User's Manual

Diagraph PELpro Ink Jet Demo Software Revision 2.0

2470-381

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User's Manual

Diagraph PELpro Ink Jet System Software, Revision 2.0

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PELpro Introduction

PELpro is a label design and printing package for PEL printing systems running on Windows®-based PCs. It provides WYSIWYG layout and message design for printing on one, two, three or four sides of a container. It creates templates for message layouts that are easily transported between printstations. Its features are easy to learn and easy to use. With password security and privilege allocation, it prevents unauthorized label changes and user errors from random key selection. It has thorough troubleshooting tools that enable quick diagnosis and remedy of online printing problems.

Software Support

Quick Start Guide

Troubleshooting

Template Design

Bar Code Help

Program Installation

Close all programs and insert the PELpro CD in your CD-ROM drive. If this is the first installation of PELpro, then follow instructions starting at A-First Installation. If you are upgrading, follow the directions at B-Upgrading PELpro.

A-First Installation

1. Look for the drive icon that has the picture of a CD and the label "PELpro". Click to open.
2. Click on **setup.EXE**. Follow the directions that appear during installation.

B-Upgrading PELpro.

WARNING: POSSIBLE DATA LOSS.

If you are upgrading PELpro, you will want to save all databases with **.mdb**. extensions by renaming them. These databases contain the messages and templates that all users of PELpro have created. A common practice is to add the word "old" to the name of a database. For example, **Template.mdb** becomes **Oldtemplate.mdb**.

3. Rename your current PELpro databases.
4. Insert the new PELpro CD.
5. Click on the CD drive icon and then on **setup.EXE**. Follow the directions that appear during installation.
6. Erase the new databases and change the names prefixed with "old" back to their original names.

Software Support

Diagraph Product Support Services

If you have a question about PELpro software, first refer to this manual or the On-line Help accessed by pressing F1. Also check any "Read Me" files included with the PELpro CD.

If you cannot find the answer, you can receive product support, or information on how to receive product support, by contacting Diagraph's Product Support Services at 1-800-526-2531. The support services are subject to Diagraph prices, terms, and conditions in effect at the time the services are used. Diagraph Corporation may offer new product support services in the future, and as they arise, the Product Support department will be pleased to provide you with the details. At this point, you can contact the Product Support department either by telephone, facsimile, mail or an on-line service at the addresses or numbers given below.

When you call, plan to be at your computer with PELpro running with the problem screen open. You should also have your manual at hand. Whether you call or write, please provide the following information:

1. The version number of PELpro software which appears on the introductory screen.
2. The type of hardware and the system configuration you are using, including network hardware.
3. A description of what happened and what you were trying to do when the problem occurred.
4. The exact wording of any messages that appeared on your screen.
5. How you tried to solve the problem.

Reaching Diagraph's Product Support

a) by Phone
Support line: 1 800-526-2531
Support fax: 1 314-770-5706

b) by Mail
Diagraph Corporation
3401 Rider Trail South
Earth City, Missouri 63045-1110

www.Diagraph.com

Quick Start Guide

This quick start guide describes the initial steps necessary to configure the PELpro software, link a product database to the software, design templates and print.

1 Selecting a Database

2 Adding a PEL Controller

3 Setting PEL Controller Options

4 System Parameters

5 Setting PEL Printhead Options

6 Setting Printhead Distribution

7 Setting Communications

8 Defining a Template

9 Editing Panel Data

10 Starting a Print Job.

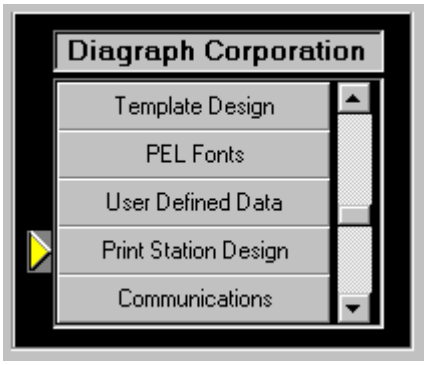
Database Selection

The first task after installation of PELpro is the selection of a database. PELpro currently works with Access 95 and Access 97. Compatibility with Access 2000 is scheduled for a future release.

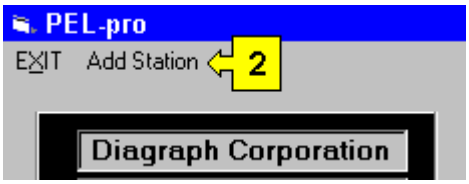
1. If you attempt to configure any parameter before selecting a database, you will encounter numerous error messages.
2. Select PROGRAM SETUP from the program cube. A "Path Not Found" error message will appear. Click OK.
3. Make sure the PRINT CRITERIA tab has been selected. All files with .mdb extensions will appear in the box immediately below the saved path box.
4. Click on the drive, folder and file of your database.
5. Click on SAVE DATABASE PATH and then select YES when prompted if you want to save your changes.
6. Select a table from the Database Table list.
7. Select a look-up field from the first drop-down list of Look-Up Fields(s). If your application uses ScanTeam equipment, you can only use a single look-up field. If your application uses a keyboard or a wedge for look-ups, then you can select and use a second and third look-up field.
8. Click on SAVE LOOK-UP FIELD(S). The database, its table and look-up field(s) are now available for use throughout PELpro.

Adding a PEL Controller

1 Select PRINT STATION DESIGN from the program cube.

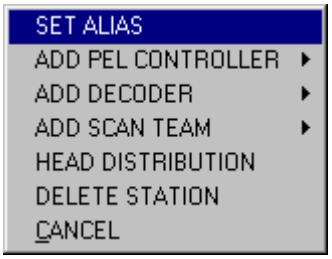


2 Select ADD STATION. A new print station icon appears in the print station window.

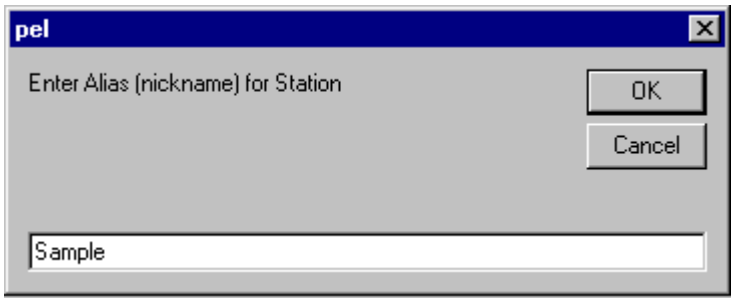


3 Right click on the new print station to display the submenu.

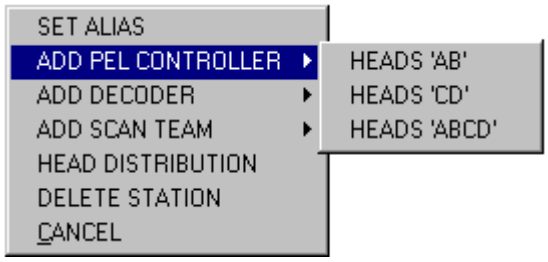
4 Select SET ALIAS from the submenu.



5 Enter the print station name and click OK.



6 Right click on the SAMPLE printstation and select ADD PEL CONTROLLER.



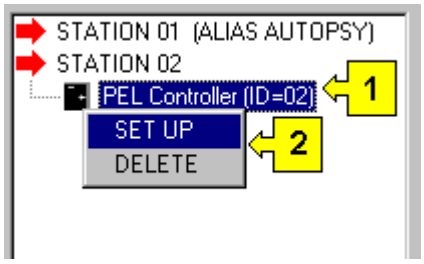
7 Select the printhead configuration. For this example select HEADS AB. A new PEL controller icon appears in the print station window.

8 Click SAVE STATIONS.

Setting PEL Controller Options

1 Right click on the new PEL controller icon to display the PEL CONTROLLER submenu.

2 Select SETUP from the submenu to display the PEL CONTROLLER SETUP menu.



System Parameters

1 Use the table below to select the PEL controller options.

2 Click SAVE to save the controller settings.

Parameters	**Description**	**Options (D)**efault
A/B Trigger	Determines whether the print cycle occurs on the rise or the fall of the product-detect sensor signal.	RISE (D) FALL
Send Params	Determines when the program sends the printhead parameters to the PEL controller. Batch applications typically send the printhead parameters with each print job. Look-up applications may only send the printhead parameters on the first print job.	BY REQUEST ONLY FIRST PRINT JOB EVERY PRINT JOB (D)
Encoder Res:	Selects the encoder resolution.	300 DPI (D) 213 DPI 142 DPI
Encoder	Sets the PEL Controller to use an encoder	YES (D) NO
Level	Activates the PEL Level command.	YES NO (D)
Networked	Sets the controller as part of a PEL network	YES (D) NO.


