# Operations Manual

# *IJ3000*
## Controller

5760-121
Revision F

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**5760-121
Revision F**

## Warranty:

### *IJ3000* Controller

The IJ3000 Controller, including all components unless otherwise specified, carries a limited warranty.

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

# *IJ3000* **Controller**

# Section 1: Introduction

This manual describes the operation of the IJ3000 Controller. It includes programming instructions to create and edit print messages for the IJ3000 Controller. The IJ3000 Controller is used in conjunction with high resolution Impulse Jet, WaxJet and large character Valve Jet type print heads. WaxJet heads utilize impulse jet printing technology, combined with solid ink (wax). References to "Impulse Jet" include WaxJet, unless otherwise noted. System installation and hardware set-up for each is described in separate system operating manuals. For the IJ3000 Valve Jet systems, refer to manual 5760-107; for the IJ3000 Impulse Jet system, refer to manual 5760-111; and for the IJ3000 WaxJet System, refer to manual 2466-400.

## IJ3000 Controller

The IJ3000 Controller consists of printer interface electronics, a color display with touch screen, and a QWERTY style elastomeric keypad, in an industrial enclosure. The controller incorporates a Graphical User Interface (GUI) with intuitive, easy to use software. The controller can be used as a stand-alone device or networked through built-in Ethernet connectivity.

The IJ3000 Controller can be configured for multiple print technologies, including large character Valve Jet, high resolution Impulse Jet print heads and WaxJet heads. Each print head type utilizes a common CPU board and resident controller firmware, in conjunction with a Print Head Interface board, unique to the print technology. This allows the IJ3000 Controller to drive multiple print technologies while maintaining a common operating platform.

The IJ3000 Controller is also capable of controlling the input to Diagraph Automated Label Printers (ALP). This allows the controller to become a single point control for dual technology (ink jet and labeling) product marking applications.

The IJ3000 has an Ethernet Controller built into the CPU. The IJ3000 Controller can be remotely controlled via the Ethernet connection. A programming interface document is available (P/N: 5760-113) for the IJ3000 software interface.

IJ3000 PC Networking Software is available to allow multiple IJ3000 Controllers to be controlled from one central PC. The IJ3000 Networking Software is also capable of connecting database stored information to controller-generated print messages.

# Section 2: 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.

**Wear safety goggles when performing the procedure described!**

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

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

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

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**CAUTION:** Turn off the equipment's main power before:
• Performing preventive maintenance.
• Performing any repairs to the unit.
• Servicing the equipment in any manner.

ESD (Electro-Static Discharge) 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.

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**NOTE**: It is extremely important to:
• Refer to your supervisor for complete instructions on personal protective equipment (PPE) required to work safely with this system.
• Read the MSDS (Material Safety Data Sheet) and follow its instructions for proper storage, handling and disposal of inks and conditioners.

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**PRODUCT COMPLIANCE DISCLAIMER NOTE:**

This product meets the requirements of CAN/CSA-22.2 NO.60950-00 * UL 60950 using Diagraph an ITW Company approved items. Units are only tested and qualified with Diagraph an ITW Company approved inks, parts and accessories. Use of other inks, parts or accessories may introduce potential risks for which Diagraph an ITW Company can assume no liability.

# Section 3: Typical System Components

(The following view shows an IJ3000 Impulse Jet System.)

| | | | |
|---|---|---|---|
| 1 | IJ3000 Controller | 8 | Encoder |
| 2 | CIDS3000 | 9 | Ink Supply |
| 3 | Print Heads | 10 | Photo Sensor |
| 4 | Conveyor | 11 | Vacuum Waste Collector Bottle |
| 5 | Product | 12 | Encoder Cable |
| 6 | Print Head Bracketry | 13 | Controller to Print Head Cable |
| 7 | Ink Status Beacon | 14 | Throw Distance (1/8" Recommended) |
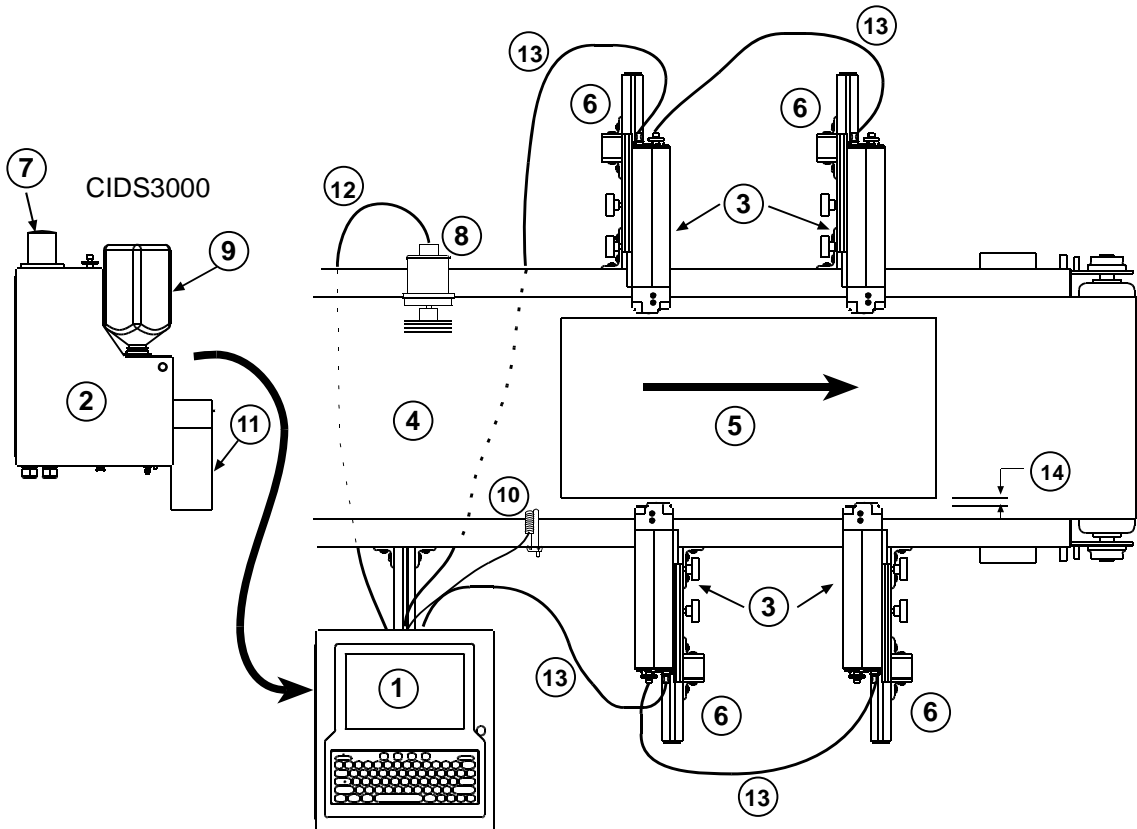


IJ3000-ES                    IJ3000-LS                    IJ3000-XLS
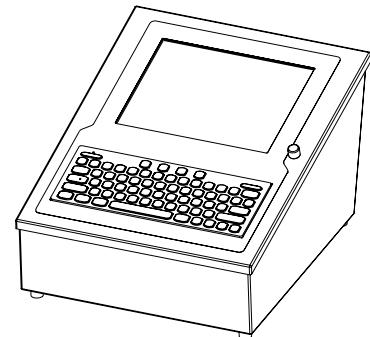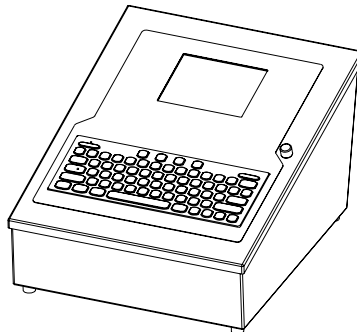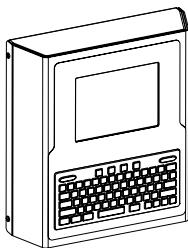
The Diagraph IJ3000 Controller is available in the following configurations:

**Part Number**    **Description**


**IJ3000-XLS Controller Assemblies, Impulse Jet Systems, w/10.4" Display**

5760-009SJ1D    Stainless Enclosure, Single Impulse Jet Interface, Domestic
5760-009SJ2D    Stainless Enclosure, Dual Impulse Jet Interface, Domestic
5760-009SJ1E    Stainless Enclosure, Single Impulse Jet Interface, European
5760-009SJ2E    Stainless Enclosure, Dual Impulse Jet Interface, European


**IJ3000-XLS Controller Assemblies, Dual Technology Systems, w/10.4" Display**

5760-009SVJD    Stainless Enclosure, Impulse Jet and Integrated Valve Interface, Domestic
5760-009SVJE    Stainless Enclosure, Impulse Jet and Integrated Valve Interface, European


**IJ3000-LS Controller Assemblies, Integrated Valve Systems, w/5.7" Display**

5760-001SV1D    Stainless Enclosure, Single Integrated Valve Interface, Domestic
5760-001SV2D    Stainless Enclosure, Dual Integrated Valve Interface, Domestic
5760-001SV1E    Stainless Enclosure, Single Integrated Valve Interface, European
5760-001SV2E    Stainless Enclosure, Dual Integrated Valve Interface, European


**IJ3000-LS & IJ3000-XLS Controller/IDS 3000 Bracketry**

5760-350    Controller/IDS 3000 Conveyor Mounting Kit
5760-351    Controller/IDS 3000 Pedestal Mounting Kit
5760-352    Controller/IDS 3000 T-Base Mounting Kit
5760-362    Controller 90° Pivot Bracket Kit
5760-368    CIDS Mounting Kit


**IJ3000-ES Controller Assemblies, Impulse Jet**

5765-001DJ    Painted Enclosure, Single Impulse Jet Interface, Domestic
5765-001EJ    Painted Enclosure, Single Impulse Jet Interface, European


**IJ3000-ES Controller Assemblies, Integrated Valve**

5765-001DV    Painted Enclosure, Single IV Interface, Domestic
5765-001EV    Painted Enclosure, Single IV Interface, European


**IJ3000-ES Controller Bracketry**

5765-200    IJ3000-ES Conveyor Mount
5760-362    IJ3000 90° Pivot Bracket


**I/O Board (For use with IJ3000-LS and IJ3000-XLS only)**

5760-392    Kit, I/O Board
5760-395    Kit, Warning Tower

# IJ3000 Controller

The controller gathers and stores all the information required for printing a message. This information can come from the following sources:

1. The user interface, which tells the controller what message to print on the product.

2. The photosensor, which tells the controller when to print.

3. The encoder, which tells the controller how fast to print. There are two types of encoders:

   •A built-in **fixed speed encoder** is used when the conveyor speed does not change.

   •An optional, conveyor-mounted **variable speed encoder** is used when the line speed varies or has frequent starts and stops.
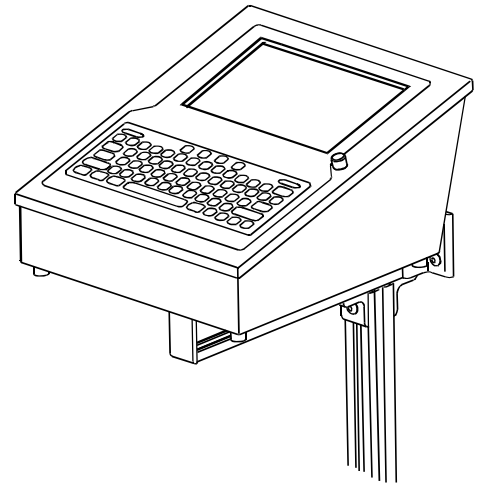
With this information, the controller knows exactly when the leading edge of the product will reach the print head and at what rate of speed.

The IJ3000-LS and IJ3000-XLS controllers come in a stainless steel case that makes it splashproof and resistant to electromagnetic interference. A hinged cover provides access to replaceable parts.

The IJ3000-ES comes in a compact, powder-coat painted enclosure. All print head, encoder, ethernet, etc. connections are readily accessible from the exterior of the enclosure.

The IJ3000 Impulse Jet Controller can control up to two 32-channel print heads or one 256-channel print head per interface board. With the optional second interface board, the system can control up to four 32-channel heads or two 256-channel heads. (IJ3000-ES does not allow for the optional second interface board.)

**NOTE:** If the controller is configured for dual technologies (Integrated Valve and Impulse Jet) the Impulse Jet Interface Board must be the first board plugged into the CPU Board. The Impulse Jet Interface Board requires use of the 24 VDC Power Supply. The Integrated Valve Jet Interface Board requires use of the 15 VDC Power Supply.

Optional 2nd Interface Board

Interface Board

CPU Board

Display Board Cable Connectors

Keypad Cable Connector

Battery
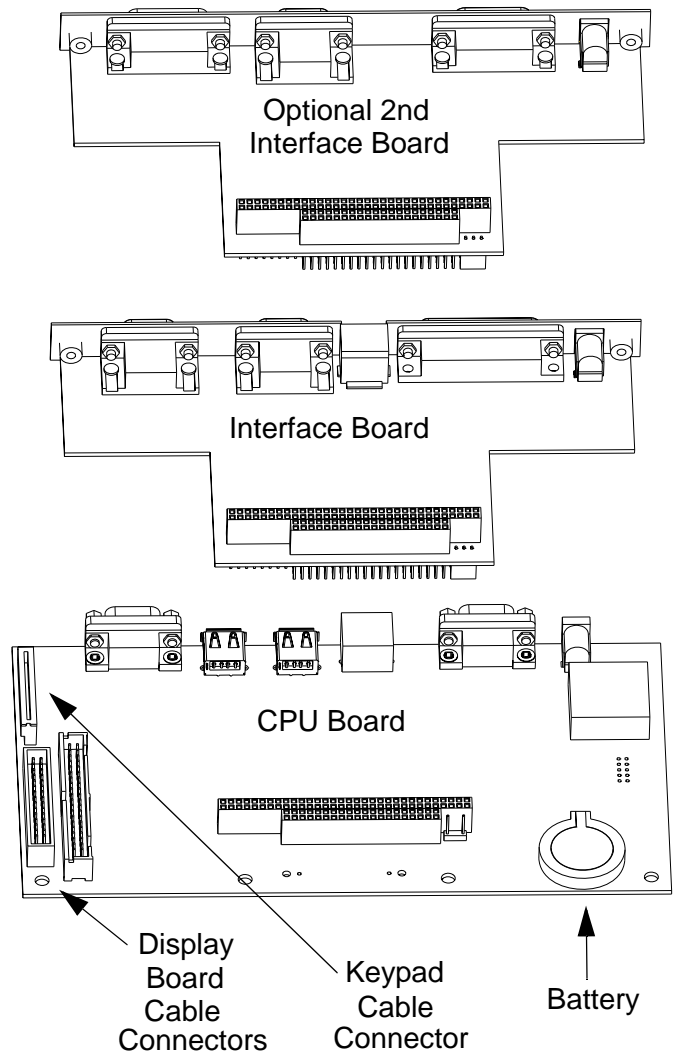
# Section 4: Getting Started

## IJ3000 Keypad
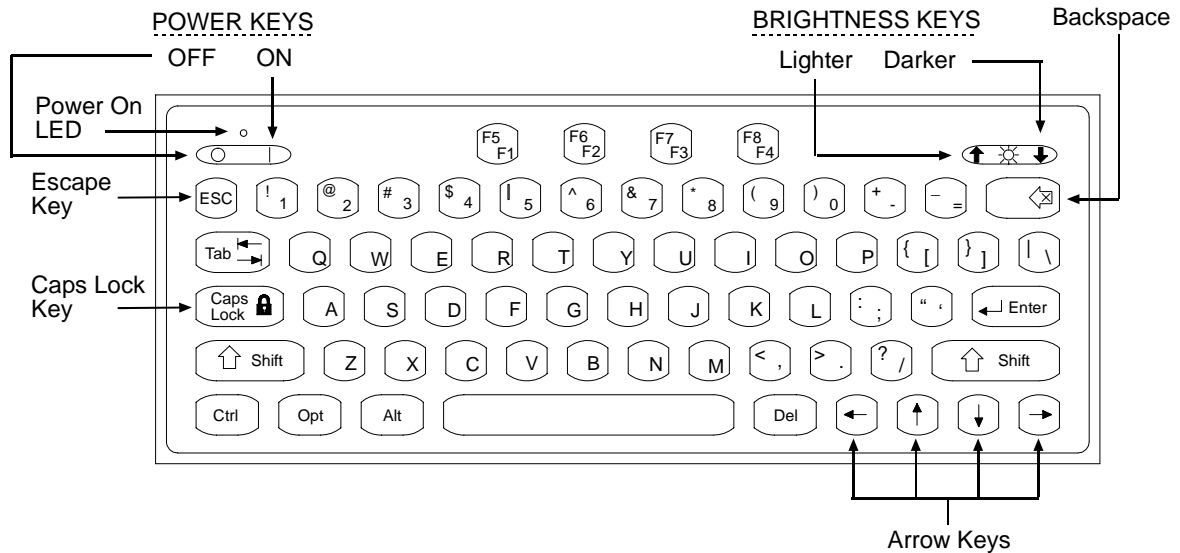


### Turning the Controller On

The power keys are located at the top left corner of the keypad. Press the **I** key to turn the controller on. Press the **O** key to turn it off. (To prevent accidental turn-off, the system will prompt for confirmation.)

⚠️ **CAUTION:** If the system is in the Print mode when it is turned off, it will resume printing when it is turned back on. Anything that is in front of the print heads when printing resumes may get ink on it.

### Adjusting Screen Brightness

The screen brightness control keys are at the top right corner of the keypad. Press the **Up Arrow** key to make the screen lighter; press the **Down Arrow** key to make the screen darker.

### Auto Repeat

The IJ3000 keypad has an auto repeat feature that activates when a key is held down for more than one half second.

# Commands

There are three main commands given in this manual: **Highlight, Press,** and **Touch.**

## Highlight

Highlight a display control to select it for further action, or to give it input focus. Different types of display controls are highlighted differently. For example, highlighted text is displayed in inverse video (light characters on a dark background), while highlighted screen buttons and message fields are displayed with a box around them.

Inverse video example:　　　Pure Bee Polllen

## Press

Press a keypad key to do or complete a particular action. Examples: Press **Enter**, press **ESC**, or press the **Up/Down Arrows** to scroll through the list of items.

## Touch

Touch a screen control to do or complete a particular action. Examples: Touch the **Status** button to display the Status Screen or touch a print head to view or change that print head's properties.

# Screen Controls

## Buttons

There are three types of screen buttons, **Text**, **Bitmap**, and **Decorated**. Touch a button to actuate its function:

- Text button: contains a text description of its function.

- Bitmap button: contains a graphic illustrating its function.
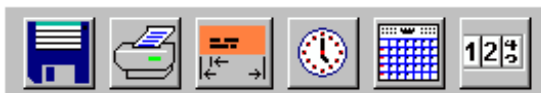
- Decorated button: contains text and graphics.

## Radio Buttons

Touch a radio button or its text description to make a selection. A black dot indicates the current selection.
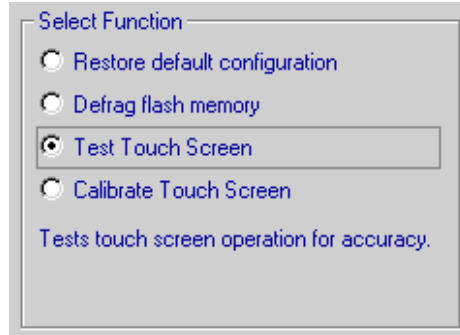
## Check Boxes

Touch a check box or its text description to toggle an option or feature on and off. The feature or option is enabled when a checkmark appears in the box.
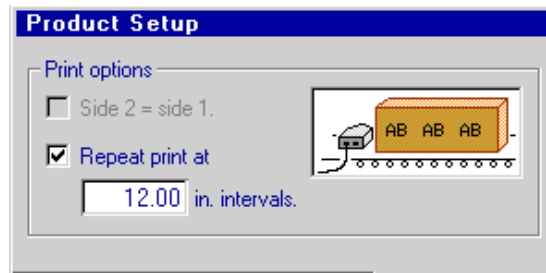
## Value Entry Box

Touch a value entry box to highlight it, type in the desired value, and press **Enter**. Press **ESC** any time prior to pressing **Enter** to restore the original value. Touching another screen control or pressing an arrow key after entering a new value, but before pressing **Enter**, sets the new value just as if **Enter** had been pressed.
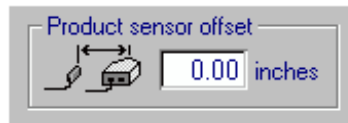
All value entry boxes have preprogrammed maximum and minimum allowable values. Enter a value greater than the allowable maximum and it automatically changes to the maximum. Enter a value less than the allowable minimum and it automatically changes to the minimum.

Depending on its usage, a value box may or may not allow decimals. When they are allowed, values are fixed at two decimal places.

## Text Entry Box

Touch a text entry box to highlight it, type in the desired text, and press **Enter**. Press **ESC** any time prior to pressing **Enter** to restore the original text. Touching another screen control or pressing the **Up** or **Down Arrow** keys after entering new text, but before pressing **Enter**, sets the new text just as if **Enter** had been pressed.

Message: | Diagraph

Existing text in a text entry box can be edited. Touch the box to highlight it, use the **Left** or **Right Arrow** keys to move the cursor to where text is to be added or removed, then use the **Backspace** or **Delete** key to remove unwanted text, or type in additional text.

## List Box

Use a list box to select an item from a number of related items, such as print heads, fonts, or date code formats. A list box is displayed in response to a button or other control being touched. (A vertical scroll bar will appear if the list contains more items than can be displayed in the list box.)

Highlight the selection by touching it, or scroll through the list using the up and down screen buttons or the up and down keys on the keypad. After an item has been selected from the list, touch the **OK** screen button, or press **Enter** on the keypad.

**Fonts**

Arial_15
Arial_15_bold
Arial_24
Arial_24_Bold
Arial_32
Arial_32_Bold
Arial_7
Arial_7_bold

Cancel        OK
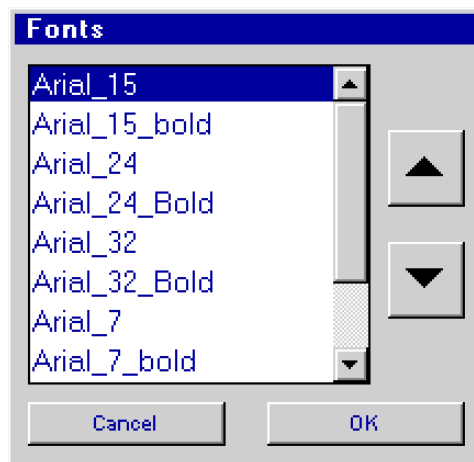
## Message Selection Box

Use the message selection box to select a print message for printing, editing, deleting, etc. Select a print message by touching its name, by using the arrow keys on the keypad to move through the message names until the desired one is highlighted, or by typing the name in the box provided. After a message is selected, touch the screen button for the operation to be performed.

**Messages**

01234567890
1234567890
12345678901
45678912301
test

Message:

Cancel   Delete   New   Open
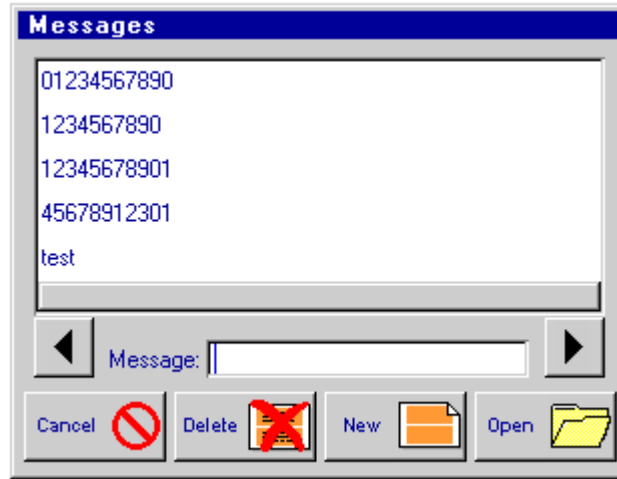
## Inactive Controls

When a screen control has no function within the context of the current situation, it is made inactive or "grayed out" (the control is displayed entirely in shades of gray). For example, if the IJ3000 is set up for printing on one side of a product only, the **Side 2 = Side 1** check box on the Print Options screen has no function and is grayed out. Likewise, the repeat intervals value entry box is grayed out if repeat print is not selected.

**Product Setup**

Print options
☐ Side 2 = side 1.
☐ Task 2 = task 1.
☐ Cancel after one print
☐ Repeat print at   12.00   in. intervals.

AB
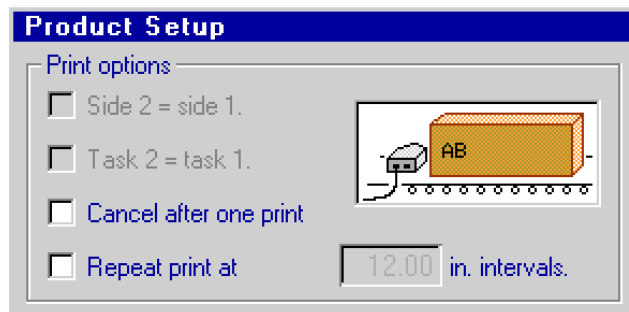
## Keypad Controls
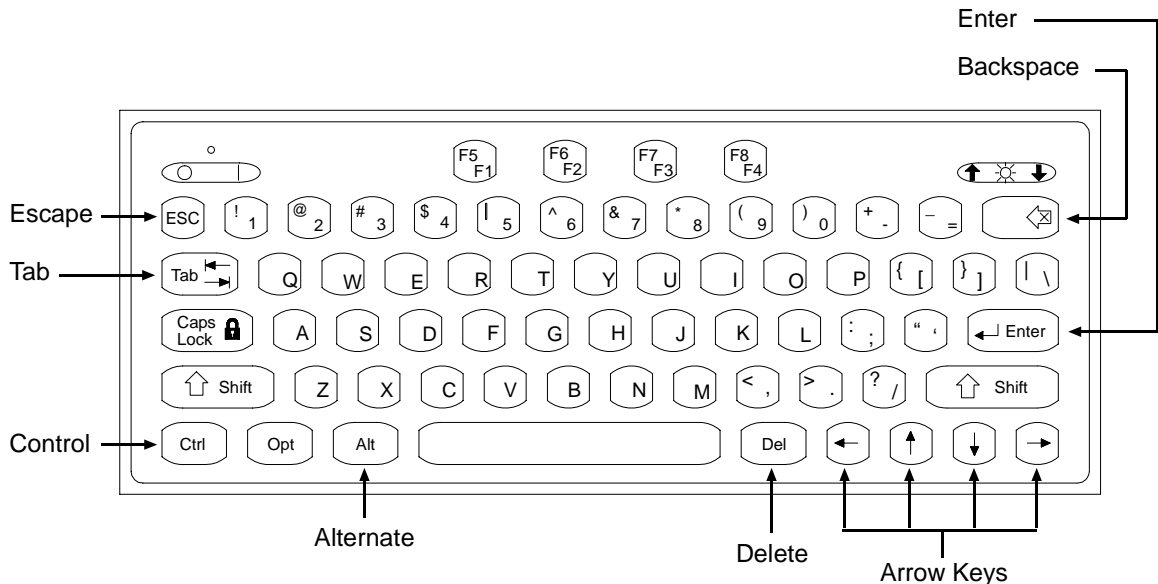


The following keypad keys can be used to navigate through a screen:

### ESC (Escape):

Press **ESC** to close the current window, dialog box, or menu. Any changes made in the window or dialog box that have not been saved will be discarded. Pressing **ESC** is the only way to close a menu without performing any of the menu's functions.

If a text entry box or value entry box has input focus and the existing contents of the box have been changed but not set (by pressing Enter), press **ESC** to restore the original contents. Press **ESC** again to close the window or dialog box that contains the text or value entry box.

### Arrow Keys:

Press the **Arrow** keys to shift input focus from one screen control to another. Focus will shift to the next control in the general direction of the key pressed. If no control lies in that direction, input focus remains where it is.

When a text-type screen control has input focus, the **Left** and **Right Arrow** keys move the cursor through the text; the **Up** and **Down Arrow** keys will shift focus to the next screen control above or below the box.

### Tab:

Press **Tab** to shift input focus from one screen control to another. Input focus shifts from control to control in the order in which they were added to the display.

**Tab** also frees the input focus when it gets "stuck" in a window. For example, when scrolling through the message list window on the Message Selection Box, the arrow keys cannot be used to leave the confines of the window. To shift input focus out of the window, press **Tab**.

### Enter:

Enter key behavior is determined by the screen control that has input focus.
- Press **Enter** to actuate a Text button, Bitmap button, or Decorated button.
- Press **Enter** to choose a Radio button selection.
- Press **Enter** to toggle a Checkbox option on and off.
- Press **Enter** to terminate data entry on Text and Value Entry boxes.

### Backspace or Delete:

Press the **Backspace** or **Delete** button to delete individual characters or entire text strings when editing text. **Backspace** removes characters to the left of the cursor, **Delete** removes characters to the right of the cursor.

### Ctrl (Control):

The **Ctrl** key is used in the Edit Screen to amplify the action of the arrow keys (see *"Moving Around the Edit Screen" on page 19"*), and to alter the function of the Enter key.

### Alt (Alternate):

The **Alt** key is used in the Edit Screen to alter the action of the arrow and Enter keys. (See *"Editing a Message" on page 54"*.)
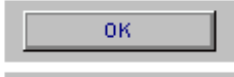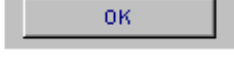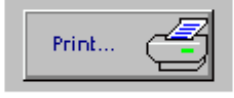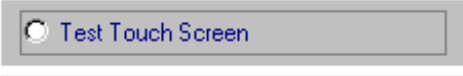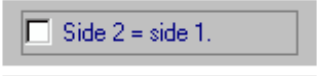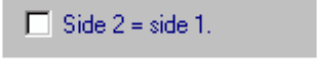
### F4/F8:

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


## Input Focus

A screen control that receives keypad inputs has input focus. A screen control is assigned input focus by touching the control, or by using the Tab or arrow keys on the keypad to shift focus from control to control. A screen control that has input focus is highlighted in some way: text based controls display a cursor that indicates the text insertion point or are displayed in inverse video; buttons and message fields have a box around them.

Examples of screen controls with and without input focus:

## Home Screen
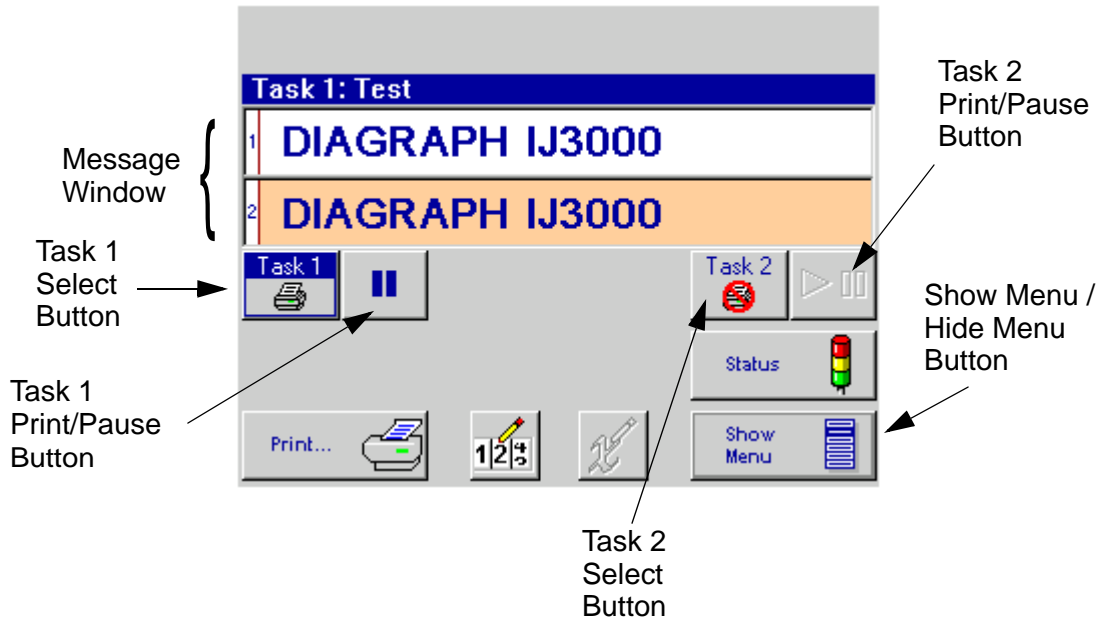


The Home Screen is usually the first screen displayed at power on. The major parts of the Home Screen are the **Message Window**, the **Task 1** and **Task 2** control buttons, the **Show Menu / Hide Menu** button, and the system controls and access buttons. (The system controls and access buttons' functions are described later in this manual.)

**NOTE:** Task 2 buttons will not appear if only one interface board is connected.

### Message Window

The Message Window displays the current print message as it will look the next time it is printed. If no message is loaded to print, the window is empty. The message window is updated approximately every seven seconds, so it likely will not show each print.

Long print messages that do not fit completely within the Message Window can be viewed by using the **F1** and **F2** keys to scroll the message left and right, respectively.

The appearance of the message window reflects the system setup. Each numbered white or beige bar represents a print head in the daisy chain. The text on a bar is the text printed by that print head. If printing on a single side of the product, only one window is shown. Two windows are displayed when utilizing two-sided printing, with the top window always being side 1 or the side closest to the IJ3000 controller.

The window's header displays which task the print message is being printed on and the file name of the message being printed. If no message is loaded to print, "**None**" is displayed.

On print tasks configured with IJ768 or IJ384 graphics print heads, a **Zoom** button on the right side of the window header expands the message window to full screen and magnifies the print message so that fine details may be seen (see illustrations below). When zoomed in, use the **F1, F2, F5** and **F6** keys, or the **Arrow** keys, to scroll the message left, right, up and down. Use the **Zoom** button or the **ESC** key to zoom back out.
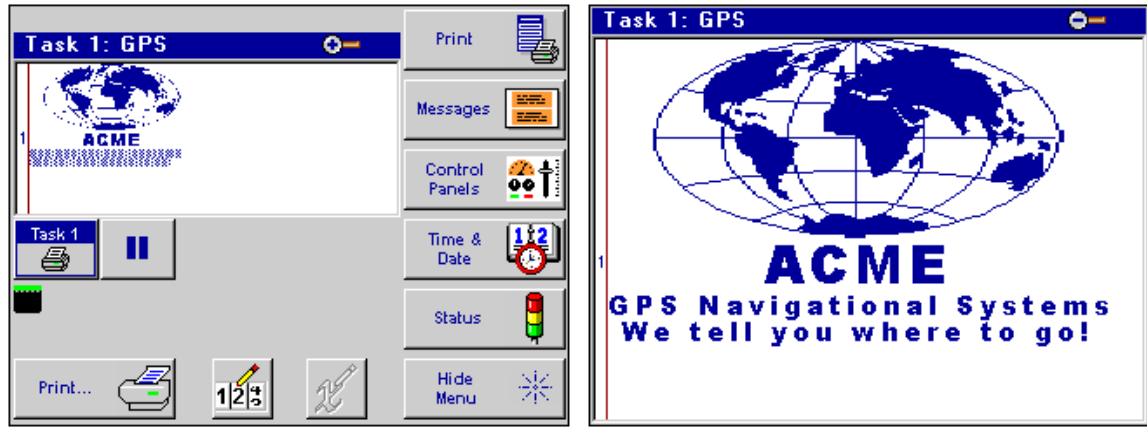
| Normal Message Window | Message Window Zoomed In |
|---|---|

## Task 1/Task 2 Buttons

Touch the **Task 1** button to display the Task 1 message in the Message Window, touch **Task 2** to display the Task 2 message. If the system is set up to have only one print head daisy chain, the **Task 2** button is not displayed.

The printer icon on the task buttons indicates the current print status. If the printer is shown covered with a red circle and slash (see the Task 2 Select Button in the illustration on previous page), the task is either paused or no print message is loaded to print. If the red circle and slash is not displayed (see the Task 1 Select Button in the illustration on previous page), the task is printing.

## Print/Pause Buttons

Touch a task's **Print/Pause** button to toggle the task between printing and not printing (paused). The icon on the button indicates what action will be taken when the button is touched. That is, if blue double bars are shown, touch the button to **pause** print. If a green arrow is shown, touch the button to **resume** printing. The **Print/Pause** button is always active; a task's message does not have to be displayed in the message window for its **Print/Pause** button to work.

When a task is empty (no message is loaded to print), its **Print/Pause** button displays both an arrow and the double bars, and is grayed out.

The Print/Pause button looks like this when the task is printing. Touch the button to pause printing.

The Print/Pause button looks like this when the task is paused. Touch the button to resume printing.

The Print/Pause button looks like this when the task is empty.

The **Task 2 Print/Pause** button is not displayed if the system is set up to have only one daisy chain.

## Show Menu/Hide Menu Button

Touch the **Show Menu/Hide Menu** button to show or hide the Home Screen menu. The functions associated with the menu buttons are described later in this manual.
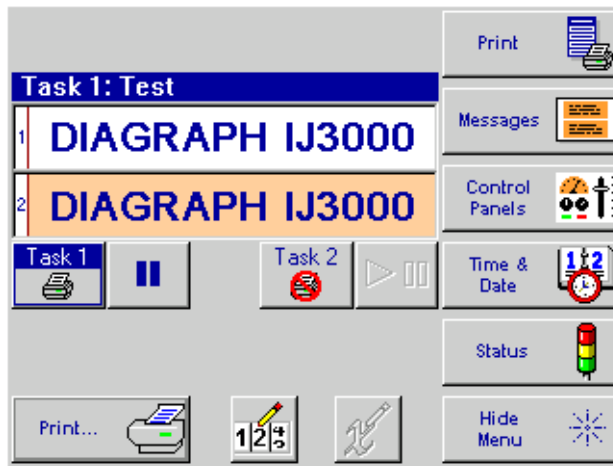
Home Screen with Menu Displayed

## Moving Around the Edit Screen

Crosshairs
Pointer

Edit
Window

Current
Position
Indicator

Side 1 /
Side 2
Buttons

Next Field
Button
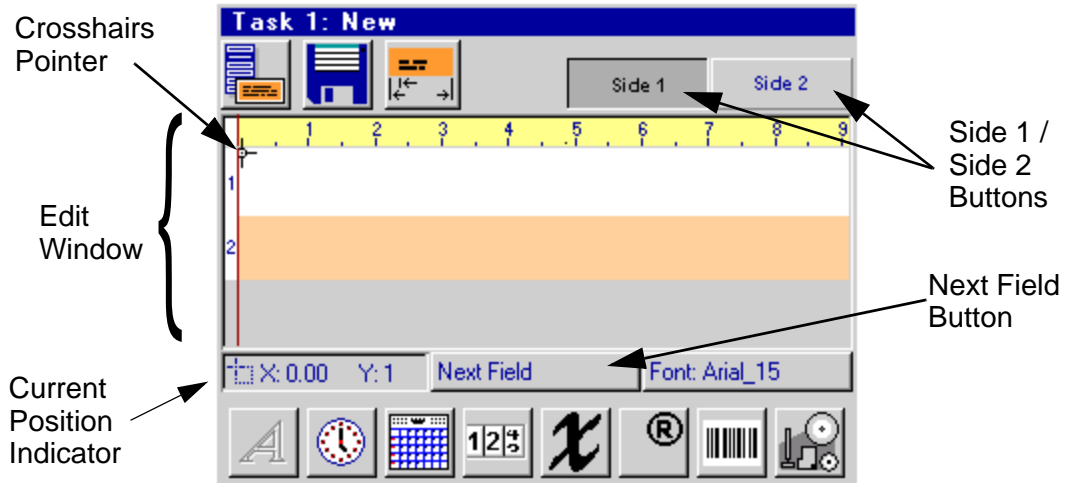
### Edit Window:

Print messages are created and edited in the Edit Window. Unlike all other IJ3000 screens and dialog boxes, input focus on the Edit Screen remains in one place - the Edit Window. Buttons outside of the Edit Window do function when touched, but they can't be made to function from the keypad. For information on the layout and appearance of the Edit Window see *"Creating a Print Message" on page 43*.

