User's Manual

Value Series/PEL High Resolution Ink Jet Printer VS/PEL

2480-023
Revision B

Diagraph® CORPORATION

3401 Rider Trail South • St. Louis/Earth City, MO. • **1-800-521-3047**, *ServiceLine* **1-800-526-2531**

TROUBLESHOOTING ADDENDUM

One known issue with the VS/PEL is the keyboard's behavior when a low ink signal is activated. To correct the problem, follow the steps below.

Apparent Keyboard Lock-up After a Low Ink Signal

A: Low Ink Signal – Phase I

1. The alarm is activated and the display indicates a low ink condition. There will also be an audible intermittent beep.
2. The system will continue to print and operate for twenty minutes.

B: Low Ink Signal – Phase II

1. A steady tone, replacing the beep, is now audible.
2. The print mode is disabled.
3. Five minutes into this phase the keyboard response slows down. The keyboard still works by typing a key and waiting for the LCD to update before typing additional keys.
4. Replace the ink.
5. Cycle power OFF/ON.

Diagraph

Value Series/PEL
High Resolution
Ink Jet Printer
(VS/PEL)

2480-023

Operations Manual

Revision B

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SYSTEM SPECIFICATIONS

CONTROLLER/INK DELIVERY SYSTEM

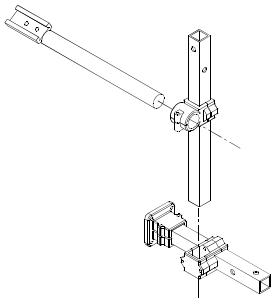
Microprocessor:	32-bit CMOS 68332
Input Device:	Value Series keypad or PC
Communication Ports:	RS-232/RS-485 Input & Output
Peripheral Ports:	Product detect, shaft encoder, external alarm
Software (stand alone):	Real time clock, Julian/Gregorian date, item count, pallet/batch count, expiration date, inverted printing
Message Storage (stand alone):	Battery-backed RAM
Multi-font:	5-dot to 32-dot high, upper/lower case, bold, condensed, slant
Cabinet:	Industrial-type enclosure
Diagnostics:	LED indicators for photocell signal, printhead voltages, input device, low ink
Field Upgrade:	Drop-in boards for on-site upgrades
Electrical:	100-240 VAC 1.5 A
Temperature:	50°-95°F (10°-35°C)
Humidity:	10-90% RH (non-condensing)
Ink Capacity:	13.0 Fluid ounces; (383 ML)
Options:	Low ink beacon, power cord
Dimensions	8.25 in. x 11 in. x 7 in.

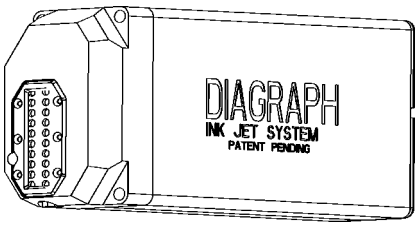
VALUE SERIES PRINTHEAD

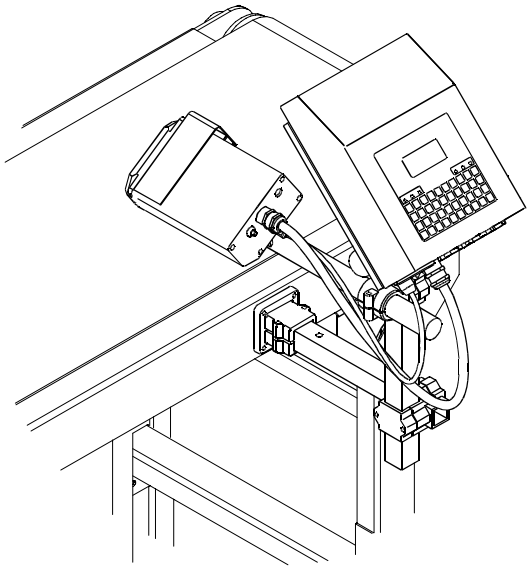
Print Speed:	Printhead	Scanable Bar Code Maximum	Alphanumeric Maximum
	9600	200 fpm	300 fpm
	1920	200 fpm	300 fpm
	2560	150 fpm	150 fpm
Print Resolution:	96, 192 or 256 dots per vertical inch with 32 addressable channels/pixels		
Print Lines:	One to five lines (alphanumeric text) and/or one bar code with human-readable interpretation		
Fonts/Styles:	1/8" to 2" (printhead dependent); 5-dot to 32-dot tall characters; Upper/lower case, bold condensed, slanted		
Bar Codes:	Interleaved 2 of 5, Code 39, Code 128, EAN-8, EAN-13, Postnet, UCC/EAN-128, UPC-A, UPC-E		
Ink Throw:	Up to 1/8" (62 mm) from substrate		
Ink Type:	Glycol based for porous surfaces		
Ink Colors:	Black		
Dimensions:	5.25 in. x 3.5 in. x 8.5 in.		

BRACKETRY AND CIDS PRINTHEAD

Qty	Items	Diagraph P/N
1	96/32 Printhead 3/4" solid character, 32 channels 96 orifices	2460-190
	OR	
1	192/32 Printhead 1" solid character, 32 channels 192 orifices	2460-192
	OR	
1	256/32 Printhead 2" solid character, 32 channels 256 orifices	2460-196







CHAPTER 1 • INSTALLATION

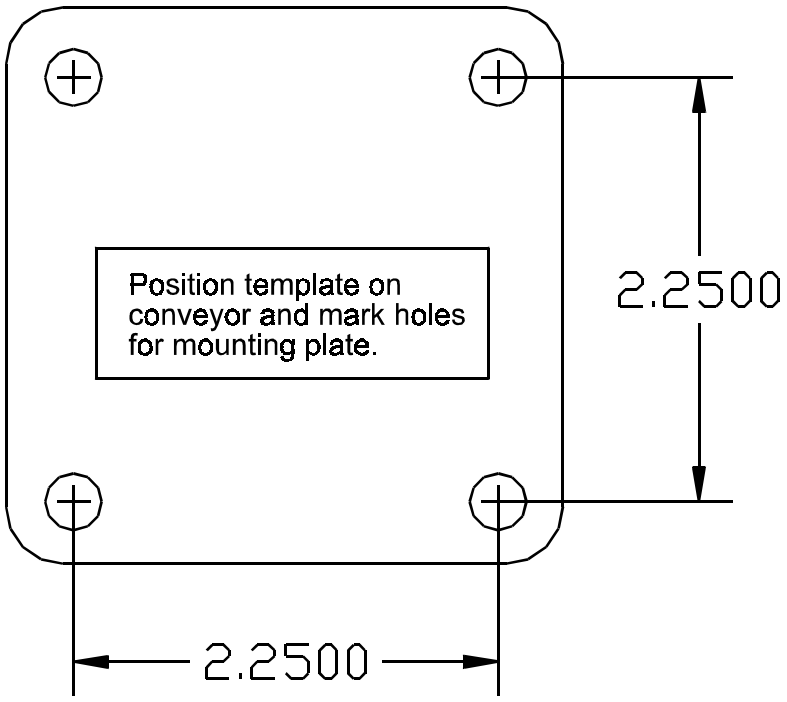
REQUIREMENTS

Conveyor Successful installation and operation of a VS/PEL printhead system depends on a conveyor that moves product smoothly and is isolated from extraneous vibrations. There are five requirements for a suitable conveyor :

Belt	Seamless splice or hidden laces;
Frame	Flat table beneath belt (not rollers);
Drive	Direct or timing belt;
Free-Standing	The print station conveyor should not be connected to infeed or outfeed conveyors to isolate it from the vibrations produced by packaging equipment.
Guide Rails	Positioned to guide cartons within 1/8" or less of a printhead and to protect the printhead from any direct contact with the carton.

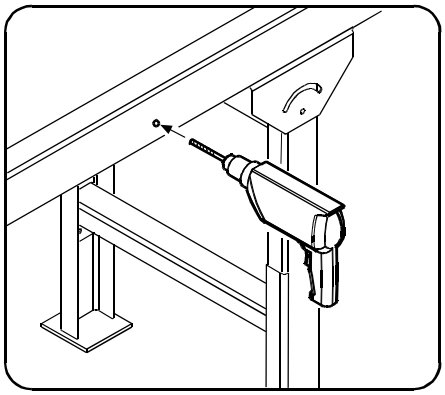
TOOLS NEEDED

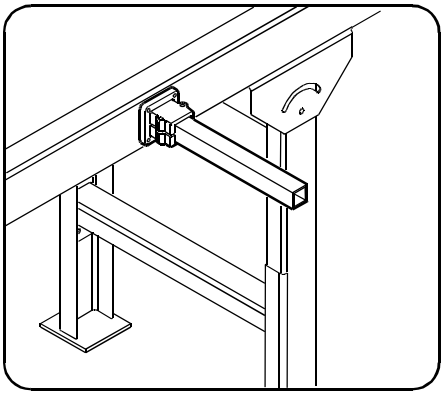
1/2" wrench
5/32" Allen wrench
1/8" Allen wrench
5/64" Allen wrench
1/2" socket
5/16" drill



BRACKETRY INSTALLATION

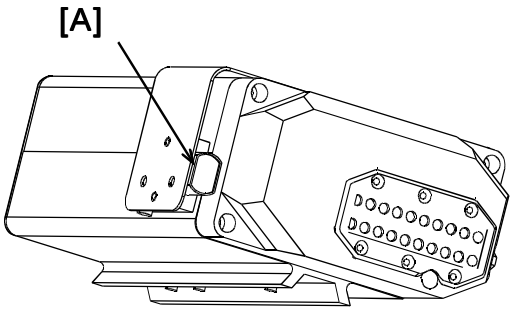
Wear suitable eye protection during installation.





MOUNTING THE PHOTOSENSOR AND ENCODER

The VS/PEL System employs a photocell and a variable-speed encoder. This section details the installation of these peripherals.



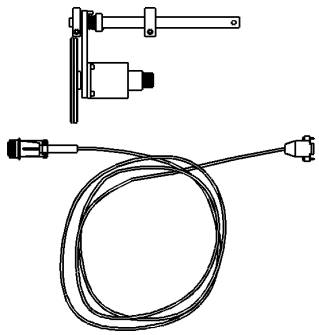
[A] Photosensor

The VS/PEL System comes with a proximity photosensor that detects the product as it approaches the printing station. Mount the sensor upstream of the printhead.

Tools: 5/32 inch Allen Wrench

1. Mount the photosensor **[A]** to the left of the printhead when the product travels left-to-right and on the right side for right-to-left travel.
2. Place the photosensor **[A]** on the side and within an inch of the printhead. Keep it close to the printhead to eliminate image area restrictions and line speed limitations.
3. Connect to the controller as shown below.

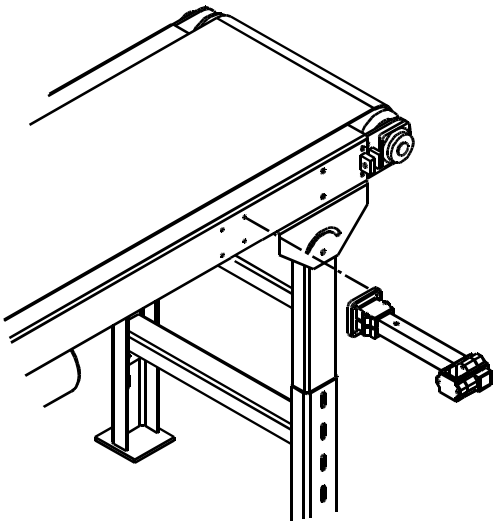
Variable-Speed Encoder

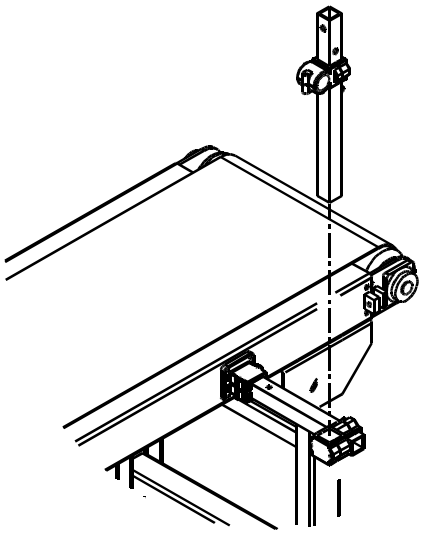


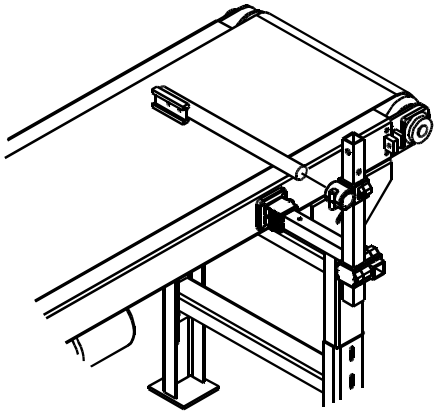
The variable-speed encoder reads the speed of the conveyor and reports to the controller for precise printing. Mount the encoder so that its wheel presses against a firm, moving surface - not where there is play in the belt.

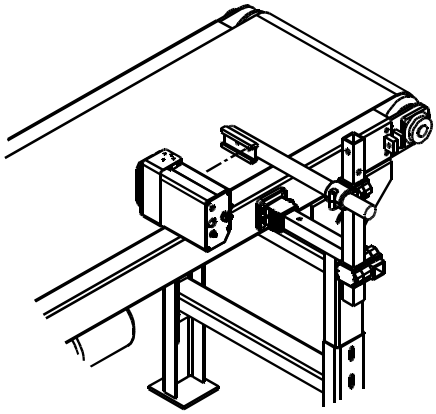
When cabling, connect to the controller as shown below.

