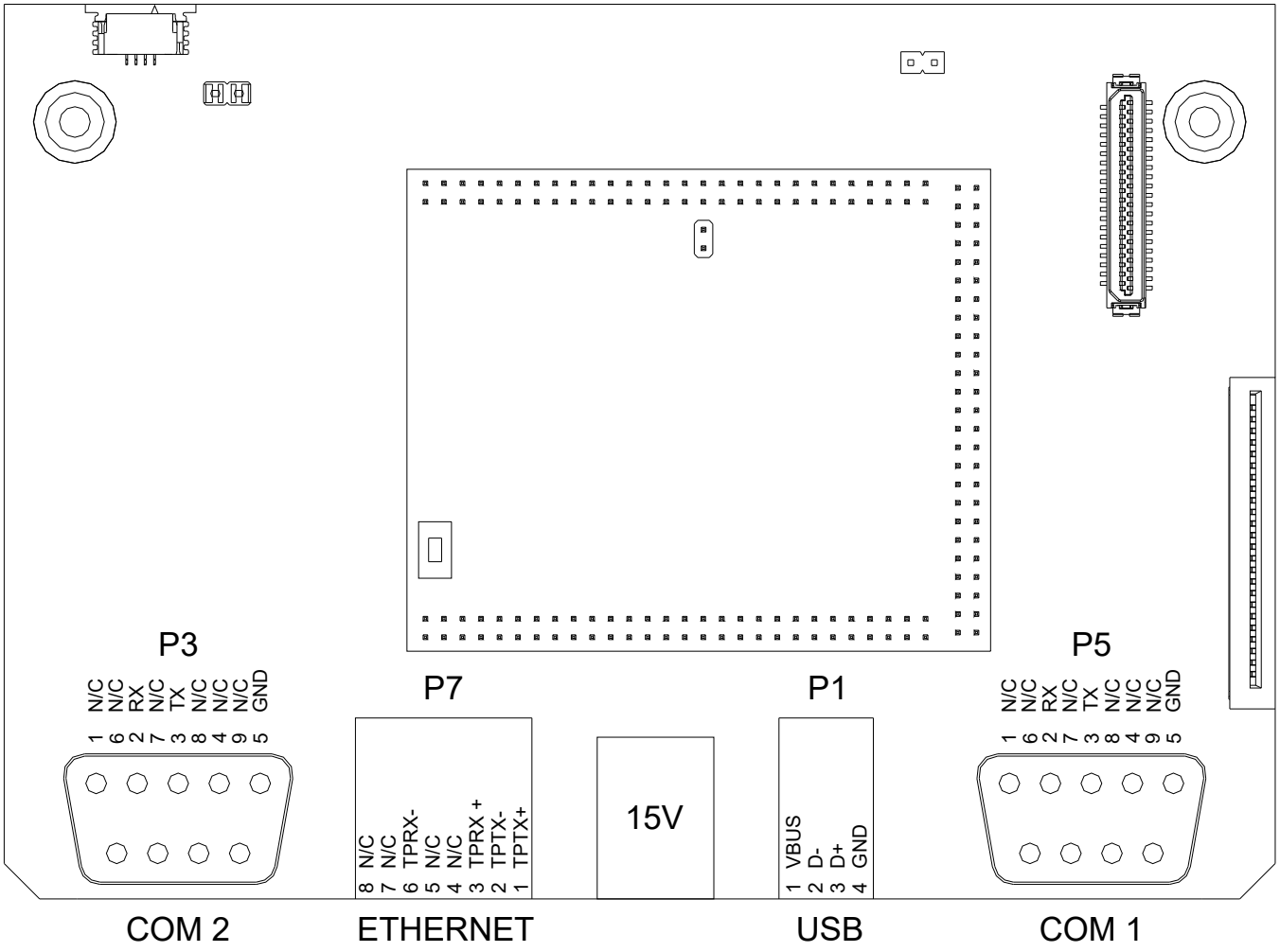
Ports
(2) RS-232 ports, 1 USB port,
(1) 100 Base-T Ethernet port
Factory set IP Address: 10.1.2.6

Electrical
15 VDC supplied from print head power supply: 90-260 VAC, 50/0 Hz, 1.5A max.

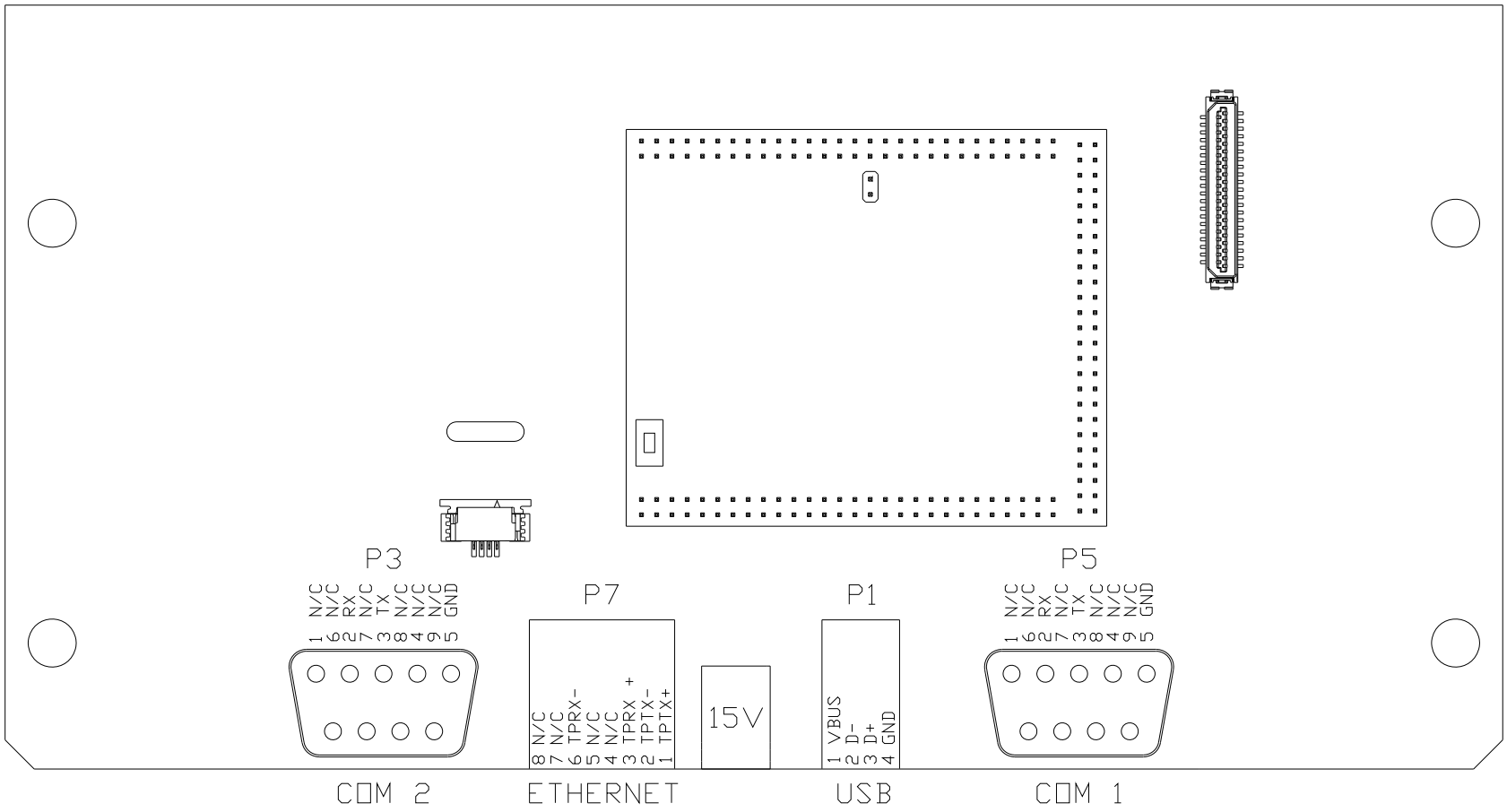
Environment
Ambient operating temperature: 5°C to 40°C (40°F to 104°F)
Operating humidity: 10% - 90%, non condensing