## Crosshairs Pointer:

The crosshairs pointer indicates where a new data field is placed when added to a print message. Use the keypad keys listed below to move the crosshairs pointer around the Edit Window.

Touching the screen inside the Edit Window can also move the crosshairs pointer. The pointer moves to where the screen is touched.

The color of the crosshairs pointer changes from black to red when it moves over a data field.

### Impulse Jet:

| Direction | IJ96, IJ192, IJ224, IJ352, IJ384 & IJ768 Distance | WJ192 Distance | Press keypad key |
|---|---|---|---|
| up/down | 3 dot row | 1 dot row | up/down arrow |
| up/down | Height of current font | Height of current font | Shift + up/down arrow |
| up/down | 1 dot row | 1 dot | Alt + up/down arrow |
| down | Height of current font | Height of current font | Enter (when no fields are highlighted and the crosshairs pointer is black) |
| left/right | 6 print columns | 4 print columns | left/right arrow |
| left/right | 54 print columns | 36 print columns | Shift + left/right arrow |
| left/right | 1500 print columns | 1000 print columns | Ctrl + left/right arrow |
| left | 6 print columns | 4 print columns | Backspace/Delete (when no fields are highlighted) |
| left | 54 print columns | 36 print columns | Shift + Backspace/Delete (when no fields are high-lighted) |
| left | 1500 print columns | 1000 print columns | Ctrl + Backspace/Delete (when no fields are high-lighted) |
| right | 6 print columns | 4 print columns | Space Bar (when no fields are highlighted) |
| right | 54 print columns | 36 print columns | Shift + Space Bar (when no fields are highlighted) |
| right | 1500 print columns | 1000 print columns | Ctrl + Space Bar (when no fields are highlighted) |

**Integrated Valve:**

| Direction | Distance | Press keypad key |
|---|---|---|
| up/down | 1 dot row | up/down arrow |
| up/down | 9 dot rows | Shift + up/down arrow |
| down | 9 dot rows | Enter (when no fields are highlighted and the crosshairs pointer is black) |
| left/right | 1 print column | left/right arrow |
| left/right | 9 print columns | Shift + left/right arrow |
| left/right | 250 print columns | Ctrl + left/right arrow |
| left | 1 print column | Backspace/Delete (when no fields are highlighted) |
| left | 9 print columns | Shift + Backspace/Delete (when no fields are highlighted) |
| left | 250 print columns | Ctrl + Backspace/Delete (when no fields are highlighted) |
| right | 1 print column | Space Bar (when no fields are highlighted) |
| right | 9 print columns | Shift + Space Bar (when no fields are highlighted) |
| right | 250 print columns | Ctrl + Space Bar (when no fields are highlighted) |

## Next Field Button:

Touch the **Next Field** button to highlight or select the data fields in the order in which they were added to the print message. A selected field's color changes from dark blue to red and a box surrounds the field. Once a field is selected, it can be moved around the Edit Window or its contents can be edited. For instructions on editing an existing data field see *"Editing a Message" on page 54*. Use the keypad keys listed below to move a selected field around the Edit Window.

Fields cannot be moved over other fields, they must be moved around them. When a field is positioned appropriately, press **Enter** to de-select it.

A field can also be selected by moving the crosshairs pointer over it (as indicated by the crosshairs pointer turning red) and pressing **Enter**, or by touching the field directly.

### Impulse Jet::

| Direction | IJ96, IJ192, IJ224, IJ352, IJ384 & IJ768 Distance | WJ192 Distance | Press keypad key |
|-----------|---------------------------------------------------|----------------|------------------|
| up/down   | 1 dot row       | 1 dot rows        | up/down arrow            |
| up/down   | 9 dot rows      | 36 dot rows       | Shift + up/down arrow    |
| up/down   | 1 dot row       | 1 dot             | Alt + up/down arrow      |
| left/right| 6 print columns | 4 print columns   | left/right arrow         |
| left/right| 54 print columns| 36 print columns  | Shift + left/right arrow |

### Integrated Valve:

| Direction | Distance | Press keypad key |
|-----------|----------|------------------|
| up/down   | 1 dot row       | up/down arrow            |
| up/down   | 9 dot rows      | Shift + up/down arrow    |
| left/right| 1 print column  | left/right arrow         |
| left/right| 9 print columns | Shift + left/right arrow |

## Current Position Indicator:

The Current Position Indicator displays the current location of the crosshairs pointer, selected field, or edit cursor. The X position is given in inches from the left edge of the active print area. The Y position is given in dot rows from the top of the active print area.

## Side 1/Side 2 Buttons:

Touch the **Side 1** or **Side 2** button to display side 1 or side 2 of the print message. The button that appears pressed or pushed indicates which side is currently displayed.

# Section 5: Setup Functions

## Tasks

A task consists of all operations associated with a single interface board. (All print heads connected in a daisy chain are part of one task.) If only one interface board is connected, or if an IJ3000-ES controller is being used, Task 2 will not be applicable and Task 2 buttons will not be displayed.

# Configuring the Print Station

## Print Head Setup Screen

On the **Home Screen**, touch **Show Menu**, **Control Panels**, then **System Setup**.

Screen prompts guide the user through the step by step print head setup procedure. Once begun, the procedure may be aborted (by pressing **Cancel** or the **Escape** key) at any time without changing the current print head setup.

To begin the print head setup procedure, touch the **Redo Print Head Setup** button. The next screen prompts the user to specify product direction.
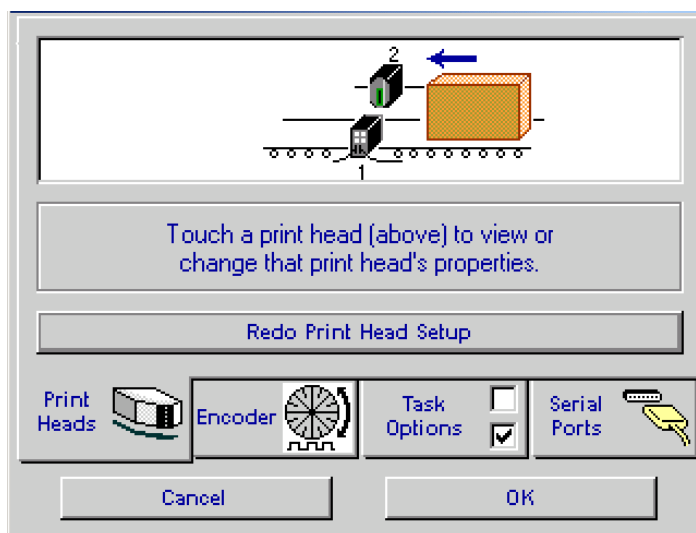
## Specifying Product Direction

Touch the box that represents the direction the product will move on the conveyor. The next screen will appear automatically.
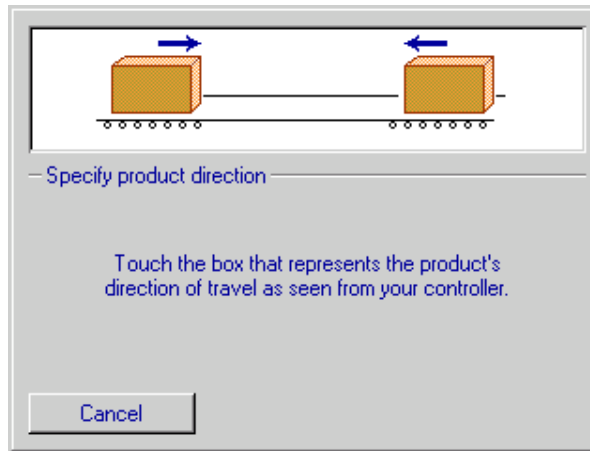


## Specifying Number of Print Heads

Touch the **Up/Down Arrows** to set the number of print heads on each side of the conveyor. The illustration at the top of the screen will automatically change to reflect the choices. In the example below, one print head has been specified on the near side and one on the far side of the conveyor. Touch the **Next>** button.
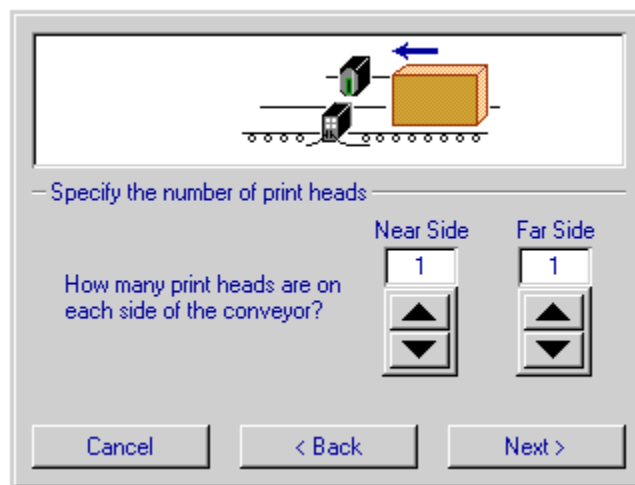
## Setting Daisy Chain Order

Both print heads are displayed, and the user is prompted to indicate the first print head in the daisy chain by touching it. (If there is only one print head, this step is bypassed.) Once this is done, the **Print Head Properties** screen appears.

**NOTE:** The first print head in the daisy chain should be the top print head in the system, as this one will be printing the top line of data and will be the first one prompted to enter data.
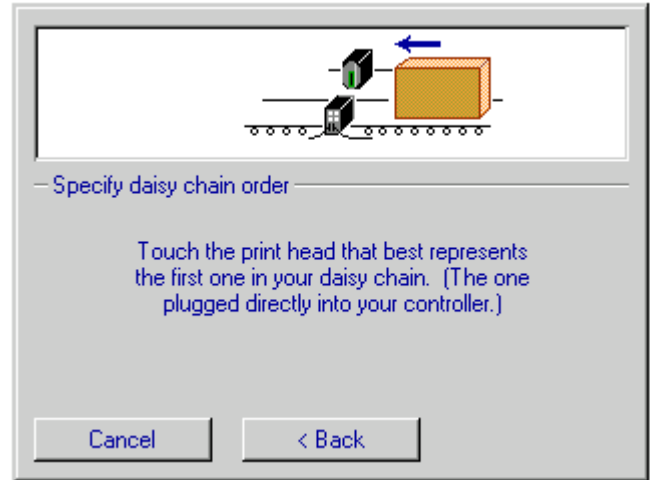


## Defining Print Head Properties

The final step in print head configuration is defining the properties of the individual print heads.
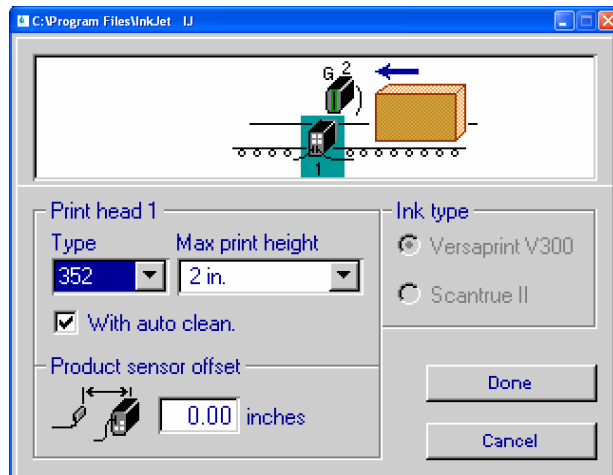


Beginning with print head number one and working in numerical order, the following will need to be defined:

• **Print head type and size:**
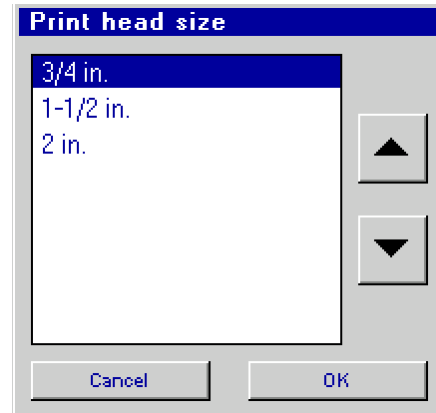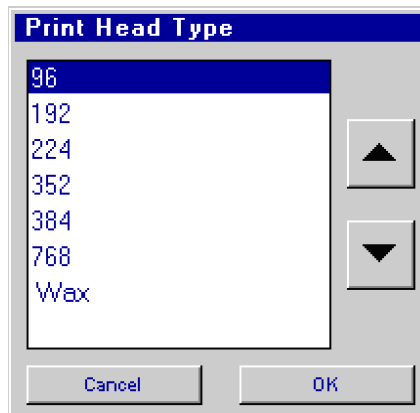
- **Product sensor offset:** Enter the distance between the photosensor and the print head, in inches. This may need to be fine-tuned after print setup.



For Impulse Jet: The maximum sensor offset is 52" for 96, 192, 224, 352 and WaxJet Print Heads. The maximum sensor offset for the 384 and 768 Print Heads is 27".

For Integrated Valve: The maximum sensor offset is 81".

- **Auto Clean** indicates whether the selected print head is auto-cleaned or not.

- **Ink Type** indicates the type of ink used for the selected print head.

After a print head's properties are defined, touch the **Next Head** button to move to the next one; or just touch a print head on the display to highlight it.

After the last print head is defined, touch the **Done** button to display the following screen. Print Head setup is now complete.
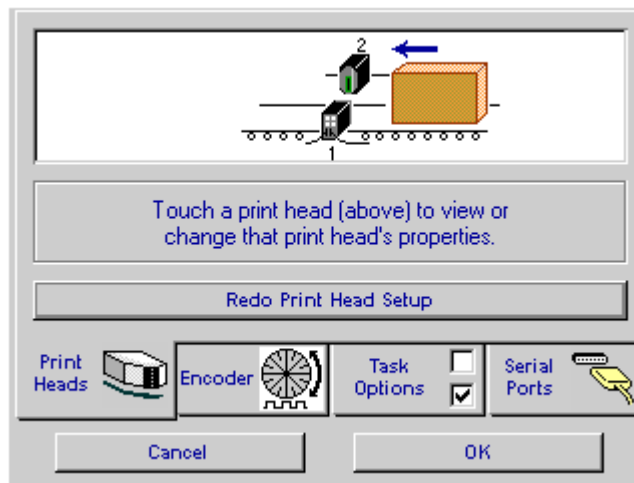


Touch any print head on the display to review or change the properties for that head. Touch the **Redo Print Head Setup** button to repeat the setup procedure using the new setup as the default. Touch **OK** to return to the **Home Screen**.

## Encoder Setup

Touch the **Encoder** tab at the bottom of the **System Setup** screen to access encoder options.



Internal timer

Line speed: 65 ft/min


External encoder: 300 ppi
Impulse Jet


External encoder: 100 ppi
Integrated Valve
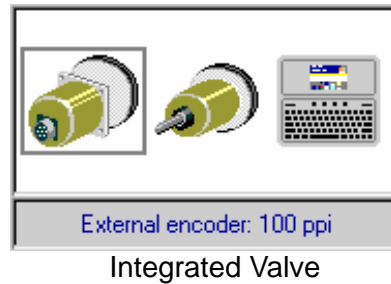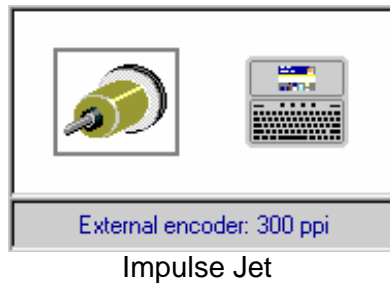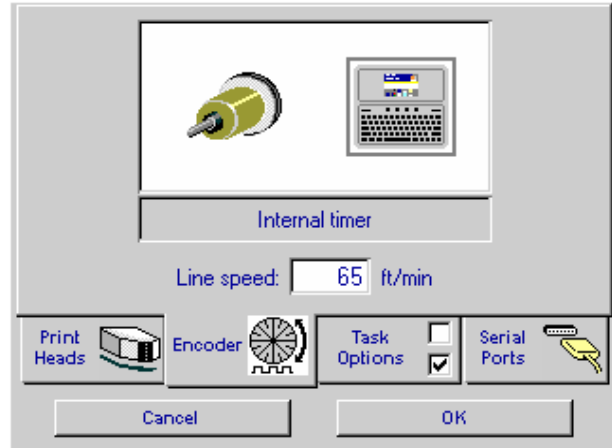
For Impulse Jet: Select either the 300 ppi external encoder at left or the internal IJ3000 timer at right

For Integrated Valve: Select from the 100 ppi external encoder at left, 300 ppi external encoder at center or internal IJ3000 timer at right.

A gray box surrounds the current encoder selection.

Use an external encoder if the line speed varies or the line makes frequent starts and stops. External encoder resolution is fixed at 300 ppi (pulses per inch) for Impulse Jet and 100 or 300 ppi for Integrated Valve.

Use the internal IJ3000 timer if the line speed is constant, with a minimum of starts and stops. When choosing the internal timer, enter the conveyor's speed into the **Line Speed** box. (See *"Appendix D: Performance Parameters" on page 99* for maximum line speeds.)

**NOTE:** The Task 2 encoder setup screen differs slightly from that of Task 1 in that it offers the option of using the Task 1 encoder for Task 2 print timing. (For more on hardware configurations, refer to the system operations manual: P/N 5760-111 for Impulse Jet, 5760-107 for Integrated Valve or 2466-400 for WaxJet.)

Touch **OK** to return to the **Home Screen**.



Use task 1 encoder.

External encoder: 300 ppi
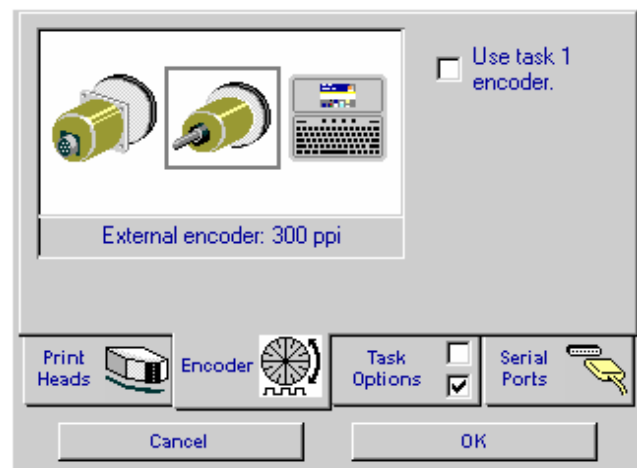
Task 2 Encoder Setup Screen

## Group Setup

The IJ3000 can be setup to create and manage messages for both Task 1 and Task 2 as a single "group" message. This allows for single message editing for a two task controller with multiple heads on each task. The group function is only utilized for dual task controllers. The system must be in group mode to create, edit, and print a group message.

**NOTE:** Once a message is created or edited as a group, it becomes a group message. This message can no longer be edited or printed without the controller set up as a group function.

Touch the **Task Options** tab in the system setup screen for Task 2.
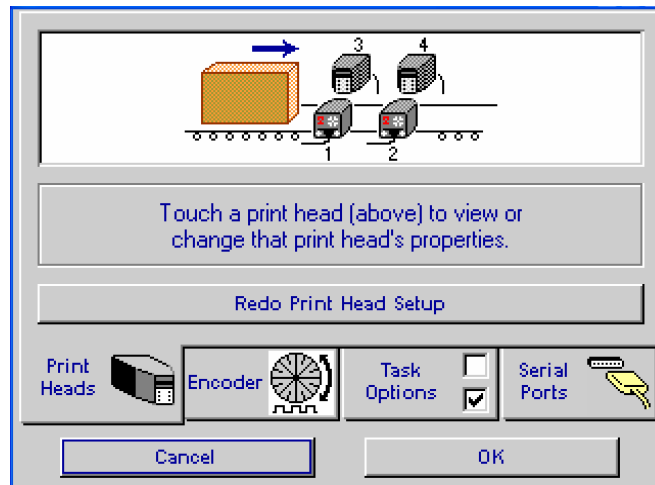


Check the **Group task 2 with task 1** box to set the system to group mode and select **OK**.
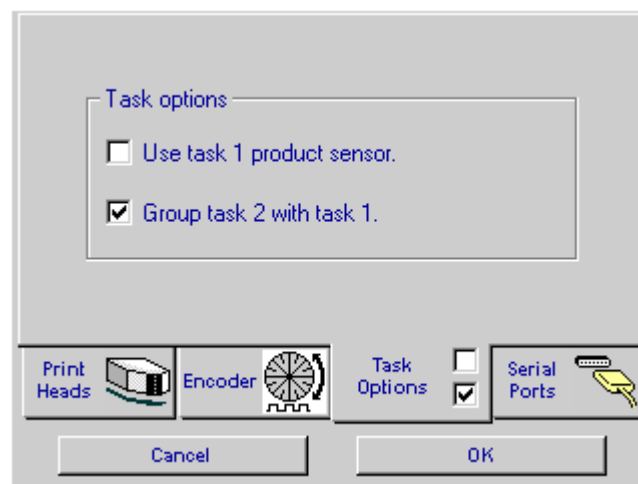
## Print Head Flushing Feature (for Integrated Valve Only)

To configure an IJ3000 to work with an IDS3000 that has the Print Head Flushing Feature:

1. On the **Home screen**, go to **Task 1** and touch the **Control Panels** button to open the Control Panels Menu.
2. Touch the **System Setup** button on the Control Panels Menu to open the System Setup screen.
3. Touch the **Task Options** tab.
4. Check the **Ink system has print head flushing feature** box. Checking the box places a **Flush Print Heads** button on the Print menu on the Home screen. For instructions on flushing the print heads see *"Section 7: Utility Functions" on page 63.*
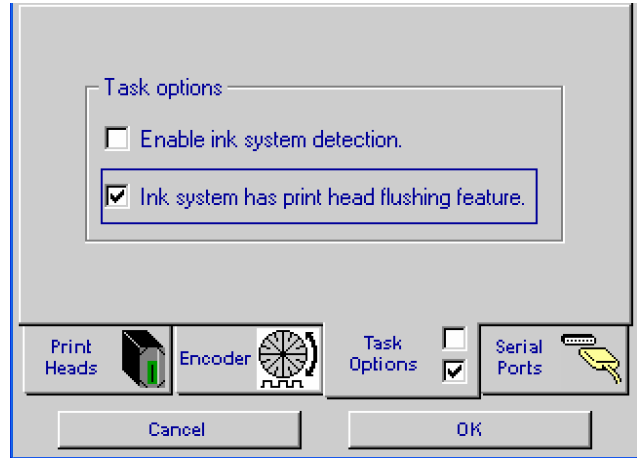
## Ink System Detection Feature (for Impulse Jet Only)

This feature will detect when an ink system is disconnected or turned off. Touch the **Task Options** tab at the bottom of the **System Setup** screen to access this feature.

Ink system detection is enabled at the factory and the controller will detect the ink system by polling it periodically. When the ink system is not detected, a dialog box will appear on the Home Screen. Touch the **OK** button to close the dialog box.

## Setting Up a Second Ink System (for Impulse Jet Only)

To set up the application to use a second ink system, go to the **Home Screen**, touch **Task 2**, **Show Menu**, **Control Panels**, **System Setup**, then **Task Options**.

The default setting for Task 2 print heads is set to use the ink system connected to Task 1. Uncheck the **Use task 1 ink system** check box to set the print heads on Task 2 to use the ink system connected to Task 2.
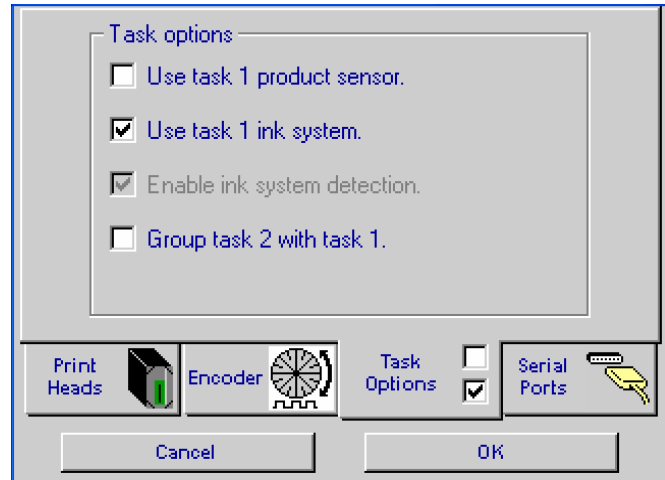
## Serial Port Setup

To set the COM1 and COM2 serial port device type and baud rate:

1. On the **Home screen**, touch the **Control Panels** button to open the Control Panels Menu.
2. Touch the **System Setup** button on the Control Panels Menu to open the System Setup screen.
3. Touch the **Serial Ports** tab on the System Setup screen to display the Serial Ports page.
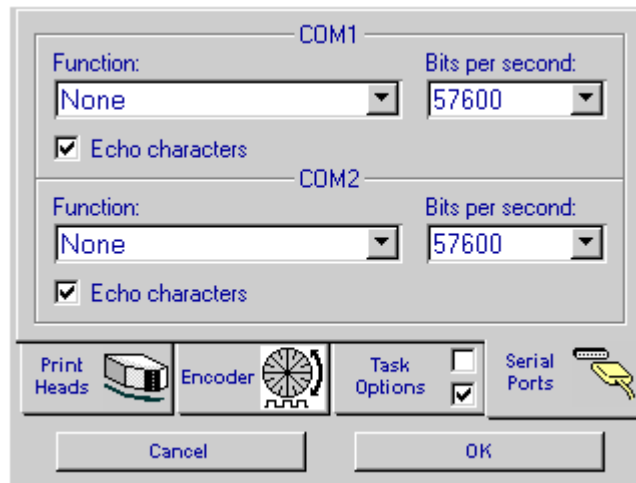
4. Touch the COM1 or COM2 **Function** box to open a list box and select a device for the related port.
5. Touch the COM1 or COM2 **Bits per second** box to open a list box and select a baud rate for the related port.
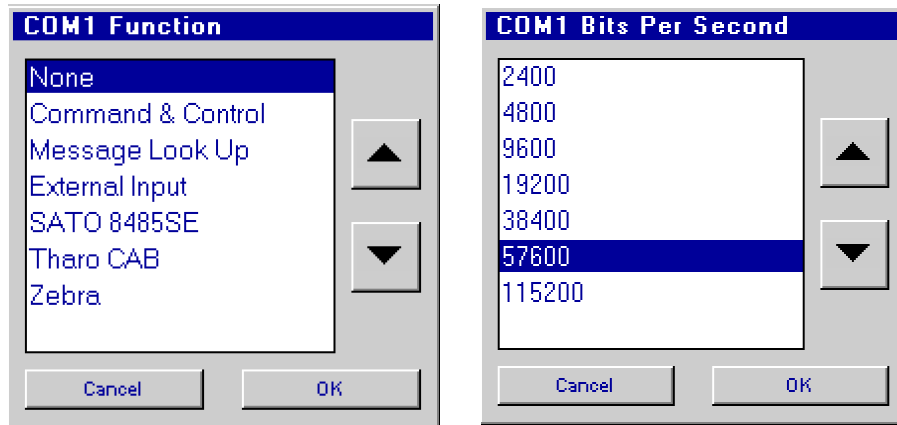
**NOTE**: The following settings are fixed on the IJ3000 and cannot be changed. Any device connected to an IJ3000 serial port must be configured to match these settings:

Data Bits: 8

Stop Bits: 1

Parity: None

Flow Control: None

## Using a Bar Code Scanner

A bar code scanner attached to a serial port can be used for message lookup, that is, loading a message for printing, or to insert variable field data into a printing message.

• **Command & Control:** When this function is utilized, the controller will use predefined scripts to modify various parameters of the controller. (See the Software Interface Document, item number 5760-113.)

• **Message Look Up**: When used for message lookup, a scanner attached to COM1 will load print messages *only* into Task 1, and a scanner attached to COM2 will load print messages *only* into Task 2. To configure a serial port for message lookup, select **Message Look Up** as the port device and set the baud rate to match that of the scanner.

**NOTE**: The name of the print message scanned must *exactly* match the name of a print message stored in the IJ3000. If it does not, or no message with the name scanned exists, the current print message is cancelled and printing stops.

• **Variable Field Data Input**: When used to input variable field data, a scanner (or scale, or other external device) on either serial port will work with messages printing on either task. The serial port used must match the one specified when the message and variable field are created (see *"Adding a Variable Field" on page 49*). To configure a serial port for variable field data input, select **External Input** as the port device and set the baud rate to match that of the device.

• **SATO 8485SE:** When this function is utilized, the controller will communicate to a PA/5000LT with a Sato 8485SE print engine when adding an element to a message. (See *"Section 6: Message Functions" on page 43*.)

• **Tharo CAB** or **Zebra:** When either of these functions are utilized, the controller will communicate to a PA/4500 when adding an element to a message. (See *"Section 6: Message Functions" on page 43*.)

# Network Setup

If the IJ3000 system is being used in a network application, the factory programmed network settings may need to be changed. If the network application is not being utilized, this section can be skipped.
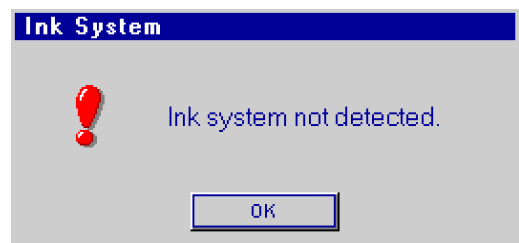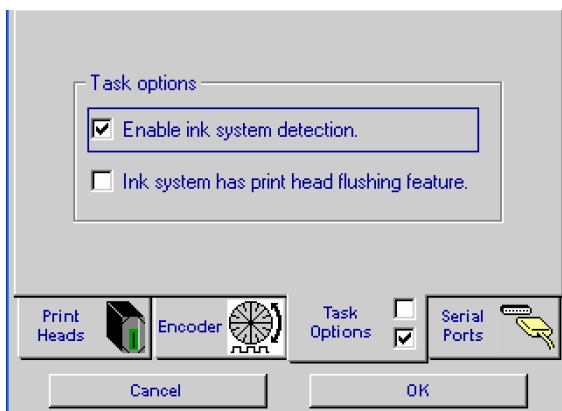
To display the Network Setup screen:

1. On the **Home Screen**, touch the **Control Panels** button to open the Control Panels Menu.

2. Touch the **Network** button on the Control Panels Menu to open the Network Setup screen.

The controls on the Map Network Device page of the Network Setup Screen apply only if the IJ3000 is running on a network controlled by a PC using the IJ3000 network software.

## Message List Access

The **Message list access** controls determine whether the print messages listed in the Print...Message Selection box are local (stored in the IJ3000's internal memory) or on the network. Touch the radio button appropriate to the application.

If **Network** is chosen, the **Network message list URL** and **Automatic Label Printer URL** text entry boxes become active. Enter the address where the IJ3000 will find the network-stored messages and, if applicable, enter the address where the IJ3000 will find files for the Automatic Label Printer. For more details, see the Network Software Documentation Manual (part number 5760-005N).

## Network Notification URL

If this text entry box is filled in, the controller will send out a packet on the network to the host specified. This packet will be sent at controller boot up and at each photocell trigger input. For more details, see the Software Interface Document (part number 5760-113).

### Setting IP Addresses

Touch the **IP Addresses** tab to display the IP Addresses page.



(IJ3000 Default IP Addresses)

An IP address has four segments. The value of each segment may be from 0 to 255. Touch the entry box for the address to be set, use the Left/Right Arrow keys to highlight the desired segment, and then type in its value. After the third digit of each segment is entered, input focus automatically shifts to the next segment to the right. When a segment has less than three digits, move to the next segment by pressing the "**.**" (period) key.

**NOTE:** The Network IP settings shown for the first and second ink systems apply only to Diagraph's Integrated Valve (IV) system. The Impulse Jet ink delivery (CIDS3000) does not contain ethernet connectivity.

Touch the **OK** button to save the changes and return to the Home Screen. To discard any changes made and return to the Home Screen, touch the **Cancel** button or press **ESC** on the keypad.

# Defining User Codes

**User Codes** are user-defined time and date codes for printing hour, minute, date, month, and week of the year information. Each code may be up to four characters long.

To display the Edit User Codes screen:

1. On the **Home Screen**, touch the **Control Panels** button to open the Control Panels Menu.
2. Touch the **User Codes** button on the Control Panels Menu to open the Edit User Codes screen.
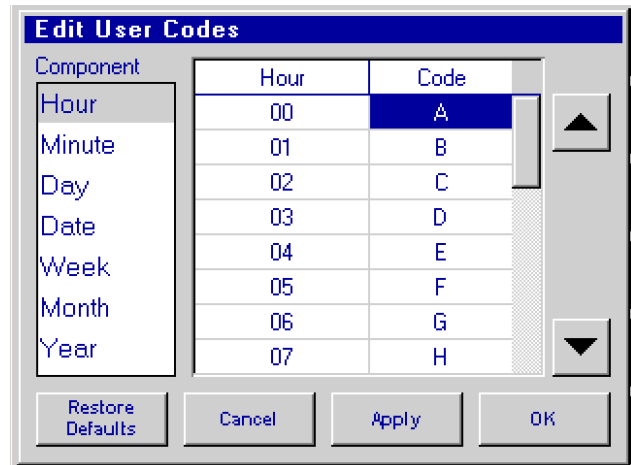
To define or edit codes:

1. Touch the radio button for the appropriate component.
2. Highlight the code to be defined or edited. If the code is not visible, touch the screen **Up/Down Arrow** buttons to scroll it into view.
3. Type in the new code and press **Enter**.
4. Repeat steps 1 through 3 as desired.
5. Touch the **OK** button to save the code definitions and return to the Home screen.

Touch the **Apply** button to save the code definitions and remain on the Edit User Codes screen.

Touch the **Cancel** button or press **ESC** on the keypad to return to the Home screen without saving any changes.

Touch the **Restore Defaults** button to restore the default codes for the selected component. The default codes are:

- Hours: 24 single letter codes A through Z, except the letters I and O (which may be confused with the numbers 1 and 0).
- Minutes: 60 two-letter codes AA through AZ, then BA through BZ, then CA through CM. The letters I and O are not used.
- Date: 31 two letter codes AA through AZ, then BA through BG. The letters I and O are not used.
- Week: 53 two-letter codes AA through AZ, then BA through BZ, then CA through CE. The letters I and O are not used.
- Month: 12 three-letter abbreviations, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, and DEC.
- Year: 99 two-letter codes AA through AZ, then BA through BZ, then CA through CZ, then DA through DZ, then EA through ED. The letters I and O are not used.

When defining user codes, avoid extremes in the number of characters for different codes within a component. For example, avoid defining hour 00 as 'A' and hour 03 as 'AAAA.' If print codes like 'A' and 'AAAA' must be printed, be sure to reserve enough room in the print messages so that the longest codes don't overlap adjacent fields when they print.

## Time & Date Screens

Time and Date screens need to be properly set in order for time- and date-related auto-codes to be used.

Touch the **Time & Date** button on the **Home Screen**. The **Time** screen will appear with tabs along the bottom to set Time, Date, Rollover Time, and Shifts.

### The Time Screen

Touch the **hour** or **minute** display to high-light the hour or minute and enable the Up/Down Arrows. Touch the **Up/Down Arrows** to adjust the hour or minute. Touch the **12 hour** or **24 hour** radio button to select the desired format. The time dis-play changes immediately to reflect the selection. Note that this only sets the for-mat for the time as it is displayed on the screen, and does not affect time-type autocodes. Touch **Apply** to save the new time, or **OK** to save and return to the **Home Screen**.

### The Date Screen

The Date Screen displays the IJ3000's current month and year set-tings and the days for that month and year. The selected date is the current date setting.

To change the date within the current month, touch the desired date.

To change the month, touch the **Left** or **Right Arrow** buttons at the upper left and right to move backward or forward through the calendar, or select the month from the list dis-played when the **Month** control at the top left center of the screen is touched (see below left).
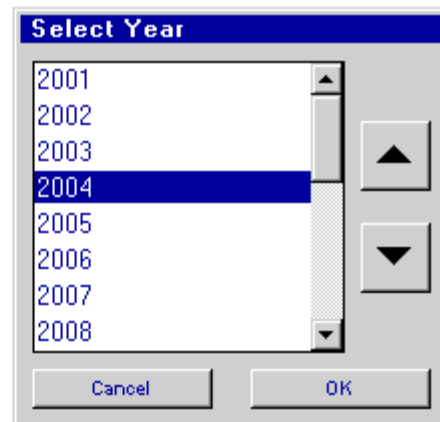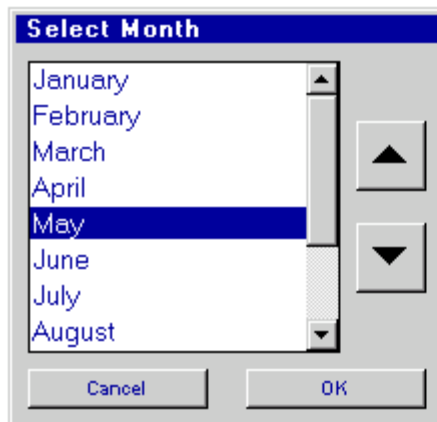
To change the year, touch the **Year** control at the top right center of the screen and select the year from the list displayed (see above right).

Touch the **Apply** button to save any changes made to the date.

Touch the **OK** button to save the new date and return to the Home Screen.

Touch the **Cancel** button to return to the Home Screen without saving any changes.

## The Rollover Time Screen

Touch the **hour** or **minute** display to highlight the hour or minute and activate the Up/Down Arrows. Touch the **Up/Down Arrows** to adjust the hour or minute. Touch **Apply** to save the new time, or **OK** to save and return to the **Home Screen**. (AM or PM will show only if a 12-hour clock is chosen on the **Time** screen.)

**NOTE:** Rollover times between 12:00 PM and 11:59 PM will change the day/date of autocodes before midnight; rollover times between 12:00 AM and 11:59 AM will change the day/date of autocodes on or after midnight.

The default rollover time is 12:00 AM (00:00 on the 24-hour clock.)

## Shifts

Use this screen to assign autocodes to work shifts. For a shift to be valid, the code boxes must be filled in; shifts with empty code boxes are ignored. Shifts may be entered in any order, but will be sorted by the IJ3000 and displayed chronologically the next time this screen is accessed.
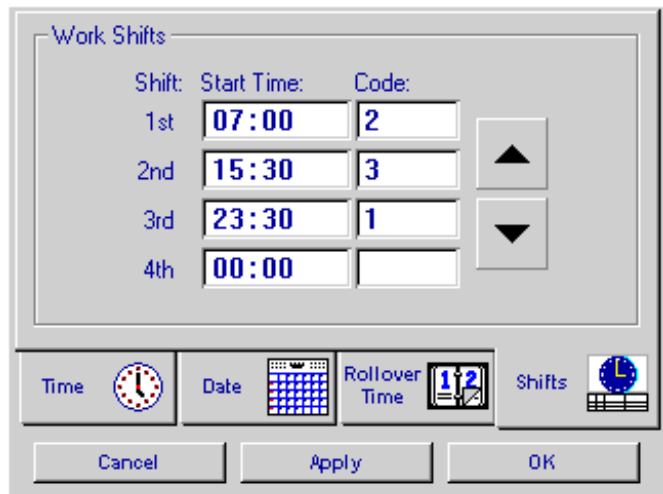
# Auto Clean Setup (for Impulse Jet Heads w/ACS only)

Use the Auto Clean Setup screen to turn automatic print head cleaning on and off, select the auto clean timing method, and program cleaning times.