PEL Controller Setup
PEL Controller Setup :
STATION 02 (PEL ID = 02)
In Polling List
ID = 02
A
B
A/B Trigger :
FALL
Send Params :
By Request Only
Encoder Res :
300 DPI
C/D Trigger :
Send Params :
Encoder Res :
Encoder :
NO
Level :
NO
Networked :
NO
SAVE

Setting PEL Printhead Options

1 Right Click on a printhead icon to display the PEL PRINTHEAD SETUP menu.

2 Select a printhead type.

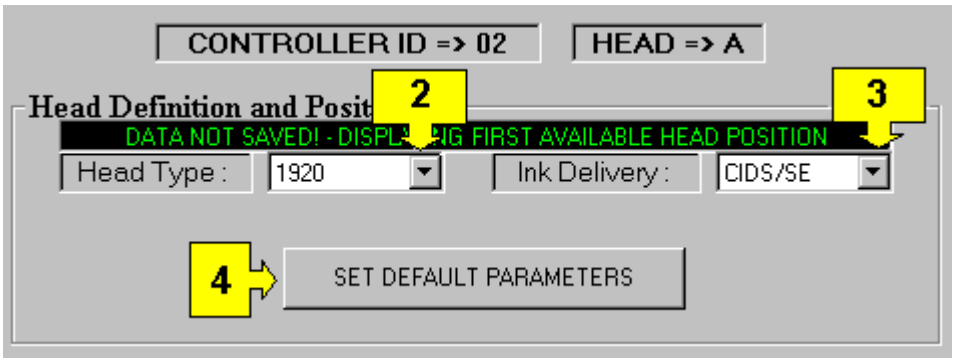
3 Select Ink Delivery.

4 Click SET DEFAULT PARAMETERS.

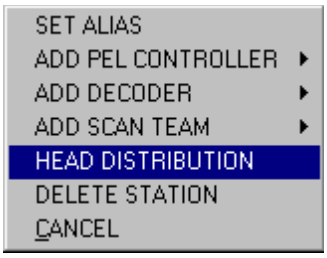
5 Use the table below and select the appropriate printhead settings.

6 Click SAVE HEAD SETTINGS to save the printhead settings.

Head Parameter	Description	Options
Head Type	Selects the type of printhead	9600, 1920, 256, 352
Ink Delivery	Selects controller type	CIDS/SE OR VALUE SERIES
Bold	Sets the width of the printed characters	0-9
Curve	Set pulse width of printhead	10:10:10
Delay	Controls print location	0-9999
Gap	Sets the spacing between characters	0-99
Inverse	Turns the message upside down	YES/NO
LongBar	Sets the height of bar codes	1-32
Offset	Timing control for printhead channels	0-99
Position	Adjusts vertical position of a message	0-32
Reverse	Reverses the message	YES/NO
Slant	Adjusts the angle of the printed message	0-31
Width	Controls the printing resolution	1-255



Setting Printhead Distribution



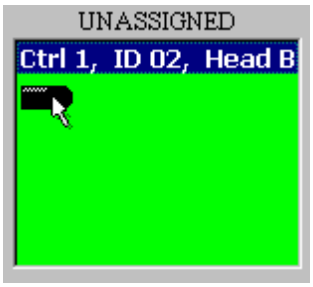
1 Right click on the printstation to display the submenu.

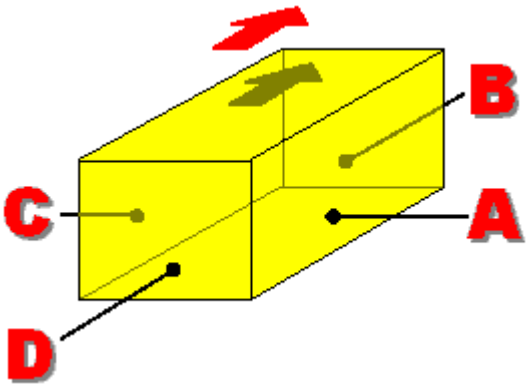
2 Select HEAD DISTRIBUTION.

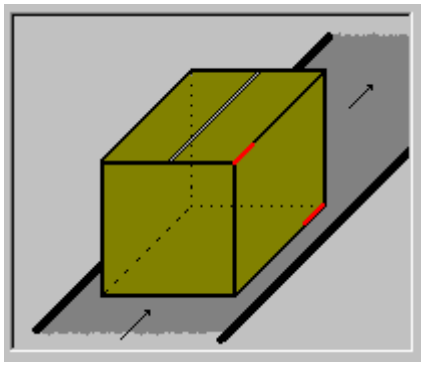
3 Double-click on a printhead and the box turns to green. Notice that the pointer changes to a printhead symbol.

4 Drag the printhead to a panel window and double-click to release the printhead.

5 Click SAVE after completing the printhead distribution.

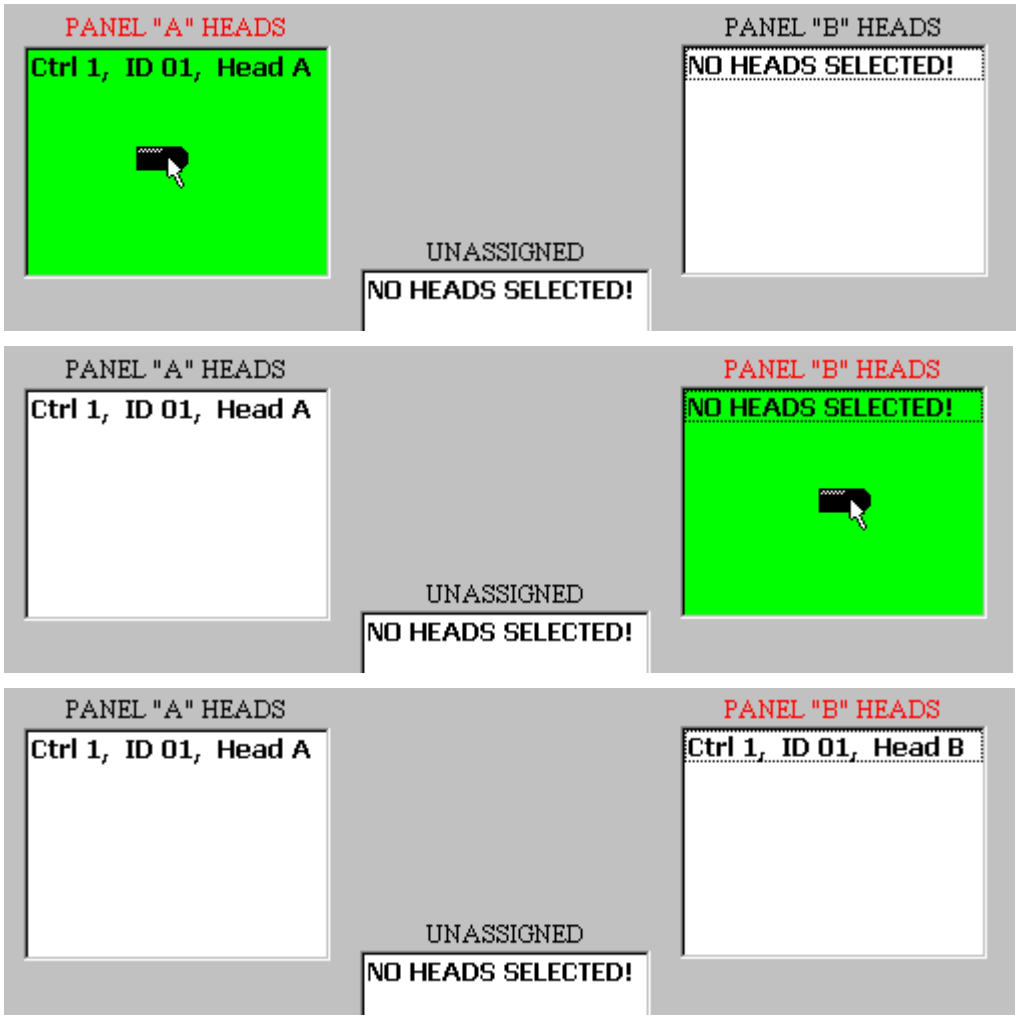






Panel Letter Assignments.