System Interconnect Diagram

HMI Controller CPU Board

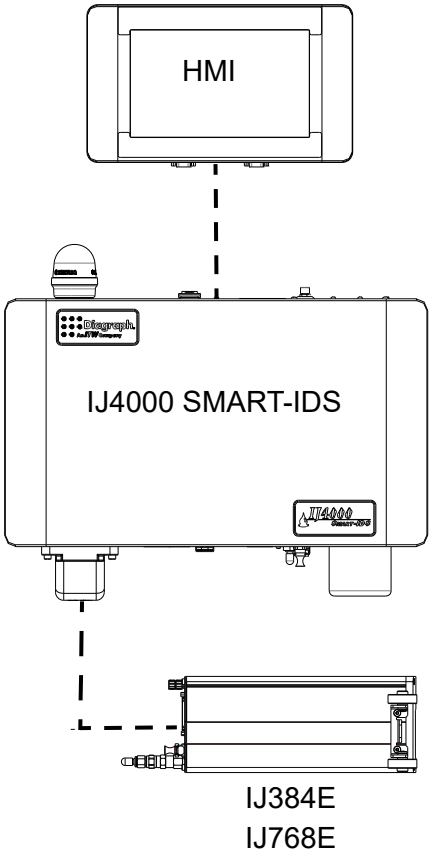


HH - Controller Board

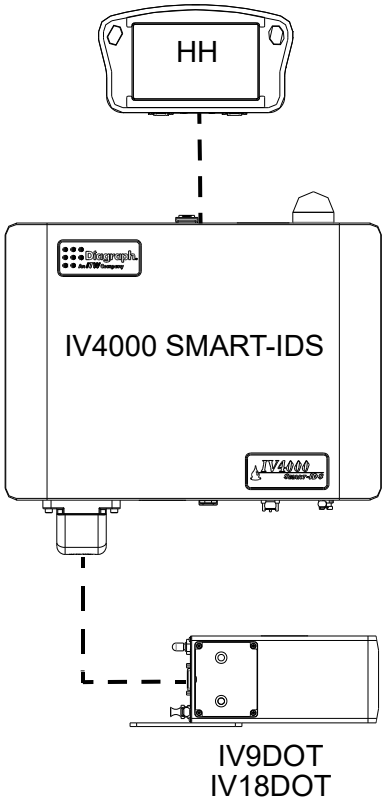


Appendix B: Theory of Operations

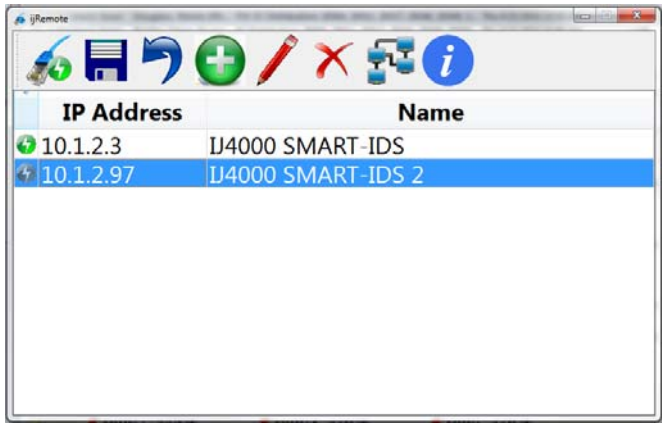
The ijRemote program on the PC and the 4000 controller utilizes a graphical desktop sharing protocol to remotely control the SMART-IDS. The program transmits keyboard and mouse events from the PC/controller to the SMART-IDS. In turn, graphical screen updates are relayed back to the HMI/HH Controller from the SMART-IDS. Print head data control is maintained by the SMART-IDS.