The Auto Clean Setup screen is available only on IJ3000 systems that have at least one Impulse Jet print head interface board. To display the Auto Clean Setup screen:

1. On the **Home Screen**, touch the **Control Panels** button to open the Control Panels Menu.
2. Touch the **Auto Clean Setup** button on the Control Panels Menu to open the Auto Clean Setup screen.

The IJ3000 can be programmed to clean print heads periodically (every hour, every 2 hours, every 6 hours, etc.).

## Periodic Operation

To set the maintenance interval:

1. Touch the hour or minute control to highlight it.
2. Touch the **Up/Down Arrow** buttons to increment and decrement the interval time. The interval can be set from 30 minutes to 24 hours, in 30-minute increments.
3. Touch the **OK** button to start the interval timer and return to the Home Screen.

**Auto Clean Setup**

Auto Clean Interval

Clean print heads every `06:00` (HH:MM).

▲ ▼

Cancel      OK
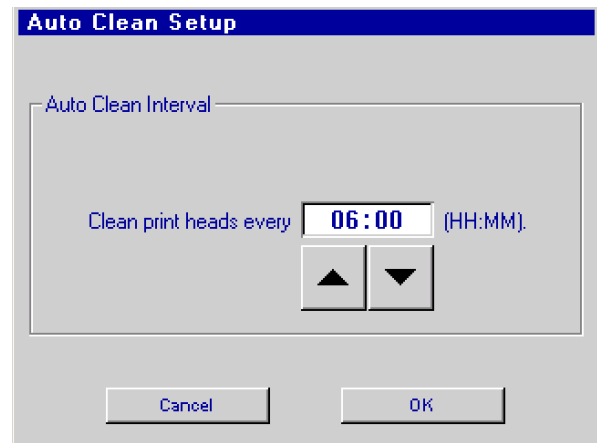
In the illustration above, the print heads will be cleaned every 6 hours starting from the time the OK button is touched or the controller is rebooted. For example, if Auto Clean Setup was programmed at 7:00 a.m., the system would clean the print heads at 1:00 p.m., 7:00 p.m., 1:00 a.m., and 7:00 a.m.

**NOTE**: Print heads are not cleaned while the IJ3000 is turned off, but the interval timer continues to run. The timer is not reset (does not start over) when the IJ3000 is turned back on. This means that, using the example above, the print heads will be cleaned at 7:00 a.m., 1:00 p.m., 7:00 p.m., and 1:00 a.m. if the IJ3000 is on at those times, regardless of if or how long the IJ3000 might be turned off in between those times.

**NOTE**: To manually clean the print heads between programmed times go to the **Purge Screen**.

**NOTE**: The IJ3000 will initiate cleaning for Side 1 print heads; then 20 seconds later will initiate cleaning for Side 2 print heads.

## Sleep Mode (for WaxJet Tasks only)

Sleep Mode lowers the temperature of the WaxJet 192 Print Heads and the Wax Delivery System from their operating temperatures to 90°C (194°F). Use Sleep Mode to maintain the viability of the wax when the system is left on during long periods of printer inactivity (eight hours or longer).

To place a WaxJet task into sleep mode, touch the **Task 1** or **Task 2** button to select the desired task, then open the **Print Menu** and touch the **Sleep** button.
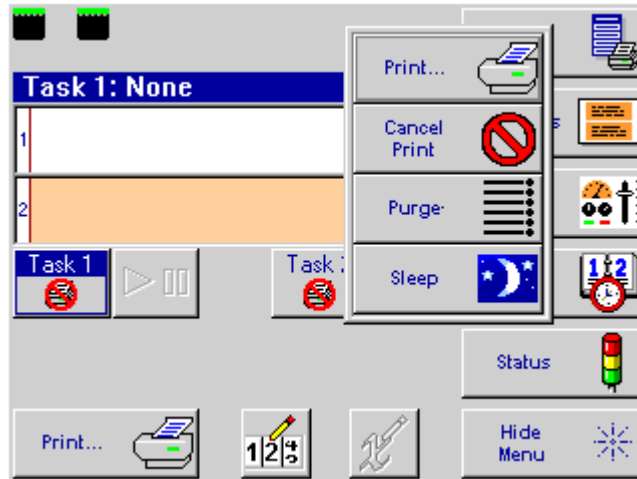
The "moon and stars" icon displayed on a task button indicates the task is in the Sleep Mode. Print is disabled on a sleeping task.
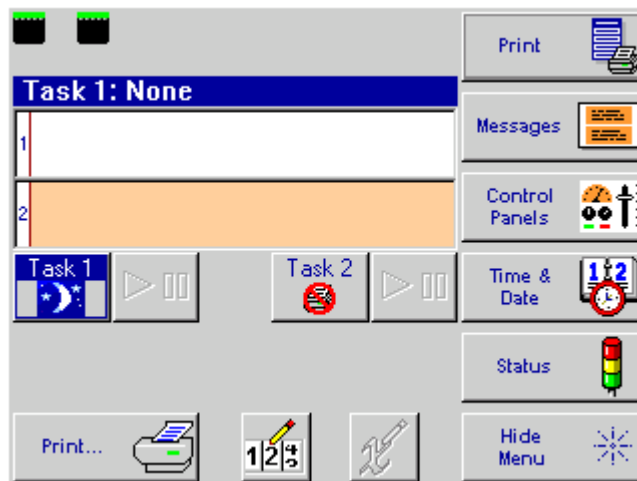
To awaken a sleeping task, select the task by touching its corresponding **Task** button, then touch the **Wake Up** button on the **Print Menu**.
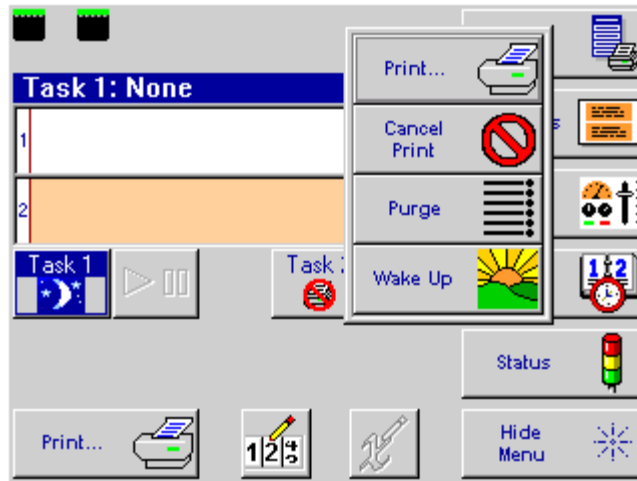


Print is re-enabled when the task's Print Heads and Wax Delivery System reach operating temperature.

## Auto Sleep

The IJ3000 can be programmed to automatically put a WaxJet task into, and take it out of, sleep mode.

To enter, edit, or delete a sleep event, open the **Control Panels** menu and touch the **Sleep Cycle Setup** button.
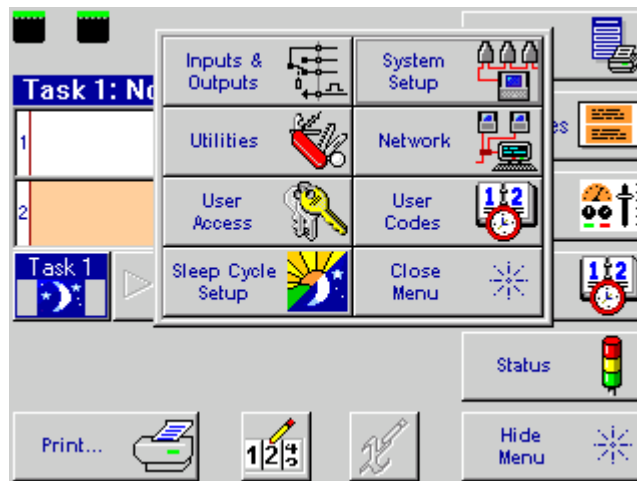
The Sleep Cycle Setup screen is displayed:

**Sleep Cycle Setup**

|       | 00  06  12  18  24 |
|-------|--------------------|
| MON   |                    |
| TUE   |                    |
| WED   |                    |
| THU   |                    |
| FRI   |                    |
| SAT   |                    |
| SUN   |                    |

Auto Sleep
○ On    ○ Off

Day     Time
From  FRI  ⬍  23:30
To    SUN  ⬍  22:30

Clear    ▼    ▲

Delete    Enter

Cancel    OK

☐ Operate
■ Sleep
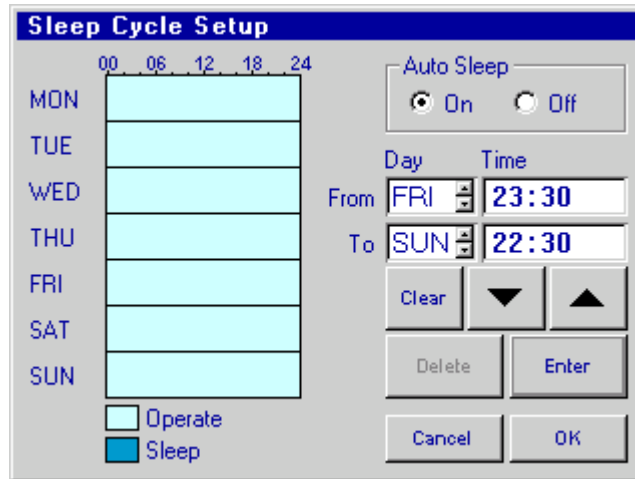
On the right side of the screen are controls for entering and deleting sleep events, and for turning Auto Sleep on and off. The left side of the screen has a chart that gives an at-a-glance look at all sleep events entered. The individual day segments (MON, TUE, WED, etc.) on the chart are also buttons that, when touched, display the specific sleep "From" and "To" times for a sleep event programmed to start on that day.

To enter a sleep event:

1.  Set the day and time the system is to go to sleep:

    a. Touch the **From:Day** box.

    b. Use the **Up** and **Down Arrow** buttons to set the day. (The large ones above the **Enter** button, not the small ones in the **Day** box; those are just decorations.)

    c. Touch the **Hour** segment of the **From:Time** box.

    d. Use the **Up** and **Down Arrow** buttons to set the hour.

    e. Touch the **Minute** segment of the **From:Time** box.

    f. Use the **Up** and **Down Arrow** buttons to set the minute.

2.  Set the day and time the system is to wake up.

    a. Touch the **To:Day** box.

    b. Use the **Up** and **Down Arrow** buttons to set the day.

    c. Touch the **Hour** segment of the **To:Time** box.

    d. Use the **Up** and **Down Arrow** buttons to set the hour.

    e. Touch the **Minute** segment of the **To:Time** box.

    f. Use the **Up** and **Down Arrow** buttons to set the minute.

3.  Touch the **Enter** key. That part of the chart that covers the period between the **From** and **To** times is shown in blue-gray. The illustration below shows the screen after a sleep event of 23:30 (11:30 PM) Friday to 22:30 (10:30 PM) Sunday is entered.

**Sleep Cycle Setup**

| | 00 | 06 | 12 | 18 | 24 |
|---|---|---|---|---|---|
| MON | | | | | |
| TUE | | | | | |
| WED | | | | | |
| THU | | | | | |
| FRI | | | | | |
| SAT | | | | | |
| SUN | | | | | |

Auto Sleep
⦿ On   ○ Off

Day      Time
From  FRI   23:30
To    SUN   22:30

Clear   ▼   ▲

Delete   Enter

Cancel   OK

☐ Operate
☐ Sleep
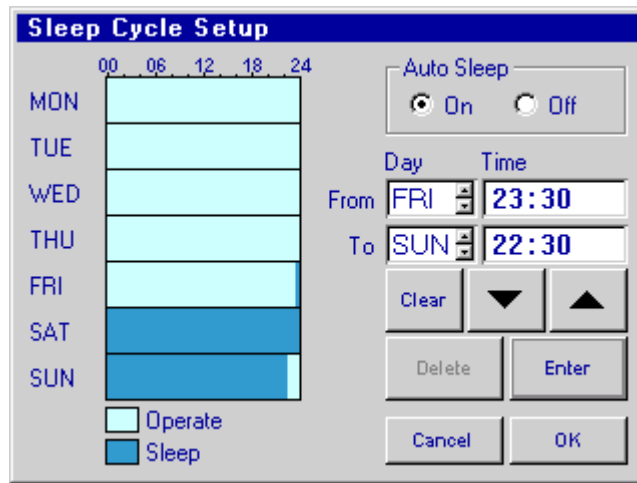
4.  Repeat steps 1, 2, and 3 for each additional sleep event.
5.  Touch the **OK** button to save the events and return to the Home screen.

**NOTES**:
1.  No more than one sleep event can begin on any given day.
2.  If the time of a new sleep event overlaps any existing sleep events, the existing sleep events are deleted and replaced by the new event.
3.  If the time of a new sleep event begins on the same day as an existing sleep event, the existing event is deleted and replaced by the new event.
4.  Sleep events may be manually overridden using the **Sleep/Wake Up** button on the **Print Menu** on the Home screen.
5.  Sleep events are not task-specific. If your system is configured for two WaxJet tasks, both tasks will enter and exit sleep mode at the programmed times.

To view or edit an existing sleep event:
1.  Touch the chart segment for the day on which the sleep event begins. The event's **From** and **To** times are displayed. If no event is programmed to start on the day touched, the **From** and **To** boxes display dashes.
2.  Make changes to the **From** and **To** times as desired then touch **Enter**.
3.  Touch the **OK** button to save the changes and return to the Home screen.
4.  Touch the **Cancel** button to return to the Home screen without saving the changes.

To delete a sleep event:
1.  Touch the chart segment for the day the sleep event begins. The event's **From** and **To** times are displayed.
2.  Touch the **Delete** button. The blue-gray area on the chart covering the event's time period is removed and the **From** and **To** boxes display dashes.
3.  Touch the **OK** button to save the deletions and return to the Home screen.
4.  Touch the **Cancel** button to abandon the deletions and return to the Home screen.

# Section 6: Message Functions

## Creating a Print Message

A print message has one or more data fields containing a text or graphic element. Text fields may contain fixed text, variable text, a date code, a time code, or a product count. Graphic fields contain either a logo or a bar code.

**NOTE:** Please read *"Moving Around the Edit Screen" on page 19* before continuing.

To create a print message:

**Step 1:** On the **Home Screen**, touch the **Messages** button. The Messages dialog box is displayed.
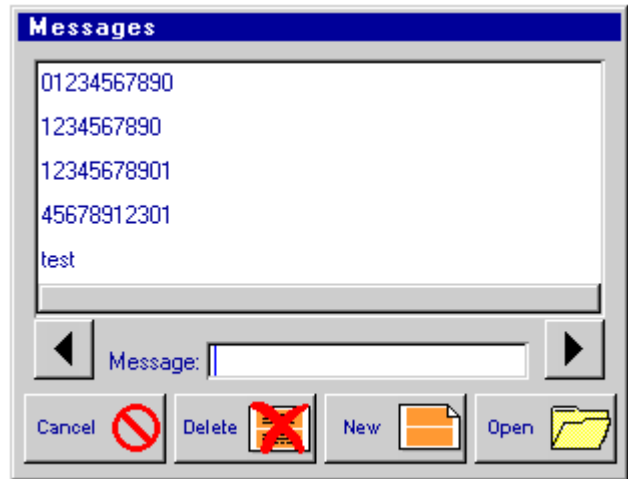
**Step 2:** On the Messages dialog box, touch the **New** button. The Edit Screen is displayed.
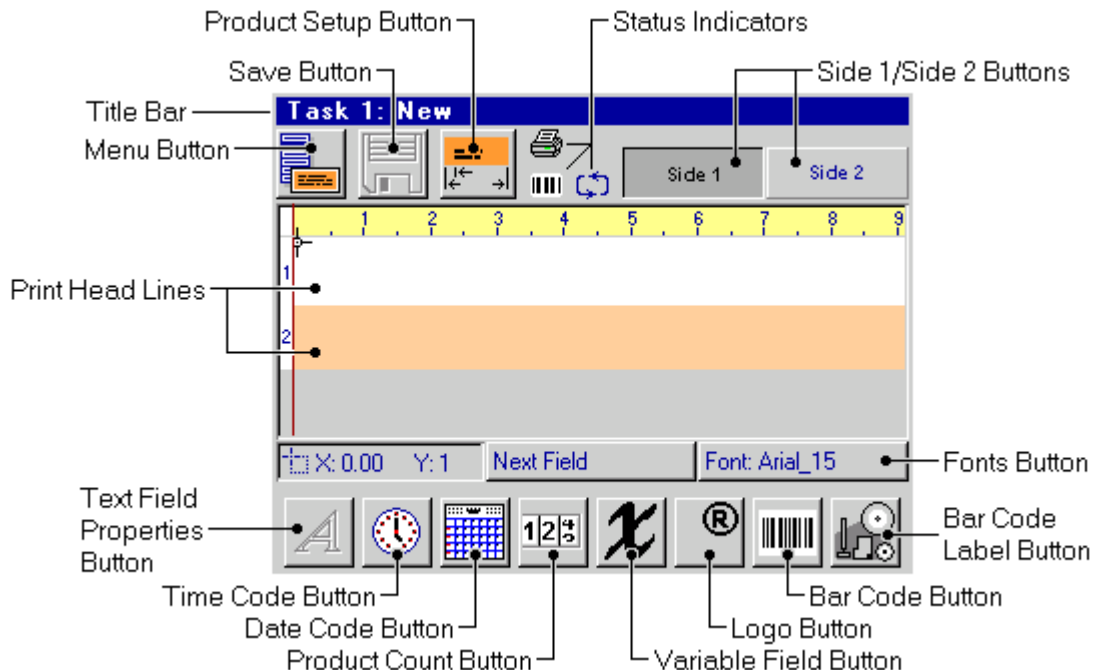
## Edit Screen Controls and Features

**Title Bar:** The Title Bar shows the task for which the message is being created (in this case Task 1) and the name of the message. All new messages have the name "New" until they are saved.

**Menu Button:** Touch the **Menu** button to display the Message menu. From the Message menu, the user can:

- Create a new message.
- Open an existing message for editing or viewing.
- Save a message.
- Do a test print of a message.
- Undo all changes made to a message (Revert).
- Delete all fields from a message (Clear).
- Compute a message's ink consumption (Ink Usage).
- Return to the Home Screen (Exit).
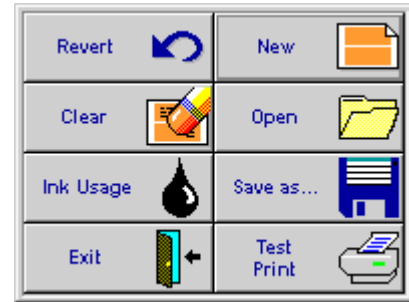
**Save Button:** Touch the **Save** button to save any changes made to the print message currently in the editor. A dark blue **Save** button indicates changes made to the message have not yet been saved. The button is "grayed out" when no changes have been made or the changes have been saved.

**Product Setup Button:** Touch the **Product Setup** button to:

- Set the product's length.
- Set the print margins.
- Set the print resolution (dpi).
- Select print options.

**Status Indicators:**

Displayed when **Test Print** is selected from the Message menu.

Displayed when the message in the editor is configured for repeat print.

Displayed when the message in the editor is configured to apply a bar code label via a print and apply label applicator attached to the IJ3000.

**Side 1/Side 2 Buttons:** Touch **Side 1** or **Side 2** to switch the editor to the corresponding side of the print message. The button that appears pressed or pushed indicates which side is currently displayed. If the IJ3000 is not configured for two-sided printing the Side button that is not needed is "grayed out" and inactive.

**NOTE:** When the IJ3000 is properly configured, **Side 1** is always the near side of the conveyor, **Side 2** is always the far side.

**Print Head Lines:** A print message being created or edited is displayed on the Print Head Lines. One line is shown for every print head in the IJ3000's configuration. All fields or parts of a field on a print head line are printed by the line's corresponding print head.

**Fonts Button:** Touch the **Fonts** button to select the font for the next field to be added to the print message, or to change the font of an existing field. The name of the current font selection is displayed on the button.

| Font: Arial_15 |

**Text Field Properties Button:** Touch the **Text Field Properties** button to change the properties of a new or existing fixed text field. This button is active and functional only when a fixed text field is selected.

**Time Code Button:** Touch the **Time Code** button to add a time code to a print message, or to edit an existing time code.

**Date Code Button:** Touch the **Date Code** button to add a date or expiration date code to a print message, or to edit an existing date or expiration date code.

**Product Count Button:** Touch the **Product Count** button to add an incrementing or decrementing product count or pallet count to a print message, or to edit an existing count.

**Variable Field Button:** Touch the **Variable Field** button to add a variable field to a print message, or to edit an existing variable field.

**Logo Button:** Touch the **Logo** button to add a logo to a print message, or to exchange an existing logo for another one.

**Bar Code Button:** Touch the **Bar Code** button to add a bar code to a print message, or to modify an existing bar code.

**Label Button:** Touch the **Label** button to add a bar code label element to a print message. This button is visible only when the COM1 or COM2 function is set to SATO 8485SE or Tharo CAB. See *"Serial Port Setup" on page 30* for instructions on configuring the COM port.

For all fields except the Logo and Label buttons, the text box will show the actual text content of the highlighted field.
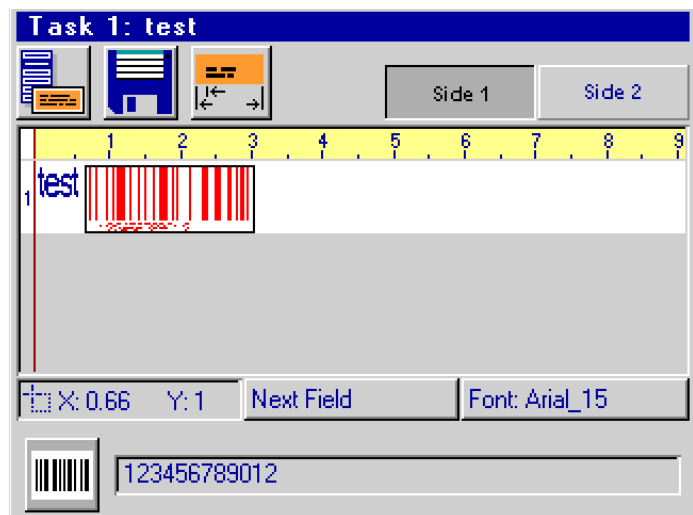
**Next Field Button:** Touch the **Next Field** button to select a field for review or editing. The fields are selected one after another in the order in which they were added to the print message. See *"Editing Fields" on page 54* more information.

**Step 3:** Set up your product. Touch the **Product Setup** button to display the Product Setup dialog box:

Enter the product's length, and the left margin for side one and two, if applicable.
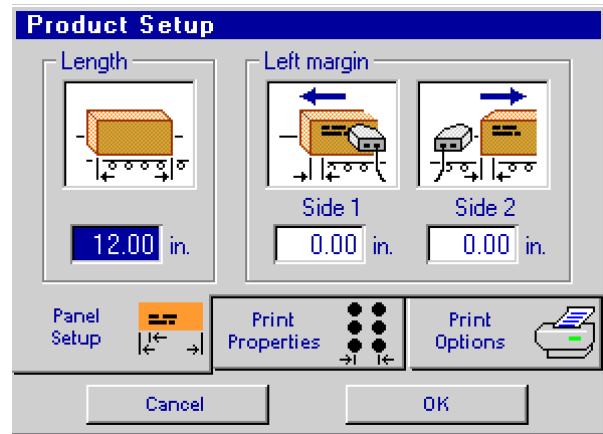
Touch the **Print Properties** tab. Use the up/down arrows to select the desired print resolution: 100, 150, or 200 dots per inch (dpi) for Impulse Jet, or 4 to 25 dpi for Integrated Valve.

**NOTE:** Bar codes must use a resolution of 200 dpi.
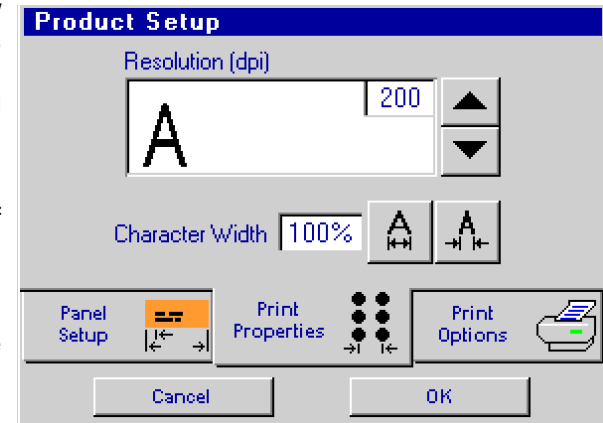
**Character Width** is used to change the width of all text fields within the message.

**NOTE:** The Character Width setting for Integrated Valve heads should never be set to less than 100%. The global DPI setting should be used to reduce or increase message width. The Character Width determines the number of printed columns in a character. With the low horizontal print resolution of Integrated Valve heads, reducing Character Width to less than 100% results in missing columns. The Character Width setting is intended for use with Impulse Jet print heads.

Touch the **Print Options** tab to select the desired print options.

Select **Side 2 = side 1** to automatically copy to side 2 all fields entered on side 1. The **Side 2 = side 1** option is available only when both sides have the same number of vertical print dots.

Select **Task 2 = task 1** to automatically copy the message from Task 1 to Task 2. This option is only available when grouping is turned on.

Select **Cancel after one print** to self-cancel the message after printing only once. This option is typically used with Message Lookup. See *"Serial Port Setup" on page 30* for an explanation of Message Lookup.

Select **Repeat print at…** when printing on continuous material, and specify the print interval (the interval box becomes active when **Repeat print** is selected). The print interval is defined as the distance from the start of one print to the start of the next.

Touch the **OK** button to save the settings and close the Product Setup dialog box.
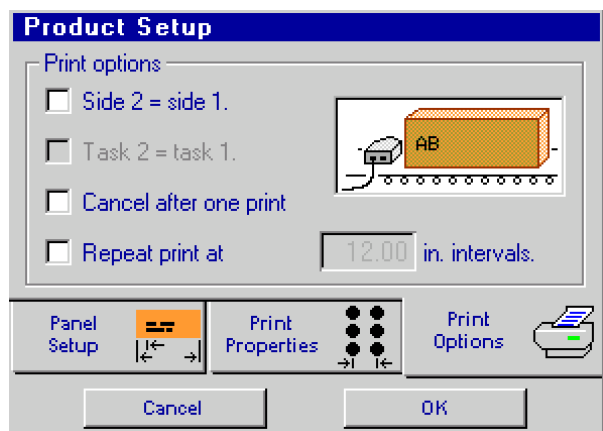
**Step 4**: Select the desired font for the first field. Touch the **Font** button to display the list of available fonts, highlight the selection, and touch the **OK** button.
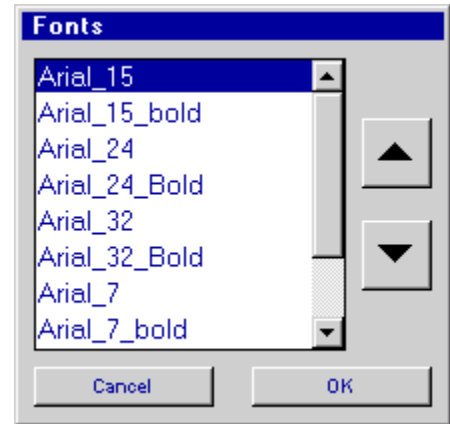
**Step 5** Add data fields to the print message, changing the font (as needed) before the addition of each new field.

## Adding a Text Field

To add a text field to the print message, move the crosshairs pointer to the desired field location and begin typing. The text is displayed (in light blue) on the Edit Screen as it is typed. It is also displayed in a box that appears at the bottom of the screen. To start a new line (a text field may have up to ten lines of text), press and hold the **Ctrl** key and press **Enter**. When finished, press **Enter.** (The field's color changes to red.) If the field is not exactly where it should be, use the arrow keys to reposition it. Press **Enter** again when the field is at the desired location. (The field's color is now dark blue.)
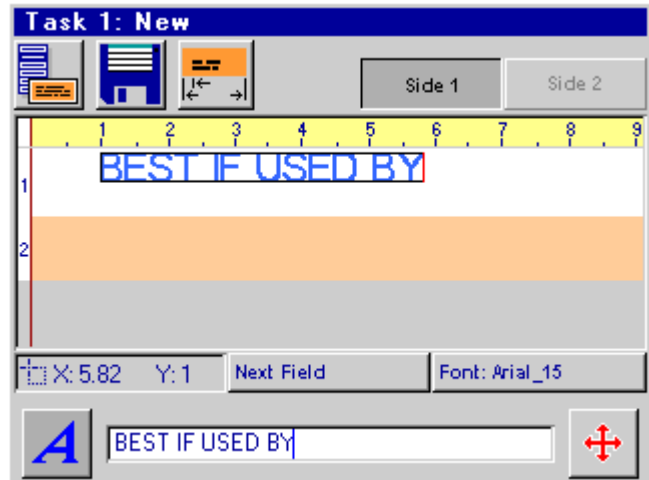
## Adding a Time Code

To add a time code to the print message, move the crosshairs pointer to the desired location and touch the **Time Code** button; the Insert Time Code dialog box is displayed. Select a format for the time code from the list, then touch the **OK** button to close the dialog box and insert the time code into the print message.
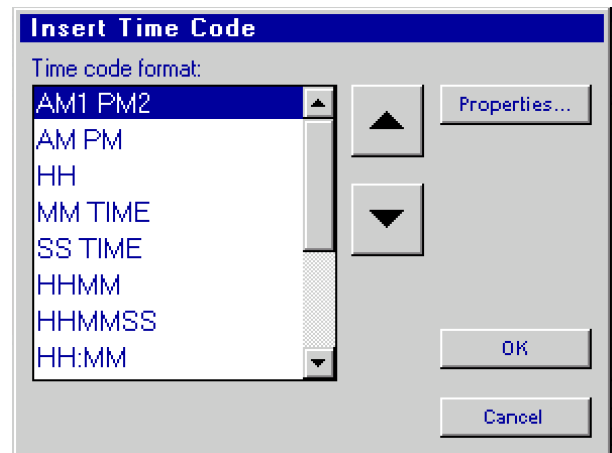
If the time code is not exactly where it should be, use the arrow keys to reposition it. Press **Enter** when the time code is at the desired location.
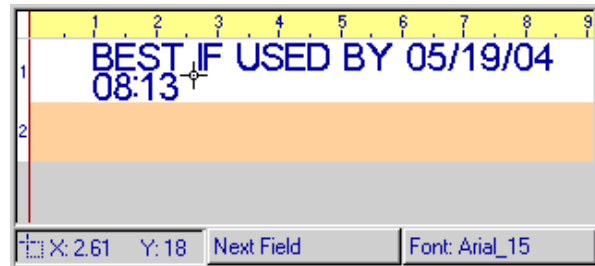
Message with time code

## Adding a Date Code

To add a date code to the print message, move the crosshairs pointer to the desired location and touch the **Date Code** button; the Insert Date Code dialog box is displayed. Select a format for the date code from the list and, if the date code is for a future date, enter the number of days or months until that date in the **Date offset** box.

Touch the **OK** button to close the dialog box and insert the date code into the print message.

If the date code is not exactly where it should be, use the arrow keys to reposition it. Press **Enter** when the date code is at the desired location.

Message with date code

## Adding a Product or Pallet Count

The IJ3000 can print increasing or decreasing item and pallet counts, with or without leading zeros, in numeric or alpha format. A numeric count may be up to nine digits long; an alpha count may be up to seven digits long.

**Product count:** To add a product count to the print message, move the crosshairs pointer to the desired location and touch the **Product Count** button; the Insert Count dialog box is displayed.
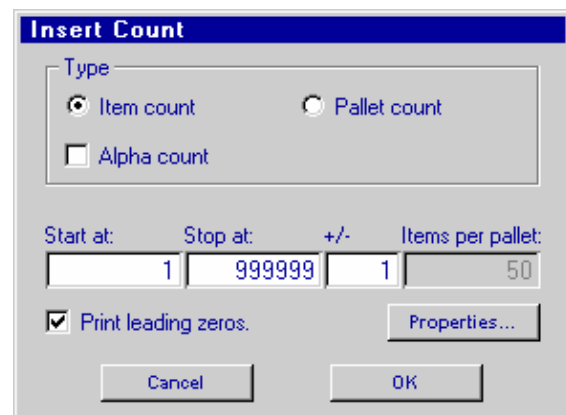
**Increasing count:** Enter a **Stop at** value that is greater than the **Start at** value.

**Decreasing count:** Enter a **Start at** value that is greater than the **Stop at** value.

**Pallet count:** Touch the **Pallet count** radio button and enter the number of items per pallet. A pallet count is incremented or decremented every *n* items, where *n* is the number of items per pallet.

**Alpha count**: To count with letters instead of numbers touch the **Alpha count** check box. When **Alpha count** is checked, the contents of the **Start at** and **Stop at** boxes change from numbers to their equivalent alpha values.

There are two alpha count formats. Use the **Print leading zeros** check box to select the format desired.

1. **Print leading zeros** checked. When printing leading zeros, A = 0 by definition, so B = 1, C = 2, etc. The counting sequence is AB, AC, AD, … AY, AZ, BA, BB, BC, …

2. **Print leading zeros** not checked. Without leading zeros, A = 1, B = 2, C = 3, etc. The counting sequence is A, B, C, … Y, Z, AA, AB, AC, …

**The +/- box:** A product count is normally increased or decreased by 1 after every print cycle. To increase or decrease the count by a value other than 1, enter that value in the **+/-** box.

Touch the **OK** button to close the dialog box and insert the product count into the print message. If the count is not exactly where it should be, use the arrow keys to reposition it. Press **Enter** when the count is at the desired location.
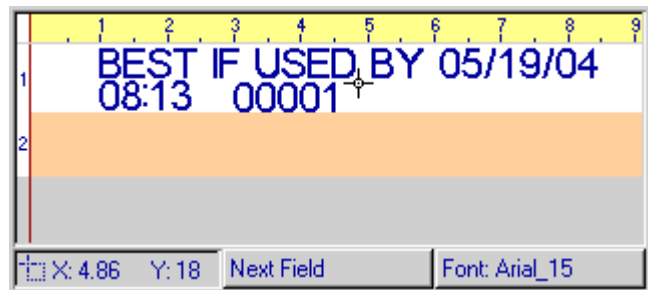


Message with product count

## Adding a Variable Field

A variable field is a text field whose contents may change from use to use or print to print. The data printed may be specified by the user, or come through the COM1, COM2, or Ethernet port.
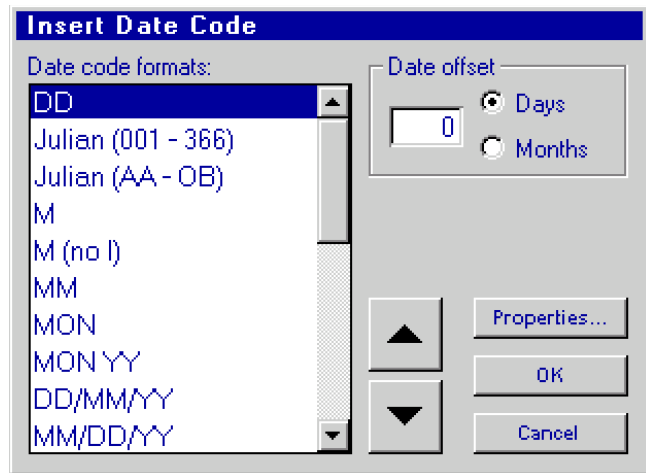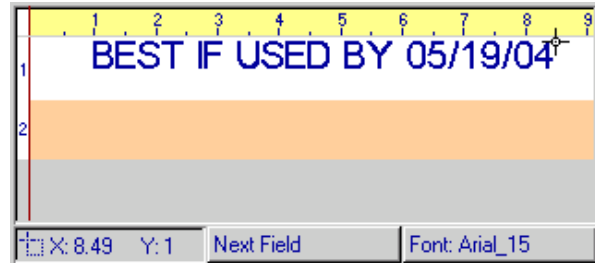
To add a variable field to the print message, move the crosshairs pointer to the desired location and touch the **Variable Field** button; the Insert Variable Field dialog box is displayed.
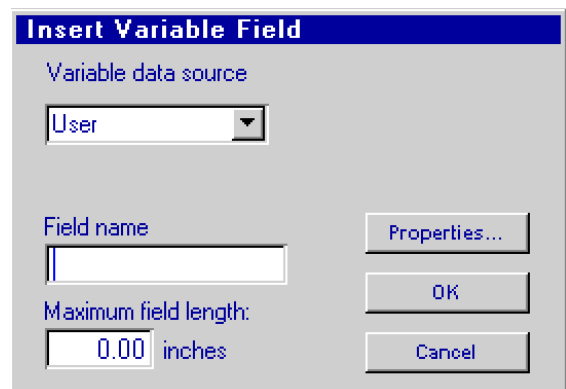


• Select the data source:

**User:** The user is prompted to enter the data to be printed when the message is loaded to print.

**Data 1 - Data 10:** Select Data 1 through Data 10 to use a common variable field in multiple locations. Data (1-10) can be selected and assigned a field name. This variable field can be placed multiple times in a message. When the message is printed, the field name will be prompted once for input, and will print the variable data in all locations where Data (1-10) was placed. The field length must be set for each location, as the font size can be changed for each data field. Up to ten different data fields can be placed in multiple message locations.

**COM1, COM2:** Select **COM1** or **COM2** when the data to be printed is from an external device such as a scale or bar code scanner. Multiple variable fields can use COM1 or COM2, but all will have the same information.

- Enter a field name. The field name identifies which variable field gets what data when **User** or **Data** is selected as the data source. It is not required for COM1 or COM2. For data variable fields, only one of each data lot can have a name.

- Enter a maximum field length to reserve space within the print message for the variable field.

- Touch the **OK** button to close the dialog box and insert the variable field into the print message. Variable fields are represented on the Edit Screen by a string of Xs. If the field is not exactly where it should be, use the arrow keys to adjust its position. Press Enter when the field is at the desired location.
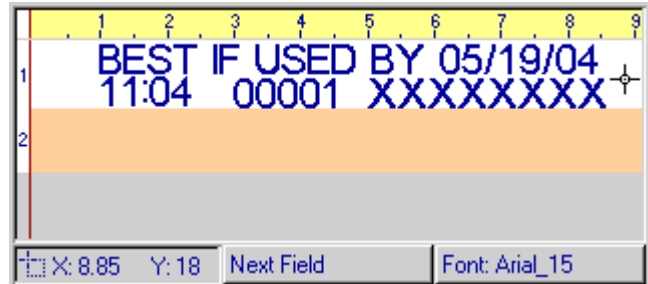


Message with variable field

## Adding a Logo

To add a logo to the print message, move the crosshairs pointer to the desired location and touch the **Logo** button; the Insert Logo dialog box is displayed.

Use the up/down arrows to select a logo. Touch the **OK** button to close the dialog box and insert the logo in the print message.