PELpro highlights the selected panel with red line animation whenever the pointer passes over a panel window.


PANEL "A" HEADS
Ctrl 1, ID 01, Head A
PANEL "B" HEADS
NO HEADS SELECTED!
UNASSIGNED
NO HEADS SELECTED!
PANEL "A" HEADS
Ctrl 1, ID 01, Head A
PANEL "B" HEADS
NO HEADS SELECTED!
UNASSIGNED
NO HEADS SELECTED!
PANEL "A" HEADS
Ctrl 1, ID 01, Head A
PANEL "B" HEADS
Ctrl 1, ID 01, Head B
UNASSIGNED
NO HEADS SELECTED!

Setting Communications

1 Select COMMUNICATIONS from the program cube.

2 Double-click to select a device.

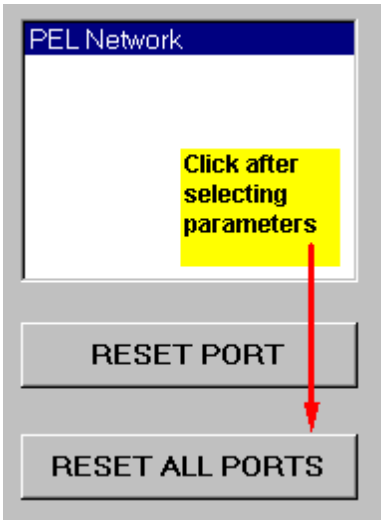
3 Click on COM to view the communication parameters.

4 Select the appropriate settings.

5 Click RESET ALL PORTS.

6 Repeat steps 1 through 5 for all devices connected to the PC.

7 Click SAVE after completing all communication settings.



Communication Parameters

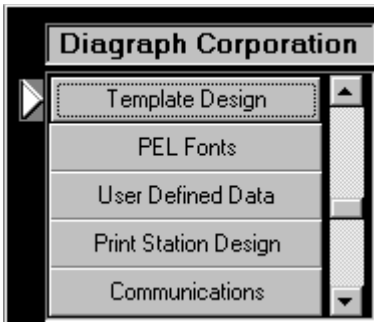
Port ID	Designates a PC communication port OPTIONS: None, 1-16.
Baud Rate	Selects the baud rate. OPTIONS: 19200, 9600, 4800, 2400, 1200.
Parity Bits	Selects the parity bits. OPTIONS: None, Even, Odd
Data Bits	Selects data bits. OPTIONS: 7, 8
Stop Bits	Selects stop bits. OPTIONS: 1, 2
Handshaking	Selects the handshaking method. OPTIONS: None, X-on/X-off, RTS, RTS X-on/X-off
PEL Network	Designates PEL communication type. OPTIONS: No, Yes

Defining a Template

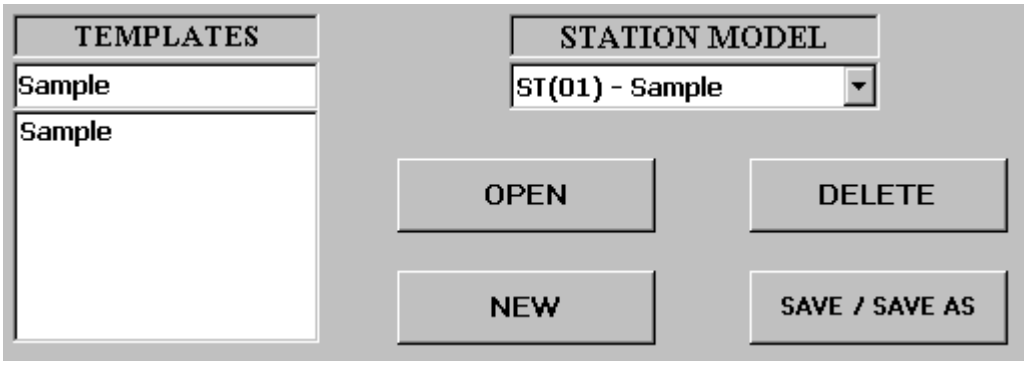
Designing a template is a two-part process: template definition and message creation. You can toggle between these two functions by clicking on the tabs at the top of the window.

Definition

1 Select TEMPLATE DESIGN from the program cube.



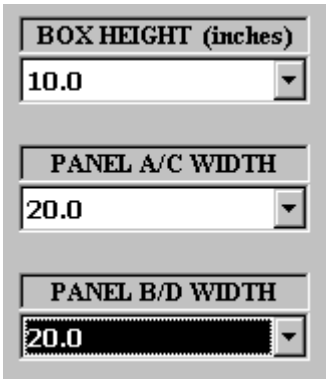
2 Select a Station Model



3 Type a template name.

4 Click NEW. .

5 Type in dimensions for BOX HEIGHT, PANEL A/C WIDTH and PANEL B/D WIDTH.



6 Click SAVE/SAVE AS.

Editing Panel Data

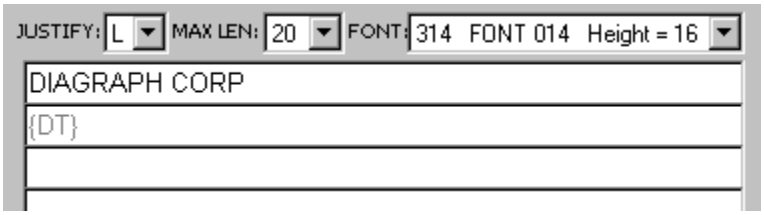
1 Right-click on the printhead symbol to display the submenu and select New Message.

2 Select the type of message justification.

3 Select maximum message length.

4 Select message font.

5 Click on the message line and enter the text.



6 Add an autocode by selecting AUTOCODES from the pull-down menu.

7 Double-click to select and place an autocode into the message.

8 Click SAVE MESSAGE.

Starting a Print Job

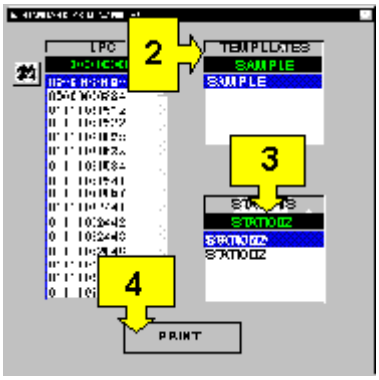
1 Select Start Print Job from the program cube.

2 Select a Template.

3 Select a Station.

4 Click on PRINT.

5 The software sends the print job to the PEL controller.

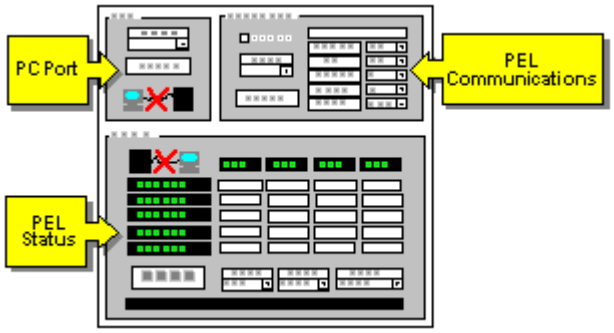


Troubleshooting

Troubleshooting functions occupy a single window with three parts:

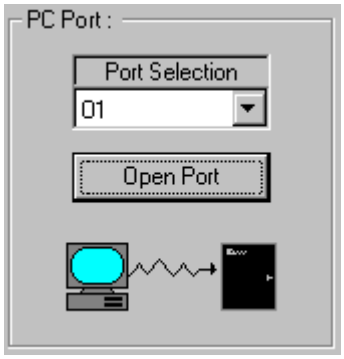
- **PC Port**
- **PEL Communications**
- **PEL Status**

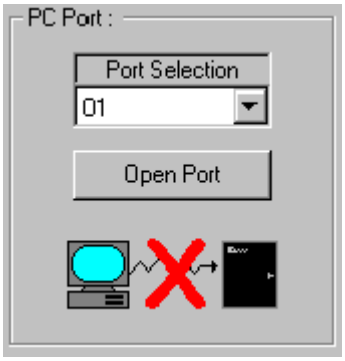
Click on the block arrows on more information.



PC Port

This section opens a serial port on the PC to a PEL controller. Before the port can be tested, it must be set to NONE in the PORT ID.