HIGH RESOLUTION



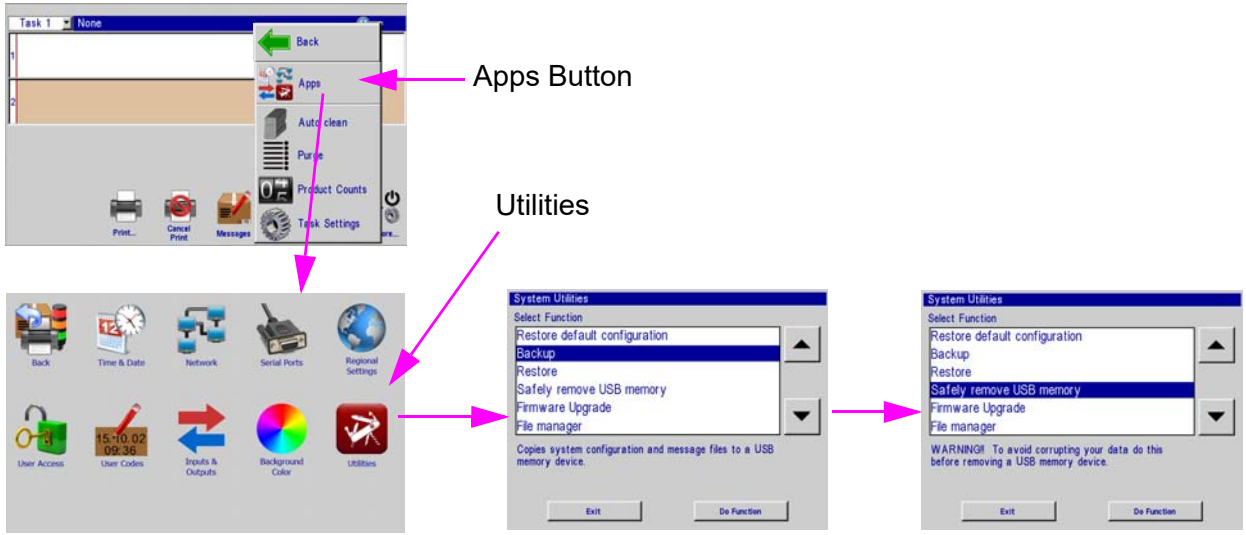
VALVEJET



Appendix C: File System Backup and Restore

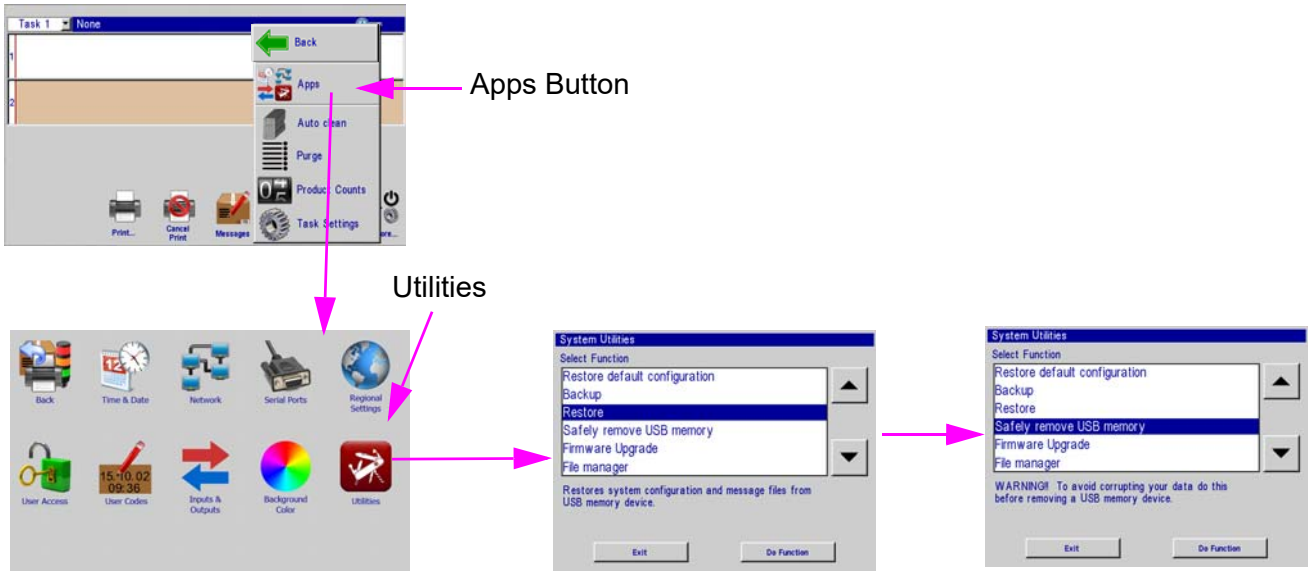
Backup

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



Restore

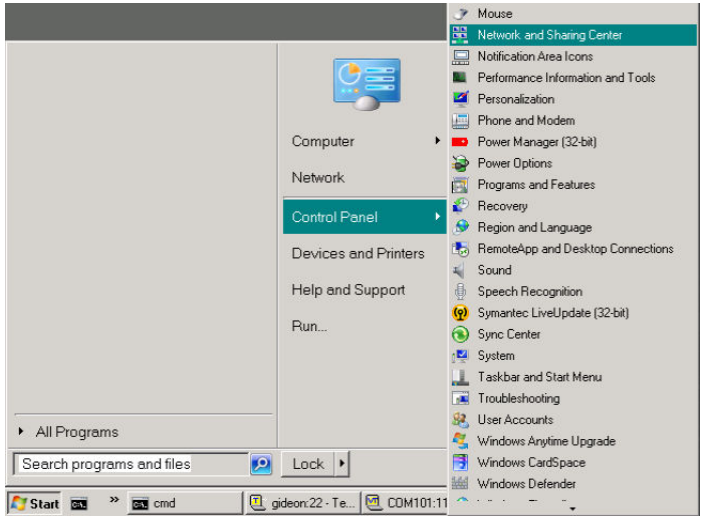
6. Insert a USB jump drive containing a "backup.tgz" file into the USB port on the HMI.
7. From the **Home** screen touch **Apps** then **Utilities**.
8. From the **Utilities** screen select **Restore**.
9. Select the appropriate backup file from the **Restore** dialog popup.
10. From the **System Utilities** screen select **Safely remove USB memory**.