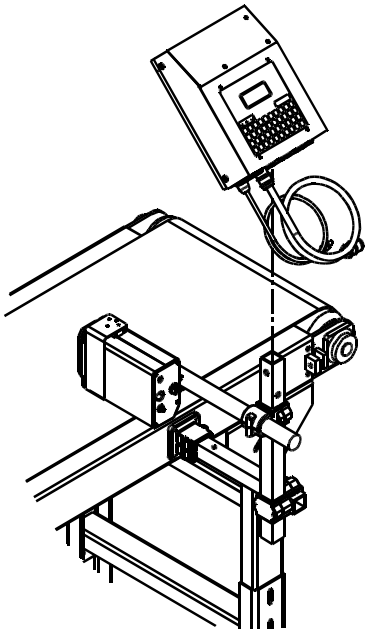
Overall View of System

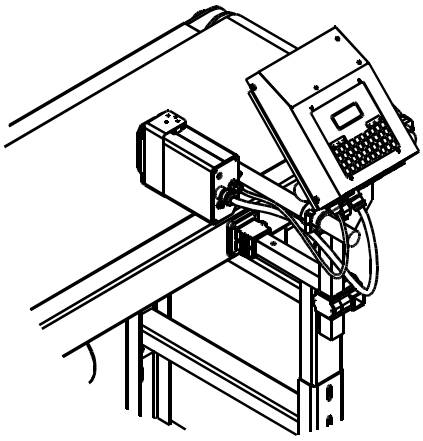


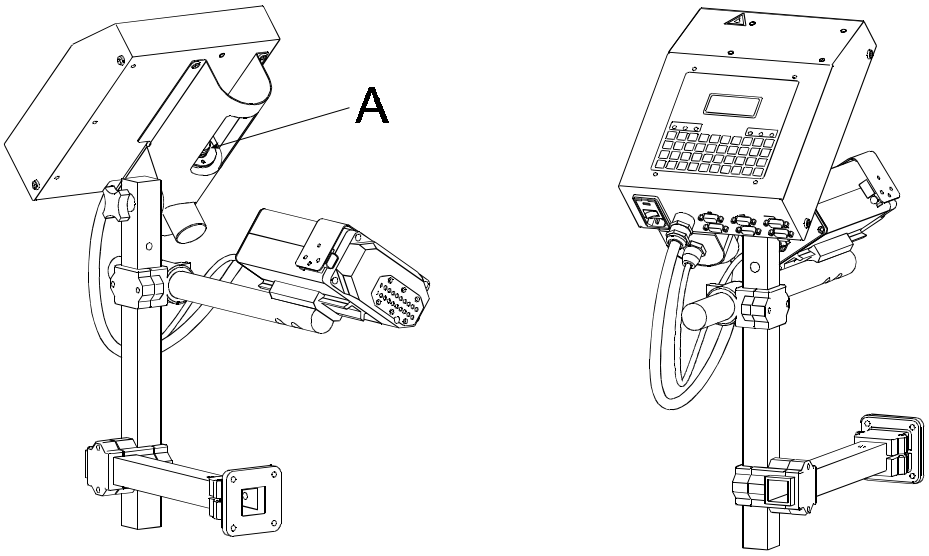




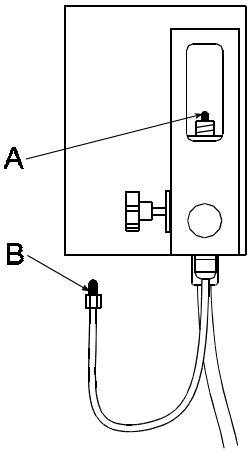








[A] - Remove Shipping Cap Before Inserting Ink Can



A - Shipping Cap for Ink Can

B - Shipping Cap for Ink Line

CHAPTER 2 • CONNECTIONS

ELECTRICAL CONNECTIONS

All external connections are made through ports located on the bottom panel of the Controller.

Type of Printhead	Printhead Description
9600 Integrated	1/2", 96 orifices, 32 channels
1920 Integrated	1", 192 orifices, 32 channels
2560 Integrated	2”, 256 orifices, 32 channels

1. Determine the printhead type for your system.
2. Open the Controller by removing the lower four screws along the seams between the side panels and the back panel of the controller. Leave the top two screws in place but loosen each slightly so they can act as hinges.
3. Lift the front cover and swing it back so the top housing screws can function as hinges.

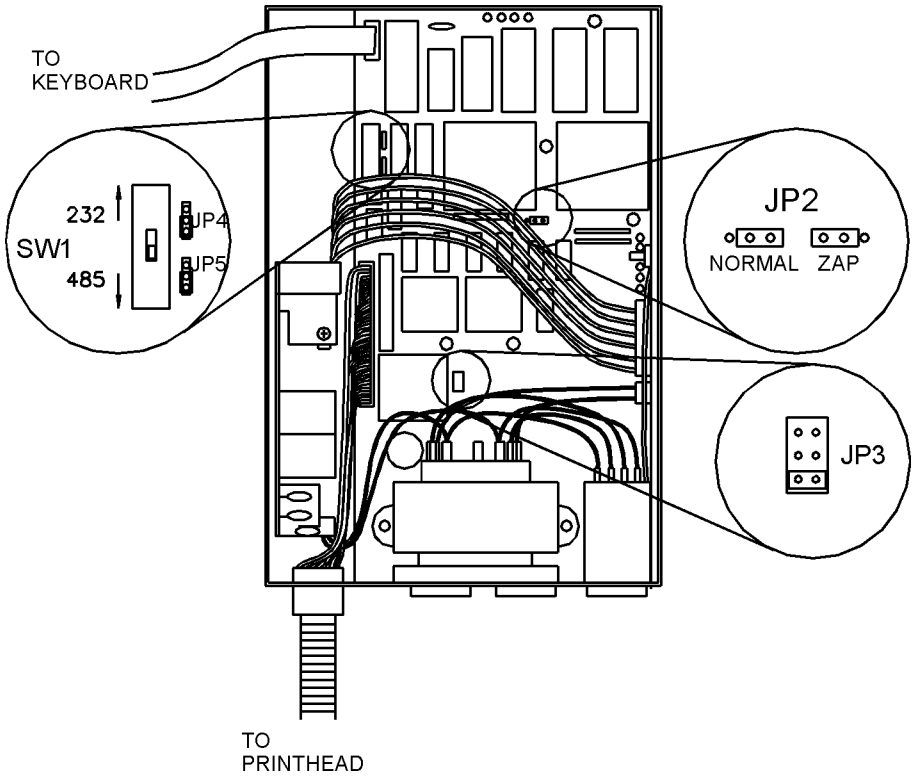


Figure 2-A Internal Controller Connections

4. Locate the jumper labeled JP3. This selects the correct printhead drive voltage.
5. For the 9600 series printhead, install the jumper over pins 2 and 5. For the 1920 and 2560 series, install the jumper over pins 3 and 4.

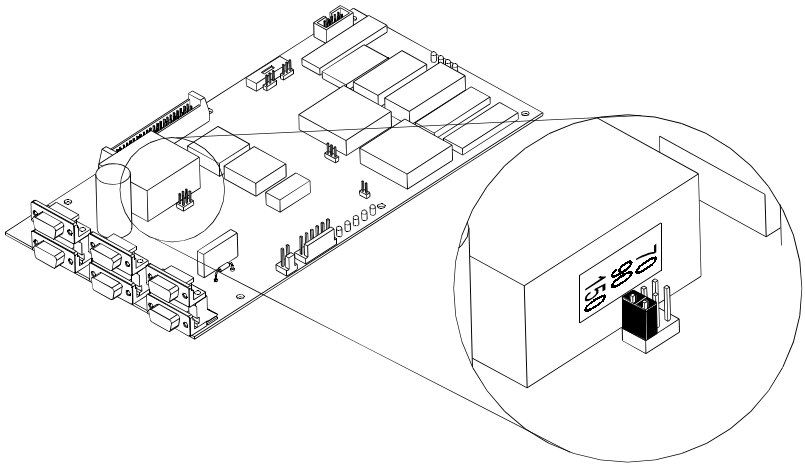
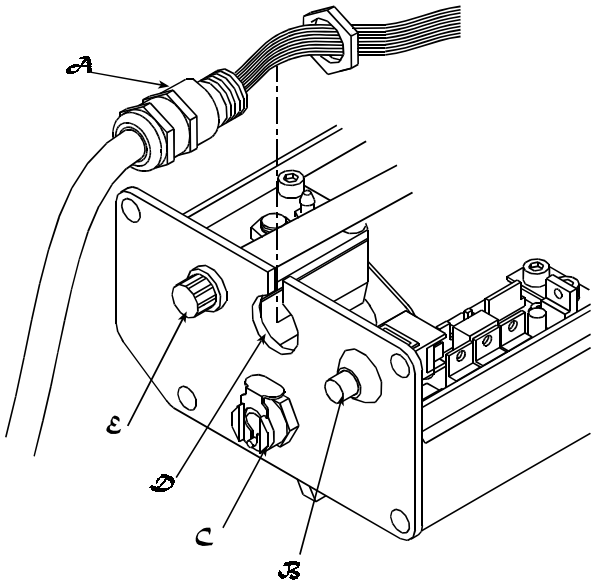


Figure 2-B JP 3 Set-up

Connecting the Printhead

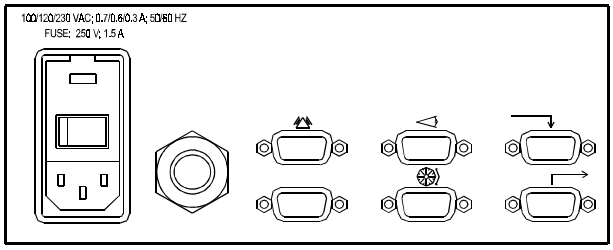
1. Remove printhead cover with a set of hex keys.
2. Insert cable with the label side up. Be sure the cable is securely seated into the key way.
3. Connect the ink line.
4. Remove the vent cap.
5. Replace the printhead cover.



[A] Cable Nut
[B] Prime Button
[C] Ink Line Fitting
[D] Key Way
[E] Vent Cap

Figure 2-C Internal Printhead Cable Connections

Carefully install the umbilical cable. Incorrect cable installation will result in damage to the equipment.



	Alarm
	Photosensor
	Network In
	Encoder
	Network Out

Figure 2-D Bottom View of Controller

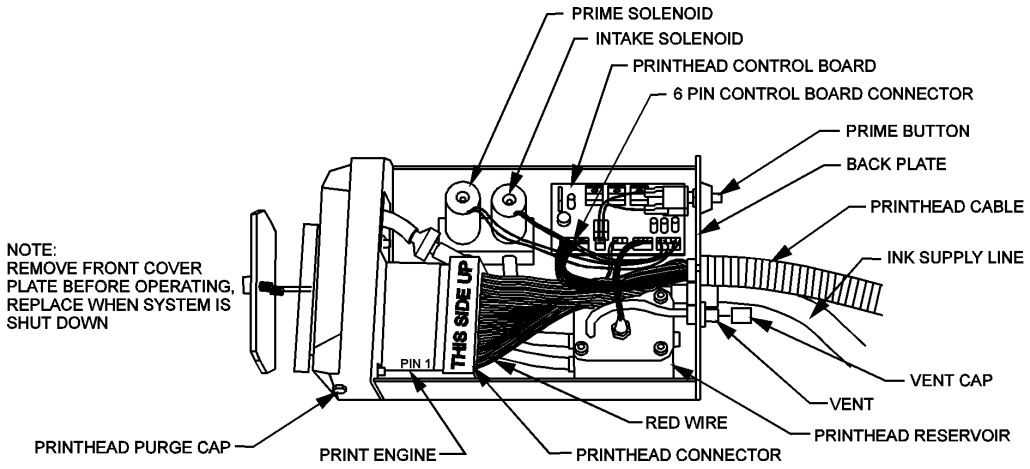


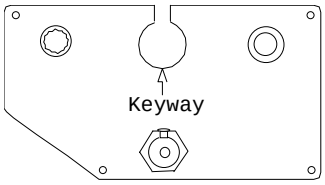
Figure 2-E View of the Printhead

MECHANICAL CONNECTIONS

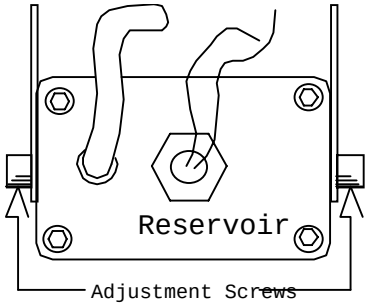
Printhead Cable Connections

1. Remove the four screws from the printhead cover and remove the cover. Identify the components from the illustration above.
2. Loosen the large nut on the bulkhead fitting on the printer cable.
3. Identify the top of the cable printhead connector from the "This Side Up" label. If the label is missing, connect the cable with the red wire to Pin 1 as shown in the figure above.
4. Carefully push the female printhead connector onto to the male connector on the back of the piezoelectric print engine.

DO NOT MOVE THE CONNECTOR ON THE PRINT ENGINE UP AND DOWN. Flexing the connector can crack the piezo crystals and ruin the printhead.



5. Push the 6-pin control board connector onto the printhead control board.
6. Work the printer cable down into the keyway in the back plate.
7. Insert the back cover keyway seal into the keyway and tighten the nut loosened in step 2 against the black plate—finger tight only.

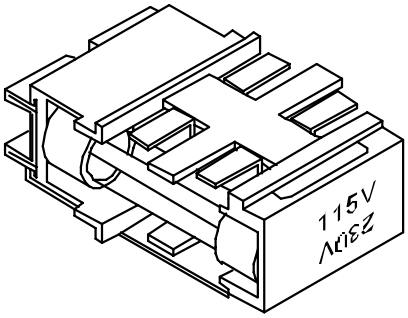


8. The position of the ink reservoir in the back of the printhead can be adjusted. Loosen its mounting screws and adjust it as close to level as possible.
9. Place the reservoir in a level position and tighten.
10. Replace the printhead cover with the four screws.
11. Remove the vent cap and shipping cap. Keep these caps for future storage or shipment of the printhead.

Before plugging in the power cord, make sure that the power switch, located on the Power Entry Module, is in the OFF position (Press the 0 on the ON / OFF switch).

Power Cable Connections

1. Select the correct voltage, either 110v or 220v. Each controller is set at the factory for: 110-120v, 1.5A 50 / 60Hz or 220-240v, 1.5A 50 / 60Hz.
2. When the correct voltage is displayed in the power module window, insert the power cord into the power entry module.



3. Insert the other end of the power cable into a 3-wire grounded outlet.

Application Notes:

1. Mount the photosensor so that it is downstream from the product.
2. Both the Controller and printhead housings are industrially strong but not watertight. Mount the equipment away from wash-down areas and be sure to cover during wash-downs.
3. The maximum printhead throw distance is 0.125, or 1/8 inch. For best printing, mount the printhead no farther than 1/16 inch from the product.
4. Position the printhead to avoid collisions with moving products. Product handling is very important to the successful operation of this equipment. Large amounts of shock or vibration can cause print deterioration, or even damage to the printhead.

CONFIGURATION

Before printing a message with your system, the following firmware configurations must be made:

COMMAND	SETTING
EN (Set Encoder)	Y/N
ID (Set Network ID)	If applicable, assign a ID number to each network station
WI (Width)	1 for encoder 12 without encoder
SL (Slant)	7 for 9600/1920 printhead 0 for 2560 printhead
CU (Curve*)	18:00:00 for 9600 printhead 17:05:04 for 1920 printhead 13:05:06 for 2560 printhead
OF (Offset)	0 for 9600/1920 printhead 12 for 2560 printhead
IN (Invert)	Y

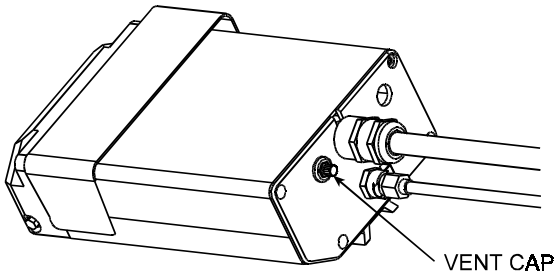
*NOTE: If the default Curve value of 16:04:03 is used, frequent depriming may occur. As a result, frequent priming or flushing will be necessary.

CHAPTER 3 • OPERATING PROCEDURES

Be sure to complete all connections before operating the system. Follow the procedures outlined below to start the system.

START-UP PROCEDURES

First Time Start-up: Be sure to remove the vent cap.

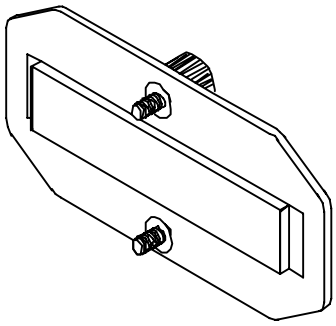


1. Turn the power switch ON.
2. Turn ON the Controller power and wait 2 to 3 minutes for the printhead to reach operating temperature. The printhead is at operating tempera- ture when the letter “A” disappears from the heating status line.
3. The ink status line (INK LOW) will show an "A" between the asterisks if ink is low.