1 Select a port from the Port Selection drop-down box. Note that a red X appears on the line from the PC icon to the black box. This indicates that communication has not been established with the selected port.

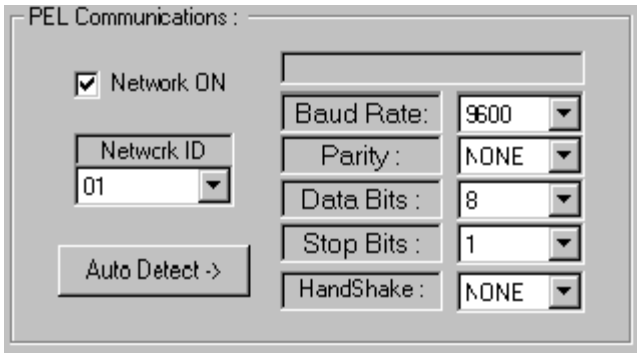
2 Click on OPEN PORT to open communications to the selected. If there is communication, the red X will disappear.

3 Refer to the PEL Communications box.

PEL Communications

This section tests serial communications parameters. The serial port must have been opened successfully with the PC Port section.

Click on buttons and boxes for details.



1 For systems that use RS-232 serial communication and are not part of a network, the NETWORK ON box should be blank.

For systems in a network with multiple controllers, then make sure that the controllers are set up for network operation and that there is a check mark in the NETWORK ON box.

2 Select a Network ID for networked systems from the NETWORK ID drop-down list box.

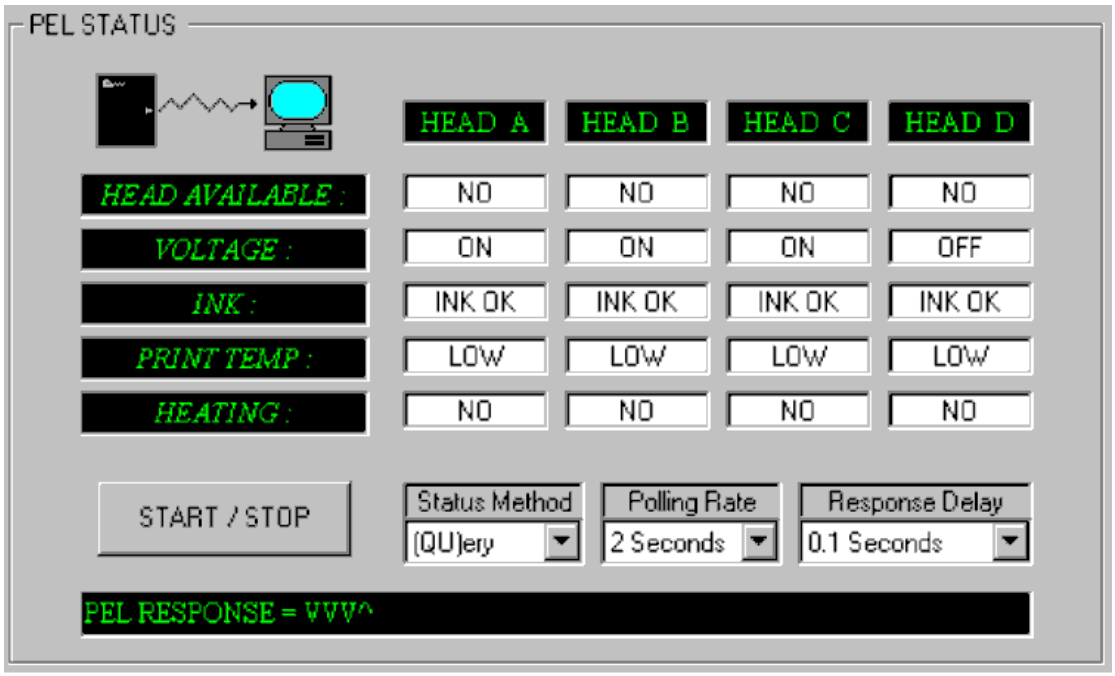
3 Click on AUTO DETECT and PELpro will run through all possible serial communication parameters. It will attempt to establish communication with the controller as is runs through each new setting. When it finds a successful match, it will post the operational parameter in the appropriate box: Baud Rate, Parity, Data Bits, Stop Bits and HandShake.

4 You can also set parameters by using individual drop-down controls.

PEL Status

The third section of the troubleshooting screen allows you to send and receive data from the PEL controllers. Clicking on the Start/Stop button on the PEL STATUS screen below will send a query or status request (User selectable) to the PEL controller.

Click on buttons and boxes for more details.



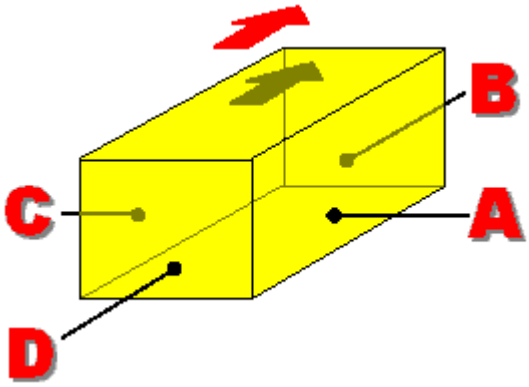
Template Design

Templates define and control the formatting of all printed output for a single printstation.

- **Panel Design**
- **Template File Manager**
- **Printhead Assignment**
- **Carton Size Controls**
- **WYSIWYG Design**
- **Message Frames.**

Panel Design

Template design is based upon a product carton with four printable sides or panels: A, B, C and D. Panels A and B are the long sides of the carton and Panels C and D are the short end panels. Panel A is the right long panel looking down the conveyor in the direction of product flow.



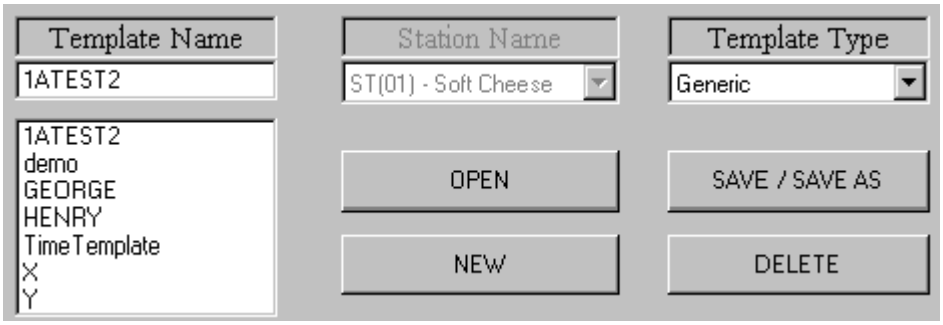
PELpro sends messages to the printheads in panel order; messages assigned to printheads on panel A will receive messages before printheads assigned to panels B, C or D.

Template design screens allow you to create a new template, open an existing template, set carton size, assign or remove print heads from carton panels and view and change printhead parameters. A maximum of eight print heads can be assigned to any one panel and a maximum of thirty-two printheads to a printstation.

Template File Manager

The template file manager provides normal file management procedures.

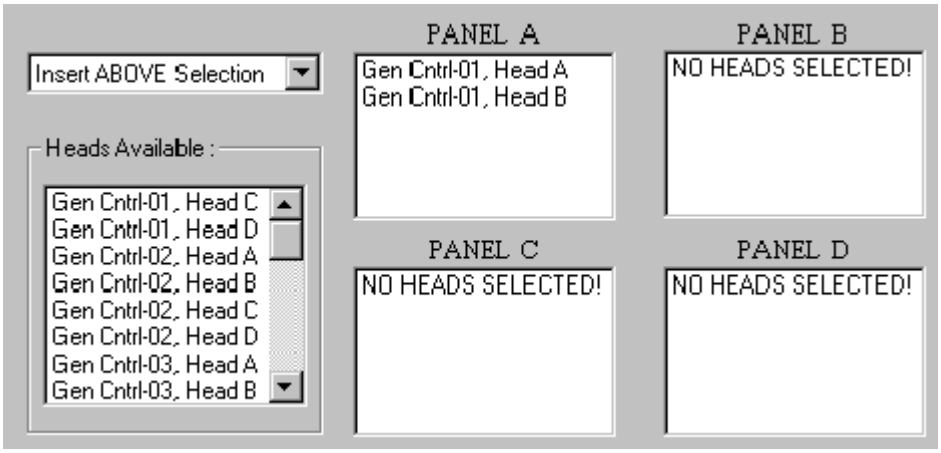
Click on the buttons for more information.