If the logo is not exactly where it should be, use the arrow keys to reposition it. Press **Enter** when the logo is at the desired location.
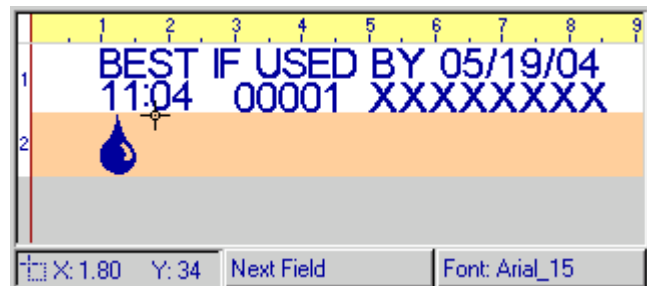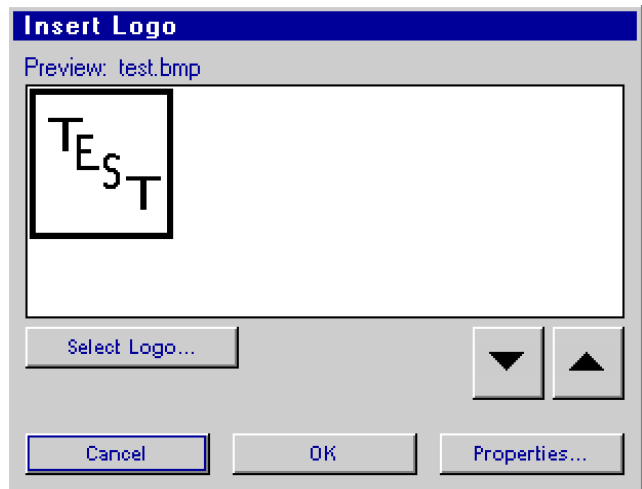


Message with logo

## Adding a Bar Code

To add a bar code to the print message (Impulse Jet only), move the crosshairs pointer to the desired location and touch the **Bar Code** button; the Insert Bar Code dialog box is displayed.

- Touch the **Bar Code Type** control to display a list of available bar code types and make a selection.

- Choose the Data Source for the bar code data (Fixed is the default). If the user will enter the bar code data when the message is selected to print, then choose User Data Source, and provide a prompt and sample bar code data. COM1, COM2 and Data 1-10 will select the data for the bar code from the respective location when the message is selected to print.

- Select the bar code magnification factor.

- Enter the bar code data. Except for Code 3 of 9, the IJ3000 automatically calculates the checksum character and adds it to the end of the bar code data.

- If human readable data is not to be printed with the bar code, touch **Properties**, then the **Print human readable** check box to remove the checkmark. (Printing human readable is the default setting.)

- Touch the **OK** button to close the dialog box and insert the bar code into the print message. If the bar code is not exactly where it should be, use the arrow keys to reposition it. Press **Enter** when the bar code is at the desired location.
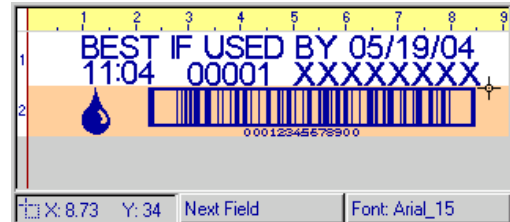
- The following section describes how to adjust barcodes to accommodate variations in ink bleed on different substrates.
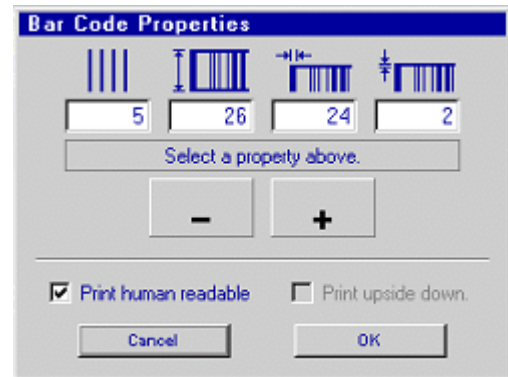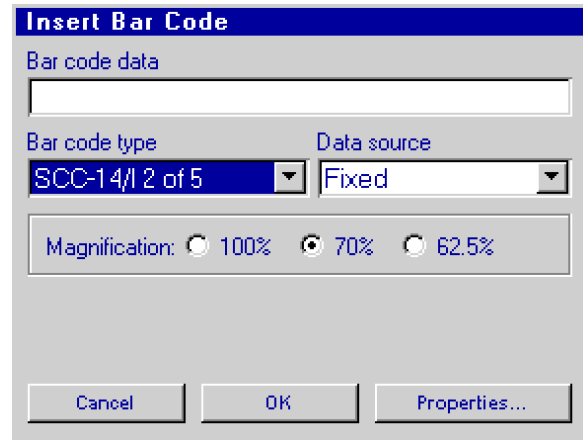
Message with bar code

**Measuring Ink Bleed:** Ink bleed can be easily measured for various substrates by printing a message that contains a "Measure ink bleed" bar code field. Insert the bar code field by touching the bar code field button at the bottom of the Edit Screen, then selecting the **Measure ink bleed** bar code type from the drop-down list. Print the message on a sample of the substrate to be used in the application and allow it to bleed for at least 24 hours before reading the measurement.
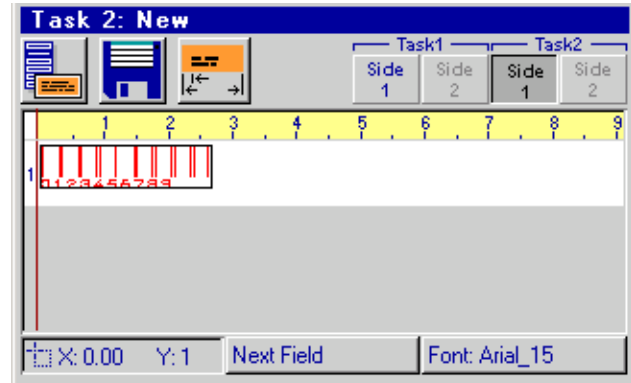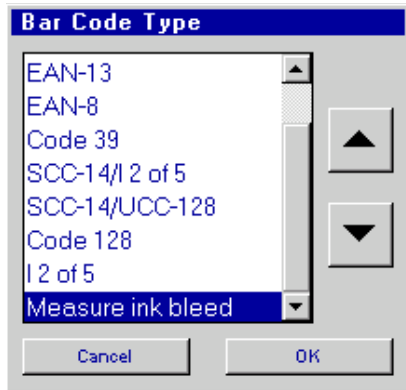


The measurement is determined by inspecting the printed bar code. The numbers below the bar code represent the number of printed columns separating each set of bars. The correct amount of bleed is determined by identifying the first set of bars that have not bled together. The number below the set of bars determined to have the correct ink bleed, is the "Ink bleed measurement". In the example, the bleed measurement is 5 (columns).



When the measurement has been determined, it can be set in all bar code fields printed on the substrate. The measurement is set by selecting a bar code field, then the field type button followed by the properties button. The factory default setting is set for printing based on the ink type selected.
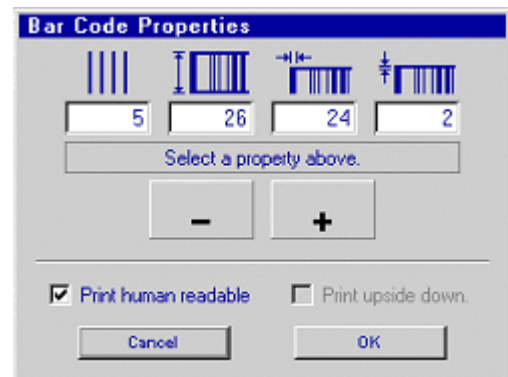
## Adding a Label Element

When a print message with a bar code label element is loaded to print, the IJ3000 instructs an attached Print and Apply Label Applicator to apply a label as described by the attached .alp file. The attached file can be created using label creating/editing software (EasyLabel, NiceLabel, etc.) with a "Print to file" feature and giving the file a .alp extension. The .alp file should then be uploaded to the Controller (see *"Appendix F: Creating Logo Files" on page 107*).

To add a label element to the print message, touch the **Label** button. The Label Applicator Data dialog is displayed.
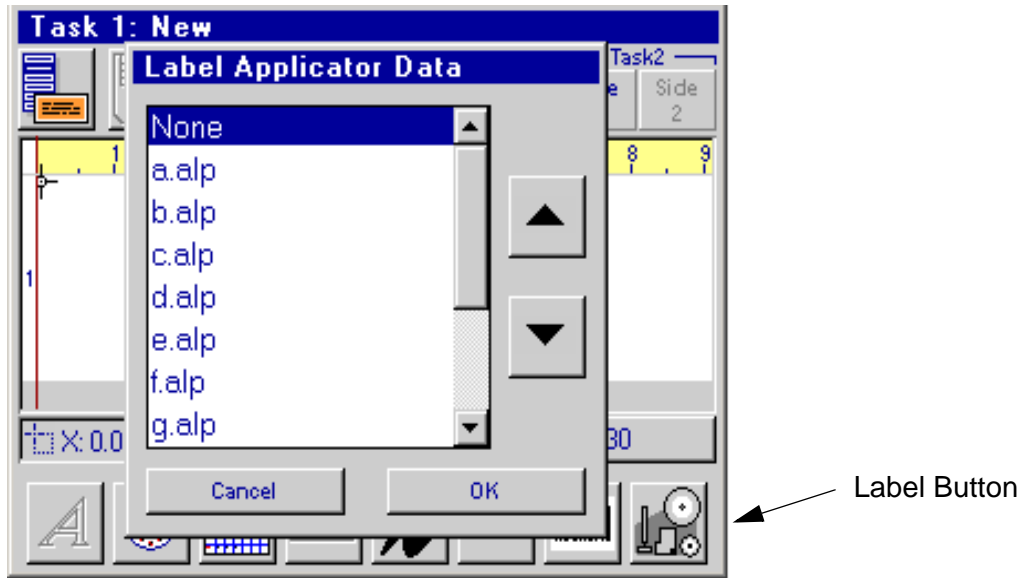


Label Button

- Select the file to be sent to the Label Applicator.
- Touch the **OK** button to close the dialog box and add the bar code label element to the print message. Note that the Label Applicator indicator is now displayed on the Edit Screen.

**Step 6** Save the print message. Touch the **Save** button to display the Save dialog box.

Enter a unique name for the message and touch the **Save** button.
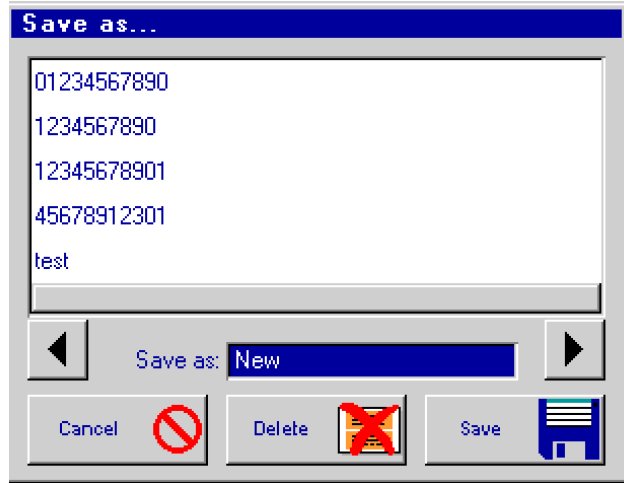
# Editing a Message

**From the Home Screen:**

1. Touch the **Messages** button. The Messages dialog box is displayed.

2. Select the message you wish to edit from the list, or type the message name in the **Message** box.

3. Touch the **Open** button. The Messages dialog box closes and the Edit Screen is displayed with the selected message in the edit window.
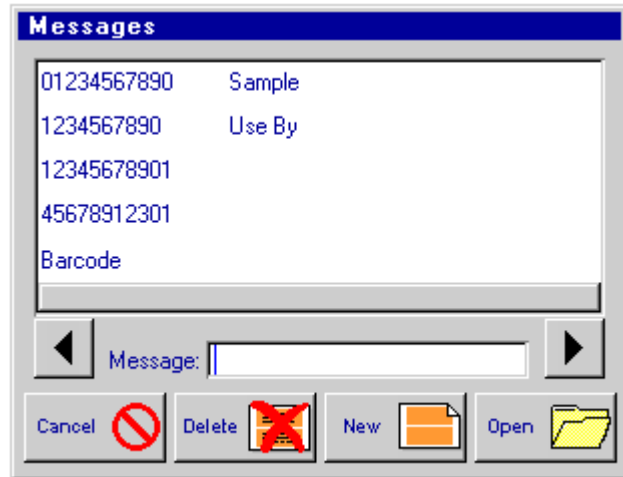
**From the Edit Screen:**

1. Touch the **Menu** button.

2. On the menu, touch the **Open** button. The Messages dialog box is displayed.

3. Select the message you wish to edit from the list, or type the message name in the **Message** box.

4. Touch the **Open** button. The Messages dialog box closes and the message selected is displayed in the edit window.
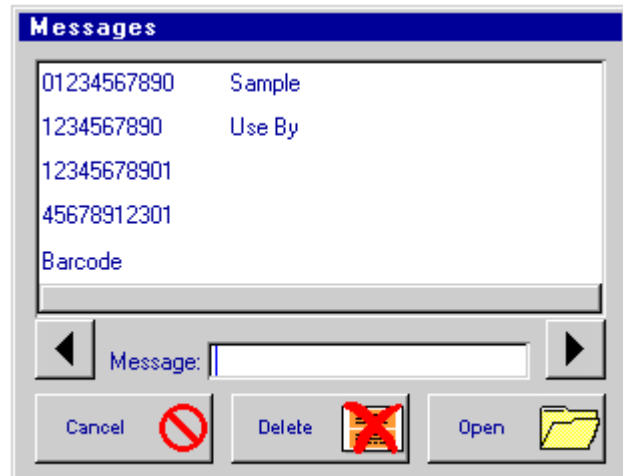
## Editing Fields

A field must be selected before it can be edited. When selected, all field types, except text fields, are displayed in red and outlined by a black box. When a text field is selected, it is first displayed in light blue. The light blue color indicates the text in the field can be edited. Press **Enter** and the field color changes to red, indicating the field can be moved.

A field can be selected by touching the **Next Field** button, by pressing the **Tab** key, or by touching the field directly. When using the **Next Field** button or **Tab** key, the fields are selected one after another in the order in which they were added to the print message.

When a field is selected, the background of its corresponding field type button becomes dark gray to identify the field type. If the field contains text, the field type button moves to the left side of the display and a text box containing the field's text is displayed at the bottom of the screen. (See the following examples.)

Release a selected field by pressing the **Enter** key, or by selecting another field.
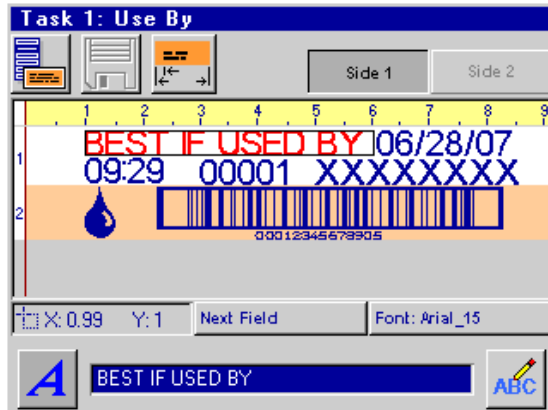
Text field selected                                Count field selected
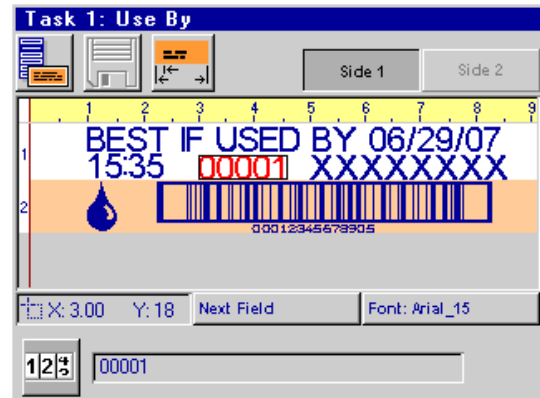
**Editing a Text Field:**
1. Select the field; its color changes from dark blue to light blue.
2. To edit the existing text:
   •Use the **Left** and **Right Arrow** keys to move the cursor to the edit point.
   •Press the **Backspace** key to delete characters to the left of the cursor.
   •Press the **Delete** key to delete characters to the right of the cursor.
   •Insert new text at the cursor point by typing.
3. To completely replace the existing text:
   •Press the **Enter** key or touch the **Move** button at the lower right corner of the screen; the field's color changes from light blue to red.
   •Type the new text. The new text replaces the old text.

MOVE

4. To change a text field's color from red to light blue so that its text may be edited, touch the **Edit** button at the lower right corner of the screen.
5. To release the field, press the **Enter** key once if its color is red; press it twice if its color is light blue.

EDIT

**Editing All Other Field Types:**
1. Select the field; its color changes from dark blue to red.
2. Touch the corresponding field type button (the button with the dark gray background); the field's Edit dialog box is displayed.
3. Make all desired changes.
4. Touch the **OK** button to close the dialog box and view the changes. Touch the **Cancel** button to discard all changes and close the dialog box.
5. Press **Enter** to release the field; its color changes from red to dark blue.

## Deleting a Field:

1. Select the field; for a Text field, press **Enter** after it's selected. The field color will change from dark blue to red.
2. Press the **Backspace** or the **Delete** key.

## Changing Field Properties:

**Text Field:**

1. Select the field; its color changes from dark blue to light blue.
2. Touch the **Text Field Properties** button; the Field Properties dialog box is displayed.
3. Change the field's properties as desired.
4. Touch the **OK** button to close the dialog box and view the changes. Touch the **Cancel** button to discard all changes and close the dialog box.
5. Press **Enter** twice to release the field; its color changes from light blue to red to dark blue.
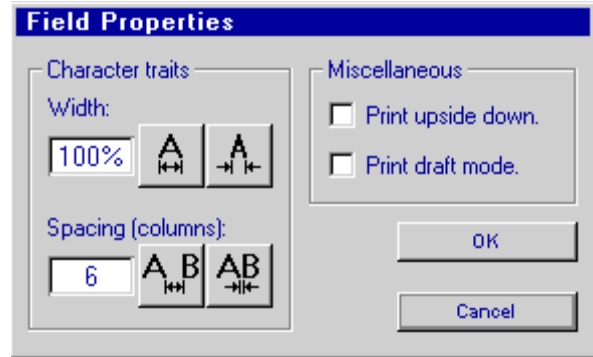
**All Other Field Types:**

1. Select the field; its color changes from dark blue to red.
2. Touch the corresponding field type button (the button with the dark gray background); the field's Edit dialog box is displayed.
3. Touch the **Properties…** button; the Field Properties dialog box is displayed.
4. Change the field's properties as desired.
5. Touch the **OK** button to close the Field Properties dialog box. Touch the **Cancel** button to close the dialog box while discarding all changes.
6. Touch the **OK** button to close the Edit dialog box and view the changes. Touch the **Cancel** button to discard all changes and close the Edit dialog box.
7. Press **Enter** to release the field; its color changes from red to dark blue.

**Character Width Trait** will adjust the width of all characters in the selected text field. The factory default character width settings will produce characters and logos that are proportional to each print head type:

| Default Character Width | | |
|---|---|---|
| Print Head Type | Fonts | Logos (.bmp) |
| I.V. | 100% | 100% |
| 96, 192, 224, 352 | 100% | 600% |
| 384, 768 | 200% | 300% |
| WaxJet | 66% | 400% |

**NOTE:** The Character Width setting for Integrated Valve heads should never be set to less than 100%. The global DPI setting should be used to reduce or increase message width. The Character Width determines the number of printed columns in a character. With the low horizontal print resolution of Integrated Valve heads, reducing Character Width to less than 100% results in missing columns. The Character Width setting is intended for use with Impulse Jet print heads.

**Print Draft Mode**: If this box is checked, every other column of the field will print.

**Changing a Field's Font:**

1.  Select the field.
2.  Touch the **Fonts** button; the Fonts dialog box is displayed with the current font selection highlighted.
3.  Select the new font.
4.  Touch the **OK** button to close the Fonts dialog and view the change. Touch the **Cancel** button to discard the change and close the dialog box.
5.  Press **Enter** to release the field.
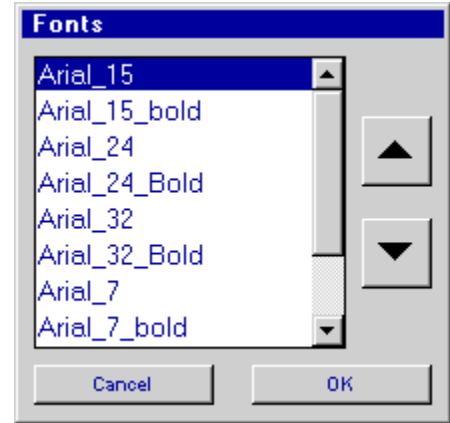
## Message Zoom

On tasks configured with IJ768 or IJ384 graphics print heads, a **Zoom** button on the right end of the Edit Screen's title bar expands the edit window to full screen, and magnifies the print message so that fine details may be seen (see illustrations below).

Normal Edit Screen
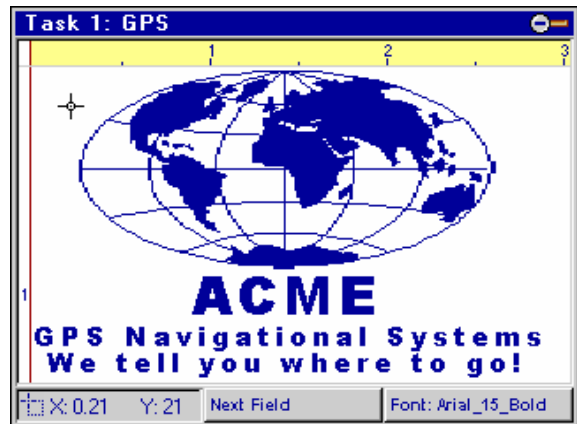
Edit Screen Zoomed In

When zoomed in, fields may be selected, moved and deleted; and text fields may be added or edited. Time and date codes, product counts, variable fields, logos, bar codes and label elements cannot be added to the message when zoomed in. Use the **Zoom** button or the **ESC** key to return to the normal Edit Screen.

## Edit Screen Keyboard Shortcuts

**Ctrl X**    Cut the selected field from the print message.
**Ctrl C**    Copy the selected field.
**Ctrl V**    Paste (insert) the last field cut or copied at the current pointer position.
**Ctrl S**    Save all changes made to the print message.
**Ctrl O**    Open a message for editing or viewing.
**Ctrl N**    Create a new print message.
**Tab**    Move from field to field, or to the first field if no field is currently selected.
**F1**    Scroll the edit window left.
**F2**    Scroll the edit window right.
**F5**    Scroll the edit window up (only when zoomed in).
**F6**    Scroll the edit window down (only when zoomed in).
**F4**    Show the extended lowercase character dialog.
**F8**    Show the extended uppercase character dialog.

# Creating and Editing a Group Message

When the system has been set up in group mode, group messages can be created. The edit screen can be entered from either Task 1 or Task 2. Touch **Side 1**, under **Task 1**, and create the desired message. Repeat for **Side 2** under **Task 1**, and for **Side 1 and 2** under **Task 2**. When this message is saved it will be saved as one group message. This message can no longer be opened without the system being set up for groups.
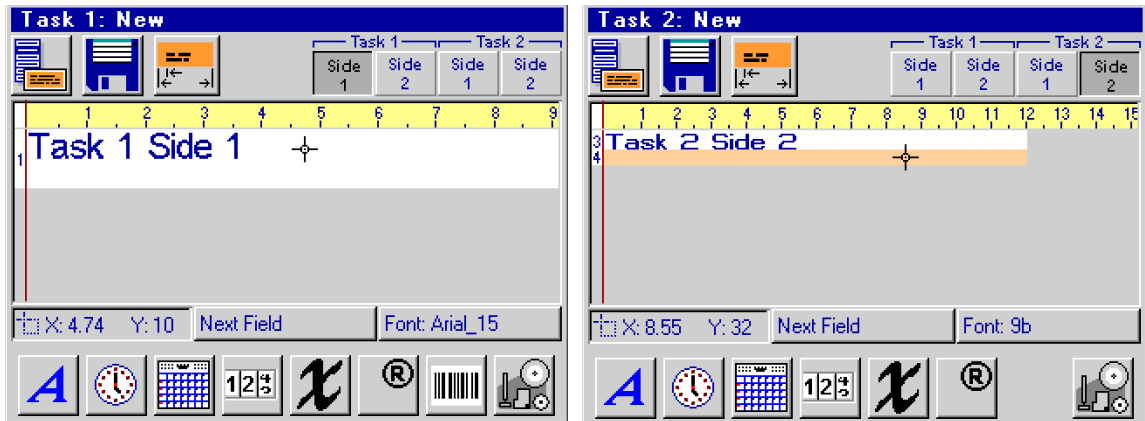


Group messages can not be opened if the system is not set up for groups.

# Estimating Ink Consumption

A utility available on the Edit Screen estimates a print message's ink consumption. To display the estimated ink consumption for the message being created or edited, select **Ink Usage** from the Messages Menu.

Ink consumption is reported as the estimated number of times the *entire* message will print per five gallons of ink for an Integrated Valve task, 500 mL of ink for an Impulse Jet task, or 20 mL of ink for a WaxJet task. All fields on all sides of a print message are included in the calculation. Ink consumption is calculated by multiplying the average drop volume by the total number of dots in the printed message.
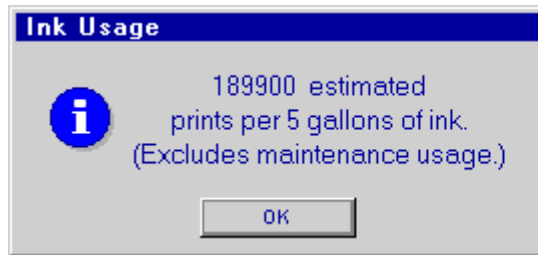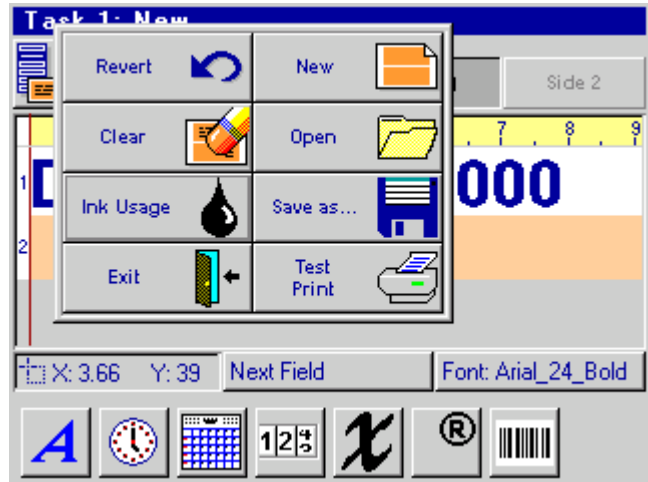
Ink consumption for an
Integrated Valve task.
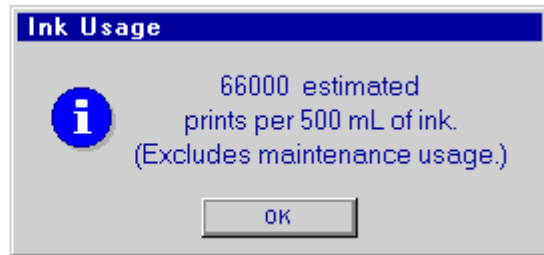
Ink consumption for an
Impulse Jet task.
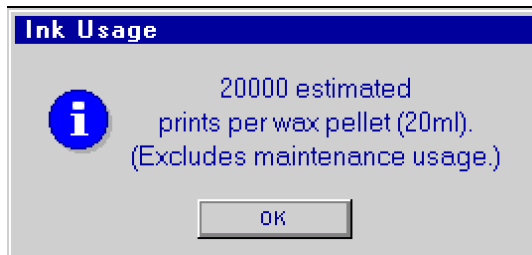
Ink consumption for a
WaxJet task.

**Side 2 = Side 1:** When the **Side 2 = Side 1** option is selected, the total number of dots is determined by counting the number of dots on Side 1 of the message, then doubling it.

**Groups:** When the **Group task 2 with task 1** option on a dual task system is selected, and both tasks are of the same print technology (both Integrated Valve or both Impulse Jet), the dots in both tasks are counted and used in the ink consumption calculation. For groups where one task is Integrated Valve and the other is Impulse Jet, ink consumption is calculated for the currently displayed task only.

# Printing a Message

1. Touch the decorated **Print** button at the top of the **Home Screen** to access print options, then touch the **Print …** button. Or, touch the **Print …** button at the bottom of the screen.

2. Type in a message name, or touch a message name on the list, and touch the **Print It** button.

   When a message with one or more count codes is loaded for printing, a dialog box is displayed showing the current value of the count and allowing the operator to preset the count to any value within its defined limits. For messages with two or more counts, separate boxes are displayed, one after another, for each count.

| Product Count Input | |
|---|---|
| Item Count | |
| | Last Printed | Next |
| Item count: | 000001 | 100 | Reset |
| Cancel | OK |

| Product Count Input | |
|---|---|
| Pallet Count | |
| | Last Printed | Next |
| Pallet count: | 000001 | 1 | Reset |
| Item count: | | 1 |
| Cancel | OK |
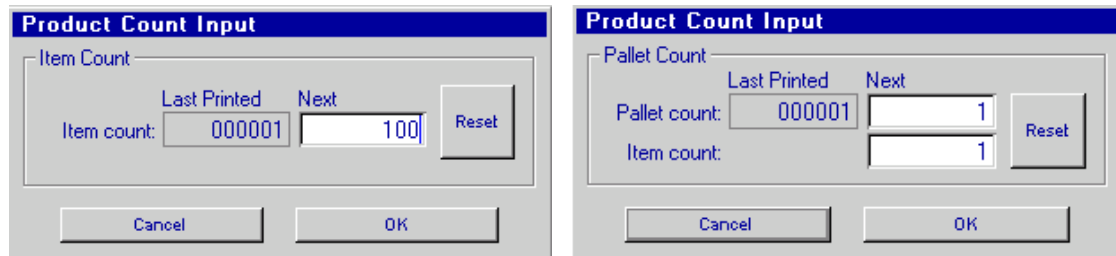
3. To stop printing at any time, open the print options list and touch **Cancel Print**. The system will prompt the user to confirm.

# Deleting a Message

1. Touch the decorated **Messages** button on the **Home Screen**.

2. On the **Messages** screen, type in a message name or touch a message name on the list.

3. Touch the decorated **Delete** button. When prompted to confirm, touch **Yes**.

# Making Adjustments During Printing

Product count and variable field data can be changed during printing, as long as the controller has not been set up for Message Look Up, Network Mode, Network Notification or Command and Control. Follow the instructions below for the type of information that needs to be changed.



Edit Counts Button ———————            ——— Edit Variable Fields Button
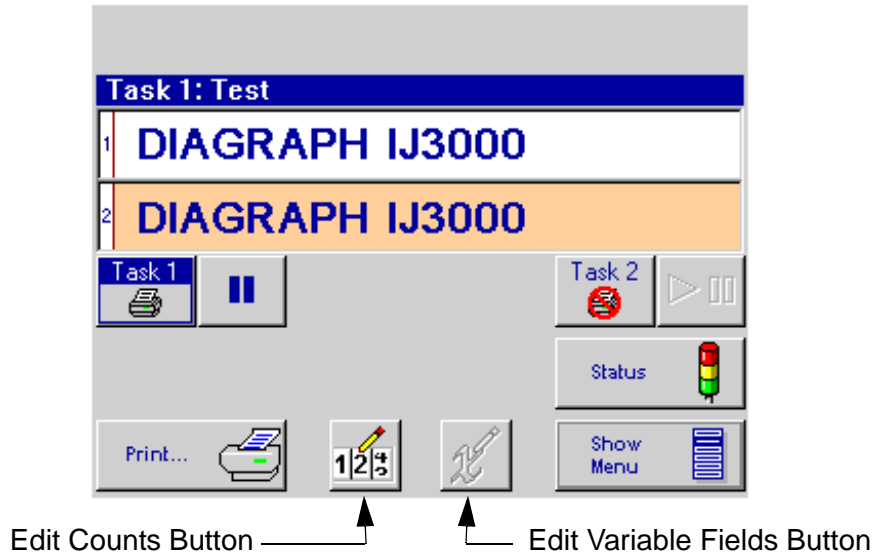
## Adjusting Product Counts

To adjust product counts for the current print message, touch the **Edit Counts** button on the Home Screen. The Product Counts dialog box is displayed:



The "Total Count of All Products Printed" is a non-printing count that is incremented every print cycle. Touch the **Reset** button to reset this count to zero.

Touch the **Adjust Print Counts...** button to change the value of any printable count the current print message may have. If the current message has no counts, the **Adjust Print Counts...** button is grayed out.

Touch the **OK** button to close the dialog box and return to the Home Screen.

When the **Adjust Print Counts...** button is touched, and the current print message contains one or more counts, the Product Count Input dialog box is displayed:
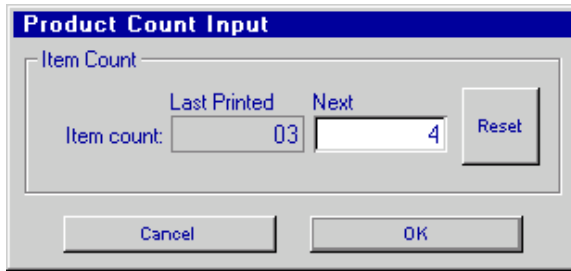


Product Count Input dialog box for an item count.          Product Count Input dialog box for a pallet count.
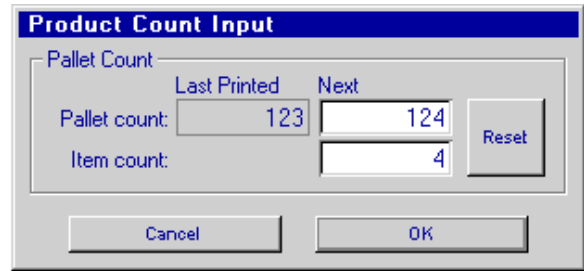
To change the product count, touch the **Next** box, type in the new count, and press **Enter**. Enter a value lower than the count's defined minimum and it changes to the minimum. Enter a value greater than the defined maximum and it changes to the maximum.

To reset a count to its starting value, touch the **Next** box, then touch the **Reset** button. Touch the **OK** button to confirm the change and return to the Home Screen, or if the message has more than one count, to go to the next count.

Touch the **Cancel** button to close the dialog box and return to the Home Screen without making any changes.

**NOTE**: The **Item Count** on the Pallet Count dialog is a count internal to the pallet count. It tracks the current number of items on the pallet. When this count reaches the defined items per pallet, the pallet count is incremented. This Item Count does not print. It is provided for those who want to print a pallet count only. If both a pallet count and an item count (for example, BOX 4 OF PALLET 124) are being printed, a separate Product Count Input dialog box will be shown for each count. To keep the item-pallet counts properly synchronized, the printable Item Count ('4' in the left illustration above) must match the Pallet Count item count ('4' in the right illustration above).

## Changing Variable Field Data

To change the data printed in a User Variable Field or Data Variable Field using prompts, touch the **Edit Variable Fields** button. The Insert Variable Field dialog box is displayed:
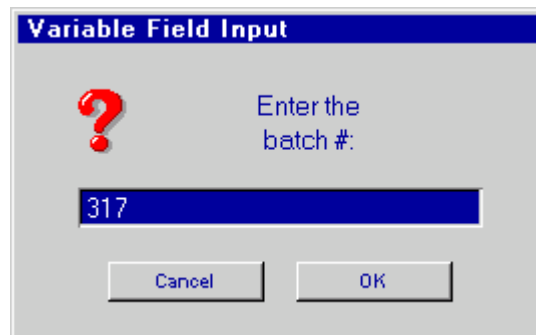


Type in the new data. Touch the **OK** button to confirm the change and return to the Home Screen, or if the message has more than one variable field, to go to the next field.

Touch the **Cancel** button to close the dialog box and return to the Home Screen without making any changes.

# Section 7: Utility Functions

## User Access Control

On the **Home Screen**, touch **Control Panels**, then **User Access.**

### Open Access vs. Passwords

Touch the **Open access** radio button to allow all users unrestricted access to all IJ3000 functions.

Touch the **Restricted access** radio button to enable password protection and restrict access to all message editing and system setup functions. When password protection is enabled, the user will still be allowed to select the print message, pause and resume printing, adjust product counts and edit variable field data in the current print message, and check system status.

Touch the **Closed access** radio button to enable closed access. Closed access only allows the user to view system status.
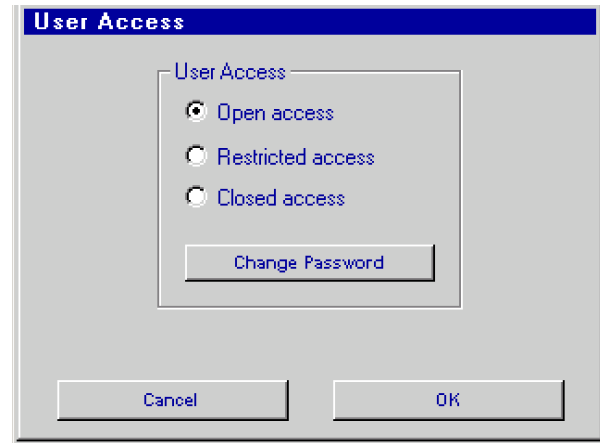
**NOTE: Restricted Access** protection prevents the **Print**, **Messages**, **Control Panels**, and **Time & Date** buttons on the Home Screen from being displayed when the **Show Menu** button is touched, until the password is entered. **Closed Access** includes all the protection from Restricted Access, plus it will not allow the user to change the print message, modify counts or variable fields, or pause and resume printing. To prevent unauthorized access, make sure to return to the Home Screen and touch the **Hide Menu** button after working in restricted areas.

**NOTE:** Turning on **Restricted** or **Closed Access** causes the controller to request user authentication when accessing the system from a web browser. When prompted, enter a user name of **user**, and the password for the controller being accessed.

Touch the **OK** button to confirm the selection and return to the Home Screen.

Touch the **Cancel** button to return to the Home Screen without making any changes.

### Changing the Password

The factory-set password is **Manager**. To change this, touch **Change Password**. Type the old password (Manager) followed by the new one, then the new one again. Passwords can be up to 16 characters long, and may contain any alphanumeric character, symbol or punctuation mark. Passwords are case sensitive.

# Status Screen

To display the Status Screen, touch the **Status** button on the **Home Screen.**
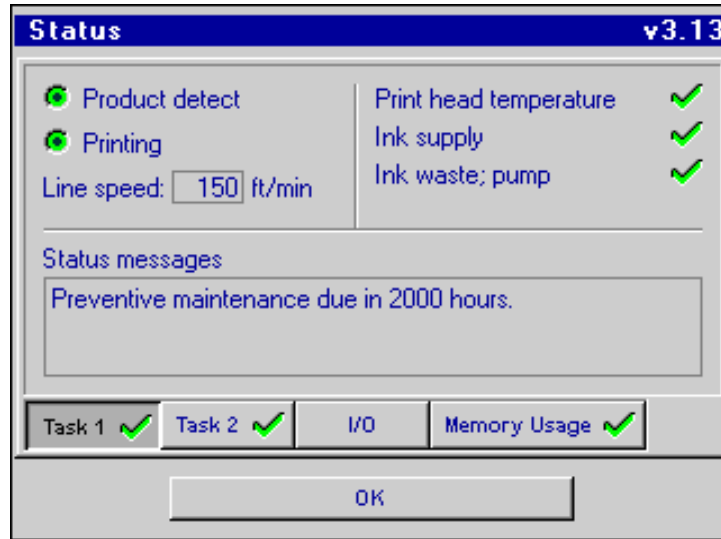


Touch the buttons along the bottom of the status window to display the current status of Print **Task 1**, Print **Task 2** (on two-task systems), the **I/O** card (if the system is so configured) or system **Memory Usage**. Indicators on the buttons give an "at a glance" indication of print task status and memory usage. A green checkmark indicates normal print task operation or memory usage, a yellow dash indicates an item needs attention and a red 'X' indicates a non-operational print task or maximum memory usage.