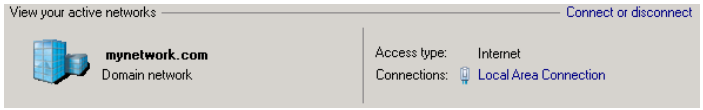
Appendix D: Configuring a PC to Communicate with a Controller and SMART-IDS

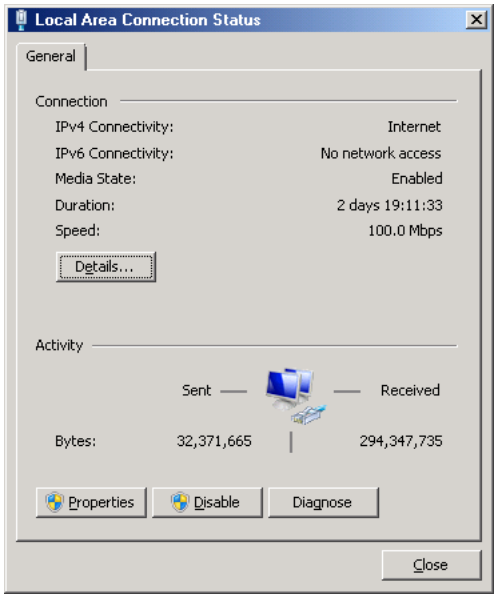
Window 7®

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

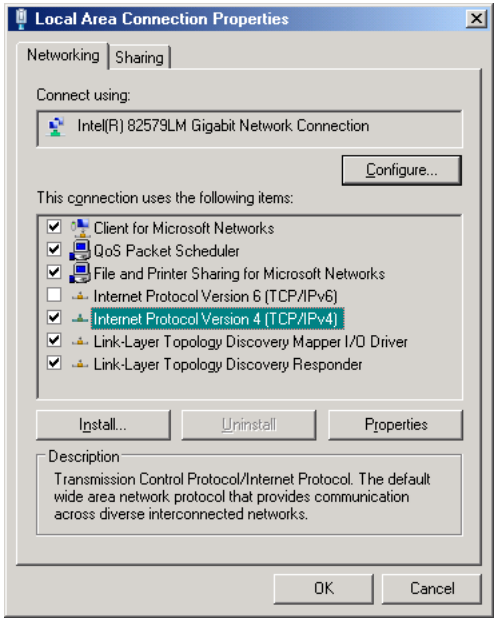


2. Click **Local Area Connection**, then click the **Properties** button.

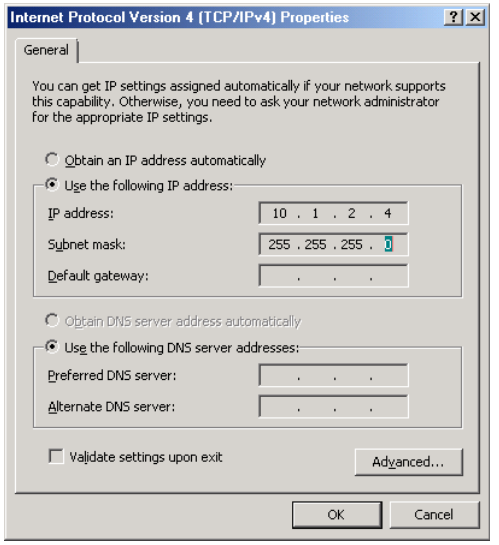




3. Select **Internet Protocol Version 4** (TCP/IPv4). Then click the **Properties** button.



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

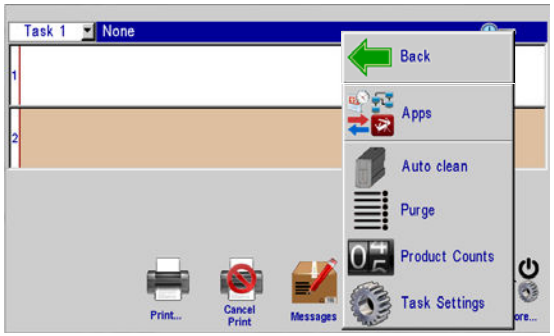


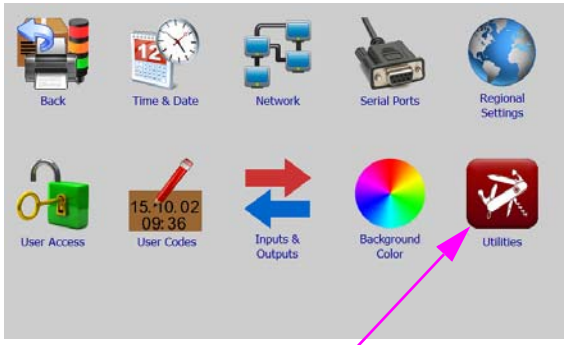
Appendix E: Controller and Print Head File Management

File Manager

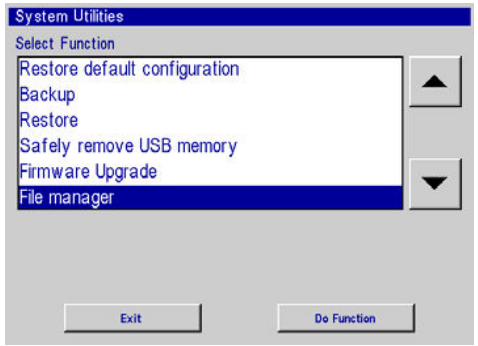
1. If logo or font files are to be transferred, place them on a portable USB storage device and insert it into the HMI USB port.

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





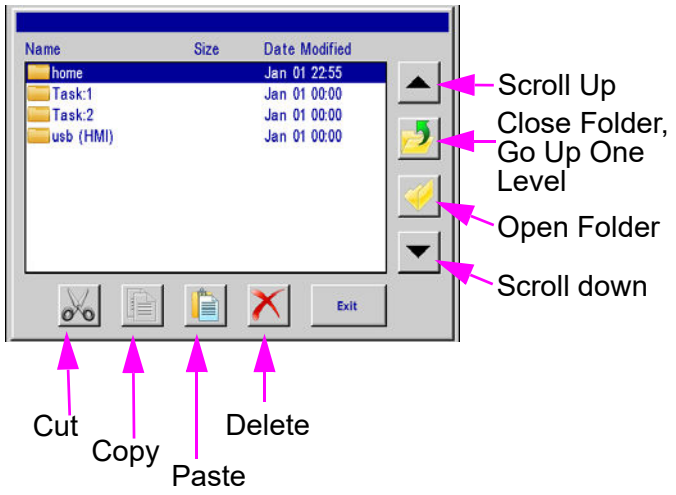
3. Scroll to the bottom of the **Select Function** list and select **File manager**. Press the **Do Function** button; the **File manager** screen is displayed.