PELpro can link these controls to a printstation when a Template is created. The link automatically places the printheads on the correct panel in the template editor.

Printhead Assignment

After creating a new template or opening an existing one, the controls shown below can add, move or remove printheads from each box panel.



In the example, Panel A has two printheads available for message creation. Panels B, C and D have no heads selected.

The HEADS AVAILABLE window shows printheads that are parts of the selected printstation that are not assigned to a carton panel. Only printheads that are assigned and appear in a panel window will be available for message creation.

Carton Size Controls

Carton size controls set the panel display in the WYSIWYG template design screen.

WYSIWYG Design

Shown below is a completed template for a 5.5-inch by 14-inch carton panel with two printheads. The printheads are represented as dark-gray rectangles on the left.

Three messages were created for the upper printhead with each message using a different font. The first message consists of two lines and the remaining two a single line. The lower printhead uses a single two-line message.

The rulers framing the panel are scaled from the dimensions entered in Carton Size Controls.

The gray rectangles on the left represent the printheads selected with the printhead assignment controls.

Message Frames

The screen below shows panel messages surrounded by Message Frames. The Message Frames provide a more accurate view of the actual beginning and end of each printhead message. Note how the upper printhead's first message begins at one horizontal inch from the left edge of the carton panel. Combining the printhead delays created during station design and printhead template delays that will be described below determine the first message starting point.

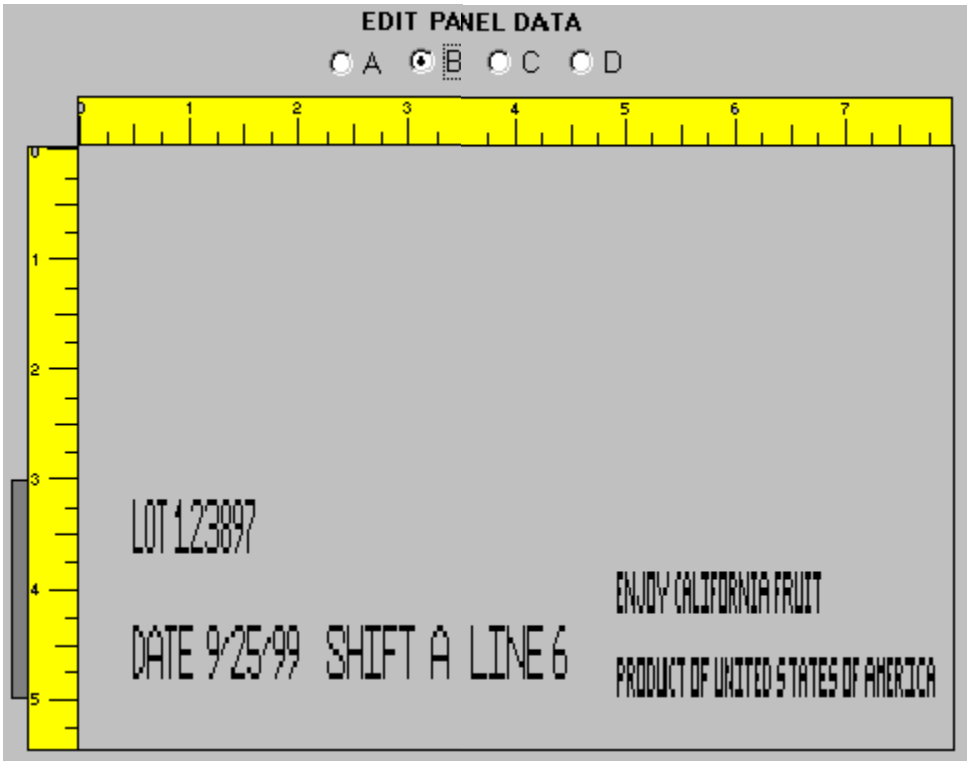
The screen below shows the three messages from the upper printhead with Message Frames around each message. The spacing between the end of message one and the beginning of message two is created by spacing at the end of the first printed line in message 1 (12-2 ½).

The example below shows the controls that adjust individual messages.

JUSTIFY sets left, right and center justification.

MAX LEN sets the maximum message length. Used in conjunction with JUSTIFY, you can center text within a defined message space. It can set the distance between one message and the next.

FONT provides font selection from a drop down list. For the message below Font 431 has been selected. Font 431 is a user-defined font created by adding a bold factor of four to system font 31.



Bar Code Help

Bar Code Help provides the technical information for creating and printing PEL bar codes. The following is a list of the bar code symbologies and PEL related topics covered in this document.

Code 39

Code 128

Interleaved 2 of 5

SCC-14

PEL Bar Code Fonts

Editing Bar Code Fonts

Creating SCC-14 Bar Codes

Bar Code Print Quality

Modulo 10 Check Digit.

Code 39

Code 39 is a general-purpose alphanumeric 2-D bar code. Code 39 is typically used in the automotive, healthcare, and electronics industries to track product throughout the manufacturing and distribution processes.

Data Requirements

Character Set:	0-9, A-Z, -, ., %, /, $, space, +, and *
Start/Stop Pattern:	The character "*".
Human Readable:	Optional, although typically used.
Check Character:	Optional (modulus 43 calculation)
Bar Pattern:	Five bars and four spaces are required to encode a character. Three of the nine bars and spaces are wide while the other six are narrow.
Encoded Information	Contingent upon data requirements.

Dimensions:

Width	Minimum "X" Dimension: .0075 inches
Height	The greater of .25 inch or 15% of the symbol length.

Code 128

Code 128 is a high-density, variable length alphanumeric bar code. Code 128 has the ability to compress data depending on the structure of the data; all-numeric data or alphanumeric data.

Code 128 uses special "start" and "shift" codes specifying that the data following is numeric, alphanumeric, or special characters. These compression techniques minimize the amount of printable space needed to contain the bar code. Because of the compact symbol, the numeric version is used whenever possible, but even alphanumeric Code 128 is more compact than Code 39.

Data Requirements

Character Set	The full ASCII set (128 characters). One advantage of Code 128 is the symbol's capability to encode all 128 characters of the standard ASCII code chart.
Encodation	Three bars and three spaces are required to encode a character.
Start/Stop Pattern	One of three start characters A, B, or C shall be used at the beginning of the symbol to define initial code set. The stop pattern is seven elements comprised of four bars and three spaces. The Start/Stop pattern shall not be used within the symbol nor shown in human-readable interpretation.
Human Readable	Optional, although typically used.
Check Character	Required (Modulus 103 calculation)
Encoded Information	Contingent upon data requirements.

Symbol Dimensions

Width:	Minimum "X" Dimension: .0075 inches
Allowable Symbol Height:	The greater of .25 inch or 15% of the symbol length.

Interleaved 2 of 5

Interleaved 2 of 5 (I 2 of 5) is a high-density, self-checking, numeric only bar code. The name "Interleaved" refers to the encoding structure of the bar code, two numeric digits are interleaved together, with the bars representing one digit and the spaces representing a second digit.

Data Requirements

Character Set:	0 - 9
Encodation	I 2 of 5 encodes characters as pairs. Character pairs consist of five bars and five spaces. The five bars represent the first digit of the pair and the spaces represent the second digit of the pair. Each set of bars and spaces consist of two wide bars and three narrow bars.
Start/Stop Pattern	The start character consists of four narrow elements beginning with a bar, and stops character consists of a wide bar followed by a space and ends with a narrow bar.
Human Readable	Optional, although typically used. However, Modulus 10 required when using the SCC-14 specification.
Check Character:	Optional, however many applications such as the SCC-14 specification require a Modolus-10 check character.
Encoded Information	Variable length bar code consisting of even number of digits (0-9). The digit zero proceeds odd number of digits, creating even sets character pairs.

Symbol Dimensions

Width:	Minimum "X" Dimension: .0075 inches
Height:	2:1 to 3:1 with "X" Dimension > .020 inches
	2.2:1 to 3:1 with "X" Dimension < .020 inches

SCC-14

SCC-14 is an application use of the I 2 of 5 bar code symbology. The Uniform Code Council developed the application standard for identifying a product or container anywhere in the world. Many industries and companies use the SCC-14 application worldwide, and the EAN and Canada have adoptive the UCC SCC-14 application standard.