Printhead A Heating	INK LOW * * HEATING*A * COMMAND (A):
Printhead A at Temperature	INK LOW * * HEATING* * COMMAND (A):

Note: The printhead cannot print until it reaches operating temperature.

4. Do not remove the front plate on the printhead until it has warmed up for 15 minutes. To remove the front plate, turn the two screws counterclockwise.



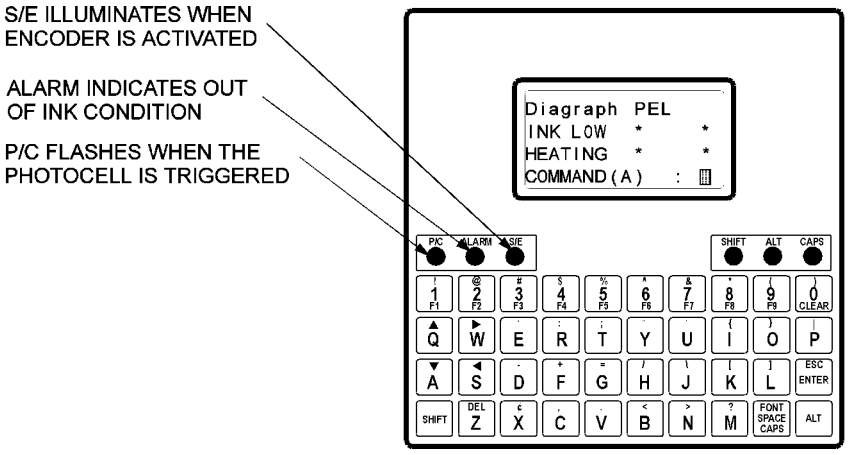
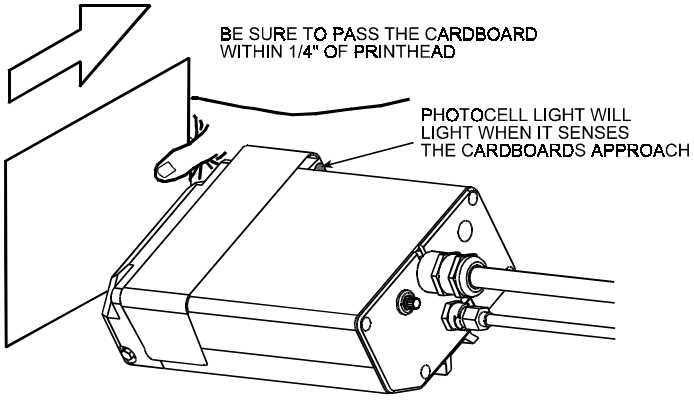


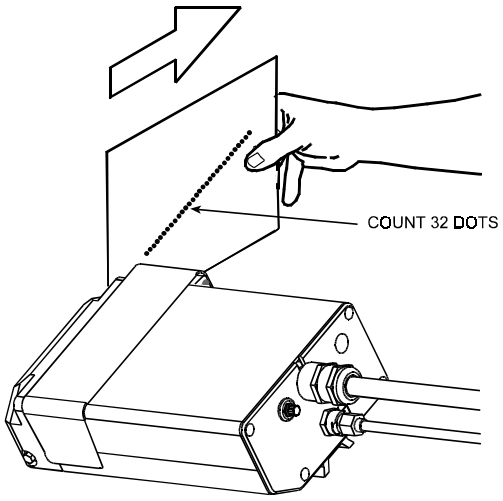
Figure 3-A Keyboard

5. Prime the printhead and use an absorbent cloth to clean the face plate (refer to Appendix D for priming procedures).

6. Type **TE**(ENTER) to run the Test command.

Pass a clean, light colored cloth, or paper, within a 1/4" to a 1/2" of the printhead to ensure that all 32 channels are operating. Prime the printhead until all 32 channels are printing. If this does not occur, refer to Section 6 Troubleshooting**.**

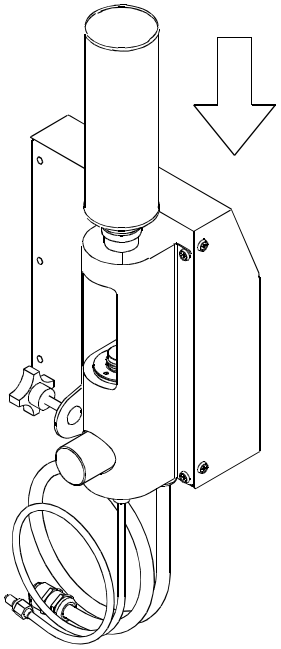




REPLACING THE

INK CONTAINER

You can observe a low ink status from the host computer or the keyboard. Change the ink can as soon you observe the low ink condition.



3-B Ink Can

Wear suitable eye protection whenever handling ink.

1. When the controller determines a low ink condition, it turns on the alarm LED and starts a twenty minute timer.
2. If the ink is not replaced within twenty minutes, the controller will stop printing.
3. Reset the controller by supplying a full can of ink to the unit.
4. As a function of the ink low firmware, it may take up to thirty-five seconds for the ink low alarm condition to clear. The red alarm LED will turn OFF.

NOTE: Anytime the unit is powered up, the alarm LED will light for up to thirty-five seconds, regardless of the ink supply state. If the ink is not low, the LED will turn OFF. If the ink supply is low, the alarm LED will remain lit until a new ink supply is installed.

4 • CREATING A MESSAGE

In this section we will create a simple message to print.

1. At the Main Menu Command prompt type **ED** ENTER. This command allows you to create and edit messages as well as select fonts.
2. Enter the message number and press ENTER.

```
E D I T   M S G   [ 0 - 2 4 ]


* A *                   :   1
```

```
M S G  0 1   L 1   F   5
- - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -
```

⇑ Scroll down to display last two lines.

3. Message 1 will print using Font 5.
4. To change the font, press ALT + FONT ENTER. The cursor moves to the top of the screen. Select the font number (see Appendix F for font samples). **NOTE:** Enter font number with a leading zero if the font is a single digit (for example, F05).

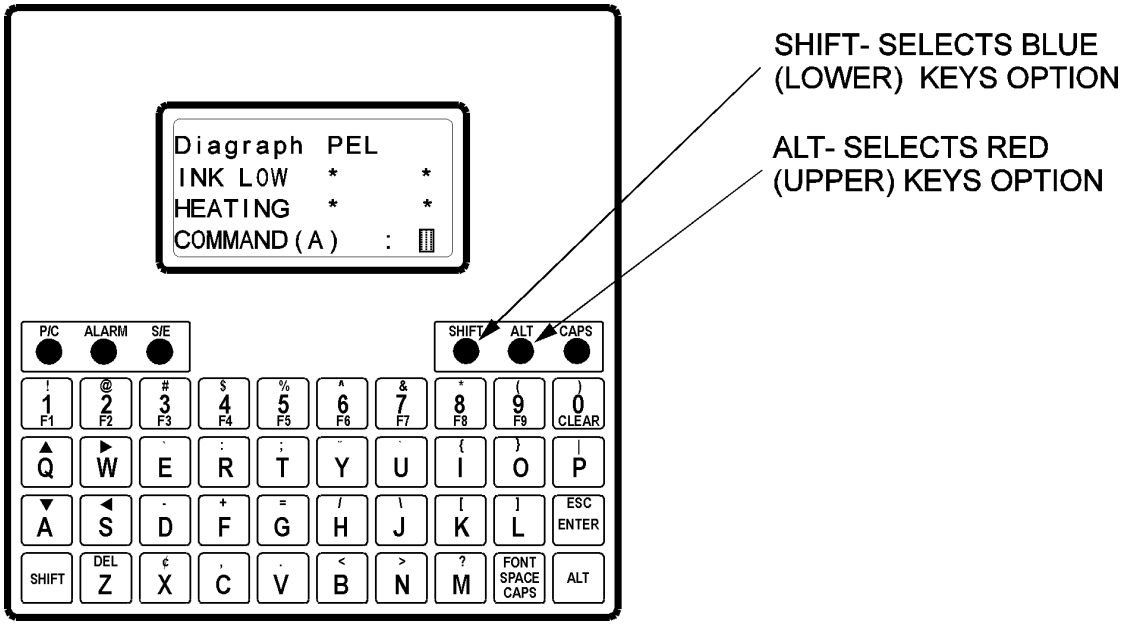


Figure 4-A Keyboard

5. Type your message. Use the ALT + down arrow to go to the next line.

```
M S G      0 1   L 1   F      5
W E L C O M E    D i a g r a p h
V S / P E L    S y s t e m
```

- - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - -

6. After completing the message, press ENTER. You will return to the Command/Status screen.
7. Type **SE** ENTER at the command prompt and select your message to print.
8. If your message does not print correctly, see Section 6, Troubleshooting.

Application Notes:

1. You can edit your message, or change fonts, while it is still printing. In order to see your message changes you must reselect the message.
2. Type **ED** ENTER and select the message number.
3. Make your changes at this time. Press ENTER when finished.
4. For example, to add a boldness level to the font, select Font and add a number from 1-9. The message below will now print using Font 5 with a boldness of 1.

```
M S G   0 1   L 1   F 1 0 5
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
- - - - - - - - - - - - - - -
```

4.1 • CREATING A BAR CODE MESSAGE

1. Type **ED** (ENTER) at the Main Menu Command prompt.
2. Enter the message number and press (ENTER).
3. To select a bar code font, press ALT + FONT (ENTER). The cursor moves to the top of the screen. Select the bar code font number (see Appendix F for font samples).
4. Type your bar code data. It is important to be familiar with the parameters of the bar code symbology that you are using. For example, an I 2 of 5 bar code is numeric only. Use the ALT + down arrow to go to the next line.
5. Use the default values for the wide / narrow bar width and the wide / narrow space width (see the example below). For special cases, see Appendix D for tables listing bar code symbology dimensions and magnifications.
6. After completing the message, press (ENTER). You will return to the Command / Status screen.
7. Type **SE** (ENTER) at the command prompt and select your message to print.
8. If your message does not print correctly, see Section 6, Troubleshooting.

```
Wide Bar Width      ⇒
Narrow Bar Width    ⇒
Wide Space Width    ⇒
Narrow Space Width  ⇒
```

```
M S G   0 2     L 1   F 2 9 2
0 0 0 1 2 3 4 5 6 7 8 9 0
7
1
9 - - - - - - - - - - - - - - -
4 - - - - - - - - - - - - - - -
```

9. Message 2 will print an I 2 of 5 bar code with a boldness of 2 and the following parameters: wide bar width = 7, narrow bar width = 1, wide space width = 9 and the narrow space width = 4.

4.2 • CREATING A MESSAGE FOR A 2560 PRINTHEAD

Before printing with the 2560 printhead, there are specific system configuration requirements necessary:

- A 300 DPI encoder (part no. 6600-603)
- Mount the 2560 printhead perpendicular to the motion of the substrate with the ink line going into the top of the printhead
- Mount the ink system 0.25" to 0.5" below the lowest printhead orifice.

After correctly configuring the hardware, several software parameter values must change. Below is a table of default settings for all printhead types.

PEL Controller Commands	2560 Printhead Parameters	1920/9600 Printhead Parameters
Slant	0	7
Width	1	2*
Offset	12	0
Level	Y	Y
Curve	13-05-06	1920 = 17:05:04 9600 = 18:00:00

* Width = 1 if using a 6600-602 encoder

NOTE: For the 2560 printhead, if the Slant value is not set to 0, the Offset value is ignored. Use the Offset command to adjust the print image to conform with the odd and even channels of the printhead.

4.2.1 I 2 of 5 Bar Code Specifications for 2560 Printhead

The 2560 printhead can print various bar code magnifications but will default to a 62.5% magnification. For different magnifications, enter the default element widths after saving the message. The Bold setting in bar code messages only affects the human readable text.

Command	Magnification			
	62.5%	70%	80%	100%
Long Bar	20	22	24	32
Wide Bar	8	18	22	26
Narrow Bar	2	5	7	9
Wide Space	10	20	24	28
Narrow Space	4	8	10	11
Bold (human readable text only)*	5	7	8	9

*The Message Bold or Global Bold command may have to increase or decrease in order to center the human readable text under the bar code.

5 • PROGRAMMING

The controller keyboard or a host computer can control the VS/PEL controller via the Rear Port.

The control commands through the rear port are concise with no prompts because this system has been designed for speed in control and data transfer.

COMMAND SUMMARY

Below is a list of commands used by the Controller keyboard and the rear COM port. Enter each command with the first two letters of the command which appear in bold type for clarity in the table below.

Command	Description	Type	Range [Default]
ACk	Acknowledgment	U	Y/N [N]
BAud Rate	Selects the Baud Rate for the Rear Port	C	9600, 19.2K, 38.4K 9600
BOld	Sets the width of the printed characters	E	0-9 [0]
CAll/SAve	Saves command information to a call group	U	0-31 [0]
Change **P**assword	Changes current password protection names	U	
CLear Map	Clears input and print buffers	U	Y/N [N]
COunters	Indicates the number of print cycles ***(display only)***	U	No range
CUrve	Controls the primary pulse width, amplitude and secondary pulse width	C	1920: 17-05-04 2560: 13-05-06 9600: 18-00-00
DAte	Sets or displays the current date	C	
DElay	Controls print location	E	0-9999 [0]
DIsplay	Display	C	1-4 [3]
EDit	Allows message entry and control	E	0-99
ENcoder	Specifies the use of a variable-speed encoder	C	Y/N
EXpir. Date	Allows setup for expiration date	C	0-999 [0]
GAp	Sets the spacing between characters	E	0-99 [01]
INvert	Turns message upside down	C	Y/N [N]
ID	Identification in a Network Application*	C	1-99
LEvel	Enables the CUrve command		Y/N
Label **R**etrieve	A network command that allows labels to be retrieved from the system.*	U	
Label **S**ave	Network message save*	U	
LOng Bar	Sets the height of bar codes	C	1-32 [8]
NEtwork	Selects the network mode*	C	Y/N
NUmbers	Setup of product count routines	U	0-99999999
OFset	Timing control for dual column 256 printhead	U	0-99 [12]
Pass**w**ord	Enables password protection	C	Level 1, 2, or 3
POsition	Adjusts vertical position of a message	U	0-32 [0]
REverse	Reverses the message	C	Y/N [N]
ROllover	Allows setup of printing auto shift codes	U	
SElect	Selects the messages to print	E	0-99

Command	Description	Type	Range [Default]
SHift Set	Allows setup of three different auto shifts	U	1-3 [1]
SIgn In	Password protected log in	U	
SLant	Adjusts the angle of the printed message	C	0-31 [7]
Small Bar	Sets height of the small bar of bar codes	C	1-32 [16]
Sign **O**ut	Password user log out	U	
Status	Displays the status of the printer	U	
Test	Test prints all 32 channels	U	
Time	Sets or displays the current time	C	
Trigger Edge	Polarity of the product detect signal	C	R/F [R]
Verify	Verification of graphic download	U	
Vibrate**	Enables printhead vibration routine	C	0-15
Width	Controls the printing resolution	C	1-255 [1]
Zap	Resets all parameters to default settings	U	Y/N [N]

*Command used only in network configurations and not discussed in this section.
**This command for technical diagnosis only. Invoking this command will radically effect print quality and continued operation.