The illustration above shows the status display for an Impulse Jet task. Status displays for other task types (Integrated Valve or WaxJet) are similar, showing status information common to all task types, plus task-specific information. Illustrations and descriptions of the Integrated Valve and WaxJet status displays appear later.

All print task status indicators are updated once very two seconds. Indicators common to all print task types are:

 Indicates the task photocell is not blocked.

 Indicates the task photocell is blocked.

 Indicates the task is not ready to print. The print buffer is empty or print is paused.

 Indicates the task is ready to print. A print message is in the print buffer and print is enabled (not paused).

 When using an external encoder, displays the line speed as measured by the encoder. When using an internal encoder, displays the internal encoder line speed setting.

 Displays status information not otherwise represented by other on-screen indicators.

## Print Task Status - Impulse Jet

| Print head temperature ✔ | Indicates all print heads in the task's daisy chain are at operating temperature. |

| Print head temperature ✘ | Indicates one or more print heads in the task's daisy chain are not at operating temperature. Look at the "At Temperature" LED on the back of the individual print heads to see which print head is not "at temp." |

| Ink supply ✔ | Indicates the ink supply is OK. |

| Ink supply ➖ | Indicates an **Ink Low** condition: The CIDS3000 Ink Delivery System's reservoir is out of ink. |

| Ink supply ✘ | Indicates an **Ink Out** condition: One or more print heads in the task's daisy chain have an empty ink reservoir. Printing stops. |

| Ink waste; pump ✔ | Indicates the waste bottle on the CIDS3000 is not full, and the ink pump is supplying sufficient ink to the print heads. |

| Ink waste; pump ✘ | Indicates the waste bottle on the CIDS3000 is full and needs to be changed, or the ink pump has run continuously for more than ten seconds (indicating a possible ink line break) and has shut down. A look at the waste bottle should determine which fault occurred. The print head Auto Cleaning System is disabled in either case. |

### Print Task Status - WaxJet
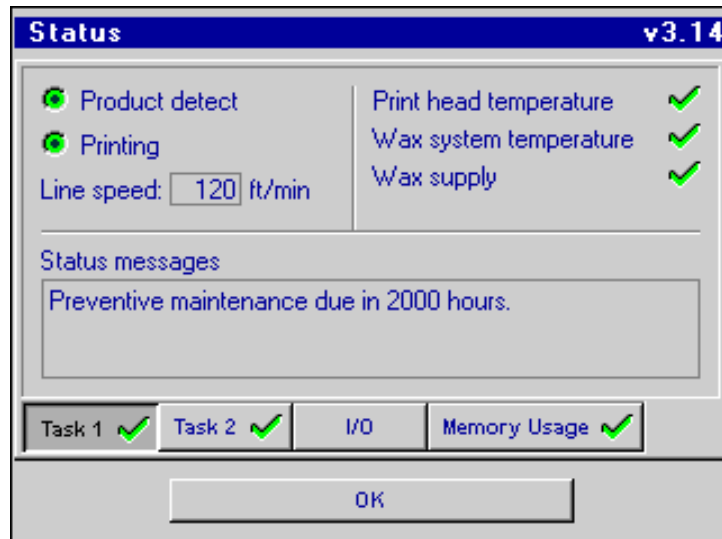
The WaxJet print task status indicators for product detect, printing and line speed are the same as those for an Impulse Jet print task. The remaining status indicators differ slightly, as noted below.

| | |
|---|---|
| Print head temperature ✓ | Indicates the task's print head is at operating temperature. |
| Print head temperature ▬ | Indicates the task is in Sleep Mode. |
| Print head temperature ✗ | Indicates the task's print head is not at operating temperature. |
| Wax system temperature ✓ | Indicates the Wax Delivery System is at operating temperature. |
| Wax system temperature ▬ | Indicates the Wax Delivery System is in Sleep Mode. |
| Wax system temperature ✗ | Indicates the Wax Delivery System is not at operating temperature. |
| Wax supply ✓ | Indicates the task's wax supply is OK. |

Wax supply ▬ — Indicates a **Wax Low** condition: wax pellets need to be added to the Wax Delivery System's melt tank. During a **Wax Low** condition, wax consumption is monitored by the Print Head Driver Assembly. If wax is not added to the melt tank before an addition 5mL of wax is used, **Wax Low** changes to **Wax Out** and printing halts. The time the **Wax Low** condition occurred is displayed in the **Status messages** box, along with an estimate of the number of prints remaining before **Wax Out** occurs (see illustration below). As it usually takes seven to ten minutes to melt enough wax to clear a **Wax Low** condition, wax pellets should be added to the melt tank as soon as possible after the **Wax Low** condition is noticed.
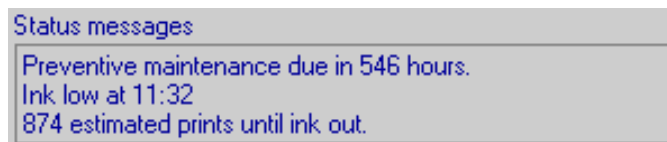
Wax supply ✗ — Indicates a **Wax Out** condition; printing halts.

## Print Task Status - Integrated Valve (I.V.)

```
Status                                    v3.14

  ⦿ Product detect        IDS3000      1     2
  ⦿ Printing              Ink level    ✓
  Line speed:  175 ft/min Ink lines    ✓
                          Pressure (psi)  15.28

  Status messages
  Preventive maintenance due in 2000 hours.


  Task 1 ✓   Task 2 ✓   I/O    Memory Usage ✓

              OK
```
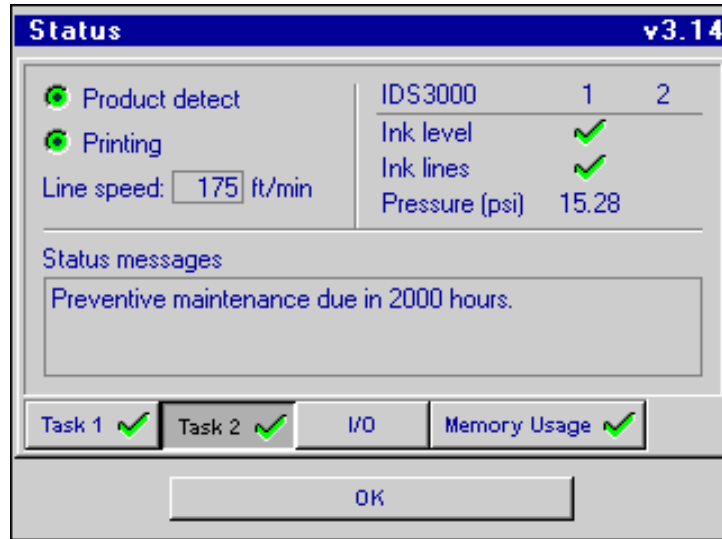
The I.V. print task status indicators for product detect, printing and line speed are the same as those for Impulse Jet and WaxJet print tasks. Additional indicators show the status for up to two IDS3000 Ink Delivery Systems:

| | |
|---|---|
| Ink level ✓ | Indicates the ink supply is OK. |
| Ink level ▬ | Indicates an **Ink Low** condition. |
| Ink level ✗ | Indicates an **Ink Out** condition. |
| Ink lines ✓ | Indicates the ink lines are OK. |
| Ink lines ✗ | Indicates a broken ink line. |
| Pressure (psi) 15.28 | Indicates normal ink pressure (greater than 10 psi). |
| Pressure (psi) 5.28 | Indicates low ink pressure (less than 10 psi; white characters on a red field). |

## I/O Status
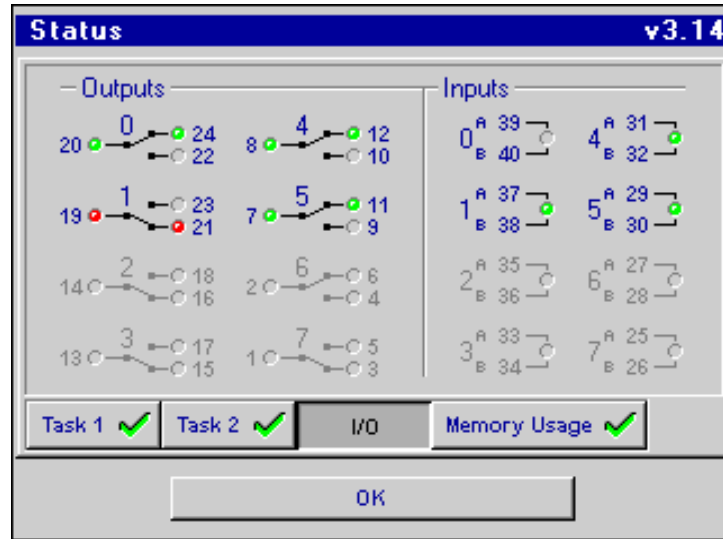


The I/O Status Screen becomes available when a function is assigned to one or more of the I/O channels. (See the **IJ3000 Board Kit Installation Instructions**, included in the I/O Board Kit, for directions on setting up the I/O card.) Indicators on the I/O Status Screen show the current state of the I/O card's relay outputs and isolated inputs, and are updated every two seconds.

**Relay Output Indicators:**
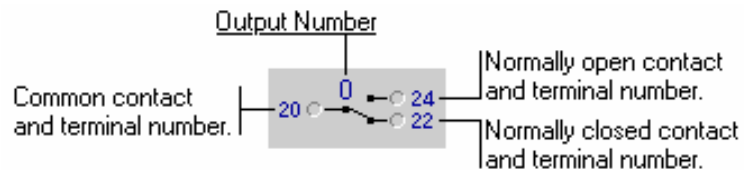


 Indicates the output function is undefined or "None".
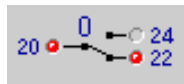
 Indicates the relay is de-energized.

 Indicates the relay is energized.

**Input Indicators:**
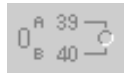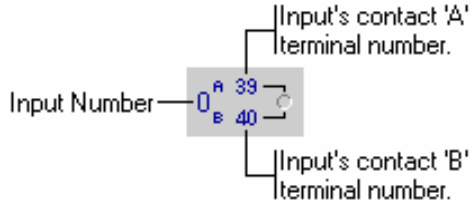


   Indicates the input function is undefined or "None".
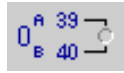
   Indicates the input signal is not present or inactive.
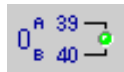
   Indicates the input signal is present or active.

### Manual Control of Relay Outputs

An output 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.

## Memory Usage

Memory Usage displays the percentage of available flash memory and RAM that is currently being used.
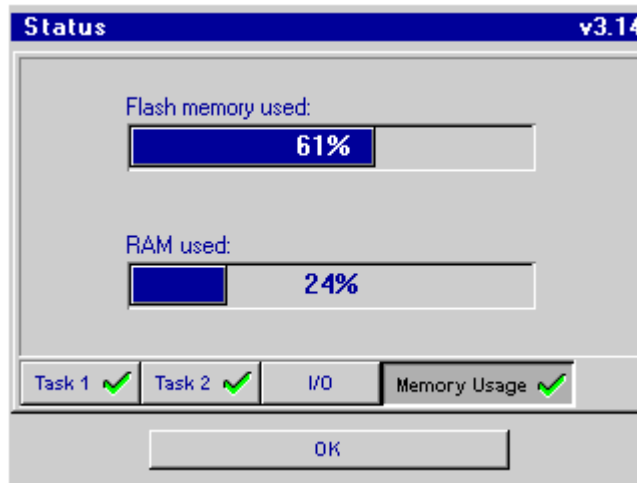
# Preventive Maintenance Timer

A 2000 Hour Preventative Maintenance Timer tracks elapsed print time. The timer's progress can be seen in the **Status messages** box on the Status Screen.
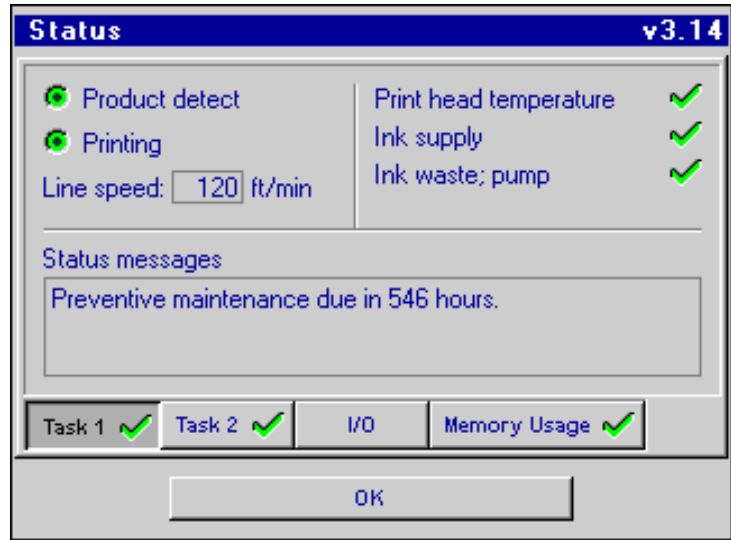
When the timer reaches zero, a dialog box is displayed, reminding the user that preventive maintenance is due.

Also displayed on the Home Screen, to the right of the ink level indicators, is a small image of a wrench. The wrench remains as a reminder that maintenance is due; it disappears when the maintenance timer is reset.
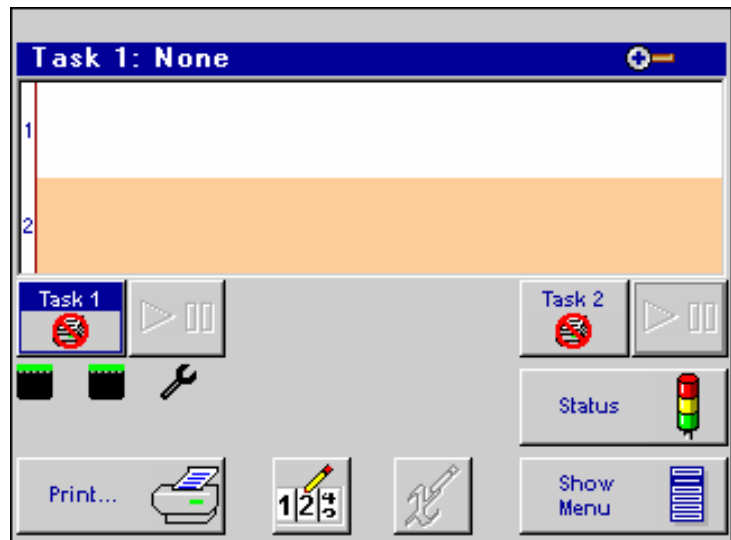
To reset the timer, open the System Utilities Screen, choose the **Reset maintenance timer** and touch **Do Function**.

**System Utilities**

Select Function

Restore default configuration
Defrag flash memory
Test touch screen
Calibrate touch screen
Reset maintenance timer
File manager

Resets the preventive maintenance timer to 2000 hours; halts the "maintenance due" reminders.

Done    Do Function
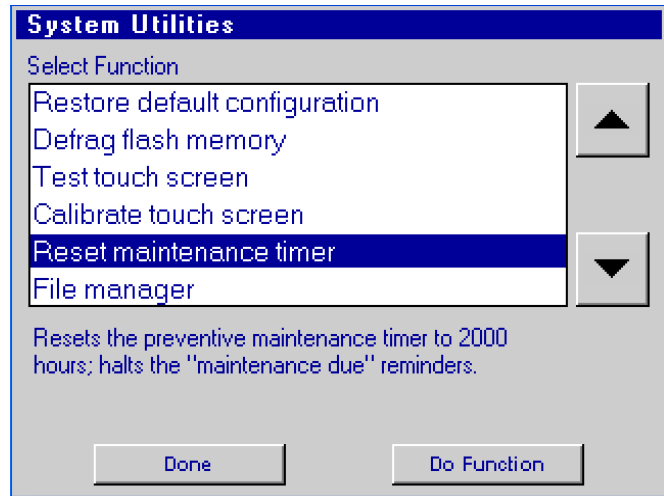
When prompted, enter the reset code and touch **OK**, or press **Enter** on the keyboard.

**Enter Code**

Code [********]

OK
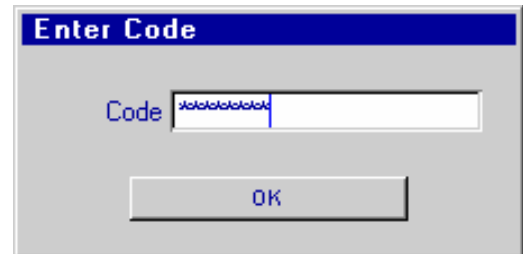
When the correct code is entered, a dialog box confirms that the timer has been reset.

**Code Accepted**

ℹ    The timer has been reset.

OK

# Print Head Flushing System (Non-Porous Integrated Valve Systems Only)

**NOTE:** This feature requires installation of the Flushing System to operate.

Flushing the ink from the print heads on a non-porous IJ3000 Integrated Valve system prior to a long-term system shut down prevents the print head orifices from becoming clogged with dry ink, and makes restarting the system much easier.

To access the Print Head Flushing Screen:

1. On the **Home screen** touch the **Print** button at upper right to open the Print Menu.

2. Touch the **Flush Print Heads** button on the Print Menu to open the Print Head Flushing Screen.
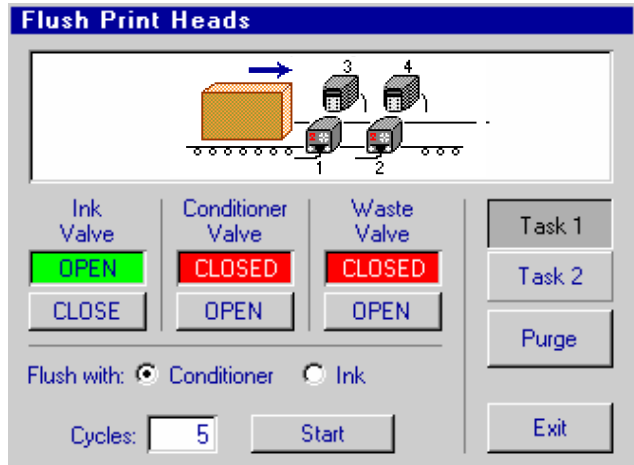


## Flushing With Conditioner

Flush with conditioner prior to a long-term system shut down.

1. All print heads on both tasks, if applicable, automatically purge at the end of the flushing sequence. Place an absorbent cloth, or some other means of capturing the discharge, in front of each print head.

2. Go to the Print Head Flushing Screen and select the **Flush with: Conditioner** radio button.

3. Select the **Cycles** box and enter the number of cycles required. The number of cycles needed depends on the number and types of print heads in the system's daisy chains. The default is 5, which should be sufficient to flush four IV18 Dot print heads. Enter a larger number if the system has more than four IV18 Dot heads on both tasks combined; enter a smaller number if less. Some experimentation may be needed to find the correct number. Any change made to the number of conditioner flush cycles is saved when the Print Head Flushing screen is exited.

4. Touch the **Start** button. A dialog box appears warning that all print heads automatically purge at the end of the flushing operation. Touch **OK** to begin the flushing operation, or **Cancel** to abort it. Once begun, the flushing operation proceeds automatically. After flushing, the conditioner valve remains open for any additional manual print head purging that may be needed.
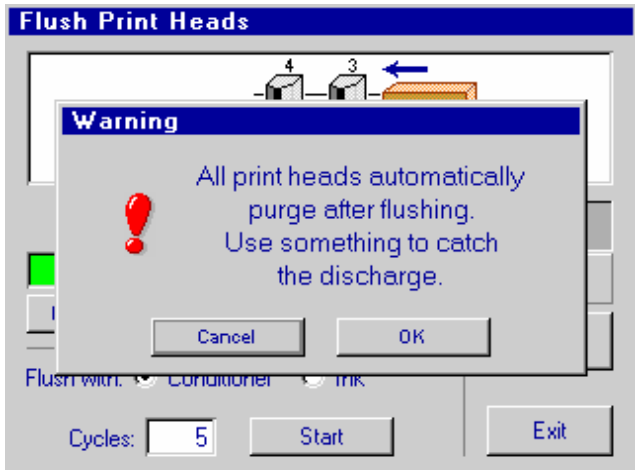
5. During the flushing operation, the **Start** button becomes a **Stop** button and all other buttons, except the **Exit** button, become inactive. The flushing operation may be stopped at any time by touching the **Stop** button. The flushing operation also stops if the Print Head Flushing screen is exited, or an **Ink Out, Conditioner Out**, or **Waste Container Full** condition occurs.

6. Touch the **Exit** button on the screen or the **ESC** key on the keyboard to return to the Home screen. Exiting the Print Head Flushing screen opens the ink valve and closes the conditioner and waste valves.

## Flushing With Ink

Flush with ink when restarting the system after a long-term shut down.

1. All print heads on both tasks, if applicable, automatically purge at the end of the flushing sequence. Place an absorbent cloth, or some other means of capturing the discharge, in front of each print head.

2. Go to the Print Head Flushing Screen and select the **Flush with: Ink** radio button.

3. Select the **Cycles** box and enter the number of cycles required. The number of cycles needed depends on the number and types of print heads in the system's daisy chains. The default is 2, which should be sufficient to flush four IV18 Dot print heads. Enter a larger number if the system has more than four IV18 Dot heads on both tasks combined; enter a smaller number if less. Some experimentation may be needed to find the correct number. Any change made to the number of ink flush cycles is saved when the Print Head Flushing screen is exited.
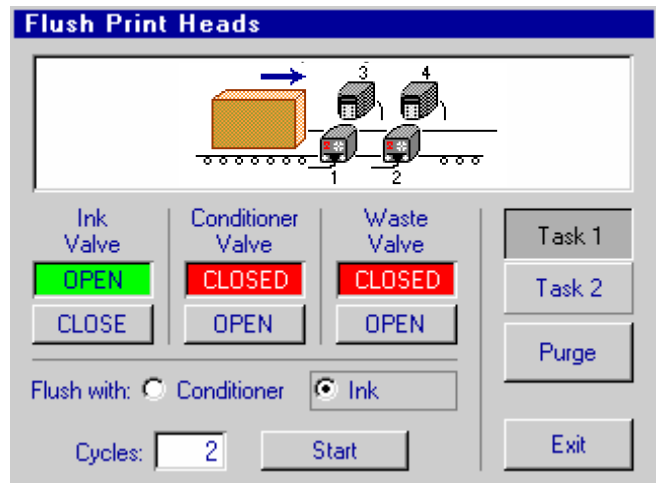
4.  Touch the **Start** button. A dialog box appears warning that all print heads automatically purge at the end of the flushing operation. Touch **OK** to begin the flushing operation, or **Cancel** to abort it. Once begun, the flushing operation proceeds automatically. After flushing, the ink valve remains open for any additional manual print head purging that may be needed.
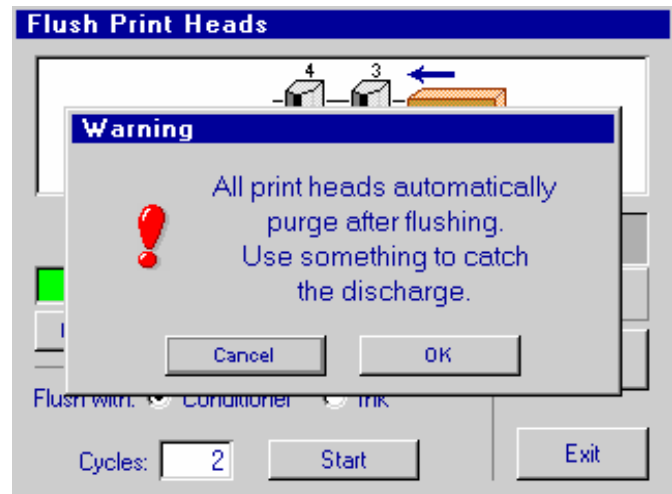


5.  During the flushing operation, the **Start** button becomes a **Stop** button and all other buttons, except the **Exit** button, become inactive. The flushing operation may be stopped at any time by touching the **Stop** button. The flushing operation also stops if the Print Head Flushing screen is exited, or an **Ink Out**, **Conditioner Out**, or **Waste Container Full** condition occurs.

6.  Touch the **Exit** button on the screen or the **ESC** key on the keyboard to return to the Home screen. Exiting the Print Head Flushing screen opens the ink valve and closes the conditioner and waste valves.

## Manual Control

The ink, conditioner, and waste valves may be manually opened and closed using their respective **OPEN/CLOSE** buttons. The valve status window above the button shows the valve's current state. It may take a couple of seconds for the status to update after an **OPEN/CLOSE** button is touched.

Individual print heads on either task may be purged from the Print Head Flushing screen:

1.  Select the task by touching the **Task 1** or **Task 2** button.
2.  Touch the print head that needs to be purged. The selected head is highlighted.
3.  Touch the **Purge** button.

**IJ3000** **Controller**

Section 7: Utility Functions

# System Test

Touch Screen Calibration is completed at the factory. Re-calibration can be performed any time there are problems with the touch screen. From the **Home Screen**, select **Show Menu, Control Panels**, then **Utilities**. Choose **Calibrate Touch Screen** and touch **Do Function**.

If the touch screen is so far out of calibration that it is inoperable, you will have to call up the calibration utility using the keyboard. From the **Home Screen**, press the space bar to display the Home Screen menu (the space bar alternately hides and displays the menu), then press the "**T**" key.

Follow the instructions on the display.
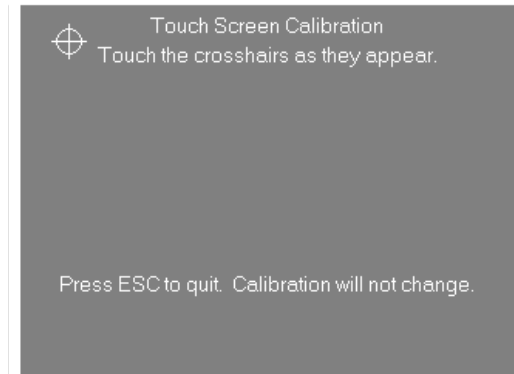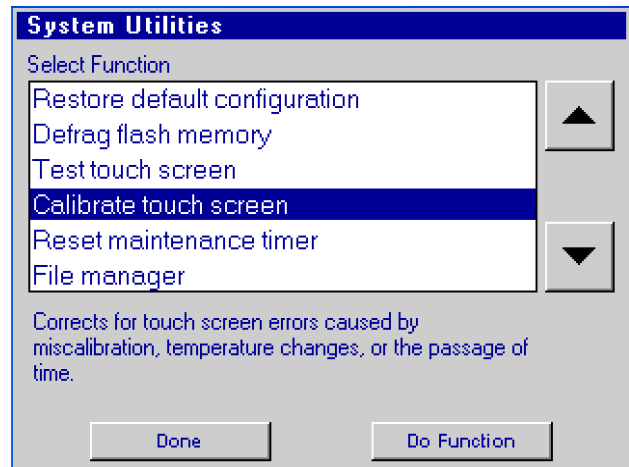
If calibration is successful, the **Success** screen appears.

Press **OK** to confirm.

If calibration is not successful, the **Calibration Failure** screen appears. Touch **Yes**, and attempt calibration again. If it continues to fail after several tries, call the Diagraph Support Line.
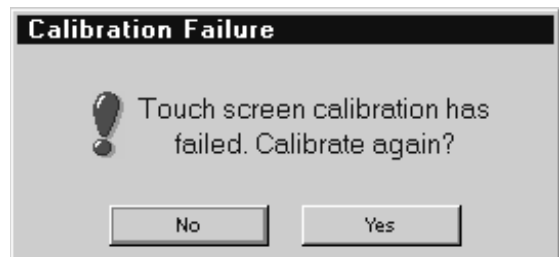
# Regional Settings

On the **Home Screen**, touch **Control Panels**, then **Regional Settings**.

Choose the **Language** to be used for the system from the list of available languages.

Touch either the **U.S. customary** or **Metric** radio button to select the desired units to be shown for the items in the following table:
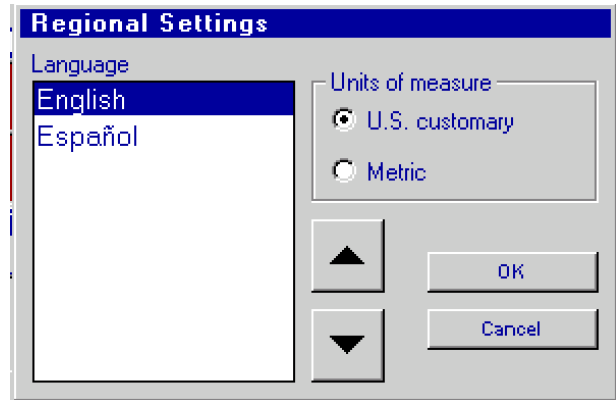
| Units of Measure | Line Speed | Print Head Size | Margins, X Coordinate, Product Length |
|---|---|---|---|
| U.S. customary | ft/min | inches | inches |
| Metric | m/min | mm | cm |

Touch the **OK** button to close the dialog box and save changes.

Extended characters that are not on the standard keyboard may be used for File Names, Shift Codes, User Codes and Variable Field names. To use extended characters, select the message or field to be changed. Press the **F4** key to bring up lowercase characters, or **F8** (Shift + F4) to bring up uppercase characters, then select the appropriate character.

**NOTE:** Extended characters are only available with Impulse Jet 384/768 fonts, from 9 to 96 dots. Extended characters are not selectable for the Arial 126 dot font.

# System Reboot

Should the system ever become unresponsive or display an "Out of memory" message, a "system reboot" must be performed. Press and hold **Ctrl** and **Alt,** then press the **Del** button.

**CAUTION:** Any message that was printing when the system locked up will automatically resume printing when the system reboots.

# File Operations

## Backup

To perform a backup of the data files on the system, open the System Utilities Screen, choose **Backup**, and touch **Do Function**.

**System Utilities**

Select Function

| |
|---|
| Calibrate touch screen |
| Reset maintenance timer |
| **Backup** |
| Restore |
| Safely remove USB memory |
| File manager |

Copies system configuration and message files to USB memory device.

Done        Do Function
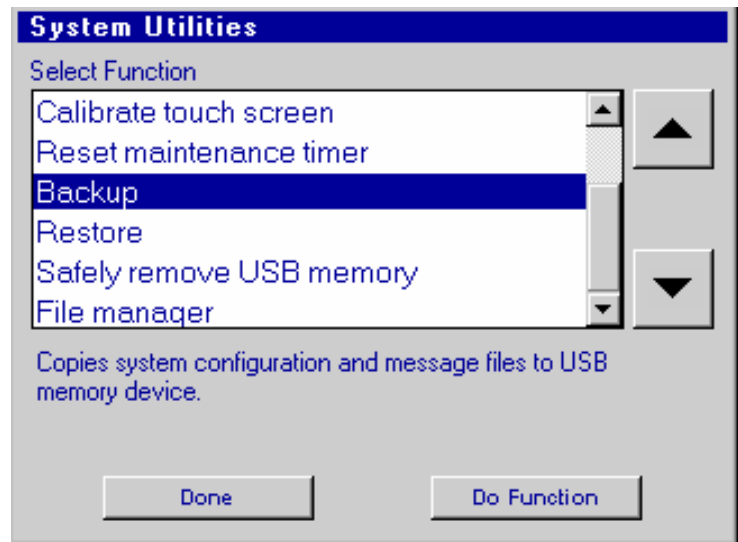
The system will then prompt for a file to save the backup file under, the default will be **backup.tgz**. If the system is unable to locate a suitable USB device for backup, an error screen will be displayed.

**Oops!**

Cannot find a USB memory device.

OK

### Restore

To perform a restore of the data files on the system from a backup file, open the System Utilities Screen, choose **Restore**, and touch **Do Function**.

**System Utilities**

Select Function
- Calibrate touch screen
- Reset maintenance timer
- Backup
- **Restore**
- Safely remove USB memory
- File manager

Restores system configuration and message files from USB memory device.

[ Done ]          [ Do Function ]
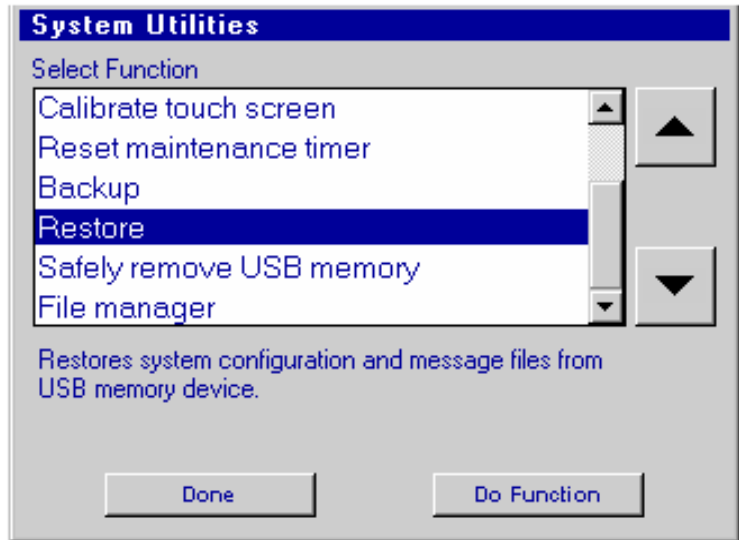
The system will prompt for a backup file from which to restore; the default file name is **backup.tgz**. If the system is unable to locate a suitable USB device for backup, an error screen will be displayed.

**Oops!**

Cannot find a USB memory device.

[ OK ]

**NOTE:** The backup file is compatible with the backup that is downloaded from the controller in a web browser.

### Safely Remove

To perform a safe removal of your USB media, open the System Utilities Screen, choose **Safely remove USB memory**, and touch **Do Function**.

**CAUTION:** Corruption of data on the USB memory device can occur if this step is not performed.

**System Utilities**

Select Function
- Calibrate touch screen
- Reset maintenance timer
- Backup
- Restore
- **Safely remove USB memory**
- File manager

WARNING!! To avoid corrupting your data do this before removing a USB memory device.
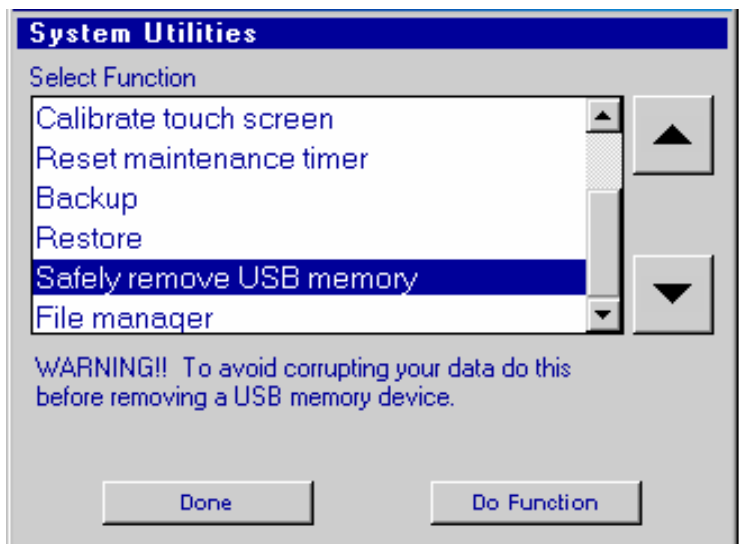
[ Done ]          [ Do Function ]

## File Manager

To access the file manager utility, open the System Utilities Screen, choose **File Manager**, and touch **Do Function**.

**System Utilities**

Select Function
Calibrate touch screen
Reset maintenance timer
Backup
Restore
Safely remove USB memory
File manager

Done          Do Function
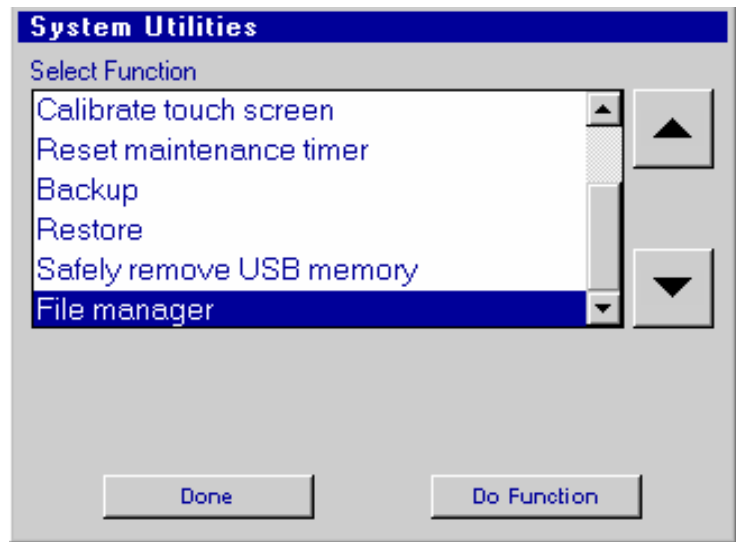
The following screen will appear. Navigation is performed by clicking the buttons on the right side of the screen. Edit functions are performed by clicking the buttons at the bottom of the screen.

| Name | Size | Date Modified |
|------|------|---------------|
| home | | Jan 01 06:00 |

Navigate up one folder

Open the current selection

Delete the current selection

Paste into the current open folder

Copy the current selection

Cut the current selection
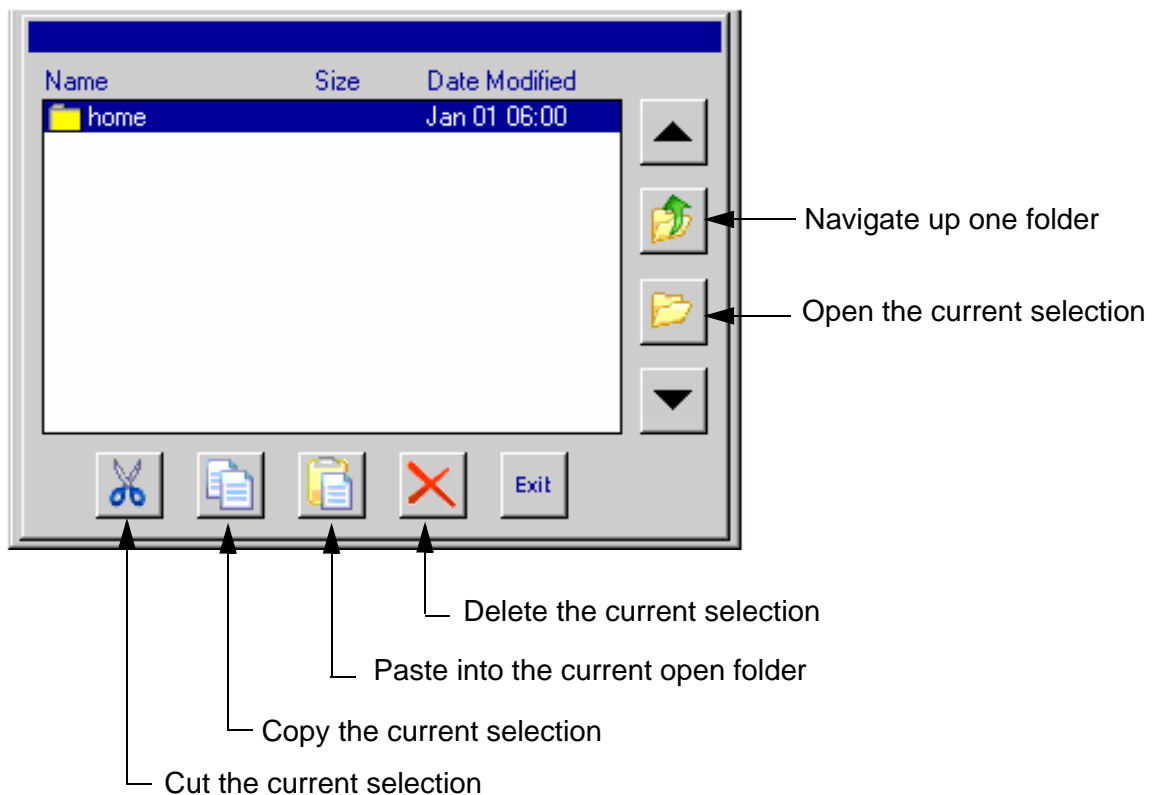
# Section 8: Troubleshooting

The IJ3000 Ink Jet System incorporates advanced designs, both in hardware and in software. However, if the system ever fails to perform properly, some built-in indicators will help in troubleshooting. This section will help minimize system downtime and explain some of the diagnostic features built into the system.