The bar code data requirements consist of combining the packaging level of a product and the product code to create a unique identification number for a product or container. The UCC defines the product code as the UCC assigned Manufacturer ID number and the item number of the product.

The data requirements and the robust quality of the I 2 of 5 bar code make the SCC-14 bar code suitable for printing on corrugate surfaces.

Data Requirements of SCC-14

The data requirements for the SCC-14 bar code combine the requirements listed below with the data requirements outlined in the I 2 of 5 data requirements.

3 00 12345 67890 6

Packaging Indicator	An identifier assigned by the manufacturer defining the packaging level of the product.
Global Compatibility with EAN	Accommodates the seven digit EAN item number.
Manufacturer's U.P.C. ID Number	The Manufacturer Number assigned by the UCC.
Item Number	A five-digit item number assigned by the manufacturer.
Check Digit	A calculated Modulo 10 check digit.

Dimensions:

Magnification:	62.5%	70%	80%	90%	100%
Symbol Length w/QZ:	3.627 inch	4.314 inch	4.876 inch	5.438 inch	6.000 inch
Height:	78 inch	.88 inch	1.00 inch	1.13 inch	1.25 inch
Quiet Zone (QZ):	25 inch	.28 inch	.32 inch	.36 inch	40 inch

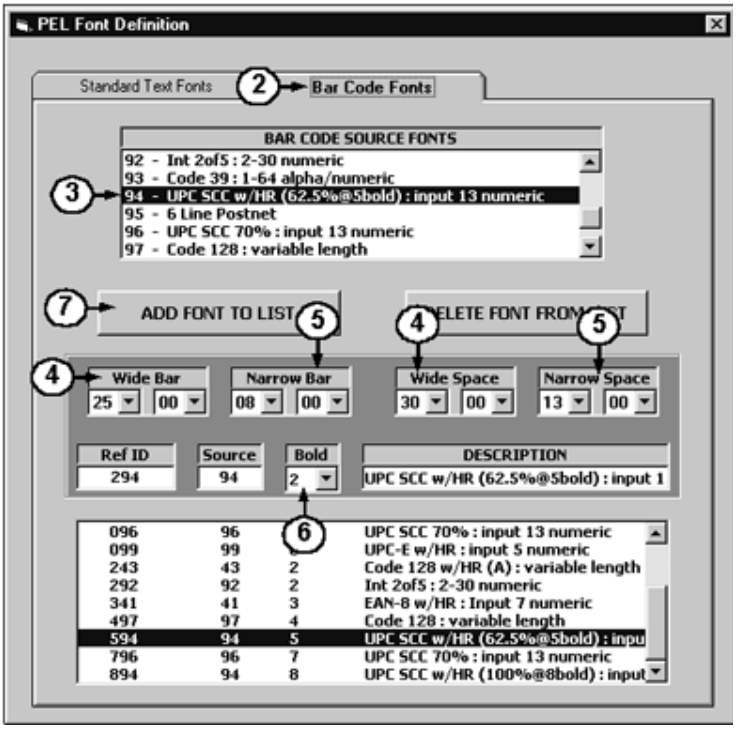
PEL Bar Code Fonts

Firmware versions - Bar Code - Font Description - Symbol Length

4	CANADIAN UPC 90% w/HR,	Prints 14 characters. 13 characters entered.4.05, 4.12, 4.13, 4.15. Numeric Only (0-9) Check character automatically **calculated.**
40	EAN-13 BAR CODE w/HR,	Prints 13 characters. 12 characters entered4.05, 4.12, 4.13, 4.15/ Numeric Only (0-9) Check character automatically calculated.
41	EAN-8 BAR CODE w/HR,	Prints 8 characters. 7 characters entered. 4.05, 4.12, 4.13, 4.15 Numeric Only (0-9) Check character automatically calculated.
42	Code 39 Bar code w/HR Chars.	Variable length 1-50 characters. 4.05, 4.12, 4.13, 4.15 (0-9, A-Z, - , ., space, $, /, +, %) Recommend 20 characters or less.
43	CODE 128 w/HR	Variable length. 1-50 characters 4.05, 4.12, 4.13, 4.15 Code 128 subset A and autocodes
44	UCC/EAN-128 SSCC w/HR	Prints 20 characters. 19 characters entered 4.05, 4.12, 4.13, 4.15 Numeric Only (0-9) Check character automatically calculated.
46	UCC/EAN-128 Bar code w/HR	Variable length 2-48 characters 4.05, 4.12, 4.13, 4.15 Subsets A, B and C, autocodes,and application identifiers.
47	I 2of 5 BAR CODE	2-30 characters. Enter characters in even pairs. 4.05, 4.12, 4.13, 4.15 Numeric Only (0-9) The digit zero proceeds odd number of digits, creating even sets character pairs.(0-9)
92	I 2of 5 BAR CODE	2-30 characters. Enter numeric in even pairs.4.05, 4.12, 4.13, 4.1 Numeric Only (0-9) The digit zero proceeds odd number of digits, creating even sets character pairs.(0-9)
93	CODE 39 BAR CODE	Variable length 1-50 characters.4.05, 4.12, 4.13, 4.15 (0-9, A-Z, -, ., space, $, /, +, %) Recommend 20 characters or less.
94	62.5% UPC SCC-14 w/HR	Prints 14 characters. 13 characters entered. 4.05, 4.12, 4.13, 4.15 Numeric Only (0-9) Check character automatically calculated.
96	70% UPC SCC-14	Prints 14 characters. 13 characters entered. 4.05, 4.12, 4.13, 4.15 Numeric Only (0-9) Check character automatically calculated.
97	CODE 128	Variable length.1-50 characters 4.05, 4.12, 4.13, 4.15 Code 128 subset A and autocodes
98	UPC-A BAR CODE w/HR	Prints 12 characters. 11 characters entered 4.05, 4.12, 4.13, 4.15 Numeric Only (0-9) Check character automatically calculated.
99	UPC-E BAR CODE w/HR	Prints 6 characters. 5 characters entered 4.05, 4.12, 4.13, 4.15 Numeric Only (0-9) Check character automatically calculated.

Editing Bar Code Fonts

1 Select PEL FONTS from the program cube.
2 Select the Bar Code Font tab.
3 Select the Source Bar Code Font.
4 Select the Wide Bar and Space value.
5 Select the Narrow Bar and Space value
6 Select a Bold setting.
7 Select Add to Font List.
8 Click ✕ to close the window.



Creating SCC-14 Bar Codes

The CIDS/SE and the Value Series are capable of printing 62.5%, 70%, 80%, 90% and 100% magnification SCC-14 bar codes. The table shown below lists the typical settings for each magnification of the SCC-14.

Review the table closely. Notice that various printhead types can print the same magnification of bar code. Review the printhead and encoder type of the intended printstation model before assigning a bar code to a template.

Typical Settings:

Print-head	**Mag/ DPI**	**Font**	**Bold *BO***	**Offset *OF***	**Width *WI***	**Height *LO***	**Wide Bar *WB***	**Nar-row Bar*NB***	**Wide Space *WS***	**Nar-row Space *NS***
192/32	62.5/150	294	0	0	2	32	7	1	9	4
256/32	62.5/300	594	1	12	1	22	14	3	21	10
256/32	70/300	794	0	12	1	23	16	4	23	11
256/32	80/300	894	0	12	1	25	19	5	26	12
256/32	100/300	994	2	12	1	30	25	8	30	13
352/32	62.5/213	494	0	8	2	22	11	3	14	6
352/32	70/213	594	0	8	2	23	13	4	16	7
352/32	80/213	694	0	8	2	25	15	4	18	7
352/32	90/213	794	0	8	2	28	17	5	20	8
352/32	100/213	894	0	8	2	30	18	6	22	9

Modulo 10 Check Digit

The Modulo 10 calculation.

1. Add the values of the digits in positions 1, 3, 5, 7, 9, and 11.
2. Multiply this result by 3.
3. Add the values of the digits in positions 2, 4, 6, 8, and 10.
4. Sum the results of steps 2 and 3.
5. The check digit is the smallest number which, when added to the result in step 4, produces a multiple of 10.

Example: Assume the bar code data is 01234567890.

1. 0 + 2 + 4 + 6 + 8 + 0 = 25
2. 20 x 3 = 60
3. 1 + 3 + 5 + 7 + 9 =25
4. 60 + 25 = 85
5. 95 + X = 90 (next highest number of 10), therefore X = 5 (checksum).