COMMAND STRUCTURE

The VS/PEL controller has three sets of commands: **C**onfiguration, **E**diting and **U**tility. The Configuration commands are used during the setup of the printer. Incorrect use of these commands can lead to serious application failures.

The Editing commands allow you to edit, store and select messages for printing, as well as change the appearance of the printed message.

The Utility commands consist of diagnostics, print feature adjustments and specialty tools for the advanced user.

Command Prompt

The Command Prompt is the first screen that appears on the terminal display and it shows the status of the printhead.

The Command Screen

```
INK LOW *      *
HEATING*       *
COMMAND (A):
```

Command Selection

At the COMMAND prompt, enter a command by typing the first two letters of the command name as shown in the table above.

Options

Wherever possible, the system will try to help you remember the expected input by displaying acceptable options in square brackets — [ ]. For example, if the system is expecting a Yes or No response, [Y/N] will appear.

Some messages allow the use of the left and right arrows to partially change the command. For example, with the date command, you can edit the month while leaving the year and day unchanged.

Saving Changes

After entering changes, you can save the new parameter or abort the changes. Press ENTER to save the changes or ESC to abort the changes.

Keyboard Functions

There are three sets of key options on the VS/PEL System keyboard—black, blue and red.

Note: Press the ALT and SHIFT keys each time a function key is needed.

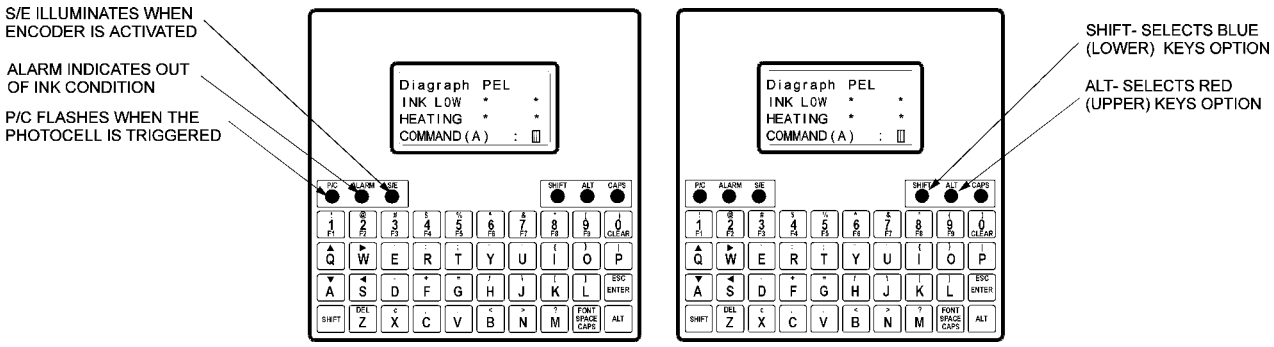


Figure 5-A Keyboard Function Keys

CONFIGURATION COMMANDS

This section contains several commands that allow you to configure the system for a particular application. Below is a list of all the configuration commands followed by a detailed description of each command.

BAud Rate	**ID**	**SL**ant
CUrve	**IN**vert	**SM**all Bar
DAte	**LO**ng Bar	**TI**me
DIsplay	**OF**fset	**TR**igger Edge
ENcoder	**P**ass**w**ord	**VI**brate
EXpiration Date	**RE**verse	**WI**dth

Carefully set all of these commands at the beginning of the application. Setting commands incorrectly, can lead to long delays during the installation.

EDITING COMMANDS

There are five commands that enable you to edit, store, and select messages for printing, or change the appearance of the printed message:

Bold	**GA**p
Delay	**SE**lect
Edit	

Note that the EDIT and SELECT commands work together to print a programmed message.

UTILITY COMMANDS

This section contains commands for diagnostics, printing adjustments, and specialty tools for the advanced user.

Acknowledge	**L**abel **R**etrieve	**S**ign **O**ut
CAll / Save	**Nu**mber	**SH**ift Set
Change **P**assword	**Of**fset	**ST**atus
CLear Map	**Po**sition	**TE**st
COunters	**Ro**llover	**VE**rify
Label **S**ave	**SI**gn In	**ZA**p

CODE PAGES

These optional Asian characters are accessed by using Font 16 and Font 32 only. To access:

1. Hold down the ALT key and press P. A | appears.
2. Type the Code Page number needed.
3. Hold down the ALT key and press P. A | appears.
4. Select the key associated with the Code Page character.
5. Repeat this sequence when using a two line font.

See Appendix E for Code Page characters.

Example 1:

A ▲ character is needed in a message.

1. Hold down the ALT key and press P.
2. Type 1.
3. Hold down the ALT key and press P.
4. Type Q.
5. The following screen appears:

|1|Q

Example 2:

Two characters, with a space between, from different Code Pages is needed. You must use Code Page 1 to insert the space. The following screen illustrates the correct code sequence:

|3|L|1|press Space Bar|2|S

HOST COMMANDS

This section details all commands supported for the VS/PEL system in stand alone operation. Representations of each command screen follows.

AC - Acknowledge Enables acknowledgment from the rear port of receipt-of-message to the print buffer.

Type	Keystrokes	Range	Default
U	AC*x*<ENTER>	Y or N	N

Y = return a character from the rear port; N = do not return a character from the rear port.

BA - Baud Rate Changes the baud rate for the rear communications port.

Type	Keystrokes	Range	Default
C	BA <ENTER>	9600, 19.2K, 38.4K	9600

Use the arrow key to toggle between the variables 9600 baud and 19.2 or 38.4 kilobaud.

BO - Bold Sets the global boldness level, the number of times each pixel in a character repeats. The higher the bold level, the darker the printed character.

Type	Keystrokes	Range	Default
E	BO*n*<ENTER>	0-9	5

n = dot multiplier or bold value. Entering a value between 0 and 9 multiplies the number of dots for each character: 0=1 1=2 2=3 3=4 etc. For example, when a 5X5 character (Font 5) prints with a bold value of 2, the 5X5 character becomes a 5X15 character, 5 pixels high and 15 pixels wide.

CA - Call/Save Saves information to a call group of related messages such as text, a bar code and a logo as one unit.

Type	Keystrokes	Range	Default
U	CA*nn*<ENTER>	0-31	0

A parameter group can be saved to thirty-two different file locations. When a file is saved and then edited afterwards, it must be saved again before exiting or changes will be lost. There are nine saved parameters in the parameter group: BOLD, GAP, DELAY, REVERSE, INVERT, SELECT, EXPIRATION DATE, WIDTH, SLANT.

CP - Change Password Enables a Level 1 user to add or delete two passwords for both Level 1 and Level 2 access.

Type	Keystrokes	Range	Default
U	CP<ENTER>	Level 1	"inkjet"
		Level 2	"111111111111111"

Enter on the top line, the Level 1 password; on line two enter the password for Level 2. The default Level 1 password is "inkjet" and Level 2 is "111111111111111" (fifteen ones). A password cannot exceed fifteen characters in length.

CL - Clear Enables the deletion of invalid messages by clearing the print buffers.

Type	Keystrokes	Range	Default
U	CL*x*<ENTER>	Y or N	N

x = Y / N; Y clears the print buffers and N does not clear the print buffers.

CO - Counters Displays what is happening in the command NUMBERS.

Type	Keystrokes	Range	Default
U	CO<ENTER>	Upper: 00000001 Lower: 99999998 Rep: 000 Inc: 001	

Useful only for monitoring.

CU - Curve Controls the width of the primary pulse, the amplitude and the width of the secondary pulse.

Type	Keystrokes	Range	Default
C	CU<ENTER>		17-05-04

CU disabled until enabled by the LE command.

Default values are set for the 1920 printhead. When printing with the 2560 printhead, change the values to 13-05-06. A 9600 printhead values are 18-00-00.

DA - Date Sets or displays the current date

Type	Keystrokes	Range	Default
C	DA*mmddyy*<ENTER>	No range	No default.

Enter the new date with the numeric values for month, day and year:

mm = 2-digit month (01, 02,...12)
dd = 2-digit day of the month (01, 02,...31)
yy = 2-digit year (00, 01,....99)
Use ← and → to change only part of the date.

Autocodes, listed with the EDIT command, allow date entry into a message for printing.

DE - Delay Controls the delay between the product detection and the start of printing. It changes the position of the message on the product without having to adjust either the printhead or the photocell.

Type	Keystrokes	Range	Default
E	DE*n*<ENTER>	0-9999	440

n = delay value. The delay value represents either internal oscillator pulses or the variable-speed encoder pulses divided by the value that is in the WIDTH command. Enter a new value of delay by entering the numeric value.

DI - Display Selects the type of terminal emulation.

Type	Keystrokes	Range	Default
C	DI*n*<ENTER>	1-4	Last terminal type in use.

n = type of terminal. Choices are 1 for VT100, 2 for Wyse, 3 for hand-held controller and 4 for ASCII.

ED - Edit Allows message creation and editing. Since it has more than one function, this command is actually a sequence of keystrokes. Message creation consists of three steps: assigning a message number; choosing a font and setting the boldness; and text entry of the message with autocodes.

1)Assigning a Message Number

Keystrokes	Range	Default
ED*nn*<ENTER>	0-24	Last message edited.

nn = the message number. Type in the message number in the message area of the screen and press <ENTER>. If the desired message number is already on screen, move to step 2.

2) Selecting a Font or Logo and Assigning a Message Boldness Value

Keystrokes	Range	Default
<ALT><Fnt>*nnn*	Font 1-99; Bold 100-800	No default

<ALT><Fnt> moves the cursor to the upper right corner of the screen. To select a font, reference the font chart at the end of this section and type a number from 1 to 99. For example, if you wanted to the message to print with font 9, type **9**. To change the boldness value for this message, type the bold value THEN the font. Since message bold values are in increments of a 100, you must enter **409** for the message to have a bold value of 400 with font 9. Setting the bold value through the EDIT command affects only a single message while the BOLD command resets a global bold value. If you select a font that is invalid, the font assignment will revert to the last used valid number.

2a) Selecting a Logo

Logos are custom-ordered and downloaded to a font assignment from XX to XX. Selecting a logo to print consists of entering the edit screen, pressing <ALT> plus <Fnt> then typing the logo's font number assignment. Assigning different bold values to logos alters their shapes. Try different values and observe the results. When done, press <ENTER>. It is not necessary to enter text or numbers in the message field to print the logo.

3) Message Entry

After selecting the font and adding a bold value, enter your message with text, numbers and special characters. The entries that follow show the editing options and autocodes available in an SE controller.

3a) Editing Options

Most editing operations require key combinations with the ALT key:

ALT ←	Moves the cursor left one character.
ALT →	Moves the cursor right one character.
ALT ↑	Moves the cursor one line up.
ALT ↓	Moves the cursor one line down.
ALT SHIFT C	Clears the text on all lines.
ALT Clr	Deletes the character behind the cursor position.
ALT Fnt	Selects the font for the message.
ENTER	Quits the Edit command and saves all changes.
ALT ESC	Quits the Edit command and aborts all changes

3b) Entering Autocodes into a Message

The edit command also allows autocodes for time, date, expiration date, numbers, rollover dates and shift codes. To enter autocodes into the message, enclose the correct variables in braces. For example, an entry of **{HO}** will insert the hour.

3b1) Autocodes for Date

{AD}	Inserts the Alphabetic Day (Mon, Tues, etc.)
{AM}	Inserts the Alphabetic Month (Aug, Sept, Oct, etc.)
{DA}	Inserts the day
{DT}	Inserts Month Day Year
{JD}	Inserts the Julian Day (1-365)
{MO}	Inserts the month
{YE}	Inserts the Year
{YL}	Inserts the Last digit of the Year (3, 4, 5)

3b2) Autocodes for Time

{HO} Inserts the Hour
{MI} Inserts the Minute
{SE} Inserts the Second
{TI} Inserts Hour:Minute:Second

3b3) Autocodes for Expiration Date

{EC} Inserts the Expiration Month:Day:Year
{ED} Inserts the Expiration Day
{EJ} Inserts the Expiration Julian Day
{EL} Inserts the last digit of the Expiration Year
{EM} Inserts the Expiration Month
{EW} Inserts the Expiration Day of Week
{EY} Inserts the Expiration Year

3b4) Autocodes for Rollover Date

{JR} Inserts the Rollover Julian day
{RC} Inserts the Rollover date (11/22/96)
{RD} Inserts the Rollover Day
{RL} Inserts the last digit of the Rollover year
{RM} Inserts the Rollover Month
{RY} Inserts the Rollover Year

3b5) Autocodes for Shift

{SH} Inserts the SHIFT code (A, B, C)

3b6) Miscellaneous Autocodes

{BB} To print reversed images (alphanumerics and logos only)

3b7) Autocodes for Counts

{Ld} Prints a specified digit of the counter as a down counter (d = variable, counter digit to print).
{NL} Prints the counter as a down counter, all 8 digits.
{NU} Prints the counter as a up counter, all 8 digits.
{Ud} Prints a specified digit of the counter as an up counter.
{Vd} Prints a specified digit of the counter as an up counter, unless it is a leading zero.
{Wd} Prints a specified digit of the counter as a down counter, unless it is a leading zero.

For example, {V3V2U1}, as an autocode for numbers, will increase and drop out the leading zeros.

3b8) Variable Space Control & Bar/Space Control

Variable Bar/Space Control enables you to control the bar widths and spaces of selected bar codes. Each bar code capable of this control is controlled in a specific format. The bar code will default to the Diagraph recommended values. If the application requires the bar code to differ from the standard, call Diagraph Technical Support for instructions on adjusting.

EN - Encoder Enables the use of a variable speed encoder.

Type	Keystrokes	Range	Default
C	ENx<ENTER>	Y/N	Last state used.

x = Y or N; Y will enable an encoder and N will disable it.

EX - Exp. Date Sets an expiration date.

Type	Keystrokes	Range	Default
C	EXnnn<ENTER>	0-9999	0

Allows a special set of autocodes to alter the real time clock by the value entered through this command. An alteration of this clock has to be within 0 - 999 days.

Autocodes, listed with the EDIT command, allow expiration date entry into a message for printing.

GA - Gap Controls the spacing between characters.

Type	Keystrokes	Range	Default
E	GAn<ENTER>	0-99	5

n = character space. Enter a numeric value.

IN - Invert Turns a printed message upside-down.

Type	Keystrokes	Range	Default
C	IN*x*<ENTER>	Y or N	N

x = Y / N; Y inverts the message and N keeps the image upright.

ID - Identify Identification in a network application.

Type	Keystrokes	Range	Default
C	ID<ENTER>	1-99	

This command is activated by the Network command. Each controller within the network is given a specific ID number. Enter a value from 1-99 for each controller. A number cannot be used more than once in a network.

LE - Level Enables the CUrve command.

Type	Keystrokes	Range	Default
C	LE<ENTER>	Y or N	N

LR - Label Retrieve Network command to retrieve labels.

Type	Keystrokes	Range	Default
U	LR<ENTER>		

LS - Label Save Network command to save labels.