## Troubleshooting Notes

### Controller

Most controller problems will be the result of improperly connected cables. Check all connections, including power interface, print heads, encoder, and photosensor. (See *"Appendix B: Theory of Operation" on page 87* for detailed test points.)

## IJ/3000 Impulse Jet System Trouble-Shooting

| Top Level Problem | Possible Component Failure | Replacement Kit Part Number |
|---|---|---|
| IJ3000 Controller | 24VDC Power Supply | 5760-333 |
| | Touch Screen/Display Assembly, 5.7" | 5760-817 |
| | Touch Screen/Display Assembly, 10.4" | 5760-836 |
| | Keypad Assembly, IJ3000-LS & IJ3000-XLS | 5760-301 |
| | Keypad Assembly, IJ3000-ES | 5765-201 |
| | Impulse Jet Interface Board | 5760-332 |
| | CPU Board | 5760-303 |
| | CPU to Display PCB Cable, 30 Conductor | 5760-713 |
| | CPU to Display PCB Cable, 40 Conductor | 5760-746 |

### IJ/3000 Controller:

| System Symptom | Possible Cause | Operational Test Method |
|---|---|---|
| No Controller power, no Green LED indicator light on CPU, no voltage on CPU TP3 (5VDC normal) | Power Supply | Check Power Supply light indicator.<br><br>Check for 24V output for Impulse Jet, or 15V output for Integrated Valve.<br><br>Check connector between CPU & first Interface Board (CPU JP1 and Interface JR1). |
| Touch Screen not responding, difficult to select/pick boxes | Touch Screen/Display Assembly | Run system test and re-calibrate Touch Screen. |
| Display will not turn on | Touch Screen/Display Assembly | Check brightness level control.<br><br>Test for 12V on Inverter Board (GND to Vin). |
| No response from keypad entry | Keypad Assembly | Inspect flex cable for damage, particularly at end going into CPU connector. |
| System not printing | Interface Board | Test Interface Board Test Points (See *"Appendix B: Theory of Operation" on page 87* for Test Points). |
| System not responding | CPU Board | Check for Green LED to indicate power.<br><br>Check for Yellow LED. Flashing indicates CPU is operating. If CPU is not responding, reset by completing: **Cntrl/Alt/Del**. If system does not restart, complete hard reset by removing power for 10 seconds.<br><br>Test power at following points:<br><br>TP1 = Backlight Voltage Supply is 12V when controller is on, ∅V when controller is off.<br><br>TP2 = 5VDC<br><br>TP3 = 3.3VDC<br><br>TP4 = 1.8VDC |
| Touch Screen not responding | CPU to Display PCB Cable | Inspect CPU to Display Cable for nicks or abrasions. |

# Appendix A: System Specifications

## LS & XLS Controller

### Size

Height: 8.75" [222.3mm]

Width: 13.0" [330.2mm]

Depth: 15.5" [393.7mm]

Weight: 16.4 lbs (7.5kg)

Cable Clearance: 3" from the rear of the controller

### User Interface

Type: Graphical User Interface

Keyboard: 70-key, QWERTY style, elastomeric keyboard

10.4" Display: 640 x 480 color LCD with touch screen, 10.4" diagonal

5.7" Display: 320 x 240 color LCD with touch screen, 5.7" diagonal

### Fonts

Impulse Jet - Arial style: 5, 7, 9, 15, 24 and 32 dot, standard and bold for 96, 192, 224, 352 and WaxJet Heads. Arial style: 9, 15, 24, 30, 48, 63, 96, and 126 standard and bold for 384 and 768 Head.

Integrated Valve - 5-dot, 7-dot, 9-dot, 18-dot

### Storage

16 MB flash memory

### Print Speed

IV - Up to 650 fpm

IJ - Up to 200 fpm

### Maximum Field Length

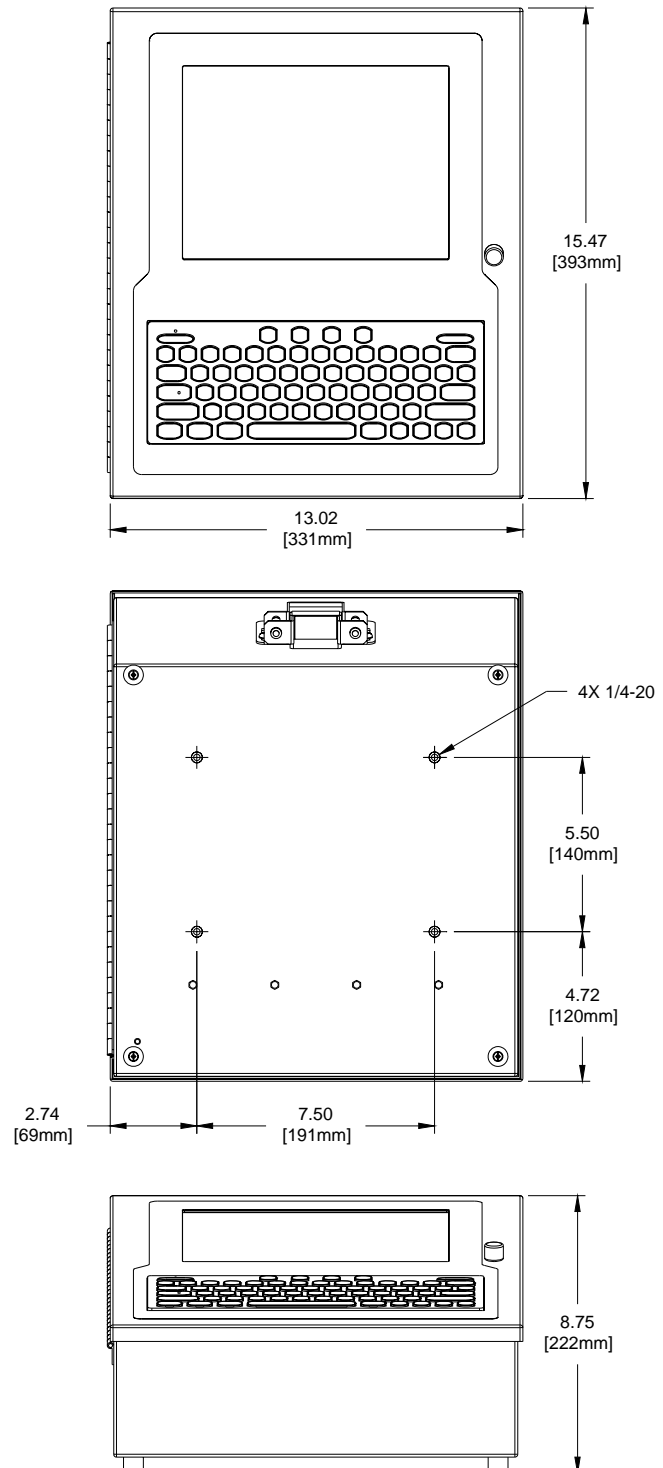Up to 256 characters long (81 inches for variable field)

### Maximum Product Length

200 inches

### Maximum Repeat Print Distance

200 inches

Dimensions for IJ3000-LS and IJ3000-XLS

**Print Heads per Integrated Valve Interface Board (LS)**

Eight (8) 9-Dot Heads

Four (4) 18-Dot Heads

**Print Heads per Impulse Jet Interface Board (XLS)**

One (1) 768 Head

Two (2) 384 Heads

Two (2) 224 Heads

One (1) WaxJet Head

**Encoder**

2400 ppr/300 ppi, TTL level, 5-26 VDC

**Product Sensor**

Impulse Jet - 24 VDC, current sinking, active low

Integrated Valve - 15 VDC, current sinking, active low

**Ports**

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

**Enclosure**

Stainless steel sealed industrial enclosure

**Print Performance**

Impulse Jet - Up to 10 lines of print at 200 fpm (See *"Appendix D: Performance Parameters" on page 99.*)

Integrated Valve - Up to 28 lines of print at 650 fpm (See *"Appendix D: Performance Parameters" on page 99.*)

**Electrical**

90-260 VAC, 50/60 Hz, 3.0A max. (power supply input)

Impulse Jet - 24 VDC, 5.0A per interface card (controller input)

Integrated Valve - 15VDC, 4.6A per interface card (controller input)

**Environment**

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

Operating humidity: 10 - 90%, non-condensing

**Maximum Distance Between Print Head and Controller**

100 feet

**Bar Codes Supported** (Specific to Impulse Jet)

I 2 of 5

SCC-14 / I 2 of 5

EAN

Code 39

Code 128

UPC

## ES Controller

### Size

Height: 10.5" [266.7mm]

Width: 9.64" [244.9mm]

Depth: 2.89" [73.4mm]

Weight: 6.6 lbs (3.0kg)

### User Interface

Type: Graphical User Interface

Keyboard: 70-key, QWERTY style, elastomeric keyboard

5.7" Display: 320 x 240 color LCD with touch screen, 5.7" diagonal

### Fonts

Impulse Jet - Arial style: 5, 7, 9, 15, 24 and 32 dot, standard and bold for 224 and WaxJet Heads. Arial style: 9, 15, 24, 30, 48, 63, 96, and 126 standard and bold for 384 Heads.

Integrated Valve - 5-dot, 7-dot, 9-dot, 18-dot

### Storage

16 MB flash memory

### Print Speed

IV - Up to 650 fpm

IJ - Up to 200 fpm

### Maximum Field Length

Up to 256 characters long (81 inches for variable field)

### Maximum Product Length

200 inches

### Maximum Repeat Print Distance

200 inches

### Print Heads per Integrated Valve Interface Board

Eight (8) 9-Dot Heads
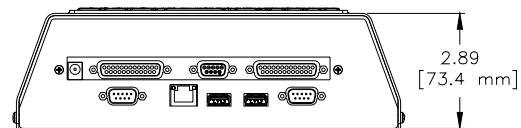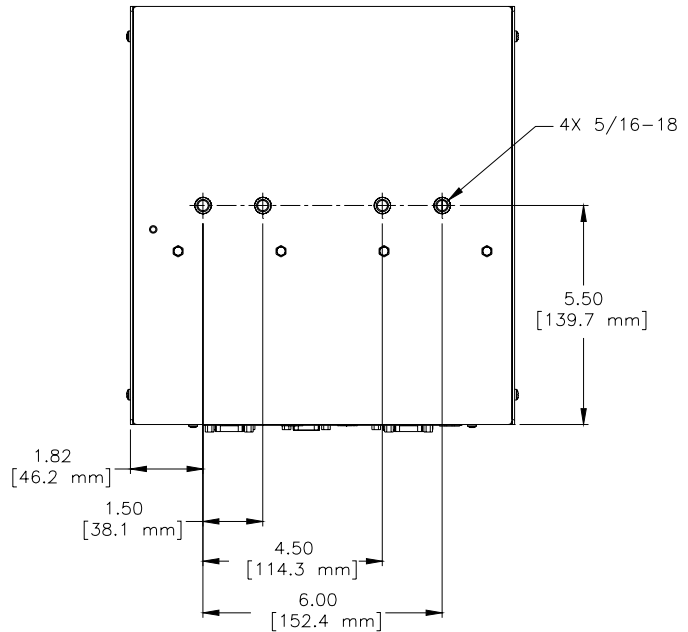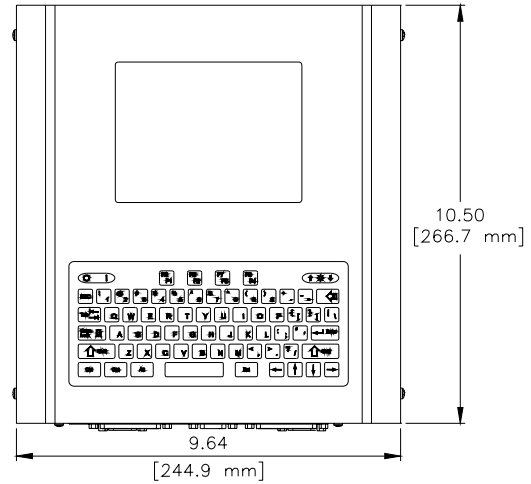
Four (4)18-Dot Heads

### Print Heads per Impulse Jet Interface Board

Two (2) 384 Heads

Two (2) 224 Heads

One (1) WaxJet Head



10.50
[266.7 mm]

9.64
[244.9 mm]

4X 5/16-18

5.50
[139.7 mm]

1.82
[46.2 mm]

1.50
[38.1 mm]

4.50
[114.3 mm]

6.00
[152.4 mm]

2.89
[73.4 mm]

**Encoder**

2400 ppr/300 ppi, TTL level, 5-26 VDC

**Product Sensor**

Impulse Jet - 24 VDC, current sinking, active low

Integrated Valve - 15 VDC, current sinking, active low

**Ports**

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

**Enclosure**

Powder-coat painted industrial enclosure

**Print Performance**

Impulse Jet - Up to 10 lines of print at 200 fpm (See *"Appendix D: Performance Parameters" on page 99.*)

Integrated Valve - Up to 28 lines of print at 650 fpm (See *"Appendix D: Performance Parameters" on page 99.*)

**Electrical**

90-260 VAC, 50/60 Hz, 3.0A max. (power supply input)

Impulse Jet - 24 VDC, 5.0A (controller input)

Integrated Valve - 15VDC, 4.6A (controller input)

**Environment**

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

Operating humidity: 10 - 90%, non-condensing

**Maximum Distance Between Print Head and Controller**

100 feet for an Impulse Jet System

35 feet for an Integrated Valve System using a P.I.C. IDS

100 feet for an Integrated Valve System using an IDS3000

**Bar Codes Supported** (Specific to Impulse Jet)

I 2 of 5

SCC-14 / I 2 of 5

EAN

Code 39

Code 128

UPC

# Appendix B: Theory of Operation

## Functional Description

The IJ3000 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. The conveyor speed is monitored using a variable speed encoder or a built-in fixed speed encoder. Products are detected using a photosensor. The information to be printed is defined as a message and is programmed into the controller via a user interface.

## Controller Features

The IJ3000 Controller has a graphical user interface consisting of a color LCD, touch screen, and 70-key QWERTY keypad. Also housed in the controller are a CPU Board, one or two Print Head Interface Boards and a Display Interface Board.
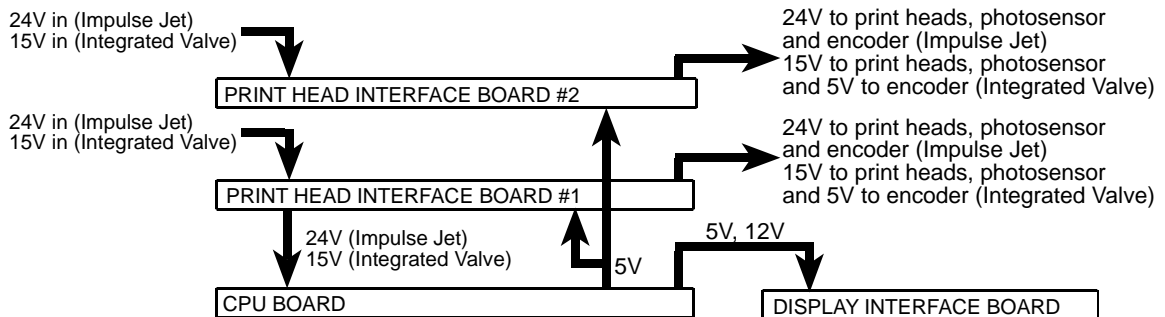
## Power

One or two 24VDC (Impulse Jet) or 15VDC (Integrated Valve) desktop power supplies provide power to the IJ3000 and all of its attachments. Power enters the IJ3000 through J5 (IJ) or J3 (IV) on the Print Head Interface Board(s). A system with a single interface board has one power supply; two interface boards require two power supplies.

On each Print Head Interface Board, 24V (IJ) or 15V (IV) is routed to the photosensor connector (P2) and the print head connector (P1) through normally energized relay K1. On Impulse Jet systems, an under voltage detection circuit de-energizes K1 and removes power from the print heads and photosensor if the voltage is less than 18V. On Integrated Valve systems, an over voltage circuit de-energizes K1 and removes power from the print heads and photosensor if the voltage exceeds 18V.

**Battery Backup** - A 3V battery on the CPU Board (BT1) maintains the contents of system SRAM and keeps the real time clock running during power outages or when the IJ3000 is not plugged into a power outlet.

**Power Distribution** - Refer to the illustration below. 24V (IJ) or 15V (IV) from the first Print Head Interface Board only (the one immediately above the CPU Board) is routed to the CPU Board, where it is stepped down to the 12VDC and 5VDC used to power the rest of the system. 12V goes to the Display Interface Board where it powers the backlight inverter, and 5V is distributed throughout the CPU Board, to the Display Interface Board, and to the Print Head Interface Board(s).



IJ3000 POWER DISTRIBUTION

Please note that power is applied to the IJ3000 even when it is "turned off." When turned off using the OFF button on the keyboard, the IJ3000 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.

## CPU Board

The CPU Board has a microcontroller, flash, SDRAM and SRAM memory, a touch screen controller, a real time clock/calendar, an Ethernet port, two USB 2.0 ports, two serial ports, 12V, 5V, 3.3V and 1.8V regulators, a 3V battery, PC/104 connectors and connectors for attaching the system display and keyboard assemblies.

The microcontroller (U20) is the IJ3000's central processing unit (CPU). It executes the system program from flash (U16, U18) and SDRAM (U15, U17). The CPU also directly controls the keyboard, detecting and processing key closures. The CPU's on-board LCD controller reads display data from the display memory (part of the SDRAM), formats it and sends it to the LCD with all necessary control signals. Display data is written into the display memory by the CPU.

The touch screen controller (U27) senses when the screen is touched, and sends screen coordinate data to the CPU for processing.

The real time clock/calendar (U21) keeps system time.

The 3V battery (BT1) preserves system data and keeps the clock running during power outages or when the IJ3000 is not plugged into a power outlet.
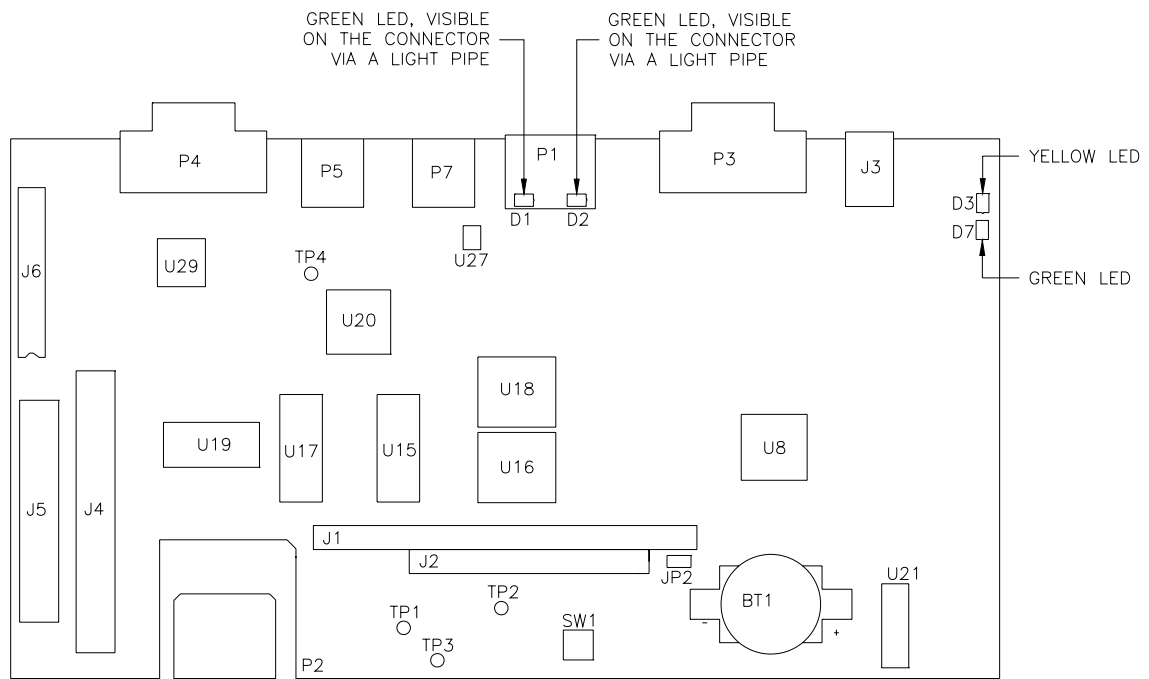


Test Points:    TP1:    12VDC, power for display backlight. Turns on/off with soft power switch.

                     TP2:    5VDC, power for 5V logic. Also supplies the input voltage to the 3.3V regulator.

                     TP3:    3.3VDC, power for 3.3V logic. Also supplies the input voltage to the 1.8V regulator.

                     TP4:    1.8VDC, power for the CPU core.

LEDs:            D1:    Ethernet connector, Green. Flashes to indicate network traffic.

                     D2:    Ethernet connector, Green. Indicates valid network connection.

                     D3:    Yellow, flashes when the CPU is running.

                     D7:    Green, indicates 3.3V is present.

## Impulse Jet Print Head Interface Board

The Impulse Jet Print Head Interface Board controls the print head daisy chain, and it is the power entry point for the print heads and the rest of the system (See the previous section: *"Power" on page 87*.) The Print Head Interface Board also contains the photosensor, external encoder, and CIDS connections.

The daisy chain controller is made up of an FPGA (U6) and print image RAM (U4). The print image is written to image RAM by the CPU board, and circuitry on the FPGA reads the print image and shifts it out to the print heads. The generation and timing of all daisy chain signals - DATA, CLOCK and LATCH - take place in the FPGA in response to signals from the photosensor and encoder.
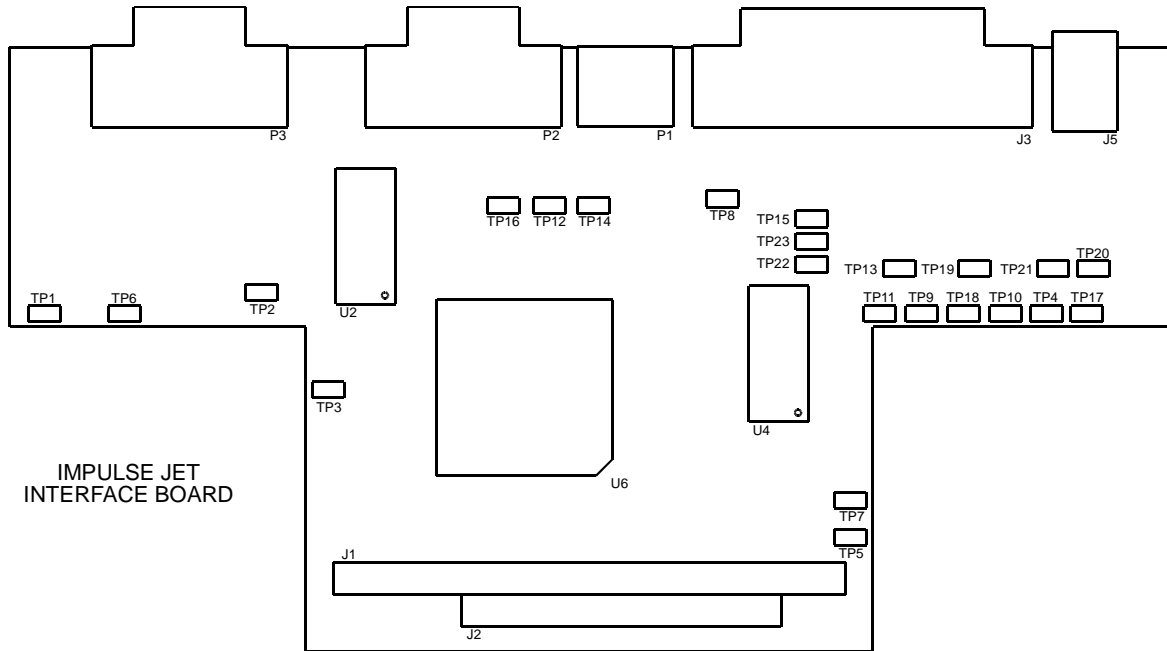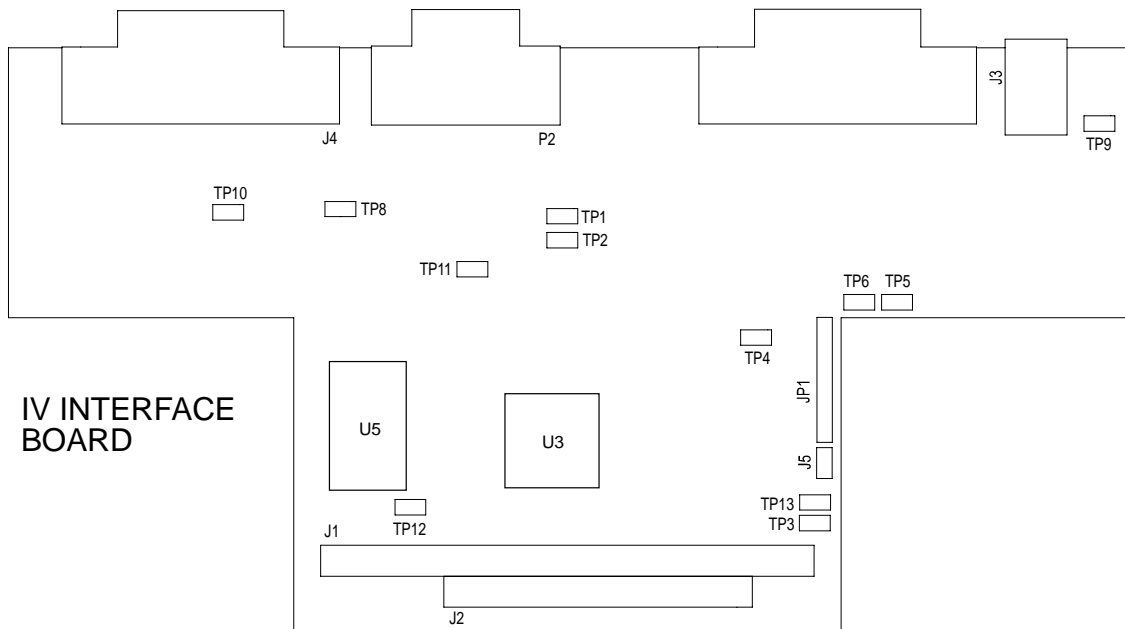


Test Points:    TP1:    5VDC.
                TP2:    3.3VDC.
                TP3:    2.5VDC.
                TP4:    GND.
                TP5:    (FPGA) PROGRAM; pulses low to initiate FPGA programming.
                TP6:    (FPGA) INIT; goes LOW to indicate an FPGA programming error.
           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

## Integrated Valve Print Head Interface Board

The IV Print Head Interface Board controls the print head daisy chain, and it is the power entry point for the print heads and the rest of the system (See the previous section: *"Power" on page 87*.) The Print Head Interface Board also contains the photosensor and external encoder connectors.

The daisy chain controller is made up of an FPGA (U3) and print image RAM (U5). The print image is written to image RAM by the CPU board, and circuitry on the FPGA reads the print image and shifts it out to the print heads. The generation and timing of all daisy chain signals - DATA, CLOCK and LATCH - take place in the FPGA in response to signals from the photosensor and encoder.



Test Points:      TP1:      5VDC

                          TP2:      3.3VDC

                          TP3:      (FPGA) DONE. LOW when the FPGA is being programmed. High when FPGA programming is complete.

                          TP4:      Print head CLOCK signal

                          TP5:      Print head DATA signal

                          TP6:      Print head LATCH signal

                          TP8:      PHOTOSENSOR signal

                          TP9:      DC power in (15V)

                          TP10:      External ENCODER signal

                          TP11:      GND

                          TP12:      (FPGA) INIT; goes LOW to indicate an FPGA programming error.

                          TP13:      (FPGA) PROGRAM; pulses low to initiate FPGA programming.
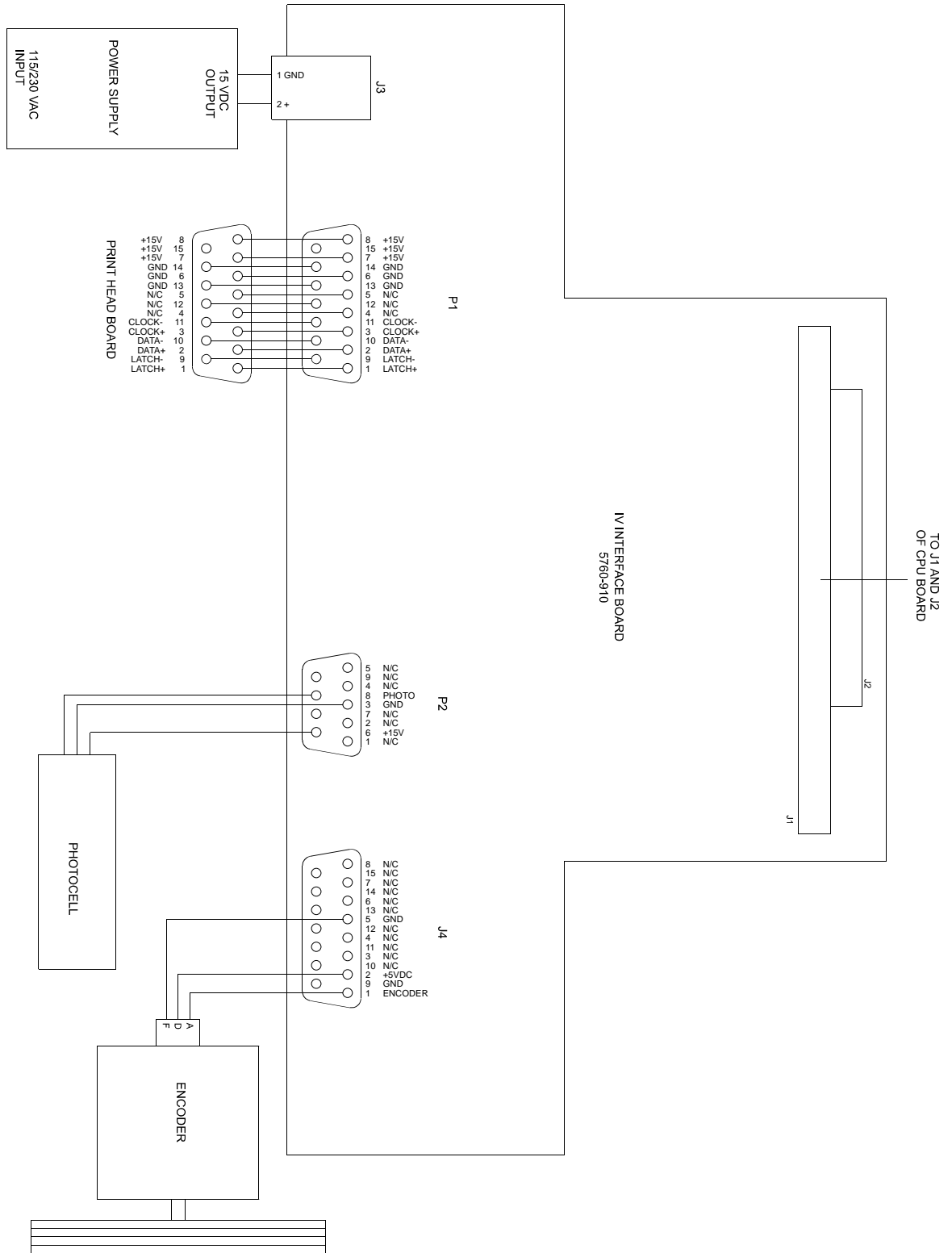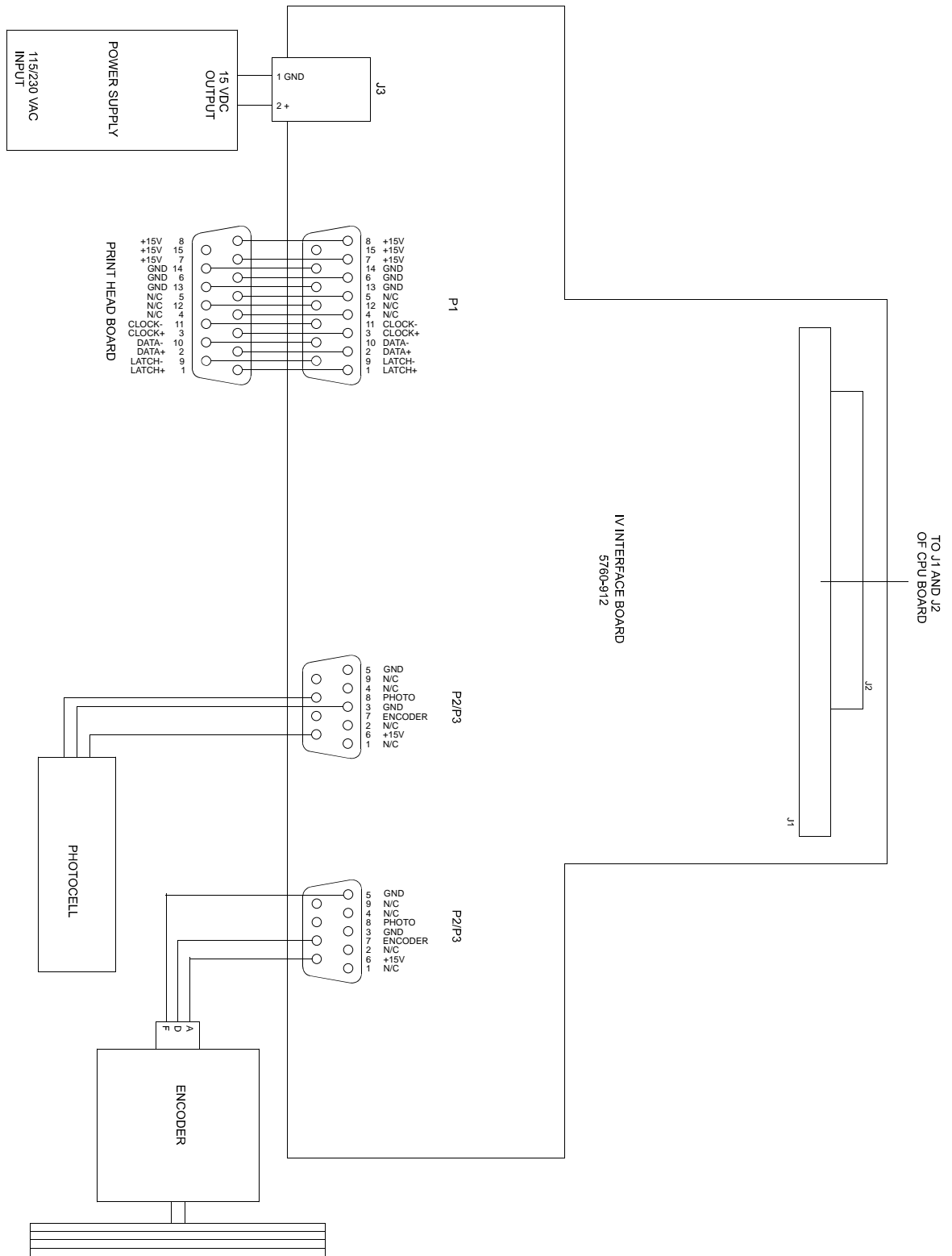
# Interconnect Diagrams