Appendix A - PEL Printheads

The Diagraph PEL 96/32, 192/32, or 352/32 printhead is a high-resolution printing device designed to work with the Diagraph CIDS/SE controller and the Value Series Ink Jet system. Diagraph's designation of "352/32" stands for 352 orifices or nozzles fed by 32 discrete channels. With 11 orifices per channel, this printhead prints sharp, dark characters.

- **Specifications**
- **Interior**
- **Angles for Mounting**
- **Cleaning & Priming**
- **Installing the Front Cover**
- **Flushing**

Printhead Specifications

Print Speed 2.5 images per second at line speeds of 150 feet per minute (45.7 meters per minute) for text, graphics and bar codes. Actual results may vary depending on image density.

Print Resolution 96, 192 or 352 dots per vertical inch with 32 addressable channels, 213 dots per horizontal inch for the 352/32 printhead. 142 dots per horizontal inch for the 96/32 and 192/32 printheads.

Print Lines One to five lines (alphanumeric text) and/or one bar code with human-readable text

Fonts/Styles 1/8 to 2 in. (printhead dependant); 5-dot to 32-dot tall characters; upper and lower case, bold, condensed and slanted

Bar Codes Interleaved 2 of 5, Code 39, Code 128, EAN-13, UCC/EAN-128, SCC-14, SSCC-18, UPC-A, UPC-E

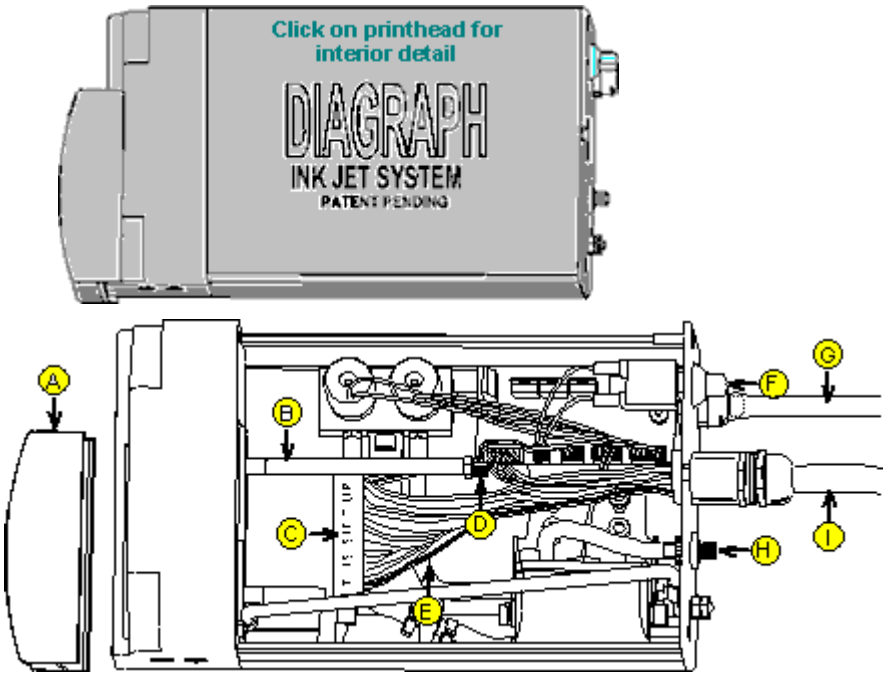
Ink Throw Up to 1/8 inch (3.2 mm) from substrate

Ink Type Glycol based for porous surfaces

Ink Colors Black

Dimensions 2.75 inch H, 5 inch W, 8.25 inch L (70 mm H, 127 mm W, 635 mm L)

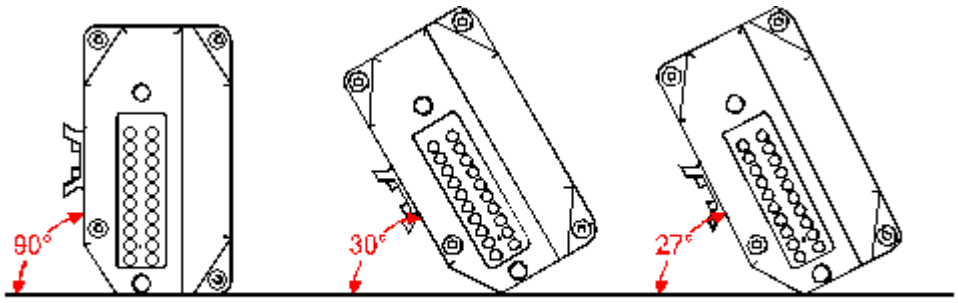
Interior View



A-Snap cover face plate
B-Outlet tube
C-“Side Up” marker
D-Purge Cap
E-Red wire
F-Prime Switch
G-Ink Line
H-Vent cap
I-Printhead cable

Setting Printhead Angles

The printheads should be set at the angles shown:



352/32 Printhead

192/32 Printhead

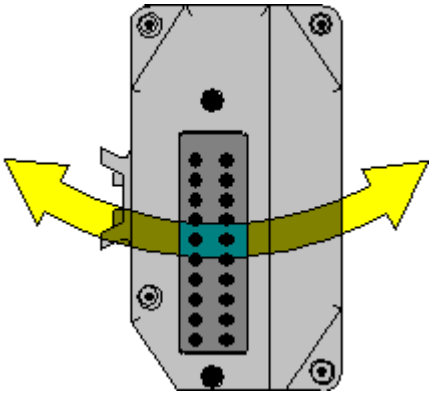
96/32 Printhead

Cleaning and Priming Printheads

Supplies: This procedure requires a 5/64 inch hex key, a box of lint-free wipes (Diagraph PN 6600-396) and a tube of Reduran® hand cleaner (Diagraph PN 1901-398)

Frequency: Daily or when printing like the sample above

1. Place a clean, lint free wipe over orifices.
2. Push the prime switch until ink runs from the orifices.
3. Gently wipe side to side along the narrow dimension to absorb ink. Repeat with a clean wipe. Show Me
4. Do not rub hard, in a circular motion, or upward, to avoid clogging the orifices with fibers

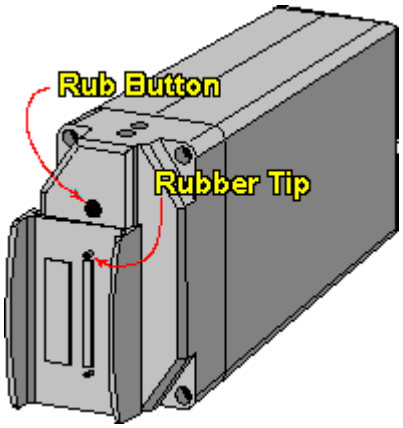


Installing the Front Cover

1. Clean and prime printhead as previously described.
2. Wait 15 minutes after turning off power before attaching the front cover or the printhead will leak ink.
3. Clean the front cover with a clean wipe.

4 Attach the front cover to the face plate and take care to align the rubber tips on the back of the cover with the rub buttons on the face of the printhead.

Show Me



NOTE: If you place the front cover on a hot printhead and do not fasten it securely, the printhead will weep ink until the head has cooled down.

Flushing the Printhead

Flushing eliminates air and debris that cause gaps in the printing. Purging after the first time start-up will eliminate tiny air bubbles in a print channel.

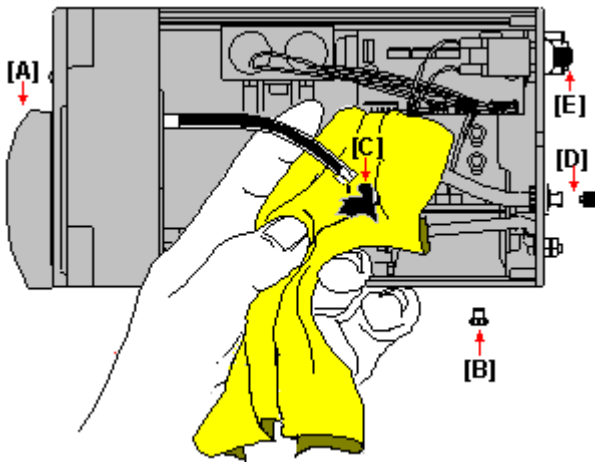
On rare occasions, debris will enter through an orifice or an air bubble may be ingested. Both circumstances produce a gap in the print. Take the following steps to expel the debris or air bubbles.