Type	Keystrokes	Range	Default
U	LS<ENTER>		

LO - Long Bar Determines the number of channels that will print the long bar on various bar codes. The more channels the taller the bar.

Type	Keystrokes	Range	Default
C	LOnn<ENTER>	1-32	16

nn = height of bar codes (1-32). The values represent channels. Since the printhead has 32 channels, entering 16 will allow 16 channels to print and create a long bar 16 channels high. See Section 9 for a complete list of all long bar settings.

NE - Network Selects the network mode.

Type	Keystrokes	Range	Default
C	NE<ENTER>	Y or N	N

NU - Numbers Enables product and batch counting. The counter can count positively or negatively, increase by a multiplier, repeat by a multiplier or simply be set as a count routine.

Type	Keystrokes	Range	Default
U	NU*nnnn*<ENTER>	See Defaults Lower: 00000000 Rep: 000 Inc: 001	Upper: 99999999

Use the arrows to move the cursor over the area that is to be changed and enter a new value. UPPER is the value that the count routine will attain. LOWER is the value that starts the count. REP is the value that determines how many times a count repeats. INC is the value by which the count sequence increases.

Autocodes (listed under the EDIT command) allow entry into a message for printing. For example, to count from 1 to 100 by 5 and repeat each count 3 times, enter **{V3V2U1}** in the message line: 0,0,0 / 5,5,5 / 10,10,10 / 15,15,15 etc.

OF - Offset Provides print alignment when printing with the 256 printhead.

Type	Keystrokes	Range	Default
U	OF*nn*<ENTER>	0-99	0

nn = ???

PW - Password Allows three levels of users with two specific passwords.

Type	Keystrokes	Range	Default
C	PW<ENTER>	Level 1	"inkjet
		Level 2	"111111111111111"

Level 1 Highest level, allows access to all commands currently supported by the controller.

Level 2 Mid-level, only allows access to the following commands:

Baud Rate	Bold	Call Save	Clear Map	Counters
Delay	Encoder	Gap	ID	Invert
Label Request	Label Save	Long Bar	Network	Numbers
Offset	Position	Reverse	Select	Sign In
Slant	Small Bar	Sign Out	Status	Test Print
Trigger Edge	Verify	Vibrate	Width	

Level 3 Lowest level, allows access to the following commands:

Clear Map	Counters	Delay	Sign In	Status
Test Print	Verify			

To enable password protection, type PW from the keyboard and select 'Y'. You are now signed on as a Level 3 user. To access other levels, type SI and enter one of the two available passwords. To sign out, enter SO and select 'Y'. No password is required for sign out.

When signed on as a Level 1 user, the Change Password (CP) command is available. This allows you to change the Level 1 and Level 2 passwords. The top line is for the Level 1 password and the second line is for the Level 2 password. A password cannot exceed fifteen characters.

NOTE: 1. Powering OFF/ON the controller will not sign off the current user.

2. An emergency password is available. Call Diagraph Technical Support for further information.
3. All commands are available through the Rear Port.
4. When Password is disabled, Sign In, Sign Out and Change Password are not accessible.

PO - Position Adjusts the vertical position of a printed message within the span of the printhead image area.

Type	Keystrokes	Range	Default
U	PO*nn*<ENTER>	0-32	0

nn = number of starting printhead channel

Enter the new POSITION value at this screen. The values represent channels and there are 32 channels in one PEL printhead. Entering 16 will allow the printed message to start at channel 16. The message will scroll if the message goes off of the screen. This is only useful when printing small fonts with very few lines to fine tune the printhead's position.

RE - Reverse Reverses the direction of printing to allow for products to pass the printhead from left-to-right or right-to-left.

Type	Keystrokes	Range	Default
C	RE*x*<ENTER>	Y or N	N

x = Y / N; Y reverses the message and N does not reverse the message.

RO - Rollover Sets an altered real-time clock for printing past the normal hours of the day.

Type	Keystrokes	Range	Default
U	RO*hhmmss*<ENTER>	00:00:00 (midnight) 23:59:59 (1 sec. before midnight)	00:00:00

Enter the altered time with values for hour, minute and seconds in the HH:MM:SS format.

hh = 2-digit hour (00-23)
mm = 2-digit minute (00-59)
ss = 2-digit second (00-59)

Acceptable entries range between 00:00:00 (midnight) to 23:59:59 (1 second before midnight).

Use ← and → to change only part of the time.

Use the autocodes listed in the EDIT command to embed this command into a printed message: {JR}, {RC}, {RD}, {RL}, {RM}, {RY}

SE - Select Selects the message(s) to print from the message library.

Type	Keystrokes	Range	Default
E	SE*n*<ENTER>	0-99	Last selected, or for initial selection, or after a ZAP

n = message number. Enter message names here for either a single message or a string of messages. You can enter a string of messages for printing one right after another. The messages will be stored in the following format: 0-9.

Note that the EDIT command and SELECT command work together to print a programmed message.

SH - Shift Defines different printing codes for three different time shifts.

Type	Keystrokes	Range	Default
U	SH*x*<ENTER>	1-3	1

x = A, B or C for shifts 1, 2 or 3

You can set three shifts for printing by using a specified code (1 - 3). Use this command in conjunction with the autocodes listed in the EDIT command to embed a Shift Set into a printed message (SH is the autocode for printing the shift code).

When a new shift begins, counters are reset. To prevent unwanted counter resets, set all shifts to begin and end at 00:00:00. This uniform time prevents automatic reset of counters. but does allow overlapping shifts. Over-lapping is not recommended.

Note: CODE is an alphabetic character only—numeric values are invalid.

Example: Shift 1: Begin 00:00:00 End 07:59:59 Code A
Shift 2: Begin 08:00:00 End 15:59:59 Code B
Shift 3: Begin 16:00:00 End 23:59:59 Code C

Between midnight and 7:59 AM SH will print Code A. Between 8:00 AM and 3:59 PM SH will print Code B. And between 4:00 PM and 11:59 PM, SH will print Code C.

SI - Sign In Enables you to log into the VS/PEL software. This command is functional only when the Password command is enabled.

Type	Keystrokes	Range	Default
U	SI<ENTER>	None	None

SL - Slant Adjusts the angle of the print to obtain a vertical image.

Type	Keystrokes	Range	Default
C	SL*nn*<ENTER>	0-31	7

nn = Amount to slant print (0-31)

Different slant values change the angle of the printed message. Three variables in combination achieve a vertical image: the SLANT command, the WIDTH command and the mounting angle of the printhead.

SM - Small Bar Determines the number of channels used to print the small bar on the Postnet bar code. The more channels the taller the bar.

Type	Keystrokes	Range	Default
C	SM*nn*<ENTER>	1-32	8

nn = the number of channels to print or the height of small bars in Postnet bar codes (1-32). Since there are 32 channels in the printhead, entering “16” enables 16 channels to fire and create a small bar 16 channels high.

SO - Sign Out Enables you to log out of the VS/PEL software. This command is functional only when the Password command is enabled.

Type	Keystrokes	Range	Default
U	SO<ENTER>	None	None

ST - Status Displays the status of the CIDS/SE printer.

Type	Keystrokes
U	ST

TE - Test Fires all 32 channels for diagnostics on the printhead.

Type	Keystrokes
U	TE<ENTER>

To exit the test mode, press any key except the SHIFT or ALT keys.

TI - Time Sets and displays the current time.

Type	Keystrokes	Range	Default
C	TI*hhmmss*<ENTER>	No Range	None

Enter the new date with the numeric values for hour, minute and second.

hh = 2-digit hour (00-23)
mm = 2-digit minute (00-59)
ss = 2-digit second (00-59)

Use ← and → to change only part of the time. Autocodes, listed with the EDIT command, allow time entry into a message for printing.

TR - Tr. Edge Selects the trigger edge, the positive or negative transitions of the product detector signal as the print-go signal.

Type	Keystrokes	Range	Default
C	TR*x*<ENTER>	R or F	Last state used.

x = Trigger edge (R / F). Select the positive- or negative-going edge of the photocell.

R = rise, the positive-going edge. This setting starts the print cycle on the leading edge of the product. F = fall, the negative-going edge. This setting starts the print cycle on the trailing edge of the product.

VE - Verify Verifies that the VS/PEL controller has received a graphic.

Type	Keystrokes	Range	Default
U	VE<ENTER>	None	None

VI - Vibrate Enables a printhead vibration routine.

Type	Keystrokes	Range	Default
C	VI<ENTER>	0-15	None

NOTE: This command for technical diagnosis only. Invoking this command will radically effect print quality and continued operation.

Setting the value above 5 may cause ink to be ejected when the printhead is not printing and cause depriming.

WI - Width Adjusts the width of the printed message to fit on the product.

Type	Keystrokes	Range	Default
C	WI*nnn*<ENTER>	1-255	1

nnn = Width of message (0-255). The width command value is a divider for encoder pulses—the higher the divider the wider the print.

ZA - Zap Resets all parameters and messages to factory defaults.

Type	Keystrokes	Range	Default
U	ZAx<ENTER>	Y or N	N

x = Y for Yes or N for No.

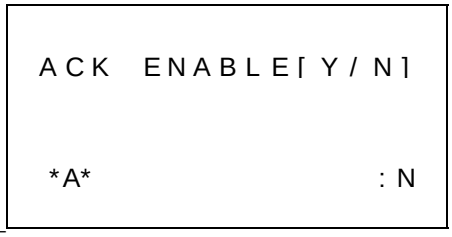
FONT CHART

HR stands for "Human Readable" text.

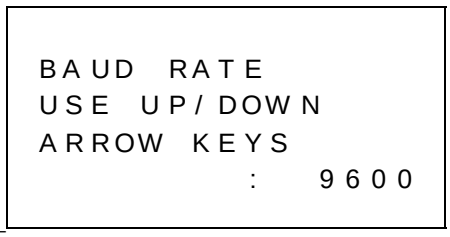
Font	Description	Text Output
1	Micro-Spacing, only allows spaces (no characters)	Spaces
5	5x5 Dot Matrix, Block Character	5 Lines
7	7x5 Dot Matrix, Block Character	4 Lines
9	9x7 Dot Matrix, Block Character	3 Lines
16	14x8 Dot Matrix, Block Character	2 Lines
17	16x8 Dot Matrix, Block Character	2 Lines
31	32x30 Dot Matrix, Block Character	1 Line
32	32x30 Dot Matrix, Block Character	1 Line
40	EAN 13 Bar Code	Bar code
41	EAN 8 Bar code	Bar code
42	Code 39 Bar code (w / HR)	Bar code
43	Code 128 Bar code (w / HR)	Bar code
46	UCC / EAN Code 128 Bar code, Application Identifiers (w / HR)	Bar code
53-58	EPROM logo space	Graphic
50	Diagraph Logo	Graphic
51	Diagraph Logo	Graphic
52	Outlined Recycle Logo	Graphic
59	Custom Graphic	Graphic
60	Custom Graphic	Graphic
61	Custom Graphic	Graphic
90	Postnet Bar code	Bar code
91	Alphanumeric Mixed Font	Up to 4 Lines
92	Interleaved 2 of 5 Bar code	Bar code
93	Code 39 Bar code (without HR)	Bar code
94	UPC Shipping Container Bar code 62.5% (with bearer bars)	Bar code
96	UPC Shipping Container Bar code 70% (with bearer bars)	Bar code
97	Code 128 Bar code (without HR)	Bar code
98	UPC A Bar code	Bar code
99	UPC E Bar code	Bar code