## IJ3000 Controller CPU Diagram
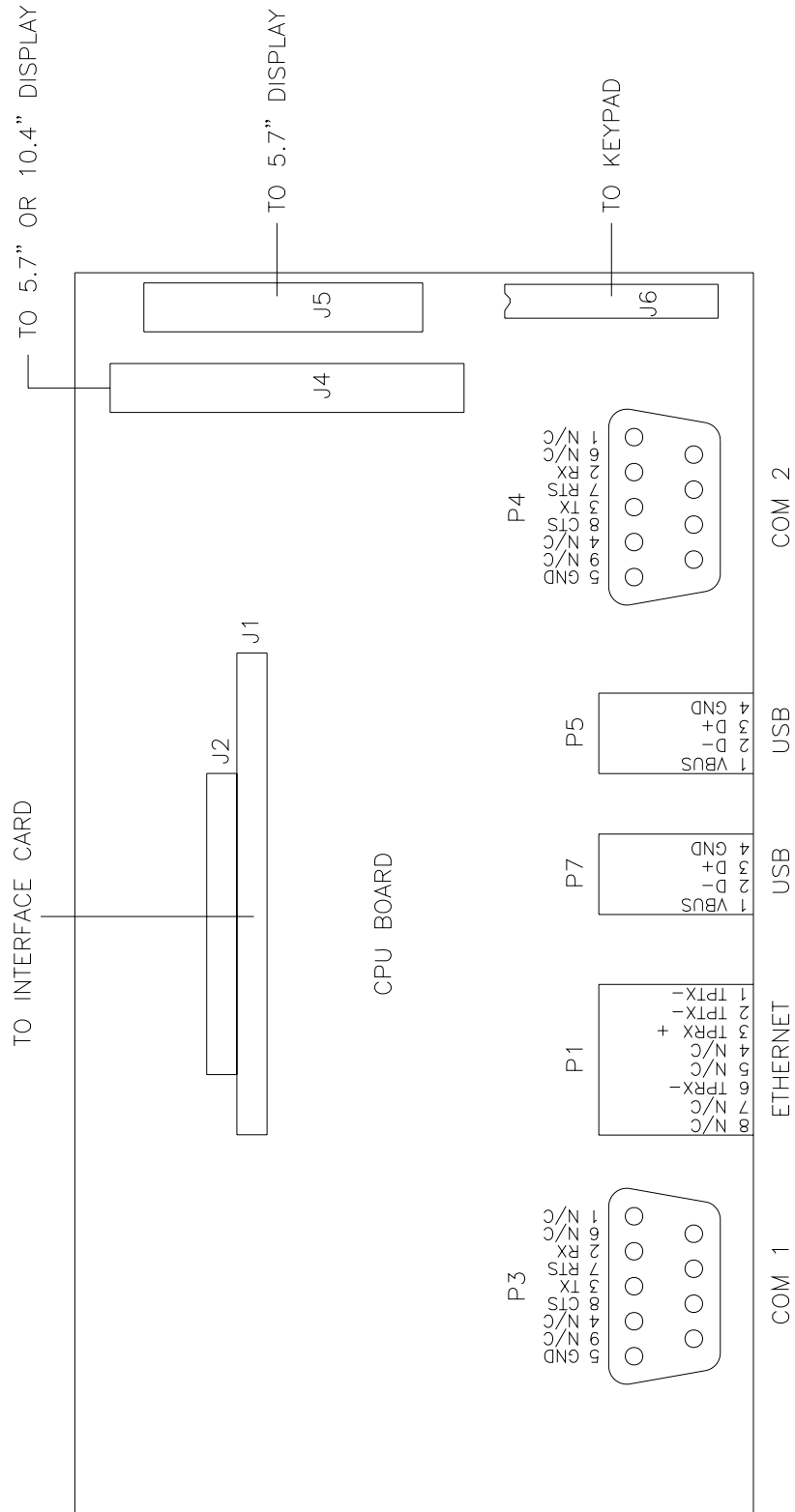
## Impulse Jet Controller Interface Board Diagram
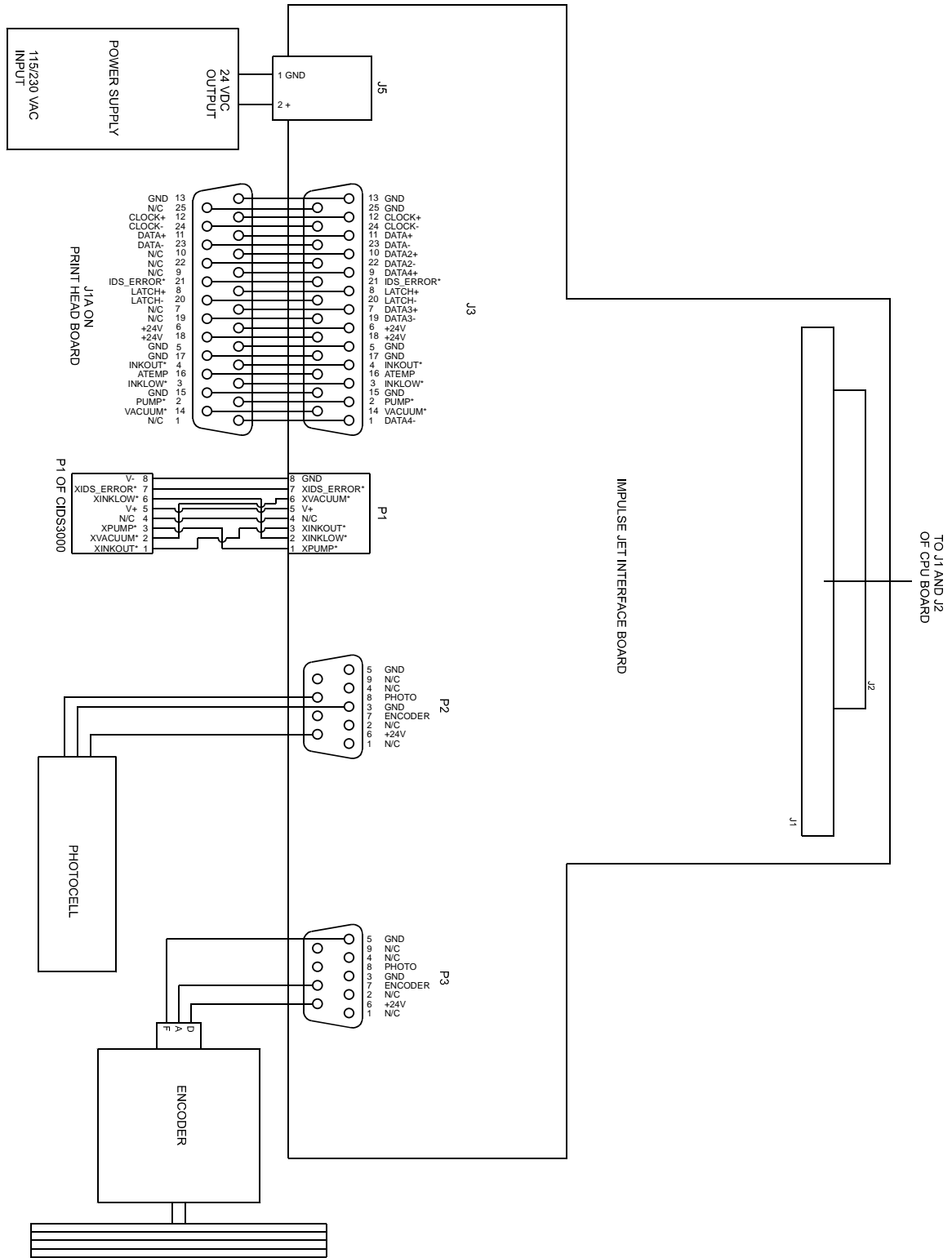
## Integrated Valve Controller Interface Board Diagram (5760-910)

## Integrated Valve Controller Interface Board Diagram (5760-912)

POWER SUPPLY

115/230 VAC INPUT

15 VDC OUTPUT

1 GND

2 +

J3

PRINT HEAD BOARD

| | |
|---|---|
| +15V | 8 |
| +15V | 15 |
| +15V | 7 |
| GND | 14 |
| GND | 6 |
| GND | 13 |
| N/C | 5 |
| N/C | 12 |
| N/C | 4 |
| CLOCK- | 11 |
| CLOCK+ | 3 |
| DATA- | 10 |
| DATA+ | 2 |
| LATCH- | 9 |
| LATCH+ | 1 |

| | |
|---|---|
| 8 | +15V |
| 15 | +15V |
| 7 | +15V |
| 14 | GND |
| 6 | GND |
| 13 | GND |
| 5 | N/C |
| 12 | N/C |
| 4 | N/C |
| 11 | CLOCK- |
| 3 | CLOCK+ |
| 10 | DATA- |
| 2 | DATA+ |
| 9 | LATCH- |
| 1 | LATCH+ |

P1

IV INTERFACE BOARD
5760-912

TO J1 AND J2
OF CPU BOARD

J2

J1

P2/P3

| 5 | GND |
|---|---|
| 9 | N/C |
| 4 | N/C |
| 8 | PHOTO |
| 3 | GND |
| 7 | ENCODER |
| 2 | N/C |
| 6 | +15V |
| 1 | N/C |

P2/P3

| 5 | GND |
|---|---|
| 9 | N/C |
| 4 | N/C |
| 8 | PHOTO |
| 3 | GND |
| 7 | ENCODER |
| 2 | N/C |
| 6 | +15V |
| 1 | N/C |

PHOTOCELL

ENCODER

A
D
F

# Appendix C: Parts and Supplies

## Controller Battery

Type: CR2032, 3V (Diagraph part number 5760-122; also available at department and electronics stores).

⚠ **CAUTION**: There is the danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

⚠ **ATTENTION:** Il y a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

### Replacing the Battery

1. Go to the **Home Screen**.
2. Cancel any currently printing messages; save the product counts, if applicable.
3. Remove power from the controller by unplugging the power supply from all print head interface boards.
4. Remove and replace the battery on the CPU board.
5. Reapply power to the print head interface boards and wait for the Home Screen to become visible. If the Home Screen does not appear after a few minutes, press the **ON** button on the keyboard.
6. Recalibrate the touch screen.

    a. If, after the Home Screen is displayed, a dialog box appears that says preventive maintenance is overdue, press the **Enter** key on the keyboard. DO NOT touch the **OK** button on the dialog box.

    b. Press the spacebar on the keyboard to display the Home Screen buttons.

    c. Press the 'T' key on the keyboard to display the Touch Screen Calibration Screen.

    **Reminder**

    ❗ Preventive maintenance is more than 2000 hours overdue.

    [ OK ]

7. Set the time and date.
8. Restore system defaults.
9. Repeat Step 6.
10. Reset the total product counts.
11. Reset the Preventive Maintenance Timer.
12. Reload the message, if any, that was printing before the battery was replaced.
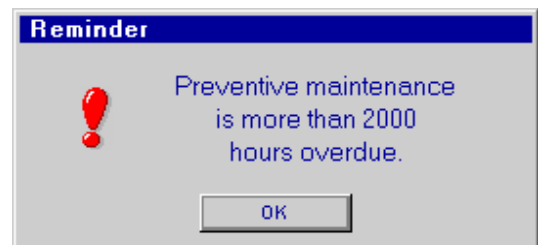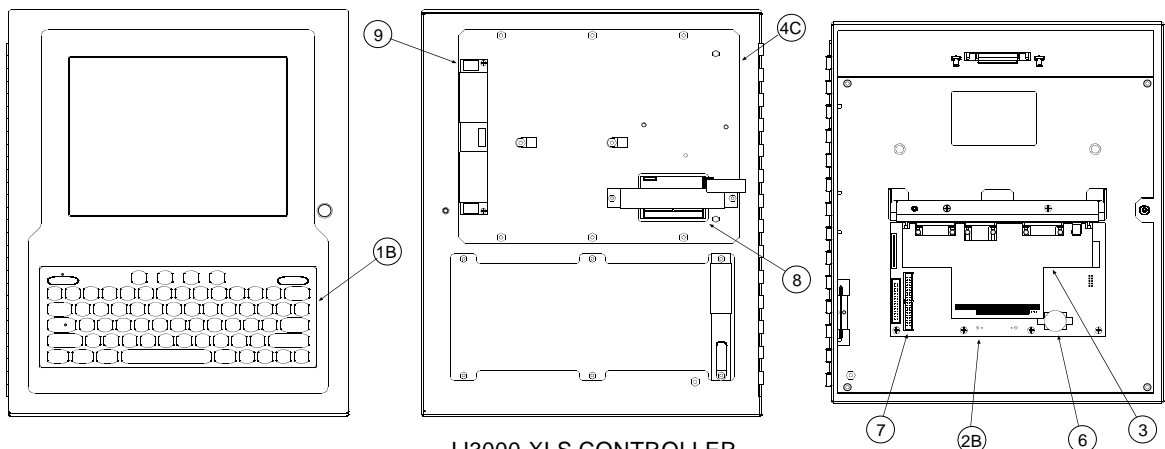
# Controller Assembly Kits
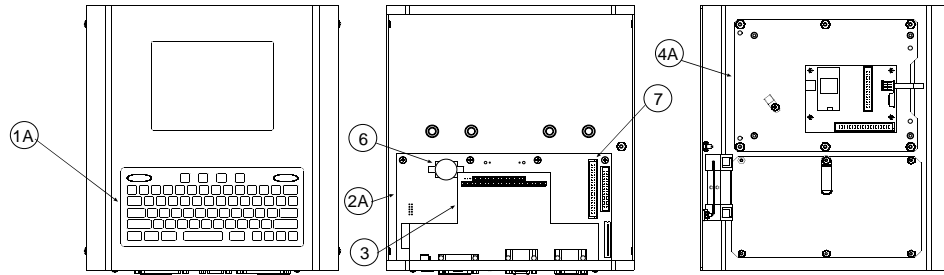
IJ3000-ES CONTROLLER
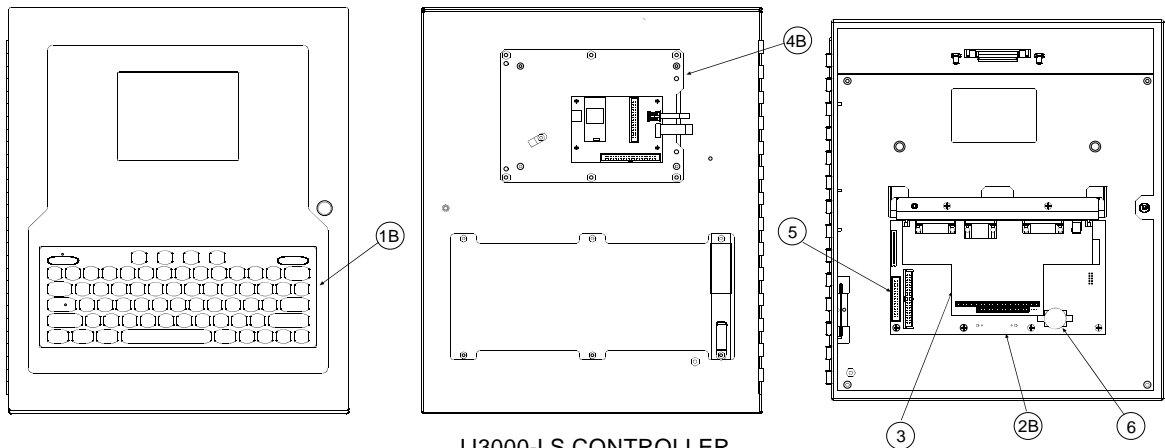
IJ3000-LS CONTROLLER

IJ3000-XLS CONTROLLER

| ITEM | PART NO. | DESCRIPTION |
|---|---|---|
| 1A | 5765-201 | Keypad Replacement Kit, IJ3000-ES |
| 1B | 5760-301 | Keypad Replacement Kit, IJ3000-LS & IJ3000-XLS |
| 2A | 5765-202 | CPU PCB Replacement Kit, IJ3000-ES |
| 2B | 5760-303 | CPU PCB Replacement Kit, IJ3000-LS & IJ3000-XLS |
| 3 | 5760-332 | Impulse Jet Interface Board Replacement Kit |
| | 5760-304 | Integrated Valve Interface Board Replacement Kit |
| 4A | 5765-205 | Display Replacement Kit, 5.7", IJ3000-ES |
| 4B | 5760-817 | Display Replacement Kit, 5.7", IJ3000-LS |
| 4C | 5760-836 | Display Replacement Kit, 10.4", IJ3000-XLS |
| 5 | 5760-713 | Cable, Display to CPU PCB, 30 Conductor |
| 6 | 5760-122 | CPU Battery (Type: CR2032) |
| 7 | 5760-746 | Cable, Display to CPU PCB, 40 Conductor |
| 8 | 5760-903 | IJ3000 XLS Display Connector Board |
| 9 | 2465-127 | Back Light Inverter, 10.4" Display |
| (not shown) | 5760-302 | 15 VDC Power Supply Kit, Integrated Valve |
| (not shown) | 5760-333 | 24 VDC Power Supply Kit, Impulse Jet |
| (not shown) | 5760-745 | Cable, Connector Board to Back Light Inverter, XLS |

# Appendix D: Performance Parameters

## Performance Parameters of an Impulse Jet Controller

The performance of an Impulse Jet Controller is limited by the DPI setting and the sum of the maximum field stacks on each side of a message. The maximum field stack for a side is defined as the maximum number of vertically aligned fields. In the following example, Task1:Side1 has a maximum field stack of three fields and Task1:Side2 has a maximum field stack of two fields. Thus, the sum of the maximum field stacks for Task1 is five fields.

(Task1:Side1) + (Task1:Side2) = 3 + 2 = 5 fields
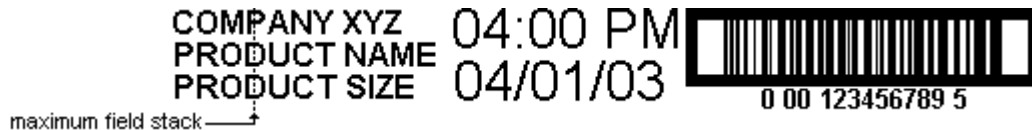


**Task1:Side1**



**Task1:Side2**

If Task1 and Task2 are printing this same message, the sum of the maximum field stacks of Task1 and Task2 is ten fields. Thus, the maximum field stack the controller has to process is ten fields.

(Task1) + (Task2) = 5 + 5 = 10 fields

The following table can be used to determine the maximum line speed of a controller given a maximum field stack and dpi.

| Maximum Field Stack of Controller | Max. Line Speed @ 100 dpi (ft/min) | Max. Line Speed @ 150 dpi (ft/min) | Max. Line Speed @ 200 dpi (ft/min) |
|---|---|---|---|
| 10 or less | 400 | 267 | 200 |
| 11 | 363 | 242 | 181 |
| 12 | 333 | 222 | 166 |
| 13 | 307 | 205 | 153 |
| 14 | 285 | 190 | 142 |
| 15 | 166 | 177 | 133 |
| 16 | 250 | 166 | 125 |
| 17 | 235 | 156 | 117 |
| 18 | 222 | 148 | 111 |
| 19 | 210 | 140 | 105 |
| 20 | 200 | 133 | 100 |

The **absolute** maximum line speed for an IJ768 print head on a Task is 200 ft/min.

The **absolute** maximum line speed for one, two, or three Impulse Jet print heads on a Task is 400 ft/min, 300 ft/min, and 200 ft/min, respectively.

The Impulse Jet Print Head operational through-put (the maximum print speed) is determined by the density and resolution of the printed message. The print density is defined as the amount of printed dots in a given area, with a solid black image having a density of 100%. The higher the density, the higher the ink flow demand is in the print head. A typical alpha-numeric message has a print density of about 20%, while a 100% magnification I- 2 of 5 bar code, has a print density of about 40%. A full-scale logo with a heavy background can have a density of up to 70%. The following tables identify the image rate versus print speed for various densities. The data shown is based on a 6" message printing at 200 dpi horizontal resolution.

| Line Speed (fpm) | 20% - 40% Density # of Images per Sec. | Above 70% Density # of Images per Sec. |
|---|---|---|
| 50 | 2 | 2 |
| 100 | 2 | 2 |
| 150 | 2 | 1 |
| 200 | 2 | 1 |

# Performance Parameters of an Integrated Valve Controller

The maximum line speed of an Integrated Valve Print Head is limited by the maximum frequency of the solenoid, which is 1000 Hz. The following steps will determine the operating frequency of the solenoids in the application. The graph on the following page can also be used to determine the maximum print resolution for a given line speed.

1. Determine the values for:

- Line speed in feet per minute: If a tachometer is not available, the line speed can be estimated by measuring the conveyor belt and using a stop watch to time one complete revolution of the belt. For example, a 20-foot, 7-inch conveyor belt takes 34 seconds to make a complete revolution. Divide 60 seconds by the number of seconds per revolution (34 in this case). Multiply the resulting number by the length of the belt (21 feet in this example; always round up to the next foot for this calculation). The answer is 37 feet per minute (60/34 x 21 = 37).

- Print resolution in dots per inch (dpi): Print resolution is selected through the software. This setting is measured in dots per inch; a setting of 4 denotes 4 dots, or print columns, per inch. Resolution can be set from 4 to 25 dpi.

2. The operating frequency of the solenoids can be determined with these two parameters by following the next two steps:

- Determine the line speed in inches per second. Divide the line speed in feet per minute by 5 to get inches per second. A line speed of 200 feet per minute is equal to 40 inches per second (200/5 = 40).

- Multiply the number of inches per second by the dpi setting to determine the solenoid operating frequency in Hz (cycles per second).   Printing at 25 dpi, at a line speed of 40 inches per second, would result in a frequency of 1000 Hz (40 x 25 = 1000).

The operating frequency of an Integrated Valve Print Head must be less than or equal to 1000 Hz. If it exceeds 1000 Hz, the print head will have reliability and print quality problems. In such a case, the best solution is to decrease the print resolution, which will decrease the operating frequency.

To determine the maximum print resolution for a given conveyor, divide 1000 by the conveyor speed in inches per second. Using the previous example, 1000 divided by 40 inches per second equals 25 dpi maximum print resolution. Even if a higher resolution is desired, the Integrated Valve Print Head is not capable of it without encountering performance and reliability problems.

Maximum Print Resolution for a Given Line Speed
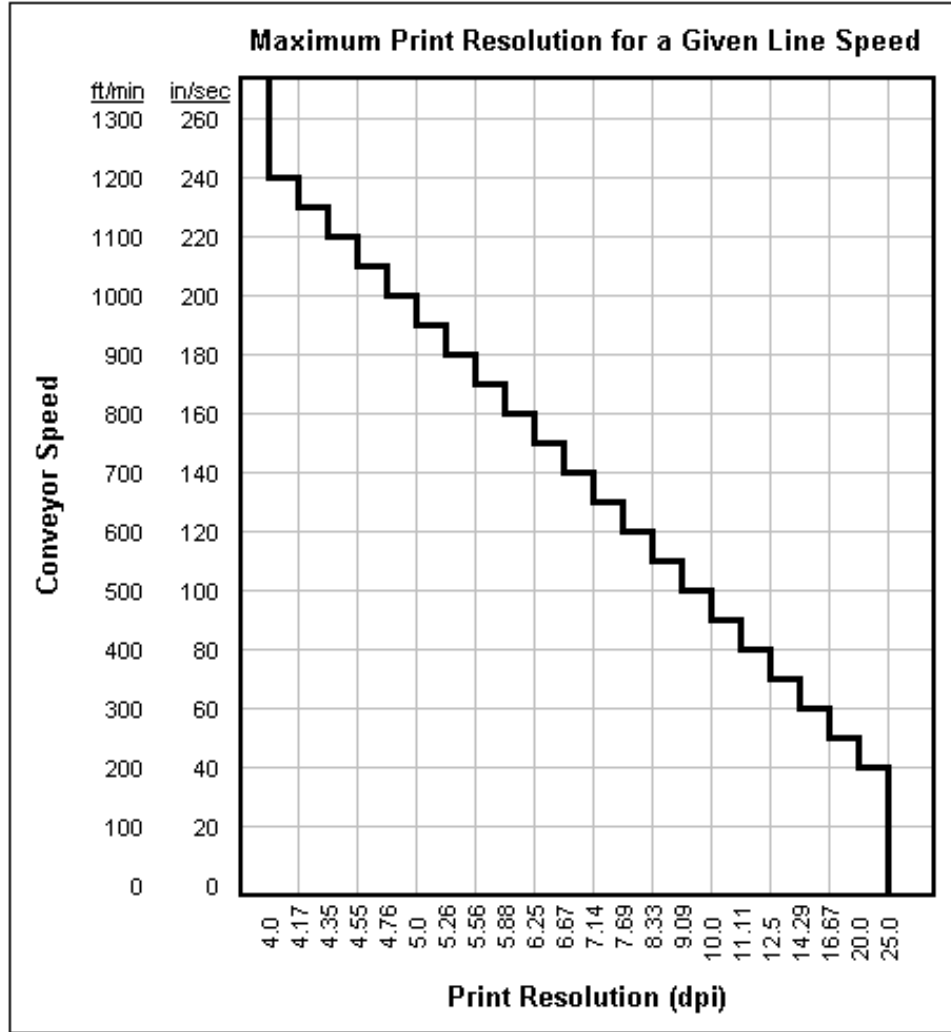
# Appendix E: File Backup and Restore

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 IJ3000 Controller is already connected, via Ethernet, to a PC. If not, please refer to *"Appendix I: Configuring a PC to Communicate with the IJ3000" on page 117.*

1. Obtain the IJ3000 Controller's IP address. Most IJ3000 controllers have an IP address of **10.1.2.3**. It may be different if the controller is networked with other IJ3000s 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 IJ3000'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:
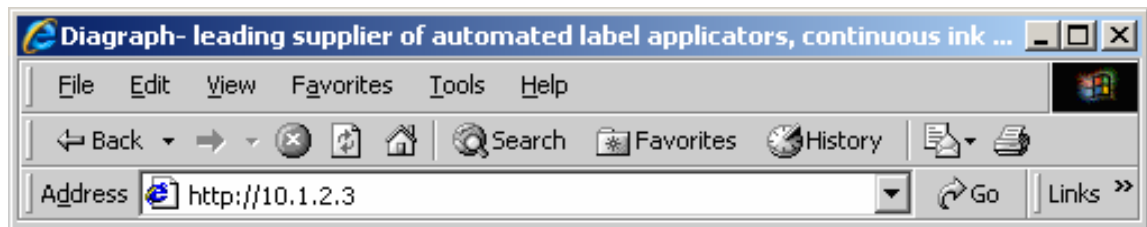
4.  Press **Enter**. The web page shown below should appear.
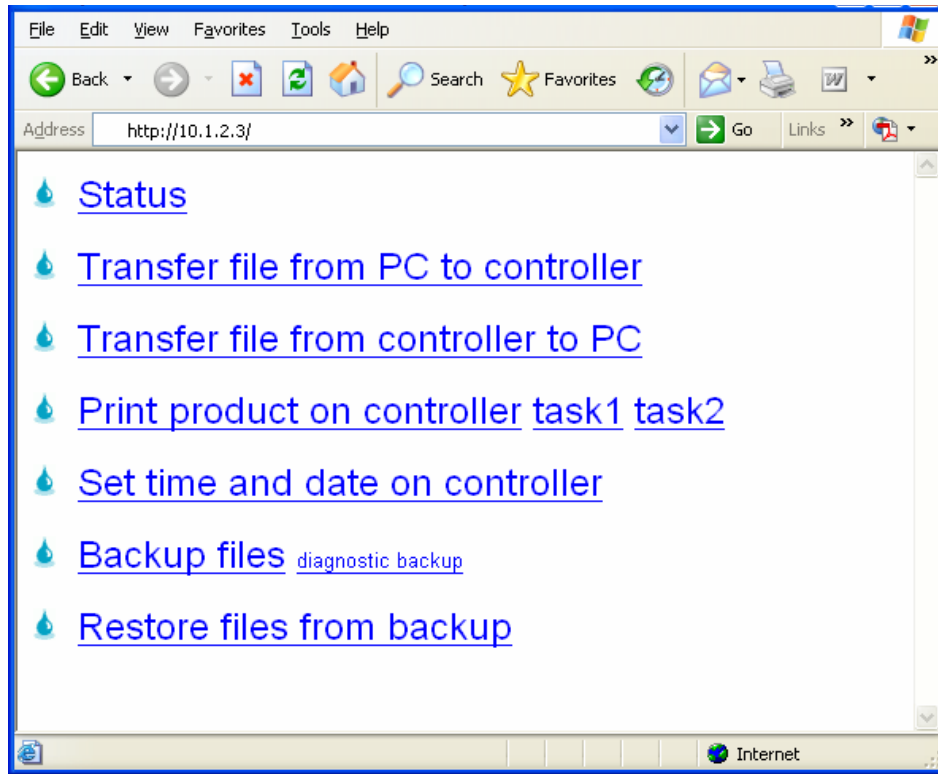
## File Backup

To backup the system files, click the **Backup files** link. The dialog box shown at right (or a similar dialog box) will appear.
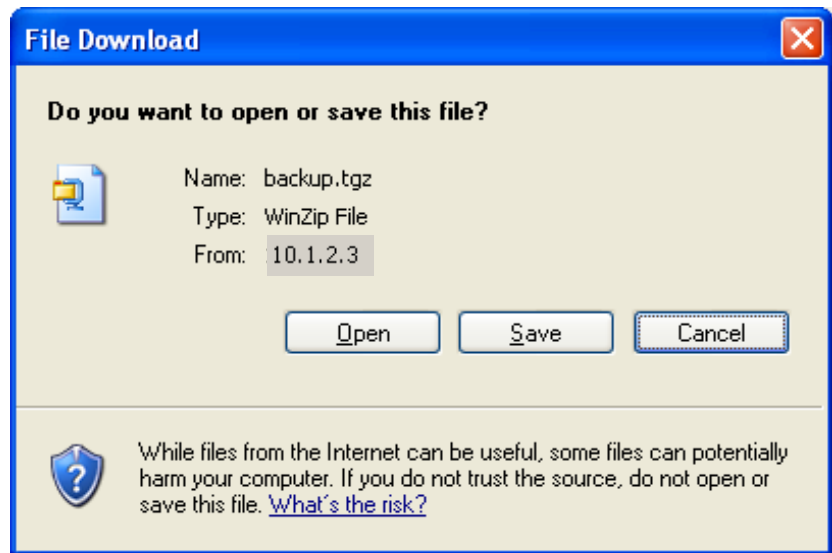
Click the **Save** button. A **Save As** dialog appears.
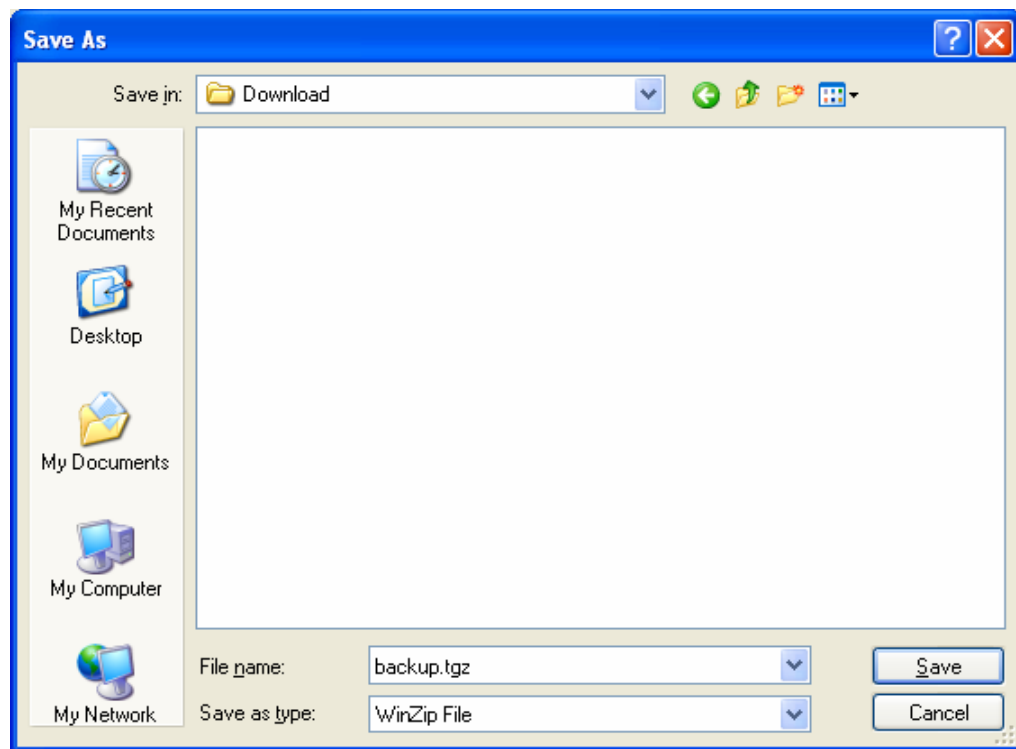
The IJ3000 files backed up are compressed and put into a single file, and are given the default name and file extension **backup.tgz**. Following normal Windows® conventions, the backup file may be renamed and given any extension, and saved in any folder desired. To save the backup file with an extension 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.
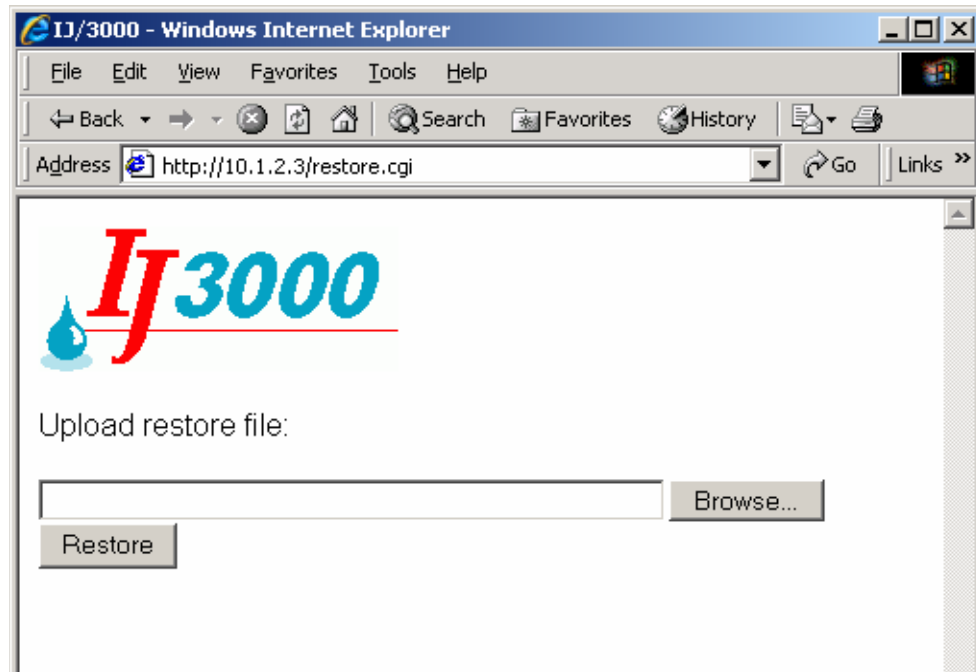


Click the **Browse...** button to locate and select the backup file to be sent to the controller.

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.
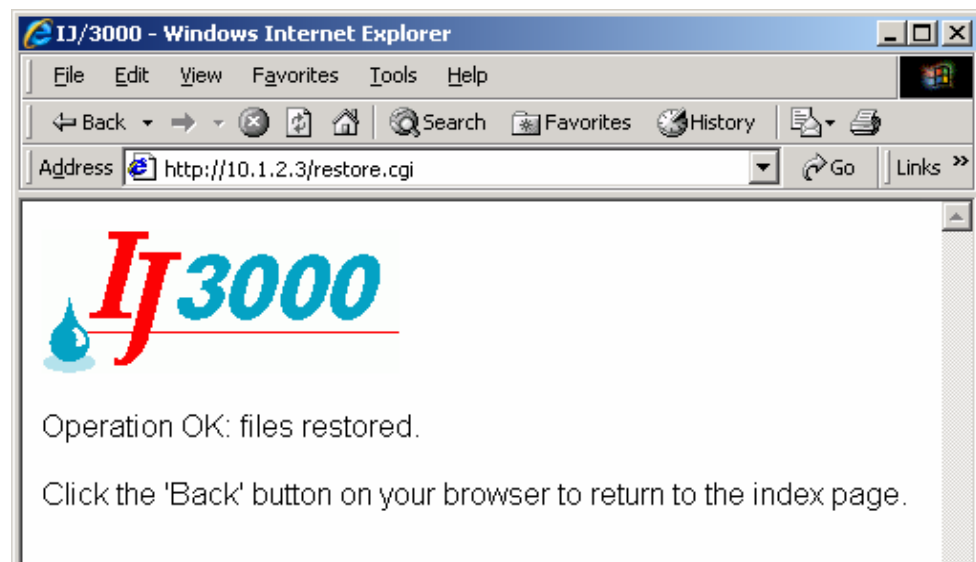
# Appendix F: Creating Logo Files

## Creating a Logo

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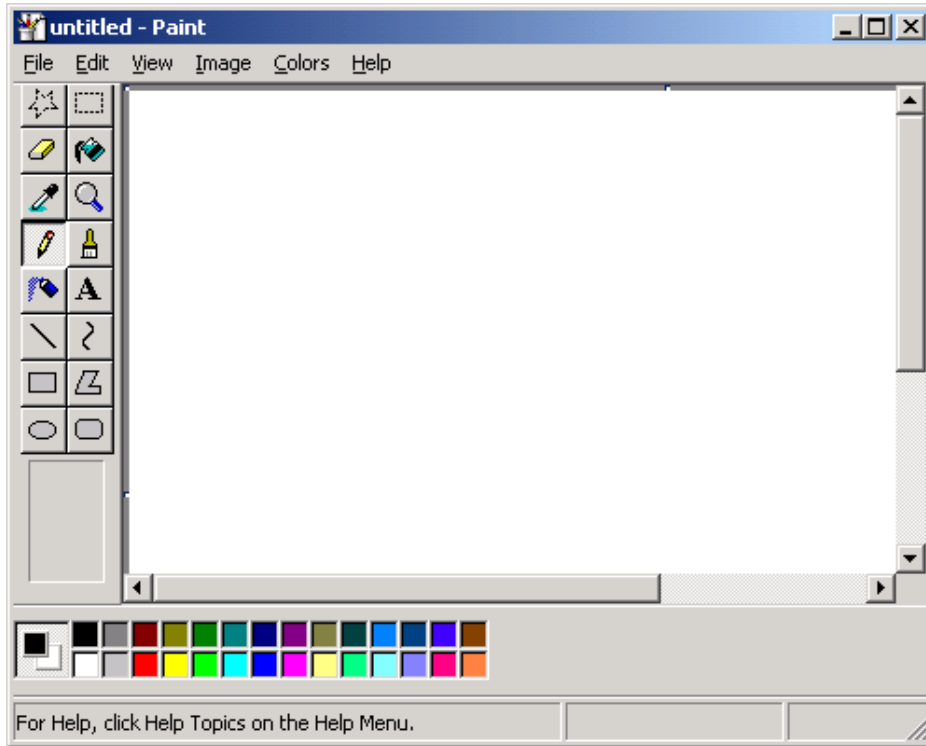


Bring up the **Attributes** dialog box by selecting **Image** and then **Attributes**.
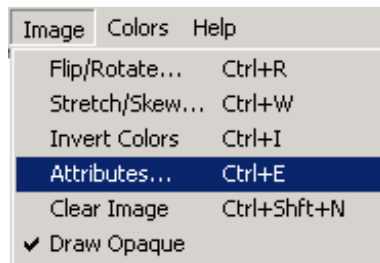
Enter the **Width** and **Height** of the logo in **Pixels**, then select **Black and white**.
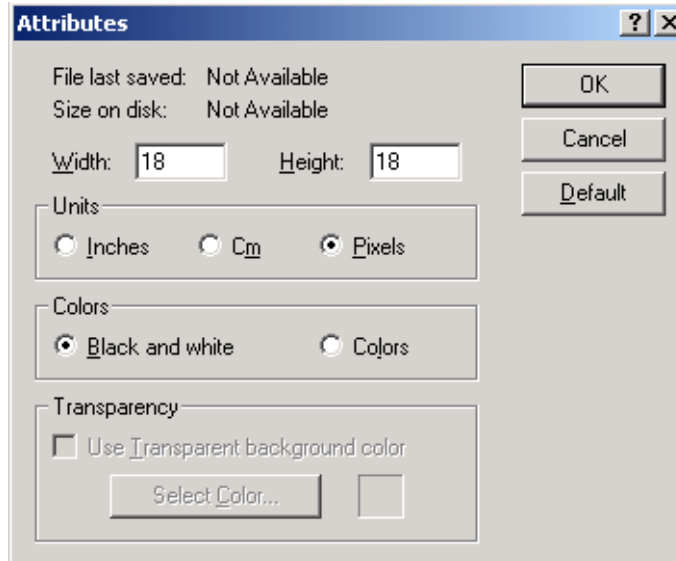
Choose **Yes** at the screen prompt to convert to black and white.
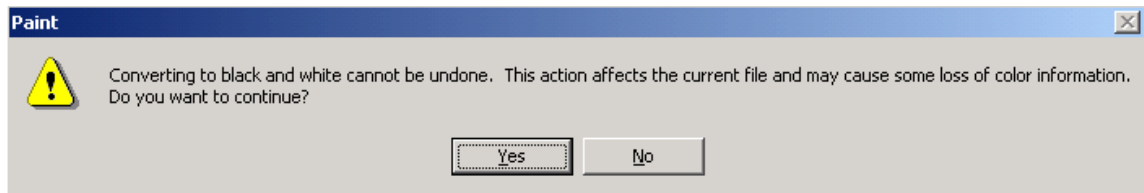
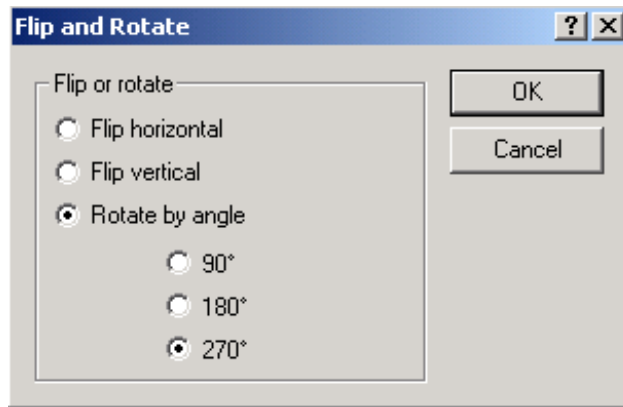Zoom in by selecting **View**, **Zoom**, then **Large Size**. This will make defining the pixels easier.
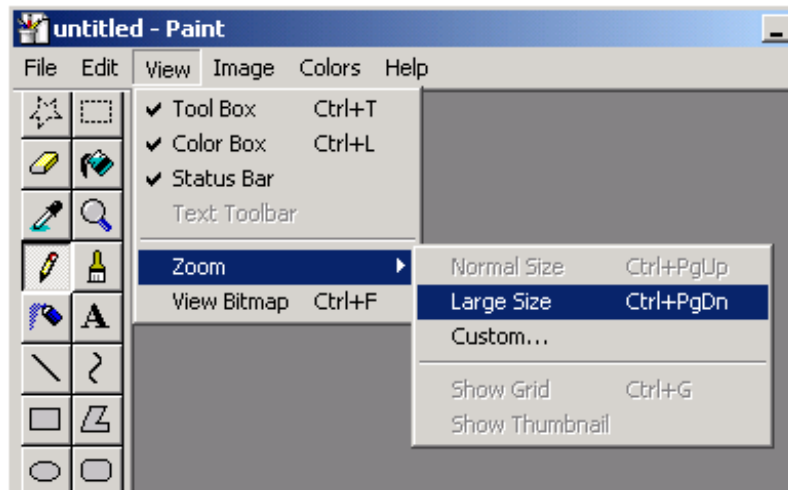
Define the pixels of the logo by using the pencil tool.
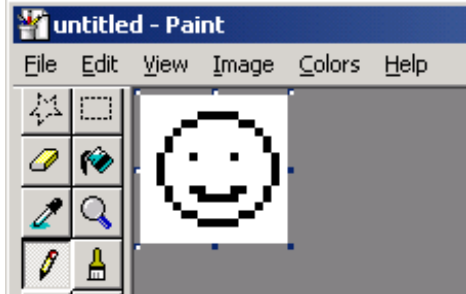


Bring up the **Flip and Rotate** dialog by selecting **Image**, **Flip/Rotate**.
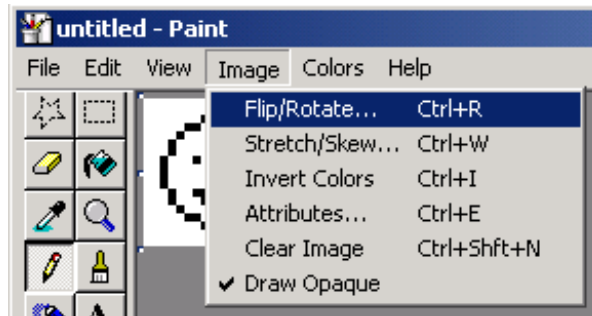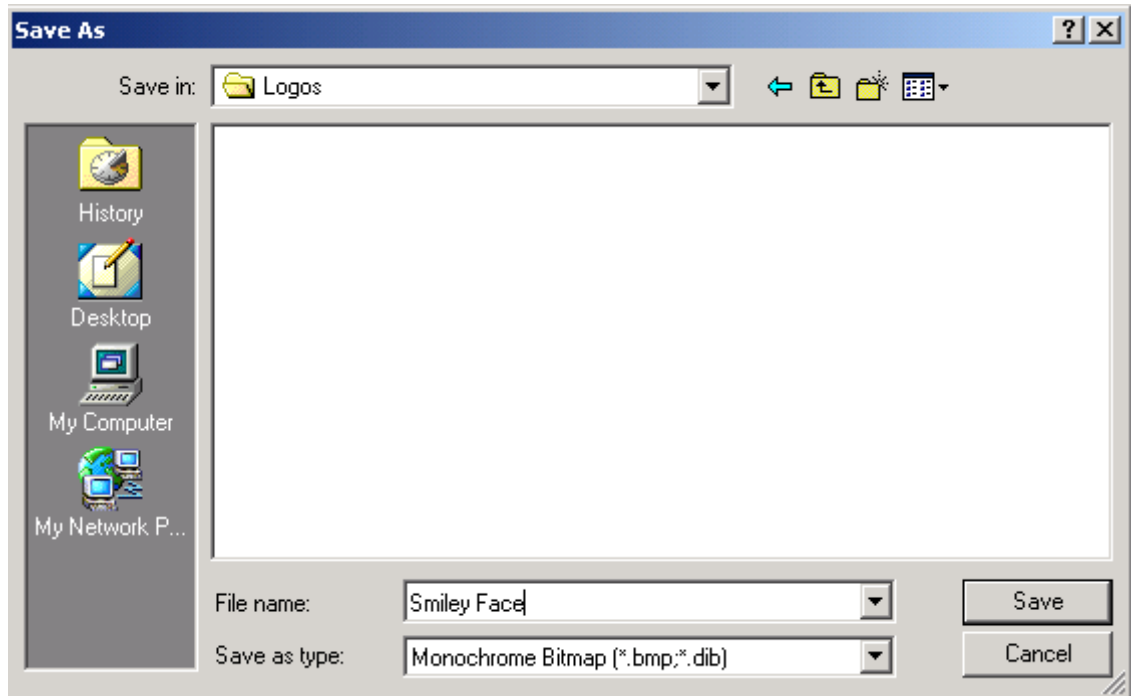


Select **Rotate by angle**, then **270°**.