Wear suitable eye protection whenever handling ink.

1 Allow the printhead 10 to 15 minutes to warm up.

2 Remove the printhead top cover with hex keys.

3 Clean and prime as previously described. Snap on faceplate cover. Make sure that it is installed in the correct position with tips in line with the rub buttons on the face of the printhead **[A].**



4 Remove the vent cap **[D]**. This cap is for shipping only and must be removed before operation.

5 Remove the luer plug **[B]** from the printhead drain line.

6 Place an absorbent wipe under the drain line to catch ink as you flush **[C]**.

7 Push the prime switch **[E]** for 5 seconds of ink flow while watching for air bubbles.

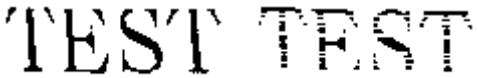
8 Repeat until ink flows without air bubbles.

9 Replace the luer cap **[B]** while pushing the prime switch **[E]** to keep ink flowing through the purge cap and prevent air from entering. Do not overtighten the fitting.

10 Leave the faceplate cover on for an additional 5 to 10 minutes; push the prime switch once before removing the faceplate cover. Clean and prime as previously described.

11 Wipe off outside of the printhead.

12 Check that all orifices are working by printing a message in font 31. If the test print shows striping like the samples shown below, repeat this flushing procedure.



This procedure may have to be repeated three to five times to be effective. When print samples are satisfactory, replace the top cover of the printhead.

Appendix B - PEL Controller

- **Controller/IDS Specifications**
- **Driver Board Settings**
- **System Settings**

Controller/IDS Specifications

Microprocessor 32-bit CMOS 68332
Input Device Hand-held terminal or PC
COM Ports Primary RS-232, Auxiliary RS-232/RS-485
Peripheral Ports Two product detect, two shaft encoder, external alarm
Software (stand alone) Real time clock, Julian/Gregorian date, item count, pallet/batch count, expiration date, inverted printing
Message Storage (stand alone) Battery-backed RAM—stores 100 messages, up to 99 characters per line
Multi-tasking Maximum two production lines with two printheads per line
Multi-printhead Up to four printheads (up to 20 lines of print)
Multi-font 5-dot to 32-dot high, upper/lower case, bold, condensed, slant
Cabinet Industrial-type enclosure with security lock
Diagnostics LED indicators for photocell signal, printhead voltages, input device, low ink
Field Upgrade Drop-in boards for on-site upgrades
Electrical 110V-115V 3A max. or 220V-240V 1.5A max.
Temperature 50°-95°F (10°-35°C)
Humidity 10-90% RH (non-condensing)
Weight 46 pounds (20.87 kg)
Ink Capacity 500 ML and 1 Liter Bottle
Distance from

Printheads 40 ft (12.2 m) maximum ink line length, with 20 ft (6.09 m) maximum vertical separation
Options Remote I/O Interface
Dimensions 16 in. H, 8 in. W, 20 in. L (406 mm H, 203 mm W, 51 mm L)

CIDS/SE Driver Board Settings

PMC version 3.03 of the driver board is required for a CIDS/SE controller to operate the ULTRAJET II printheads.

Driver Board Switch 1. The printhead driver board has one switch that should be configured to factory default.

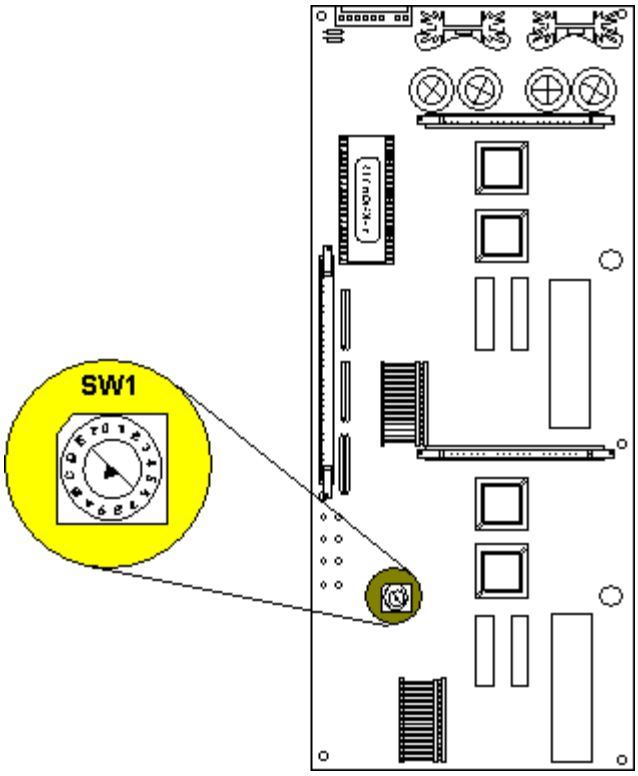
Switch 1 sets the amount of voltage sent to the printhead(s) according to the type of printhead you are using. Use the charts following for voltage settings.

PRINTHEAD DRIVER BOARD 1

SWITCH SETTING	HEAD A	HEAD B
0	OFF	OFF
1	OFF	Not Used
2	OFF	96
3	OFF	192/352
4	Not Used	OFF
5	Not Used	Not Used
6	Not Used	96
7	Not Used	192/352
8	96	OFF
9	96	Not Used
A	96	96
B	96	192/352
C	192/352	OFF
D	192/352	Not Used
E	192/352	96
F	192/352	192/352

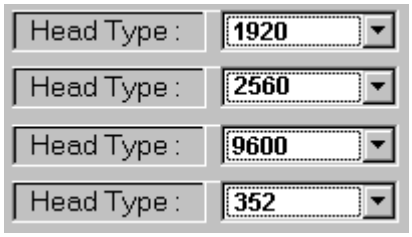
PRINTHEAD DRIVER BOARD 2

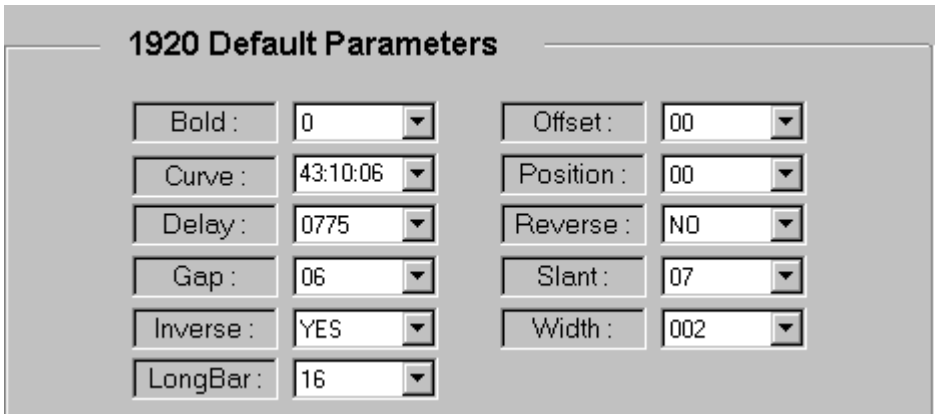
SWITCH SETTING	HEAD C	HEAD D
0	OFF	OFF
1	OFF	Not Used
2	OFF	96
3	OFF	192/352
4	Not Used	OFF
5	Not Used	Not Used
6	Not Used	96
7	Not Used	192/352
8	96	OFF
9	96	Not Used
A	96	96
B	96	192/352
C	192/352	OFF
D	192/352	Not Used
E	192/352	96
F	192/352	192/352



System Settings for the CIDS/SE

For a successful start-up, make sure that system variables have been set to default values.





Encoder Connection

For PEL systems requiring an encoder, Diagraph recommends a 142/213-dpi encoder with bracket, Diagraph part number 2460-710.

Start cable routing at the controller. Route cable for the encoder down through the stand column and out to the encoder. The DB9 connector on the controller end plugs into **ENCODER_1** on the controller.

Photosensor Connection

For PEL systems requiring a photosensor, Diagraph recommends a proximity photosensor with a mounting bracket, Diagraph part numbers 5100-600 and 2460-180.

Mount the photosensor within one inch of the printhead. Keeping it close to the printhead eliminates image area restrictions and line speed limitations.

Start cable routing at the controller. Route the photosensor cable down through the stand column and out to the photosensor. The DB9 connector on the controller end plugs into **PHOTOCELL_1** on the controller.