REPRESENTATIONS OF DEFAULT SCREENS

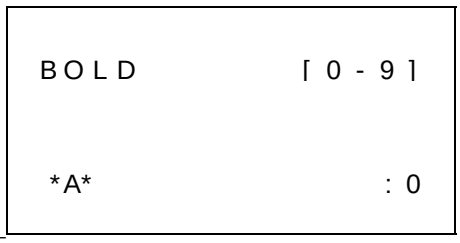
AC - Acknowledge



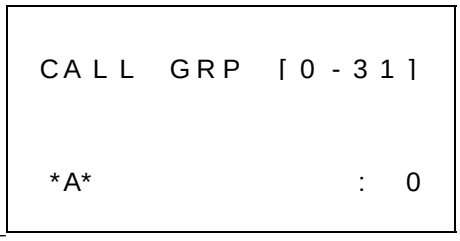
BA - Baud



BO - Bold



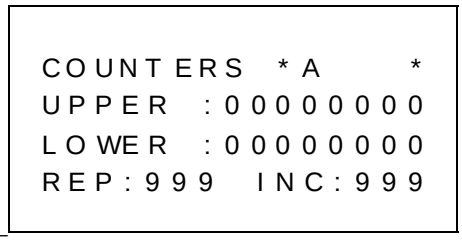
CA - Call/Save



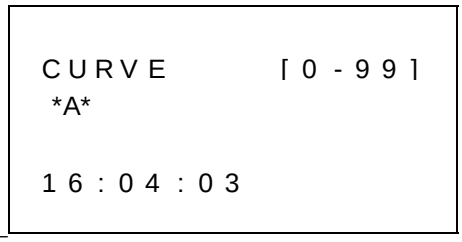
CP - Change Password

CL - Clear

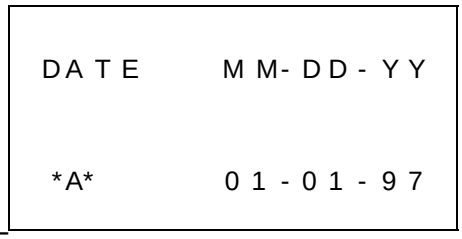
CO - Counters



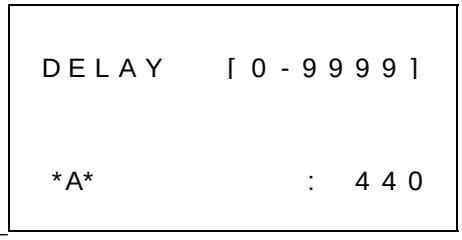
CU - Curve



DA - Date

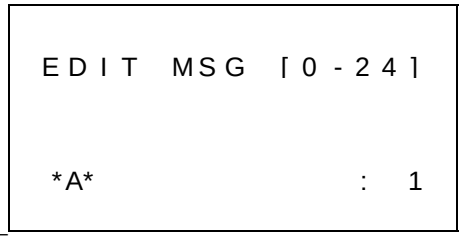


DE - Delay

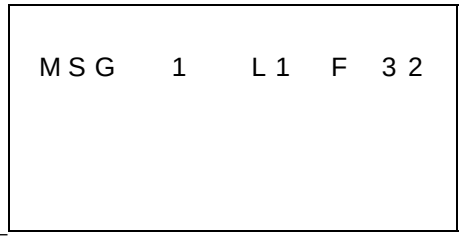


DI - Display

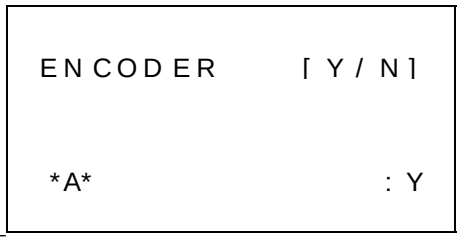
ED - Edit



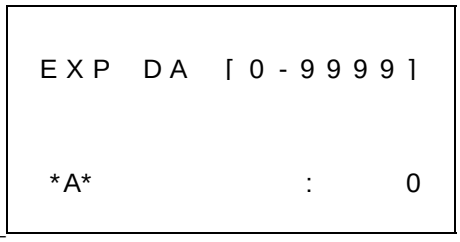
Msg 1



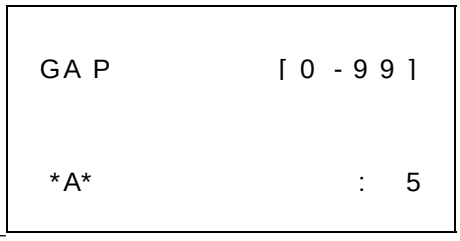
EN - Encoder



EX - Exp. Date



GA - Gap

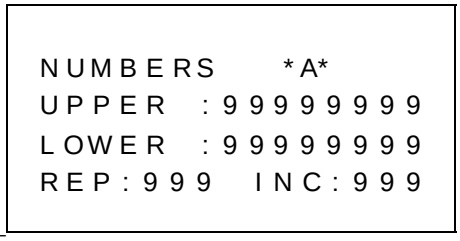


IN - Invert

LE - Level

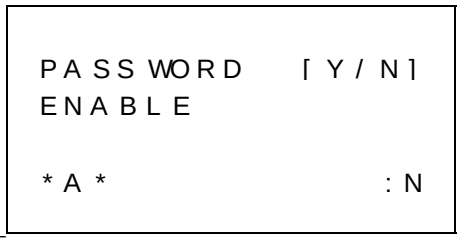
LO - Long Bar

NU - Numbers

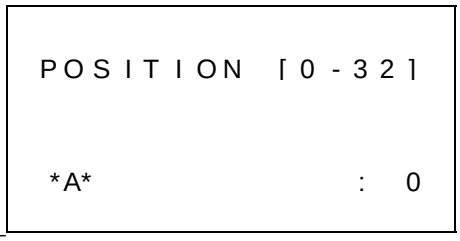


OF - Offset

PW - Password



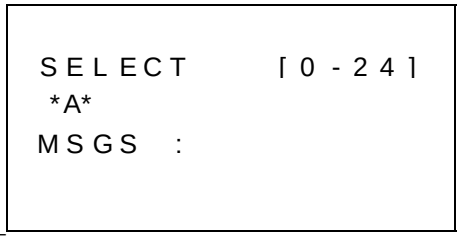
PO - Position



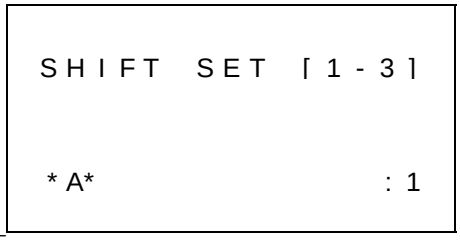
RE - Reverse

RO - Rollover

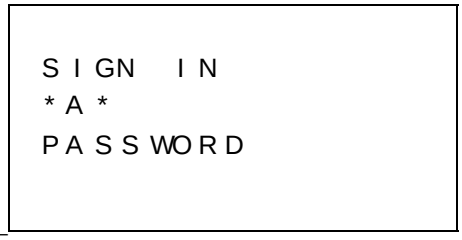
SE - Select



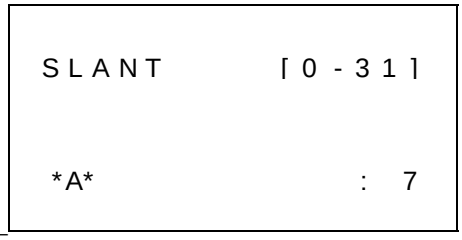
SH - Shift



SI - Sign In

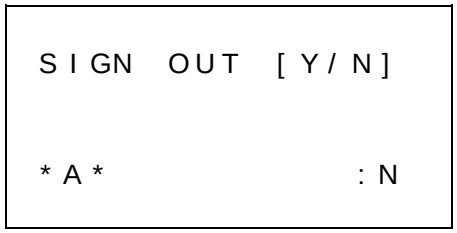


SL - Slant



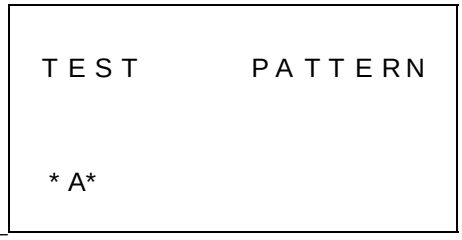
SM - Small Bar

SO - Sign Out



ST - Status

TE - Test



TI - Time

```
TIME      HH:MM:SS

*A*       23:41:1
```

TR - Trigger Edge

```
TRIG EDGE [R/F]

*A*           :Fall
```

WI - Width

```
WIDTH     [1-255]

*A*             :   1
```

VE - Verify

```
VERIFY LOGOS
-  -  -  -
-  -  -  -
-  -  -  -
```

ZA - Zap

```
ZAP           [Y/N]
***POWER OFF***
*AFTER 'Y'<CR>*
                :N
```

6 • TROUBLESHOOTING

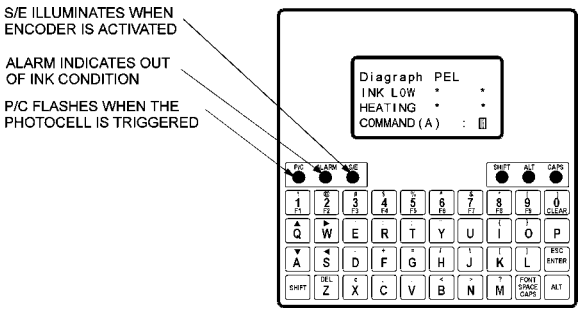
6.0 PRINTING PROBLEMS

The list below shows the problems covered in this section along with their location numbers.

6.1 NOT PRINTING

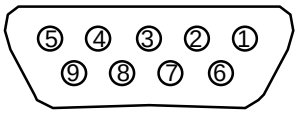
This section covers causes and actions to take when the VS / PEL printer is not printing. Problems are identified with numbers at the left margin; all LEDs referenced in the problems are on the CPU board; the underlined statements are possible causes of the problems.

6.1.1 Not Printing, LED P/C Does Not Light.

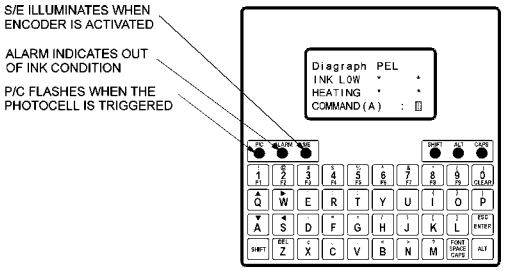


A. No photocell signal.

1. Check photocell connections and make sure they are tight.
2. Check the photosensor by waving a piece of scrap board in front of it. The red LED will glow when the sensor detects an object. Failure to light indicates either a lack of power or a damaged photosensor.
3. Check pins 5 and 6 of the photocell connection. A 12 VDC reading indicates that the controller is functioning correctly and the sensor needs replacing (P/N 5100-600). If you read no voltage from pins 5 and 6, contact Diagraph service.



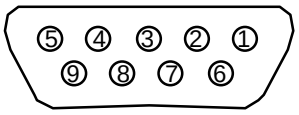
6.1.2 Not Printing, LED S/E Does Not Light.



A. No encoder signal

1. Check shaft encoder connections.
2. Check pins 5 and 6 of the encoder connection. A 12 VDC reading indicates that the controller is functioning correctly and the problem is in the encoder or its cable (150 dpi encoder: 5100-604; 300 dpi encoder; 6600-603).

   If you read no voltage from pins 5 and 6, contact Diagraph service.



6.1.3 Not Printing and Out of Ink

A: Out of Ink

1. Check ink container for ink by removing and feeling the weight of the container and shaking.
2. If the container is out of ink, investigate why it ran out and did not light the Ink Out beacon.

   2a. Check the lamp in the beacon. If the bulb is burned out, replace from Diagraph Service Kit 2480-040.

B: Incorrect Settings

1. Call up SE on keypad and check for existence of message. Edit (ED) message to check for message content, or to see if message is blank.

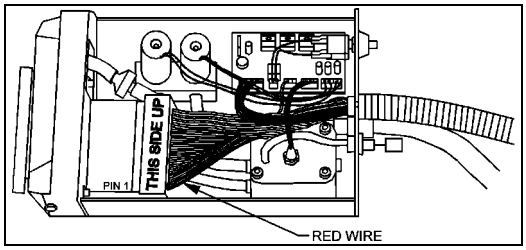
C: Blown Fuse on the CPU Board

1. Eliminate the possibility of an empty ink supply by checking the ink supply.
2. Remove the cover from the printhead and take voltage readings from GND and VCC (5 volts) and GND and 12V (12 volts) on the IDS float control board (shown at right).

6.1.4 Not Printing, LEDs Are Functioning Normally and the Printhead is Warm

A. No data for printhead to print.

1. Check connections to the printhead. Make sure that there is a message in the edit command and that you have selected the correct message.
2. Check cable connection inside of the printhead by removing the top cover and inspecting the cable. The color-coded line must connect to pin one.



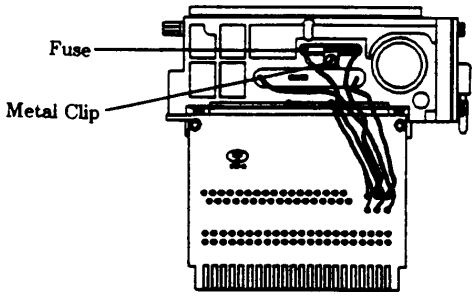
B. Air in the print channels.

1. Prime the printhead. If orifices flow well, then some or all channels should fire and the problem is not air-related. If no channels fire, then purge. If it still does not print, repeat the process.
2. Check all signal inputs as described above. It the printhead still does print, then contact Diagraph for service.

6.1.5 Not Printing, LEDs Are Functioning Normally and the Printhead is Cold

A. Blown thermal fuse in the printhead.

1. Remove the printhead cover and check the continuity of the fuse with a multimeter.
2. If the fuse fails a continuity test, order Diagraph Service Kit 2460-609 for replacement.
3. Review the installation instructions—2460-609N—in Section 8 of this manual.



B. Blown PICO fuse on the driver board.

1. Check F1 and F2 on the driver board. If bad, replace from Service Kit 2470-141.
2 Review instruction set 2470-141N in Section 8 of this manual.

6.1.6 Printing Between Products but Not on Them.

A. Incorrect settings for either Width or Delay.

1. Reset parameters to defaults.
2. Set width (WI) to correct setting (see chart below).
3. The correct delay (**DE**) setting depends on the type of printhead in your system and the type of encoder. Use the following table to find the default Delay setting for your system.

Printhead Model	Encoder Model	Width Setting
9600	150 dpi	1
9600	300 dpi	2
1920	150 dpi	1
1920	300 dpi	2
2560	150 dpi	N / A
2560	300 dpi	1

6.2 POOR PRINT QUALITY

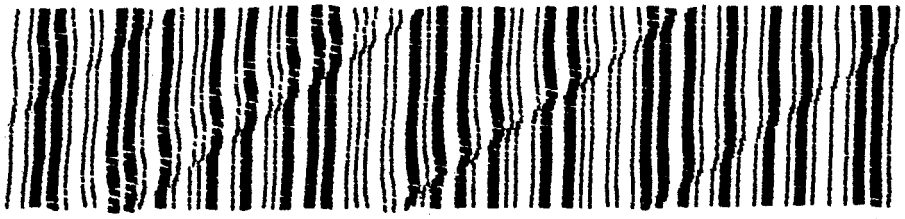
This section covers causes and actions to take when your VS/PEL print lacks quality.

6.2.1 Bar Code: Characters Missing at End of Message

A: Boldness is set too high.

1. Use **BO** and lower the boldness factor.

6.2.2 Bar Code: Diagonal Lines



A: Vibration in conveyor.

1. Mount VS/PEL system on conveyor that moves product smoothly, free from extraneous vibrations. Suitable conveyors require:
   1) belt with smooth splice or hidden laces;
   2) flat table beneath belt (not rollers);
   3) direct drive or timing belt;
   4) free-standing without connection to packaging equipment; and
   5) guide rails that move cartons to within 1/8" of VS/PEL printheads while avoiding collision.

6.2.3 Bar Code: Hazy Printing (See 6.2.11, Hazy Printing in Message)

6.2.4 Bar Code: Height Too Short on UPC SCS 62.5% (Font 94)

A: Printhead is tilted incorrectly.

1. Check the printhead angle: The 2560 printhead must be vertical and the 1920 printhead must be set at 34°. A .5° deviation will knock the bar code out of specification.
2. Check the Long Bar (LO) settings. LO should be set at 20 for a 2560 printhead.

6.2.5 Bar Code: PCS is Out of Tolerance with 2560 Printhead

A: The printhead operating temperature is too low.

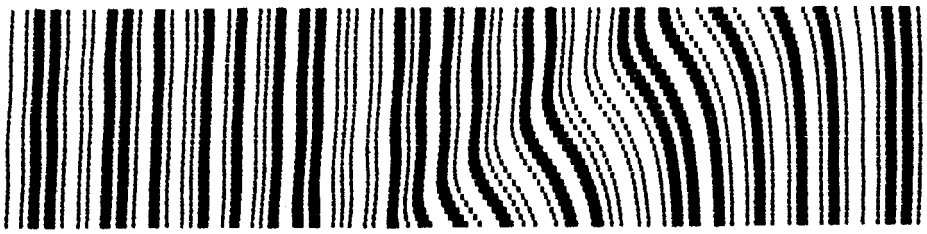
1. Check the Curve (CU) setting (see page 4-4).
2. Check that the U7 chip on the driver board version 714200000 or higher (see Section 8 2480-040N). If not, contact Diagraph service.

6.2.6 Bar Code: Top of Elements Missing

A: POsition is set too high.

1. Set the position to zero with the **PO** command. If PO is set to 1, the top of the bar code will disappear. This is sometimes mistaken for the top channel in the printhead not firing.
2. Run the Test Command outlined on page 3-2.
3. Prime the printhead then try flushing.

6.2.7 Bar Code: Twisted Elements in Message



A: Encoder installed incorrectly.

1. Mount encoder securely to conveyor so it can ride smoothly and maintain constant contact with the drive surface without slipping.

6.2.8 Character Height: Too Tall or Too Small

A: Printhead angle is incorrect.

1. Adjust the angle so that the tallest image using all 32 channels is 1" for the 96/32 printhead.

6.2.9 Drop Out of Channels in High Speed Printing

A: Air in channels.

1. Reprime.
2. Check for correct Curve value
3. Flush system.
4. Reduce Length or Boldness.
5. Increase product interval.
6. Reduce line speed.

6.2.10 Gaps in Printing and/or Trailing Satellite Dots

A: Debris in a channel typically blocking only one of the three channel orifices.

Debris can come from paper dust or internal particulates that have broken free from within the printhead.

1. Try to wipe debris away or purge out. It is possible for the debris to move within the channel, allow printing then block the orifice again.
2. If you cannot remove the debris, return the printhead to Diagraph Service.

6.2.11 Hazy Printing of Message or Bar Code

A: Distance from printhead to substrate is incorrect.

1. Move printhead to within 1/8" of product.

6.2.12 Incorrect Characters or Parts of Characters Missing

A: Driver Board Failure

1. Turn Controller OFF then ON. If print is OK now, then a static charge or a surge in the line was the culprit. If this occurs frequently, then controller problems will develop and you will have to replace either the driver or CPU board or both.