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

The **usb (HMI)** folder contains all folders and files resident on the USB storage device.

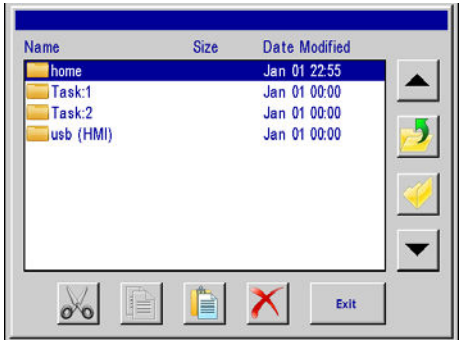
NOTE: Cut, Copy, Paste, and Delete function the same way as any software. Navigate to any file in any of the folders and perform the desired function.

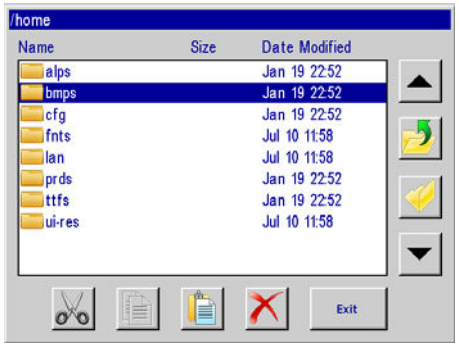


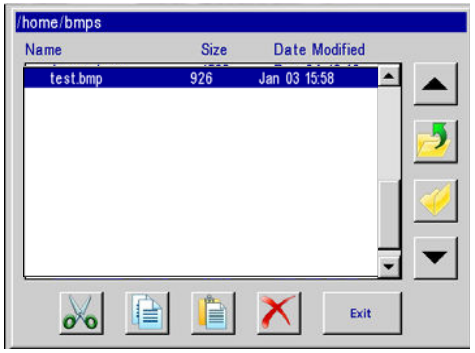
Appendix F: Transferring Logo and Font Files

NOTE: Files cannot be transferred to the print head while printing. Pause print first.

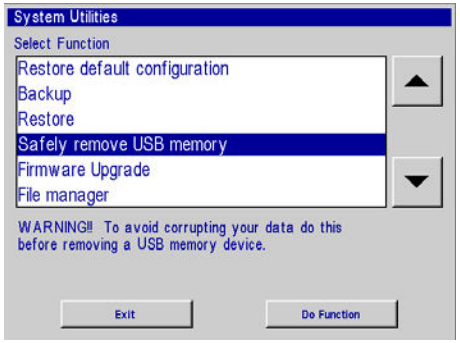
1. As shown in the “File Manager” section, make sure USB storage device is installed and the **File manager** selection screen is present on the controller.
2. Select the **usb (HMI)** folder and press the **Open Folder** icon button.
3. Navigate to a previously saved file, highlight the file and press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





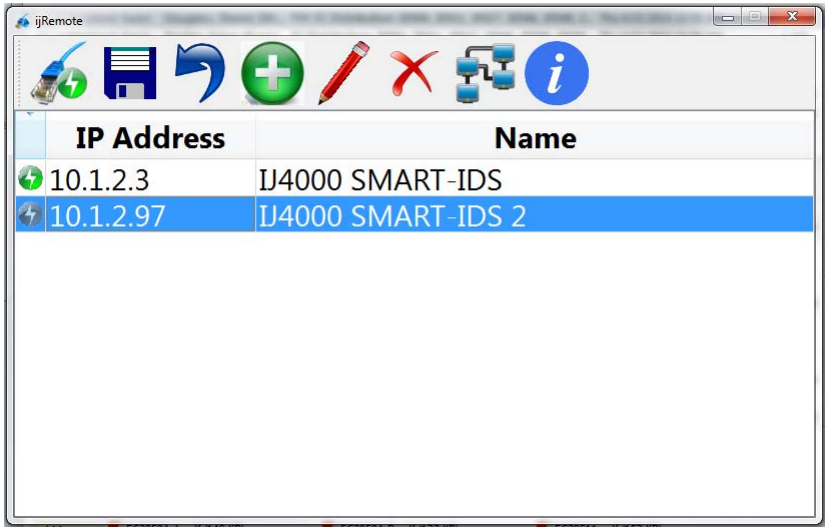


6. Press the **Paste** button. The logo (bmp) file will appear in the **bmps** folder.
7. When all desired file transfers are complete, press the **Exit** button.
8. From the **System Utilities** menu, press the **Safely remove USB memory** button, and then **Done**.
9. The file is now available for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



Appendix G: ijRemote Application and Multiple SMART-IDSs

ijRemote Application



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

Connects to the selected IJ4000 / IV4000 SMART-IDS.

Save any changes made to the list of SMART-IDS.

Undo any unsaved changes.

Adds another SMART-IDS to the list.

Edit existing SMART-IDS in the list.

Deletes a SMART-IDS from the list.

Sets the Network settings of an HMI, HH or SMART-IDS using the device's MAC address.

Shows the current firmware version of the HMI.

Operating Multiple SMART-IDSs with One IJ4000 HMI or IJ4000 HH

This section describes how to configure a system where one IJ4000 HMI controls up to ten IJ4000 SMART-IDSs via Ethernet.

What's Needed

- A PC.
- Ink Jet Demo software (on USB drive included with HMI).
- RJ45 CAT5E in-line crossover coupler, part number 5765-379 or equivalent.
- IJ4000 HMI.
- IJ4000 SMART-IDSs.
- An Ethernet drop for the PC, the IJ4000 HMI, and each SMART-IDS.

Summary of Procedure

This procedure assumes all SMART-IDSs and the HMI have their factory set IP addresses.