From the **File Menu**, select **Save As...**
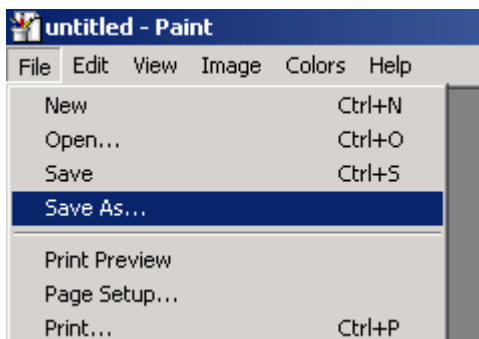
Name the logo and save it as a **Monochrome Bitmap** file in the desired folder.

# Appendix G: Transferring Logo Files
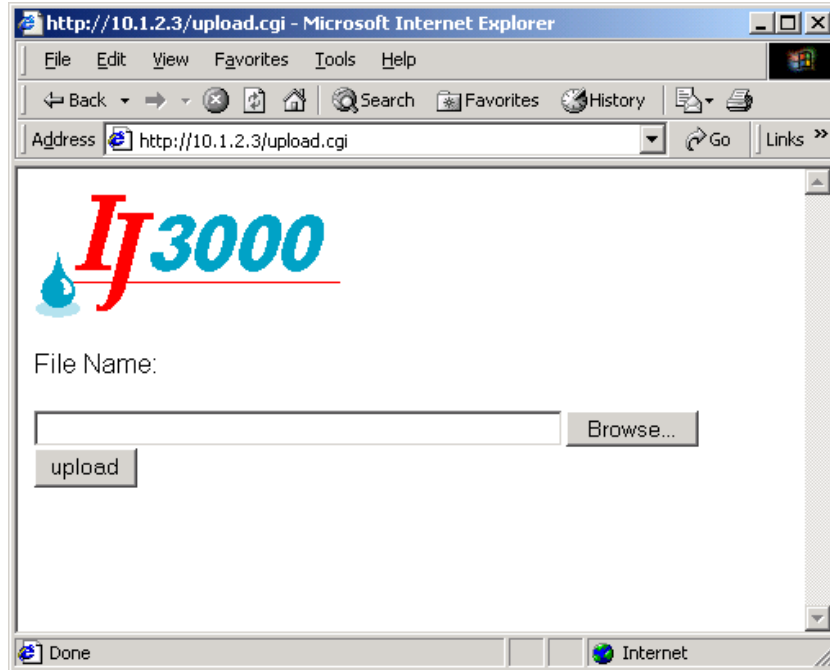
## Transferring a File from a PC to an IJ3000

Use this procedure to transfer a font file, logo file, message file, or any other IJ3000-type file from a PC to a controller. If the controller already has a file with the same name as the one being transferred, the existing file will be replaced with the new file.

These instructions assume the IJ3000 Controller is already connected, via Ethernet, to a PC. If not, please contact your IT department or someone who knows how to set it up; or refer to *"Appendix I: Configuring a PC to Communicate with the IJ3000" on page 117*.
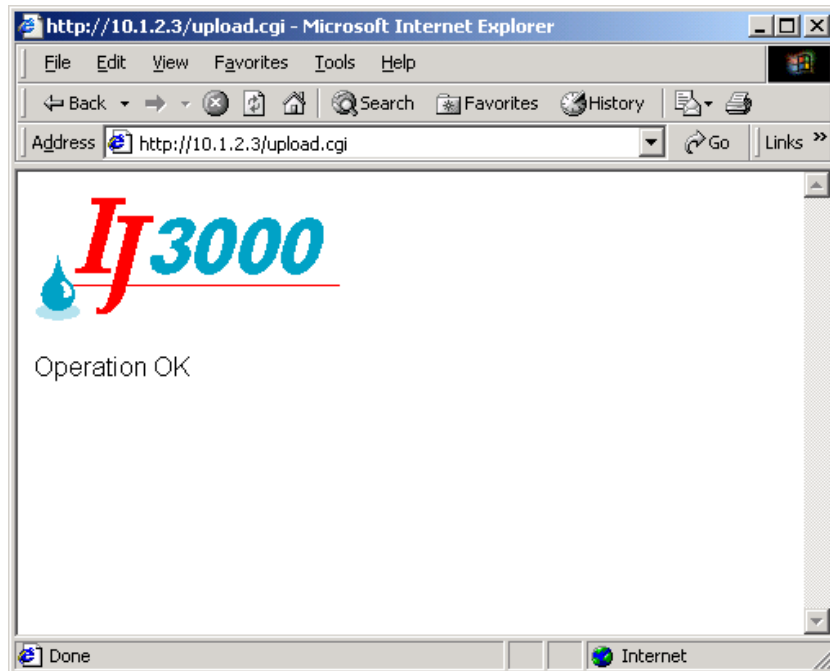
1.  Obtain the IJ3000 controller's IP address. Most IJ3000 controllers have an IP address of **10.1.2.3**. It may be different if the controller is networked with other IJ3000s or other devices. If the IP address is unknown, go to the controller, and from the **Home Screen**:

    •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 IJ3000's IP address (it's the top one).

2.  On the PC, start Microsoft Internet Explorer (must be version 3.02 or higher) or another web browser.

3.  In the browser's address box type in "http://", followed by the controller's IP address, followed by "/upload.cgi." See the illustration below:
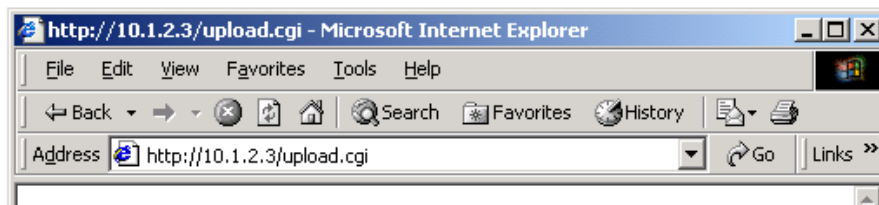
4. Press **Enter**. The web page shown below should appear.



5. Click the **Browse…** button to locate and select the file to be sent to the controller.
6. Click **Upload** to send the file to the controller. If the file transfer is successful, the web page shown below will be displayed. If there is a problem, the page will state why the transfer failed.



7. Click the **Back** button on the browser to repeat the procedure.

# Transferring a File from an IJ3000 to a PC

Use this procedure to transfer a font file, logo file, message file, or any other IJ3000 type file from an IJ3000 Controller to a PC.

These instructions assume the IJ3000 is already connected, via Ethernet, to a PC. If not, please contact your IT department or someone who knows how to set it up; or refer to *"Appendix I: Configuring a PC to Communicate with the IJ3000" on page 117*.

1. Obtain the IJ3000 controller's IP address. Most IJ3000 controllers have an IP address of **10.1.2.3**. It may be different if the controller is networked with other IJ3000s 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 IJ3000's IP address (it's the top one).

2. On the PC, start Microsoft Internet Explorer (must be version 3.02 or higher) or another web browser.

3. In the browser's address box type in "http://", followed by the controller's IP address, followed by "/download.cgi". See the illustration below.



4. Press **Enter**. A web page lists all of the files on the IJ3000 in alphabetical order.
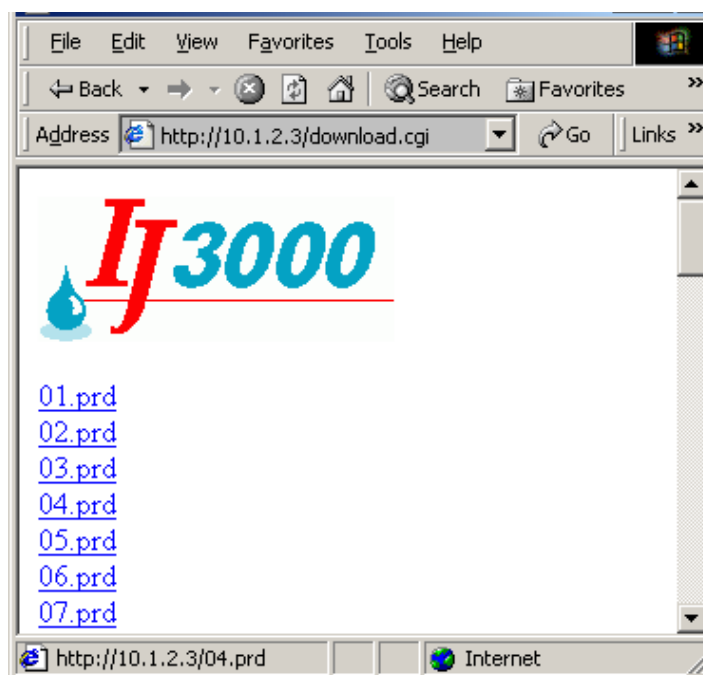
5.  Scroll through the list to locate the file to be transferred from the IJ3000. Click on the file name to display the Windows® "File Download" dialog box.
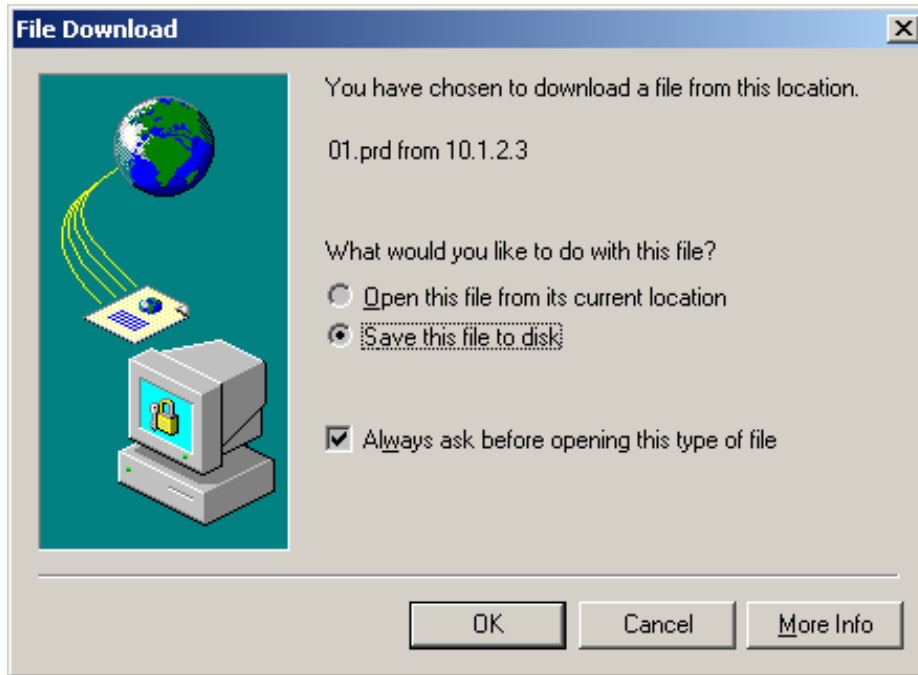


6.  Click **OK**. A standard Windows® "Save As" dialog box is displayed.
7.  Navigate to the desired folder and click **Save**. When the file transfer is done, a "Download Complete" dialog box is displayed.
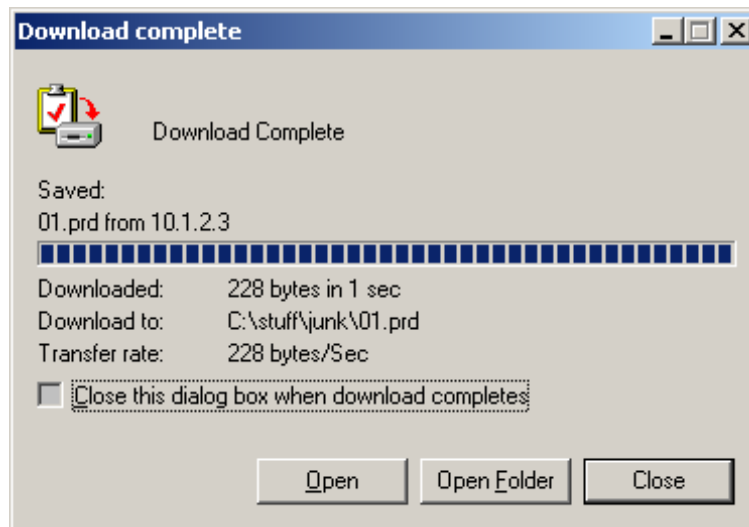


8.  Click **Close**.
9.  Repeat steps 5 through 8 to save additional files.

# Appendix H: Setting the IP Address of an IDS3000

## Equipment Needed

- IDS3000.
- PC with an Ethernet port.
- Ethernet crossover cable. (Diagraph part number 5760-240, shipped with the IDS3000.)
- The **setip.exe** program. (Available from Diagraph Customer Service.)
- Phillips head screwdriver.

## Procedure

1. Install the **setip.exe** program on your PC.
2. Unplug the IDS3000.
3. Remove the IDS3000 cover.
4. Locate the integrated circuit with the label at the center back of the circuit board. (See photos below.)

The label will look similar to this:

V1.00.0024
00:06:0B
00:00:13
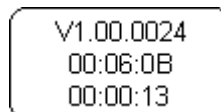
Record the bottom two lines of numbers. This is the IDS3000 MAC address.

5. Plug one end of the Ethernet crossover cable into P1 on the circuit board. Plug the other end into the Ethernet connector on your PC.

6. Plug in the IDS3000 and turn it on.

7. Open a Command Prompt (DOS window) on your PC; go to the folder where you installed **setip.exe**.

8. Type **setip**, followed by a space, followed by the IDS3000 MAC address recorded in step 4, followed by a space, followed by the IP address for the IDS3000, then press Enter. For example, type **setip 00:06:0B:00:00:13 10.1.2.2**.

9. To verify that the IDS3000 was set to the desired address, type **ping**, followed by a space, followed by the address. For example, **ping 10.1.2.2**. If successful, the response will look something like this:

```
C:\>ping 10.1.2.2

Pinging 10.1.2.2 with 32 bytes of data:

Reply from 10.1.2.2: bytes=32 time=15ms TTL=30
Reply from 10.1.2.2: bytes=32 time<10ms TTL=30
Reply from 10.1.2.2: bytes=32 time<10ms TTL=30
Reply from 10.1.2.2: bytes=32 time<10ms TTL=30

Ping statistics for 10.1.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum =  15ms, Average =  3ms

C:\>_
```

An unsuccessful attempt will look like this:

```
C:\>ping 10.1.2.2

Pinging 10.1.2.2 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.1.2.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum =  0ms, Average =  0ms

C:\>_
```

10. Turn off the IDS3000 and unplug it. Remove the Ethernet cable and put the cover back on.

# Appendix I: Configuring a PC to Communicate with the IJ3000

This appendix has instructions for setting the IP address and subnet mask of the PC so it can communicate with the IJ3000 Controller. Included are instructions for Windows XP®, Windows 2000®, Windows 98®, and Windows 95®.
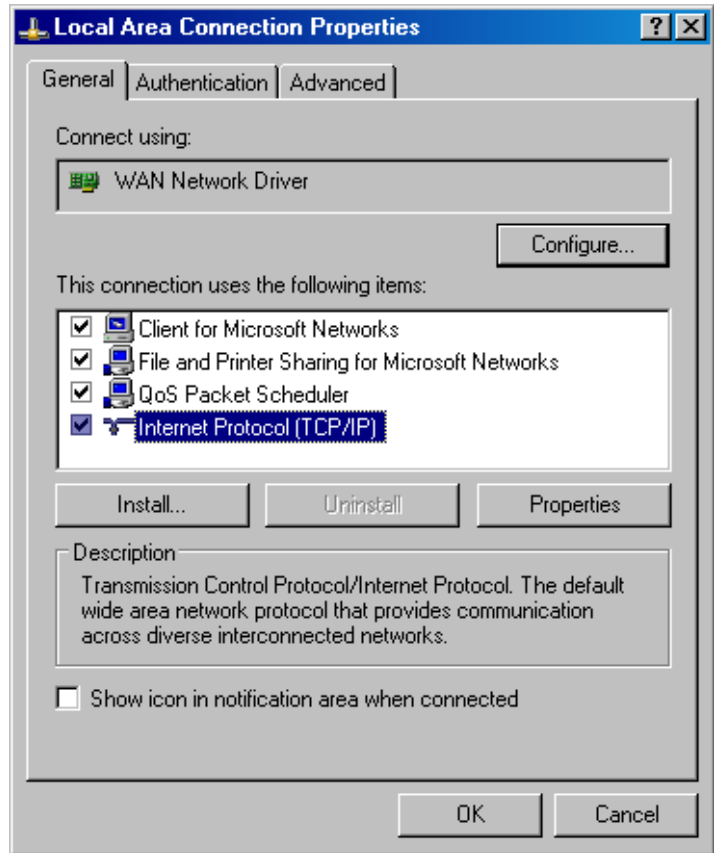
## Windows XP®

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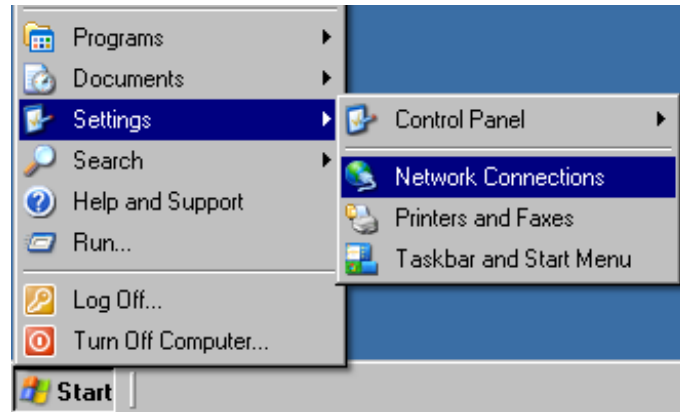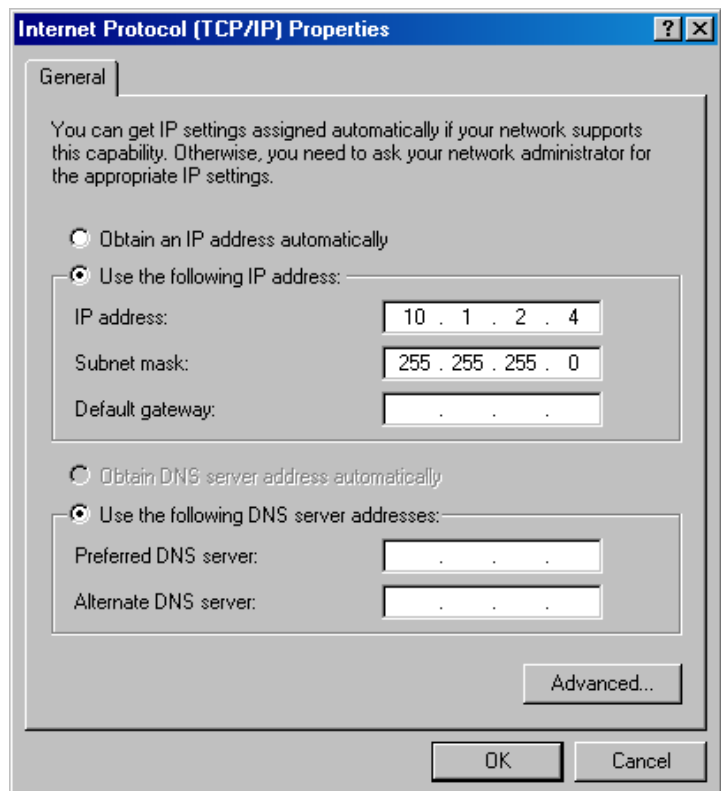


2. Click **Local Area Connection**, then open the **File** menu and select **Properties**.
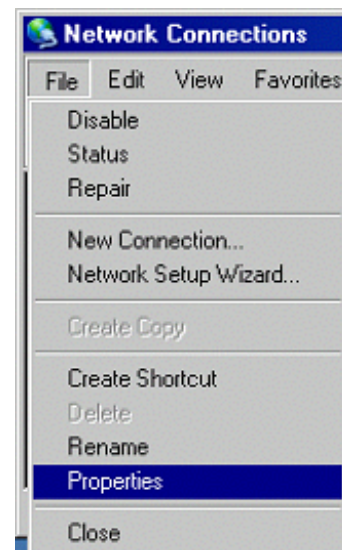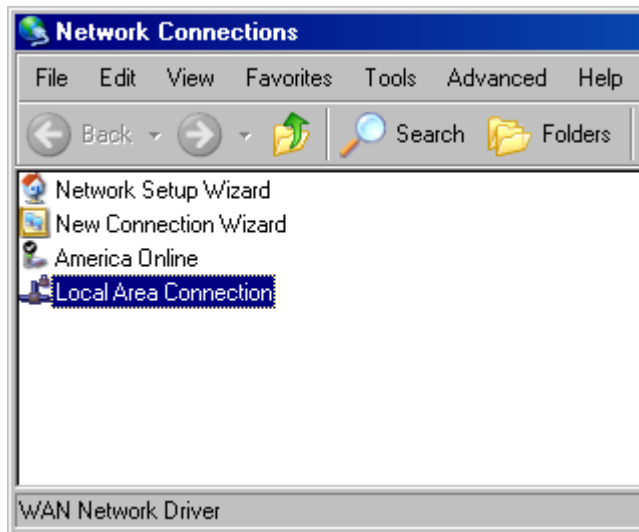
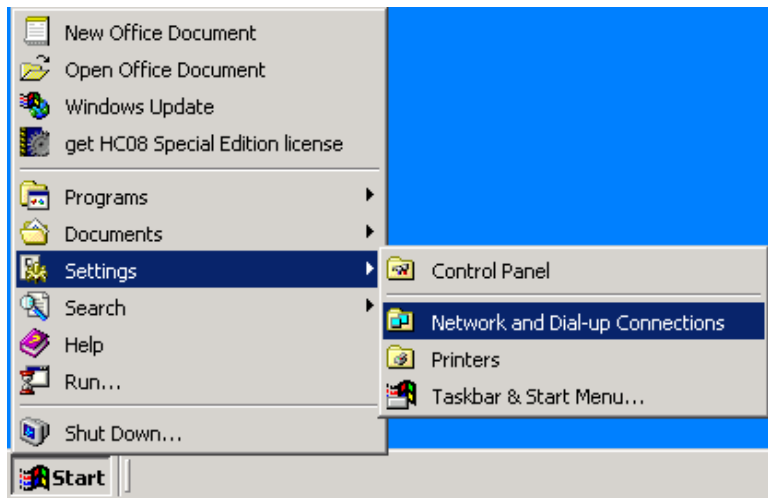3. Select **Internet Protocol (TCP/IP)** then click the **Properties** button.

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.

![IJ3000 Controller logo]

## 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.
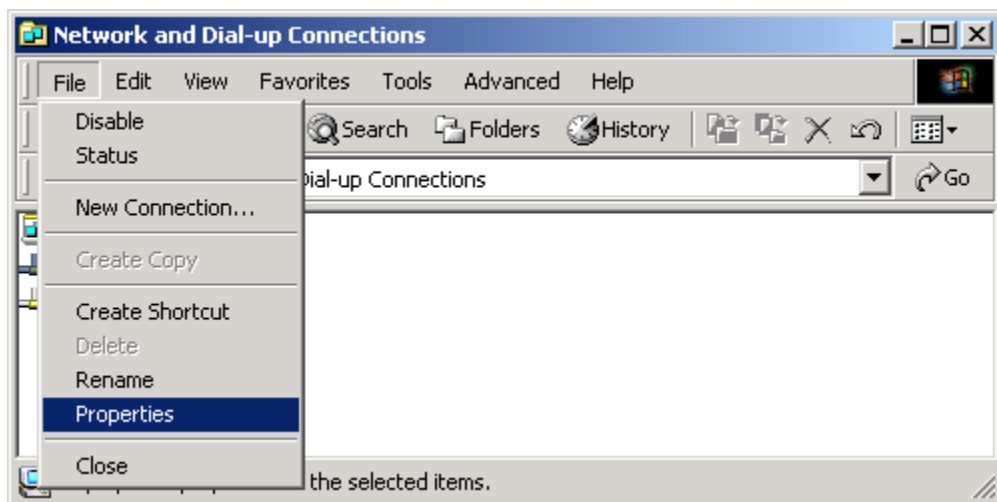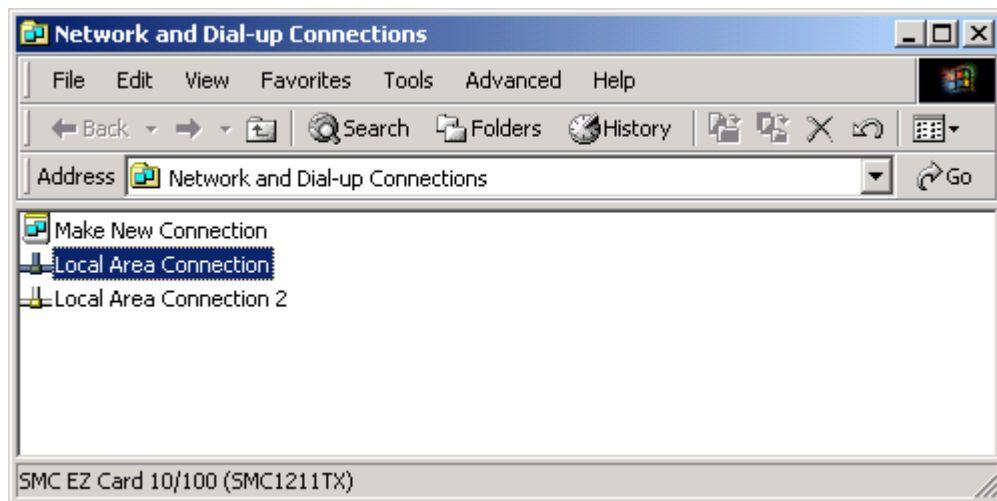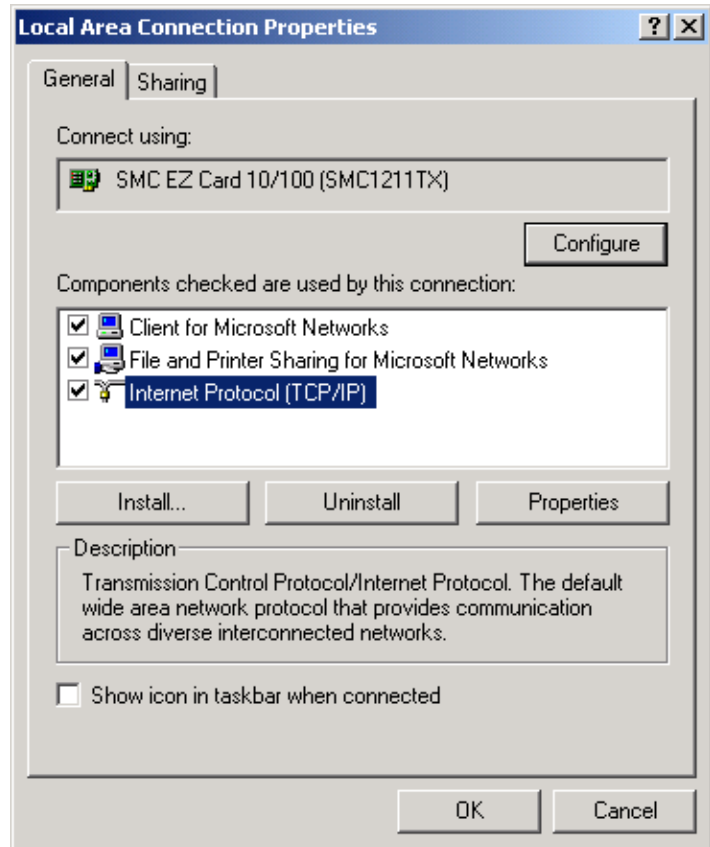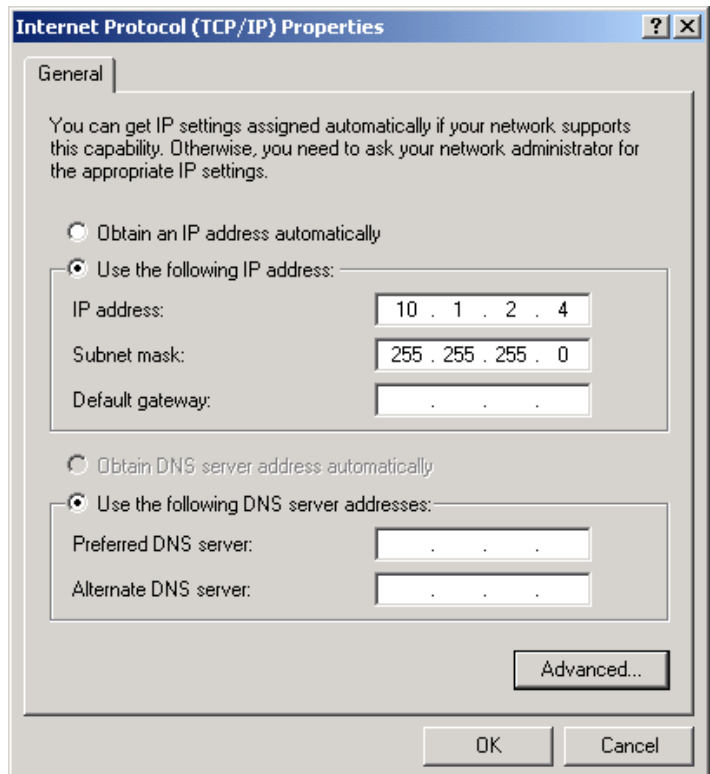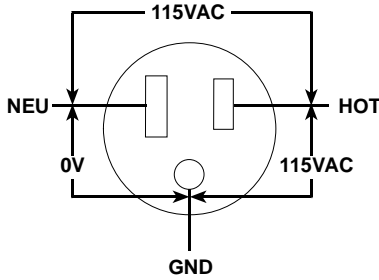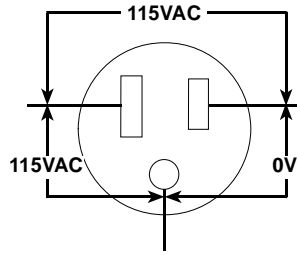
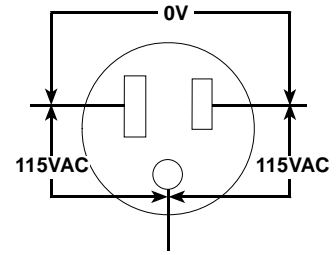# Appendix J: Testing an Electrical Outlet

An outlet tester is the preferred method of checking an electrical outlet, although a voltmeter can also be used.



**CORRECTLY WIRED OUTLET**          **INCORRECTLY WIRED HOT AND NEUTRAL REVERSED**          **INCORRECTLY WIRED HOT AND GROUND REVERSED**

## BACKGROUND INFORMATION ABOUT AC WIRING

Equipment running at 115VAC must have one hot wire and one neutral wire. Additionally, a separate ground wire runs to non-current carrying parts of most loads.

## THE WIRES IN AN AC OUTLET (115VAC)

| WIRE | DESCRIPTION | FUNCTION |
|------|-------------|----------|
| LINE | Usually black. Cannot be white or green. | Carries the live voltage and current to the equipment. |
| NEUTRAL | White or natural gray. | Grounded at the service equipment* only. Serves as the return for 115 volts. |
| GROUND | Bare, green, or green with yellow stripes. May be metal armor or metal conduit. | Grounded at the service equipment* and every metal box or cabinet. Runs to non-current, carrying parts of most loads. |

*The service equipment is defined as "the equipment used to disconnect the entire building and overcurrent device to protect the entire installation, but not the branch circuits individually."

At the service equipment, a single ground wire connects both the neutral and ground to earth. The NEC calls this wire the "ground electrode conductor."

# Appendix K: Electrostatic Discharge (ESD)

### What is ESD?

Electrostatic Discharge (ESD) is a triboelectric charge generated by separating or rubbing together two non-conductive materials.

### What causes ESD?

Friction can cause ESD. Friction can be generated by walking across a floor, removing tape from a tape dispenser, pulling a work order from a plastic work order holder, rolling the wheels of a push-cart across the floor, sitting on a foam cushion such as a stool or blowing air across a nonconductive surface.

| Source | 70-90% Relative Humidity Volts | 10-20% Relative Humidity Volts |
|---|---|---|
| Walking across a carpet | 1,500 | 35,000 |
| Working at a bench | 100 | 12,000 |
| Sitting on a foam cushion | 600 | 20,000 |
| Removing plastic bag from bench | 12,000 | 20,000 |
| Removing work-order from plastic pouch | 600 | 7,000 |

ESD at the print station can be caused by the product rubbing against ungrounded guide rails, conveyor belt static voltage build-up, or a residual static charge on the product from earlier processing.

Generally, ESD problems are more prevalent in the winter months. Heated air has a much lower relative humidity than the cold air had prior to heating. In many instances ESD problems appear in the fall when the outside temperature drops, and go away in the spring when the outside temperature begins to rise.

### What are the effects of ESD?

Unexplainable system resets, controller lockups, and multiple prints on the product can be signs of static discharge to the system. When static electricity is discharged to an electronic circuit (components or printed circuit boards), permanent damage may also occur. This damage may be in the form of reduced functionality, reduced life, or complete non-functionality.

The static charge does not have to be noticeable to the human touch in order to cause problems in an electronic system. A human being does not start to feel the effects of static electricity until the voltage reaches or exceeds 4,000 volts. Voltage as small as 100 volts can cause problems with some sensitive electronic components.

### What prevents ESD?

Prevention begins with training and knowledge. The use of wrist straps, heel straps, work-bench mats, floor mats, and monitoring systems for electronic devices will drastically reduce the ill effects of ESD when handling circuit boards. ESD wrist straps should be used when handling electronic components or printed circuit boards.

If static discharge is suspected of causing controller problems at the print station, check the grounding of the conveyor and print station components. Nonconductive or ungrounded guide rails are the most common cause of static discharge. Ionized air blowers and static dissipating material have proven effective in eliminating many static problems.

# Appendix L: Glossary of Terms

**Autocode** - A field entered into a message to print a variable such as date, time, pallet count, or plant location.

**COM** - Abbreviation for a serial communications port on a computer. Usually expressed as "COM port" or associated with a number, "COM 1" or "COM 2."

**Input Focus** - A screen control that receives input by information entered through the keypad.

**Inverse Video** - Information on the computer screen in which the typeface is light and the background is dark. (As opposed to standard video where the typeface is dark and the background is light.)

**RS-232** - Serial communication standard employed by personal computers. It defines three types of connection (electrical, functional and mechanical) usually used with 25-pin D-shaped connectors.

**RS-422** - Serial communication standard which allows transmissions over long distances at high speeds.