   Investigate why the controller received a charge or a surge:

   1a. If a surge suppresser is not installed, recommend Diagraph's Model 600 PCLD.

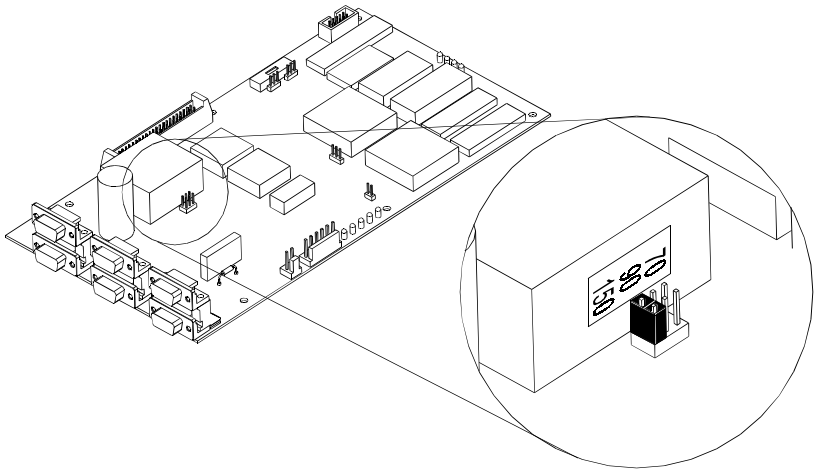
   1b. Check power source and grounds. Verify that the electrical source is in specification when system was installed.

   If the print is not OK after recycling the power, continue with this procedure.
2. Use anti-static protection and inspect chips on the CPU driver board. Check all chips to see if they are fully soldered onto the board and firmly seated.
3. Run a print sample. If the print is still distorted, use the software ZAP command. Note that all settings and information will be lost. Be sure to write down all parameters before continuing.
4. Print again after the software ZAP. If problem still persists, ZAP again. Run another print sample. If the problem still persists, go to step 5.
5. Turn the power OFF and perform a hardware ZAP by moving jumper J2 on the CPU board from the lower two pins to the upper two pins.
6. Wait one minute and put jumper J2 back on the lower two pins.
7. Turn ON power. Since all settings and information are now gone, re-enter parameters and one message.
8. Print the new message. If message prints OK, the problem was a result of a power surge. If the problem still exists, replace driver board with Diagraph Service Kit 2480-042.

6.2.13 Light Print

TEST

Not enough voltage to the transducers



1. Make sure J3 is set to 150 for either a 1920 or 2560 printhead.
2. Set J3 to 90 for a 9600 printhead.
3. Setting 70 is never used.

6.2.14 Missing Dots at the Top of the Message

TEST

A: Air in internal printhead manifold behind channels

1. Reprime.
2. Check for correct Curve value
3. Flush system.
4. Reduce Length or Boldness.
5. Increase product interval.
6. Reduce line speed.

6.2.15 Missing Dots Throughout the Message

A: Air in channels or clogged channels.

1. Follow the prime procedure. If channels flow well, then some or all channels should fire and the problem is not air-related.
2. If no channels fire, then prime again. If the printhead still does not print, repeat the process. If channels are still missing after repeated primes, contact Diagraph service.

6.2.16 Streaks in Message or Bar Code.

A: Depriming.

1. Ensure that orifices are not obstructed by priming. Wipe upward with lint-free wipe.
2. Reduce length or boldness of messages.
3. Increase product interval.
4. Reduce line speed.

6.2.17 Twisted Elements in Message (See 6.2.6, Bar Code Twisted Elements)

6.2.18 Unreadable Characters

A: Reverse set is wrong.

1. Change reverse (RE) direction in the software.

6.3 MISCELLANEOUS PROBLEMS

6.3.1 Leaking Printhead

A: Ink Leak Inside the Printhead

1. Check printhead orientation and make sure it is not tilted forward.
2. Remove printhead cover and inspect for ink leak:
   a. Hole in ink line.
   b. Bad check valve.
   c. Leaking gasket between reservoir and check valve.
3. Replace damaged ink lines with Viton tubing (see Section 8 2460-600N).

6.3.2 Controller: Flashing Cursor in Upper Left Corner

A: Firmware Failure

1. To verify firmware failure, type **DI** <Enter>.
2. Record all parameters for this system.
3. Use the software ZAP command. If the system is still does not respond, initiate a hardware ZAP (as defined in 6.2.12).
4. Turn the power OFF and perform a hardware ZAP by moving jumper J2 (next to the battery) on the CPU board from the lower two pins to the upper two pins.
5. Wait one minute and put jumper J2 back on the lower two pins.
6. Turn ON power. Since all settings and information are now gone, re-enter parameters and one message.

   If the system still does not respond, change the firmware module.

   When replacing firmware, make sure the customer receives the same version. Specify. For custom firmware replacement, contact Diagraph Service.

   Customer receives a set of chips on a firmware board and instructions for installation.

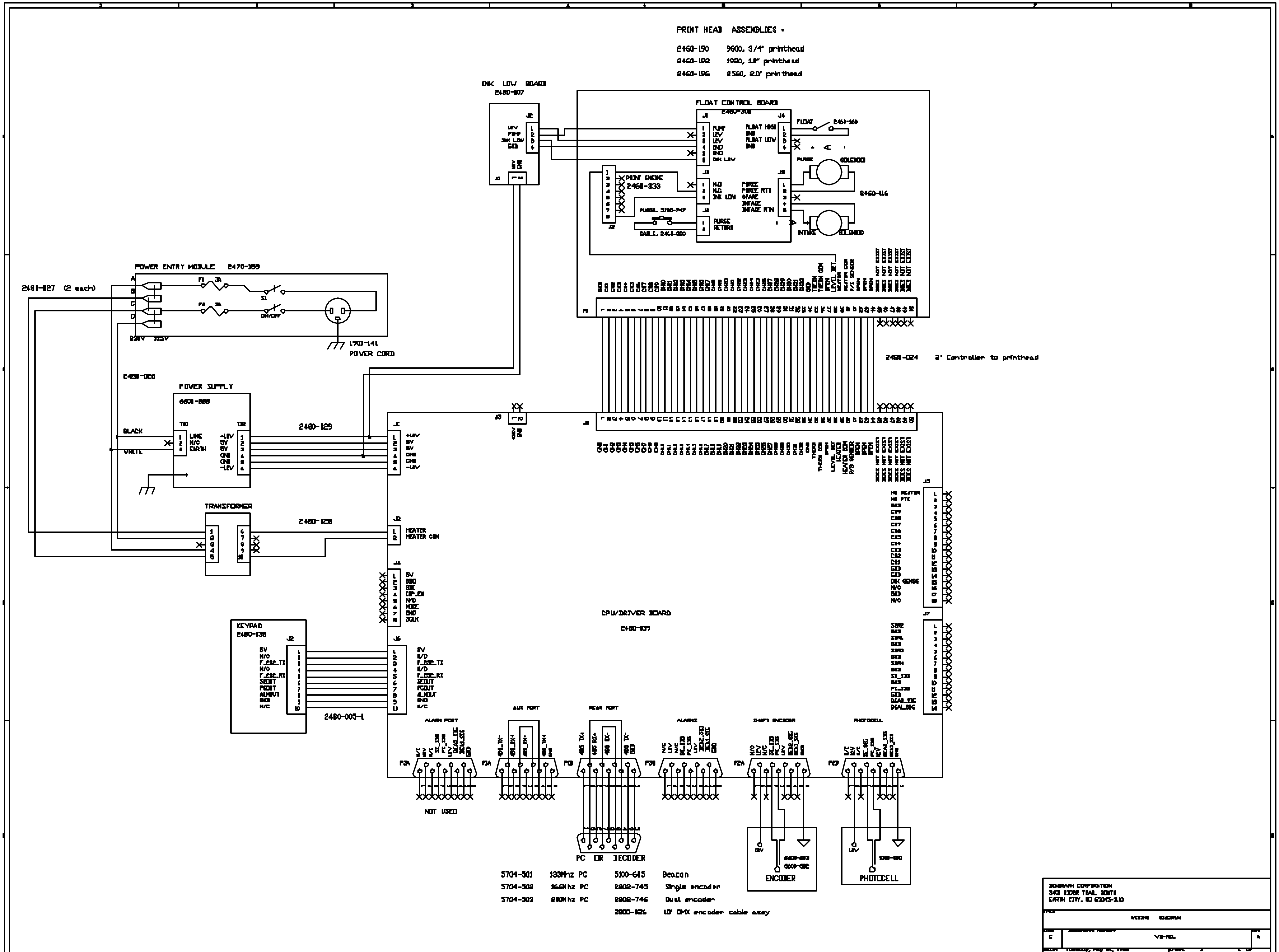
6.3.3 Controller: Blank Display

A: Failed CPU board.

1. Check connections.
2. Type **DI** <Enter>. If nothing happens then the CPU board has failed.
3. Replace the CPU board with Diagraph Service Kit 2480-042.

6.4 INTERCONNECT DIAGRAM

On the following page is the VS/PEL interconnect diagram.


PRINT HEAD ASSEMBLIES :
9600, 3/4" printhead
POWER ENTRY MODULE
(2 each)
POWER CORD
POWER SUPPLY
LINE
N/C
EARTH
BLACK
WHITE
TRANSFORMER
HEATER
KEYPAD
FLOAT CONTROL BOARD
PUMP
FLOAT
FLOAT HIGH
FLOAT LOW
PURGE
INTAKE
SOLENOID
PRINT ENGINE
CPU/DRIVER BOARD
2' Controller to printhead
ALARM PORT
AUX PORT
REAR PORT
ALARMS
SHAFT ENCODER
PHOTOCELL
NOT USED
PC OR DECODER
ENCODER
PHOTOCELL
5704-301
5704-302
5704-303
Beacon
Single encoder
Dual encoder
WIRING DIAGRAM

PROCEDURES	Daily	Weekly	Quarterly
Clean and prime printhead	●		
Clean outside of ink reservoir (to prevent contaminant invasion)		●	
Clean outside of printhead thoroughly		●	
Clean photocell lens			●
Check that mounting hardware is secure			●
Check that all electrical connections are secure			●
Check that all ink tube fittings are secure			●

It is important that a Preventative Maintenance Program be followed for reliable operation of the VS/PEL System.

CUSTOMER OR TECHNICAL SERVICES

The Operations Manual is the main source of information. If you require Technical Support, contact the Authorized Distributor from whom you purchased the system. They should be able to answer any questions concerning the use of this system. However, if there are questions that the Distributor cannot answer, Diagraph has a staff of Technical Specialists that are capable of helping. Before calling or writing, please do the following:

- Read the section of the manual that describes the procedure you are trying to perform.
- Call the Technical Support Line at (800) 526-2531.

CHAPTER 8 • SERVICE PARTS

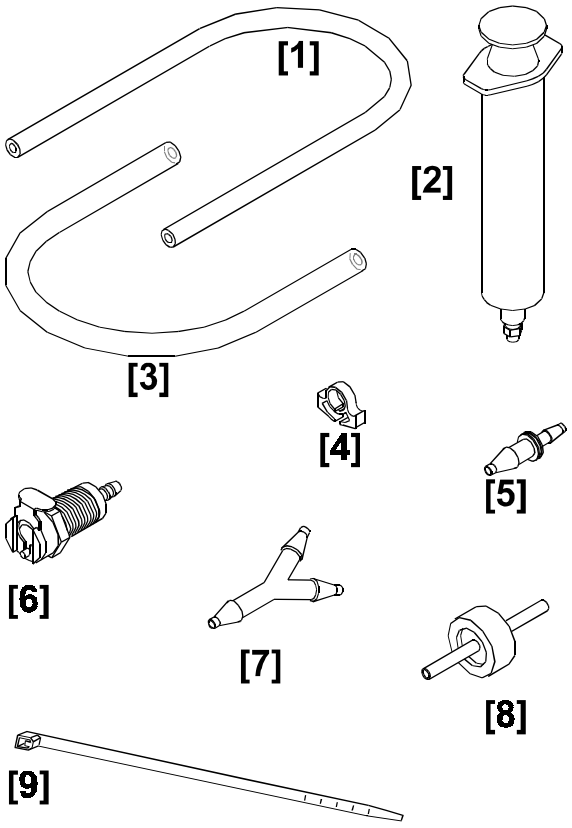
This section contains all the service part installation instructions that are included with VS/PEL service kits. Each instruction set details all parts in the kit.

Kit	Description	Instructions
2460-600	Printhead Tubing & Fittings Kit	2460-600N
2460-601	Printhead Solenoid & Manifold	2460-601N
2460-603	Printhead Reservoir Fitting	2460-603N
2460-606	Printhead Cover	2460-606N
2460-607	Printhead Prime Switch	2460-607N
2460-608	Printhead Float Control Board	2460-608N
2460-609	Printhead Thermal Fuses	2460-609N
2480-040	VSP Spare Parts: Fuses	2480-040N
2480-041	VSP Spare Parts: Screws	2480-041N
2480-042	VSP Spare Parts: CPU	2480-042N
2480-043	VSP Spare Parts: Keypad	2480-043N
2480-044	VSP Spare Parts: IDS Board	2480-044N
2480-045	VSP Spare Parts: IDS	2480-045N
2480-046	VSP Spare Parts: Power Supply	2480-046N
2480-047	VSP Spare Parts: Transformer	2480-047N

INSTALLATION OF THE PARTS IN THIS SERVICE KIT INTRODUCES AIR INTO PRINTHEAD INK LINES. PURGE ALL AIR BEFORE RETURNING THE PRINTHEAD TO SERVICE.

Contents

[1]	1/8" ID Tubing	2460-135
[2]	Syringe	2460-222
[3]	3/16" ID Tubing	1303-551
[4]	Hose Clamp (4)	2460-166
[5]	Barbed Fitting 1/8" to 3/16"	2460-168
[6]	Quick Disconnect Coupling	1900-758
[7]	Y Connector	2460-142
[8]	Check Valve (2)	2460-167
[9]	Tie Wrap 3"	1900-372
	Instruction Sheet	2460-600N



Tools and Materials

Depending on the component, printhead tubing and fitting replacement could require all of the following tools:

Test Tube
1/4" Nut Driver
.08 Hex Key with Handle
Protective Gloves
Shop Gown
Wire Cutters
Shop Towels
Lint-free Wipes

■ Replacing Tubing

Whenever possible, use old pieces of tubing from inside a Centralized Ink Delivery System (CIDS) printhead as guides for replacement tubing lengths.

Cut tubing pieces with wire cutters.

No connections need a tie wrap except for the ink line that supplies the print engine. If you are replacing that line, do not connect it to the print engine until after bleeding air from the system.

Avoid any pressure on the print engine when working inside the printhead. Take extra care when removing tubing from existing fittings to avoid moving the print engine up and down. Slight movement of the print engine can destroy its piezo crystals.