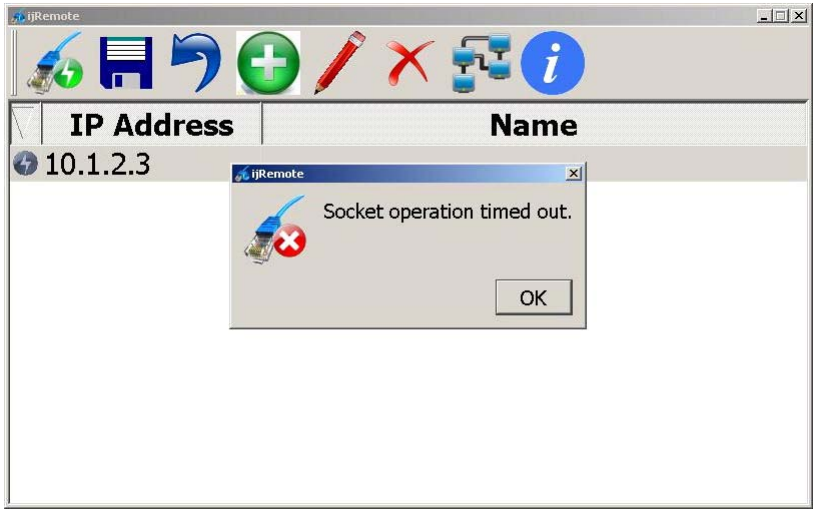
1. Install the Ink Jet Demo software on the PC and start the **ijRemote** application.
2. Attach a SMART-IDS to the network.
3. Set the SMART-IDS's IP address.
4. Add the SMART-IDS to the ijRemote controller list.
5. Repeat steps 2, 3, and 4 for each of the remaining SMART-IDSs.
6. Tell the HMI where to find the SMART-IDSs

Procedure

1. Attach the PC to the network, and then install the Ink Jet Demo software:

- Insert the USB flash drive that came with your system into a USB port on your computer. Open the drive, open the **Software** folder, and double-click the **demo.exe** file. An installation wizard will start, giving step by step instructions for installing the software.

- Start the **ijRemote** application. If a desktop icon was created when the software was installed, double-click the icon. If an icon was not created, navigate to **c:\InkJet** and double-click the **ijRemote.exe** file. It may take up to 10-15 seconds for the program to initialize and begin running, after which the screen will look like the image to the right.
- The error dialog is displayed because no SMART-IDSs are attached to the network yet. Click **OK** to close the dialog.



2. Attach a SMART-IDS to the network. One Ethernet drop is required if attaching a SMART-IDS and HMI. An Ethernet Switch (5765-461) is also required when attaching an HMI.

   To connect to the network:

   A. Make sure the SMART-IDS is turned off and unplugged from its power source.

   B. Remove the cover from the SMART-IDS.

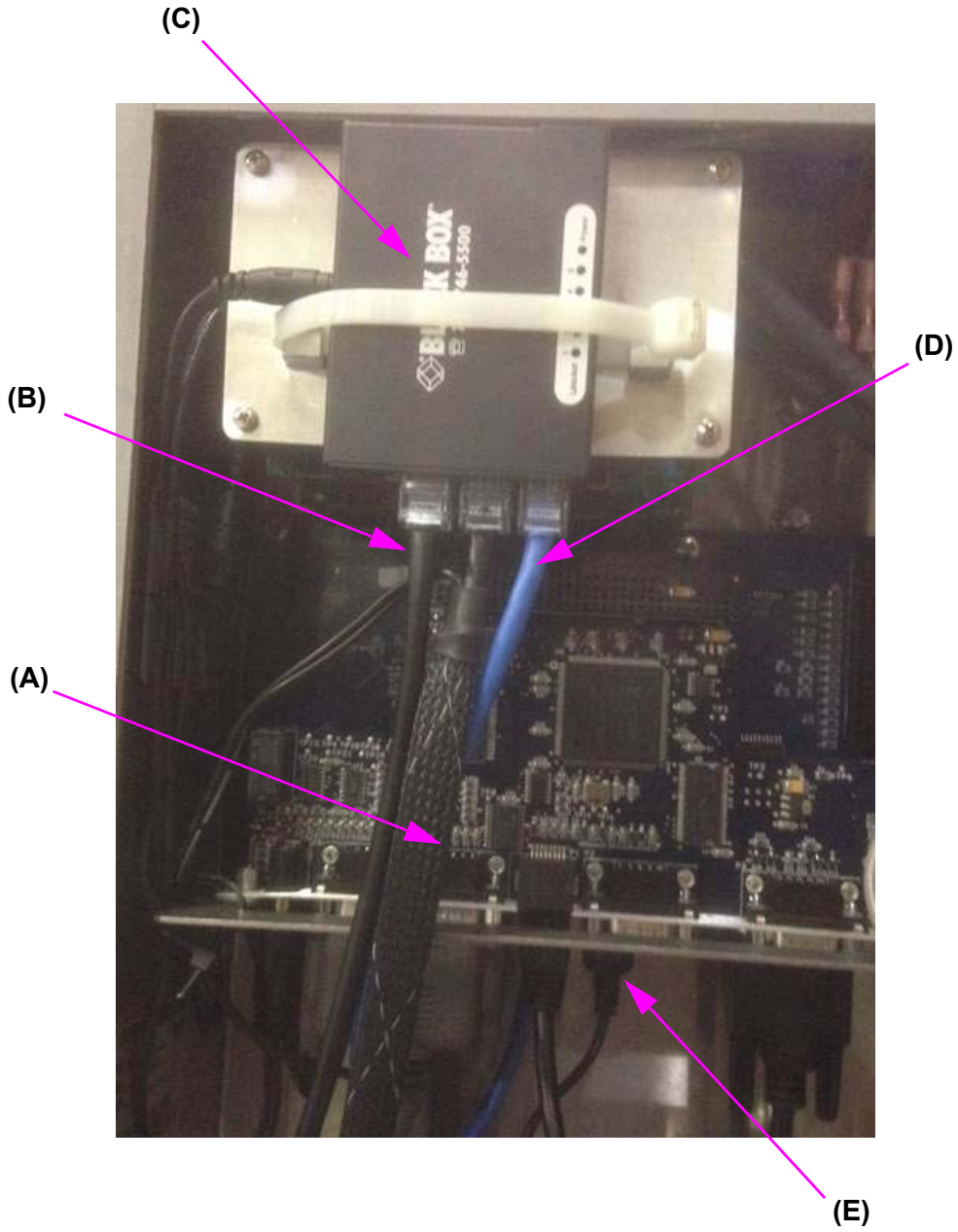
   C. Disconnect Ethernet cable **(A)** from CPU board and connect to Ethernet Switch **(C)**. The other end of the cable assembly plugs into the HMI.

   D. Feed a cable from an Ethernet drop **(B)** into the cabinet through its strain relief and plug it into the Ethernet Switch **(C)**.

   E. Plug one end of an Ethernet cable **(D)** into the Ethernet Switch, and the other end into the CPU Board's (bottom board) RJ45 connector.

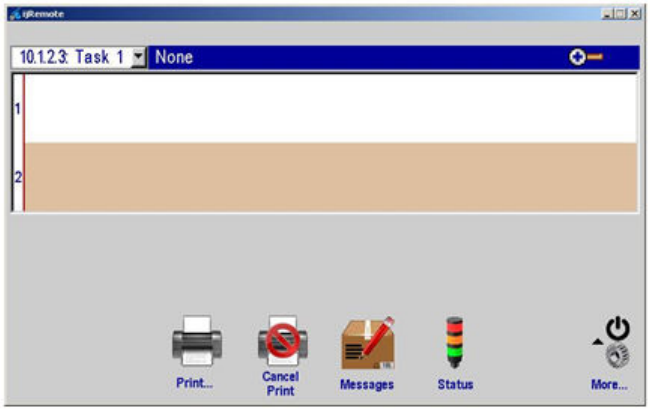
   F. Plug the USB power cable **(E)** that runs from the Ethernet Switch into the unpopulated USB port on the CPU board.

   G. Replace the cover on the SMART-IDS, plug it into its power source, and turn it on.

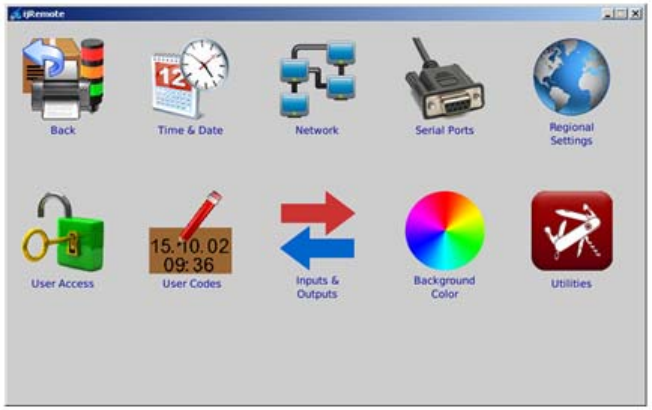


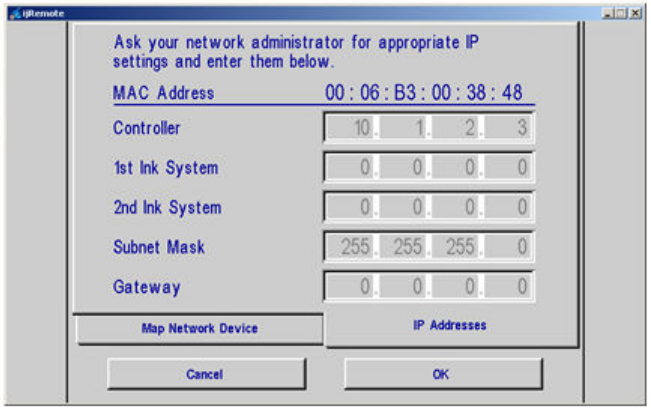
3. Set the SMART-IDS's IP address:

- On the PC, wait for the Connected icon  to the left of IP address 10.1.2.3 to turn green (it may take a few moments), then select the SMART-IDS and click the **Connect** button. The Home Screen of the SMART-IDS will be shown (below left).
- Open the **More…** menu and click the **Apps** button (below right).



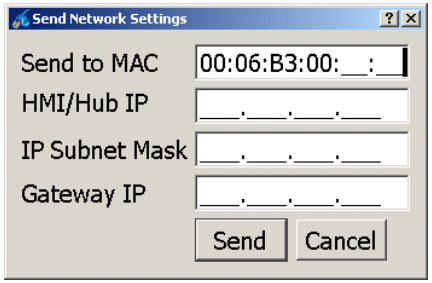
- On the **Apps** Screen (below left) touch the **Network** button to open the Network Settings Dialog (below right), and then touch the **IP Addresses** tab.

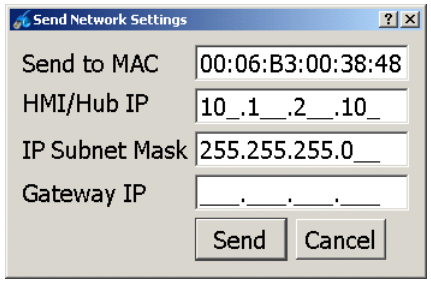




- Locate the MAC address at the top of the page and record it for later use.
- Return to the Home Screen, open the **More…** menu, and click the **Back** button to return to the ijRemote main screen.

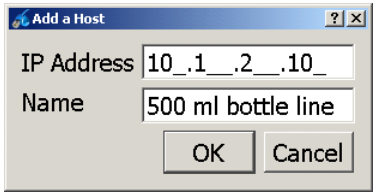
- On the ijRemote Main Screen, click the **Network** button to open the Send Network Setting Dialog.
- Complete the **Send to MAC** line using the last two digit pairs of the previously recorded MAC address. In the case of the first SMART-IDS of this example, it would be **38 48**.
- Enter the SMART-IDS's desired IP address on the **HMI/Hub IP** line. Do NOT use 10.1.2.3 or 10.1.2.6, which are the factory set IP addresses for the SMART-IDS and HMI, respectively.
- The **IP Subnet Mask** is typically set to 255.255.255.0. If this is not suitable to your application, ask your network administrator for an appropriate address.
- If appropriate to your application, enter a **Gateway IP** address; otherwise leave it blank.
- When complete, the dialog will look similar to that at right.
- Click the **Send** button.





4. Add the SMART-IDS to the ijRemote controller list:

- On the ijRemote Main Screen click the **Add** button to open the Add a Host Dialog.
- Enter the SMART-IDS's IP address (as configured in previous step).
- Enter a name for the SMART-IDS (optional).
- Click the **OK** button. The SMART-IDS is added to the list.

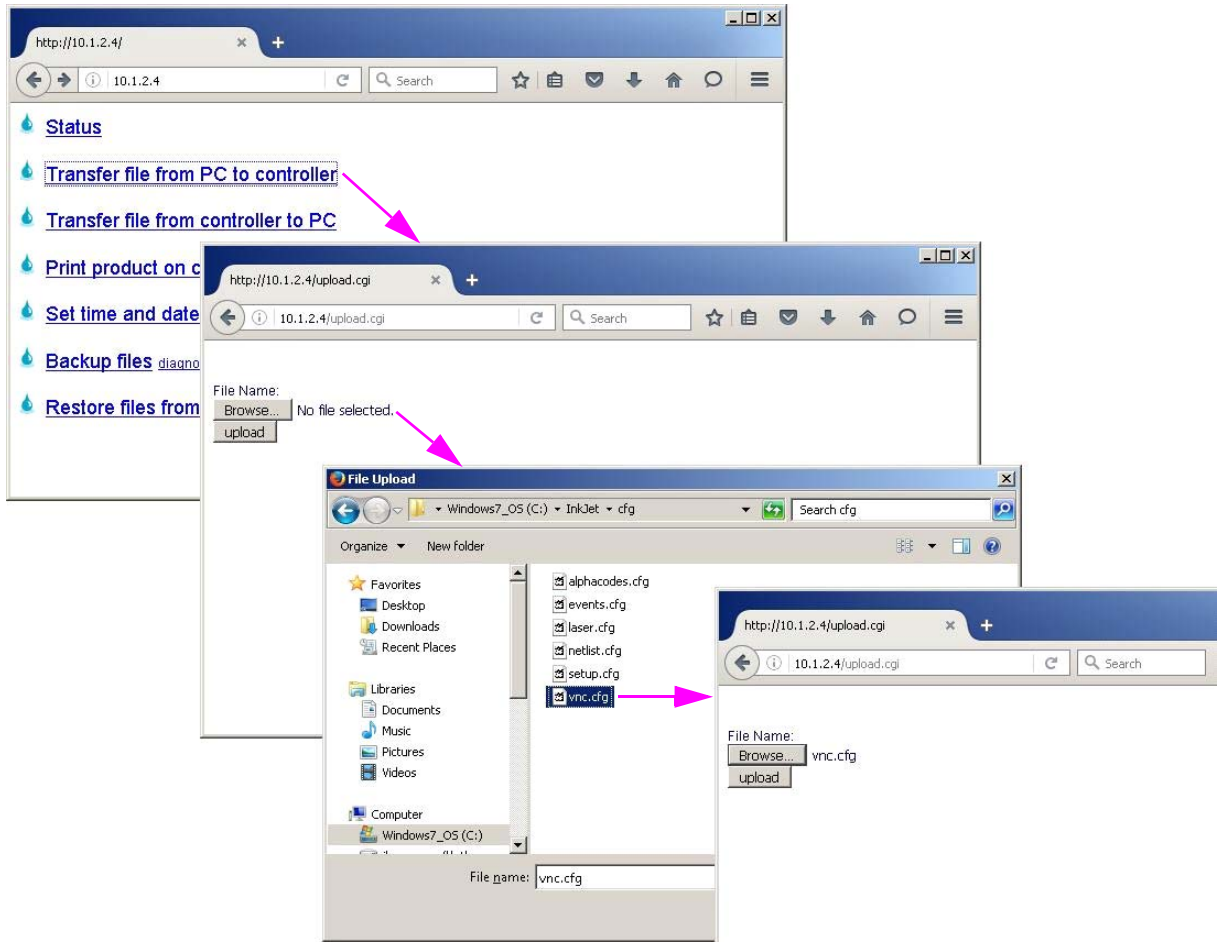


5. Repeat steps 2, 3, and 4 for the remaining SMART-IDSs.

6. Click the **Save** button to save the list and generate a **vnc.cfg** file.

7. Tell the HMI where to find the SMART-IDSs:

- On the PC, open a web browser, enter a URL of 10.1.2.6 (the HMI default IP address), and press **Return**.
- Click the **Transfer file from PC to controller** link.
- Click the **Browse…** button. When the File Upload dialog appears, navigate to **c:\InkJet\cfg**.
- Select the **vnc.cfg** file and click the **Open** button.
- Click the **upload** button.
- Reboot the HMI by cycling power to its SMART-IDS.



Appendix H: Updating the HMI & SMART-IDS via USB or Ethernet

For instructions on updating the controller and ink delivery system, please refer to document **5765-390N Updating the Controller and Ink Delivery System via USB or Ethernet**.

Appendix I: InkJet Demo Software for Windows

For information on the InkJet Demo software, please refer to document **5765-388N InkJet Demo Software for Windows**.

Appendix J: Software Interface

For information on interfacing with the software, please refer to document **5760-113 Software Interface Document**.

Appendix K: Language Support

The following languages are supported by the IJ4000 User Interface and/or Print Messages:

User Interface (via Regional Settings)	Print Messages (via Message Editor)
(not available)	Arabic
中文 (Chinese)	中文 (Chinese)
Deutsch (German)	Deutsch (German)
English	English
Español (Spanish)	Español (Spanish)
Français (French)	Français (French)
(not available)	עִברִית (Hebrew)
Italiano (Italian)	Italiano (Italian)
한국어 (Korean)	한국어 (Korean)
Nederlands (Dutch)	Nederlands (Dutch)
Português (Portuguese)	Português (Portuguese)
Русский (Russian)	Русский (Russian)
Svenska (Swedish)	Svenska (Swedish)
(not available)	Türk (Turkish)

Appendix L: Part Numbers

IJ4000 System

Item	Kit No.	Description
1	5765-004J	IJ4000-HMI, Controller (Domestic or European)

IV4000 System

Item	Kit No.	Description
2	5780-017V	Handheld Controller, IV (Domestic or European)

Service Parts - IJ4000 HMI

Item	Kit No.	Description
3	5765-221	Kit, Replacement Display, IJ4000-SS, 10.2"
4	5765-222	Kit, Replacement, CPU, IJ4000 HMI

Service Parts - Integrated Valve

Item	Kit No.	Description
5	5780-232	Kit, Replacement Display, Handheld
6	5765-228	Kit, Replacement, CPU, IJ4000 HH