■ Bleeding Air from Ink Lines

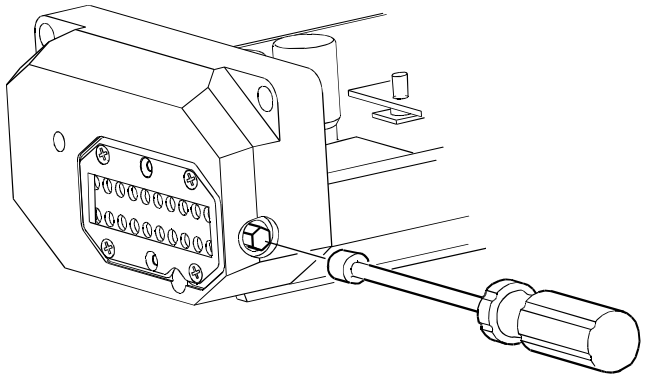
Before bleeding, the printhead cover must be off, the system powered up and the tie wrap removed from the ink line that supplies the print engine.

1. Withdraw the syringe plunger to the middle of its barrel and screw the syringe onto the air vent connector on the back of the printhead.
2. Place a clean wipe over the print engine to protect it from ink drips.
3. Pull the ink feed line from the print engine and place the open end into a test tube.
4. Press the purge button for 1/2 second to start the ink flow.
5. Press the plunger no more than 1/8 inch. This small change will pressurize the ink reservoir and start ink flowing to the check valve. Check ink flow into the test tube.

6. Press the purge button. Again, check ink flow to the test tube. The IDS pump may turn on during this process.

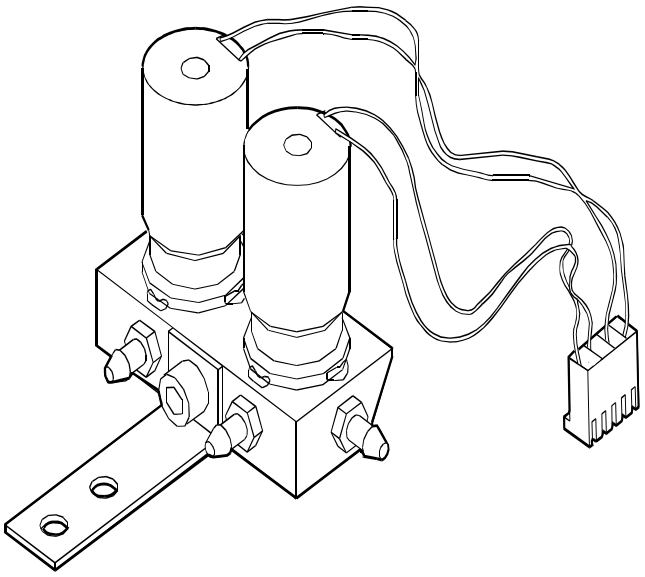
   REMOVE THE SYRINGE FROM THE AIR VENT TO RELIEVE PRESSURE ON THE RESERVOIR AND ALLOW THE IDS PUMP TO FILL THE RESERVOIR WITH INK.

7. Connect the syringe and continue to alternate small movements on the plunger with quick pulses on the purge button until you establish an ink stream into the test tube.
8. Remove the syringe when an ink stream is established. Wait at least a minute for the IDS pump to fill the reservoir.
9. Repeat the syringe procedure to ensure that the ink lines are free from air bubbles.
10. Remove the syringe.
11. Remove the ink line from the test tube and connect to the supply fitting on the print engine.
12. Secure the ink line to the engine with the tie wrap and trim with wire cutters.
13. Remove the lower two screws on the front cover of the printhead and tip the front cover up to elevate and access the air bleed valve on the side of the cover.



14. Remove the air bleed valve cap with a 1/4" nut driver (see above).
15. Place a clean wipe around the air bleed valve and press the purge switch for five seconds to force ink out of the valve. Watch for tiny air bubbles in the ink. If you see air bubbles, continue to purge ink slowly through the valve by pressing the purge switch at regular intervals until you see a continous flow of ink without air.
16. Replace the vent cap with the nut driver taking care not to introduce air in the printhead. Do not overtighten.
17. Reattach front cover to the printhead enclosure and clean up ink drips.

INSTALLATION OF THE PARTS IN THIS SERVICE KIT INTRODUCES AIR INTO PRINTHEAD INK LINES. PURGE ALL AIR BEFORE RETURNING THE PRINTHEAD TO SERVICE.



Contents

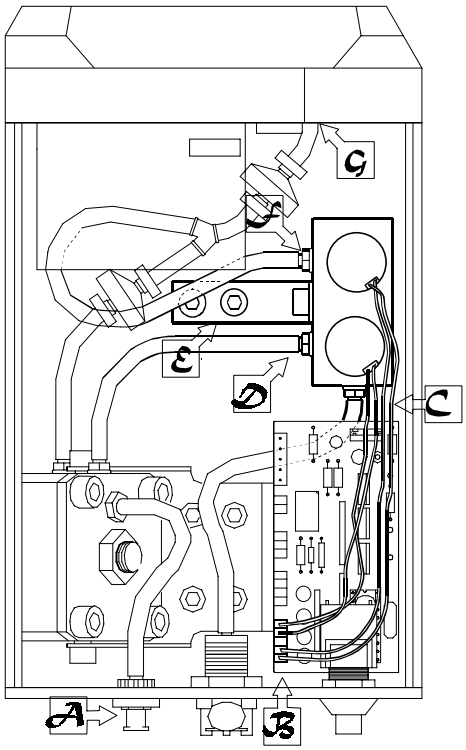
Printhead Solenoid Assembly	2460-601
Installation Instructions	2460-601N

Installation of a solenoid manifold assembly in a CIDS printhead also requires tools and materials supplied in Service Part Kit 2460-600

Tools & Materials

- Set of Hex Keys
- Test Tube
- 1/4" Nut Driver
- Hex Key with Handle
- Protective Gloves
- Shop Gown
- Wire Cutters
- Syringe from the 2460-600 Service Kit
- Shop Towels
- Lint-free Wipes

■ Removing the Old Manifold



1. Switch OFF power to printhead.
2. Remove the top cover of the printhead enclosure.
3. Disconnect the signal cable from the print engine.
4. Disconnect the old solenoid assembly from the float control board at **B**.
5. Unscrew caphead screws at **E**.
6. Fold and place a clean wipe in the bottom of the enclosure beneath the solenoid manifold.
7. Disconnect ink lines from the manifold at **C**, **D** and **F**.
8. Dispose of ink-filled manifold in accordance with state and federal guidelines on waste materials.

■ Installing the New Manifold

1. Connect ink lines to the new manifold at **C**, **D** and **F**.
2. Secure the manifold to the enclosure at **E** with caphead screws removed earlier.
3. Connect the solenoids to the float control board at **B**.
4. Clean up all ink in the bottom enclosure.

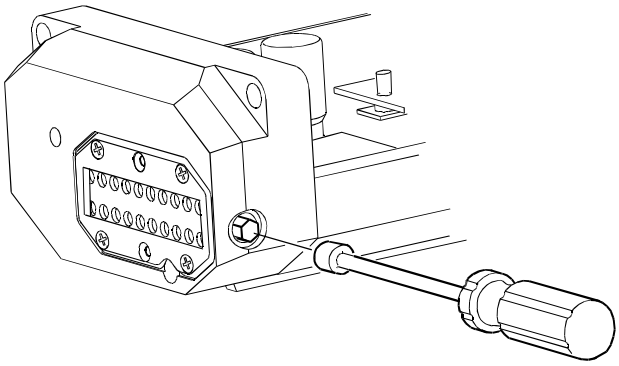
Avoid applying any pressure on the print engine when working inside the printhead. Take extra care when removing tubing from existing fittings to avoid moving the print engine and damaging its piezo crystals.

■ Bleeding Air from Ink Lines

Before bleeding, connect the signal cable to the print engine, remove the tie wrap from the ink line that supplies the print engine and power ON the IDS.

1. Withdraw the syringe plunger to the middle of its barrel and screw the syringe onto the reservoir air vent at **A**.
2. Place a clean wipe over the print engine to protect it from ink drips.
3. Pull the ink feed line from the print engine at **G** and place the open end into a test tube.
4. Press the purge button for 1/2 second to start the ink flow.
5. Press the plunger no more than 1/8 inch. This small change will pressurize the ink reservoir and start ink flowing to the check valve. Check ink flow into the test tube.
6. Press the purge button. Again, check ink flow to the test tube. The IDS pump may turn on during this process.

   REMOVE THE SYRINGE FROM THE AIR VENT TO RELIEVE PRESSURE ON THE RESERVOIR AND ALLOW THE IDS PUMP TO FILL THE RESERVOIR WITH INK.
7. Connect the syringe and continue to alternate small movements on the plunger with quick pulses on the purge button until you establish an ink stream into the test tube.
8. Remove the syringe when an ink stream is established. Wait at least a minute for the IDS pump to fill the reservoir.
9. Repeat the syringe procedure to ensure that the ink lines are free from air bubbles.
10. Remove the syringe.
11. Remove the ink line from the test tube and connect to the supply fitting on the print engine.
12. Secure the ink line to the engine with the tie wrap and trim with wire cutters.
13. Remove the lower two screws on the front cover of the printhead and tip the front cover up to elevate and access the air bleed valve on the side of the cover.
14. Check the hand-held terminal to verify that the printhead has warmed up to operating temperature.
15. Remove the air bleed valve cap with a 1/4" nut driver (see at right).
16. Place a clean wipe around the air bleed valve and press the purge switch for five seconds to force ink out of the valve. Watch for tiny air bubbles in the ink. If you see air bubbles, continue to purge ink slowly through the valve by pressing the purge switch at regular intervals until you see a continous flow of ink without air.
17. Replace the vent cap with the nut driver taking care not to introduce air in the printhead. Do not overtighten.



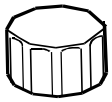
18. Reattach front cover to the printhead enclosure and clean up ink drips.
19. Power OFF system.
20. Replace top to printhead enclosure.

Avoid applying any pressure on the print engine when working inside the printhead. Take extra care when removing tubing from existing fittings to avoid flexing the print engine up and down. Print engine movement can damage piezo crystals.

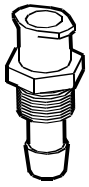
Contents

[A]	Vented Plug	2460-143
[B]	1/8" Panel Mount Fitting	2460-141
[C]	Lock Ring Fitting	2460-145
[D]	Locknut	2460-144

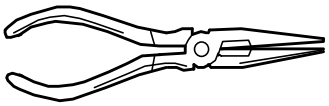
[A]



[B]



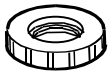
Tools



[C]

Tubing and Other Printhead Fittings

[D]



If the CIDS printhead requires replacement tubing or additional fittings, order Diagraph Service Parts Kit 2460-600.

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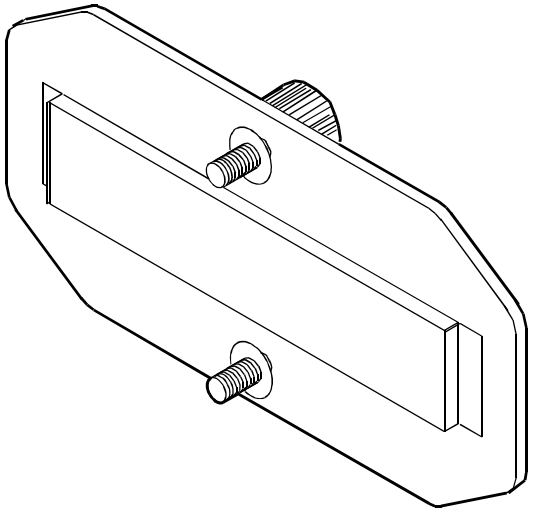
SE.I7A24

Service Part Kit 2460-603

Contents

CIDS Printhead Front Cover	2460-128
Cover Sheet	2460-606N



Tools

None required.

Precautions

- Secure cover to the face plate whenever the printhead is idle.
- Clean face plate and front cover with isopropyl alcohol.

Diagraph CORPORATION

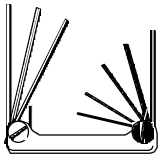
Printed in USA
SE.I7A24

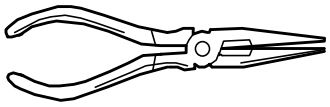
Service Part Kit 2460-606

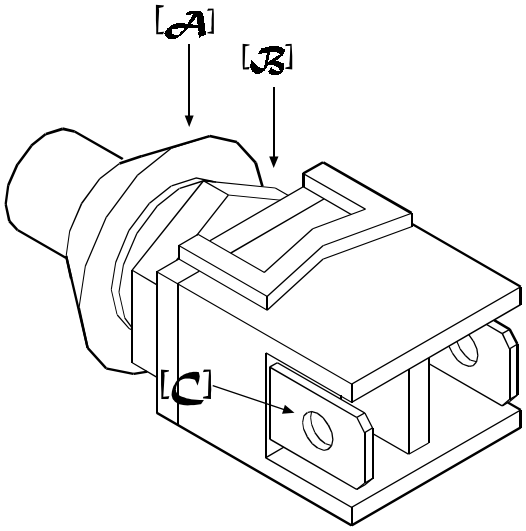
Contents

Printhead Prime Switch	5700-747
Installation Instructions	2460-607N

Tools







■ Installation

1. Switch OFF power to printhead.
2. Remove the top cover of the printhead enclosure.
3. Disconnect wires from the back of the old prime switch **[C]**.
4. Loosen nut **[B]**.
5. Unscrew threaded bezel **[A]** and remove the old switch.
6. Unscrew threaded bezel from the new switch.
7. Place the new switch in the switch opening.
8. Screw on threaded bezel.
9. Tighten nut **[B]**.
10. Connect wires to the back of the switch and replace the printhead cover.
11. Switch ON system and test for prime.

Diagraph CORPORATION

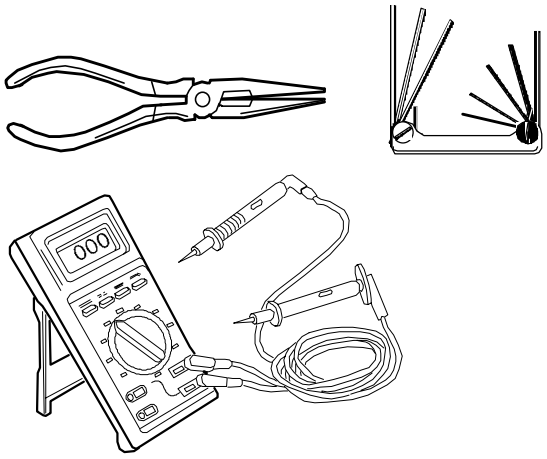
Printed in USA
SE.I7A24

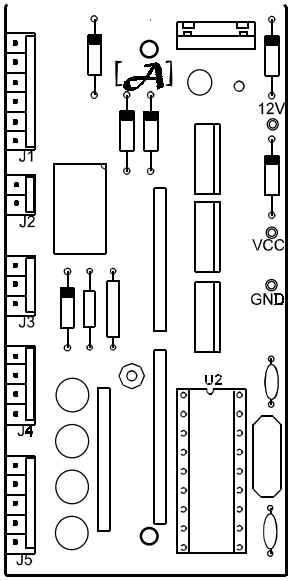
Service Part Kit 2460-607

Contents

CIDS Printhead Float Control Board	2460-300V2.0
Instruction Sheet	2460-608N

Tools





[B]

Precautions

- Secure cover to the face plate before working on the printhead.
- Use anti-static protection throughout this replacement procedure.

■ Removing the Old Float Control Board

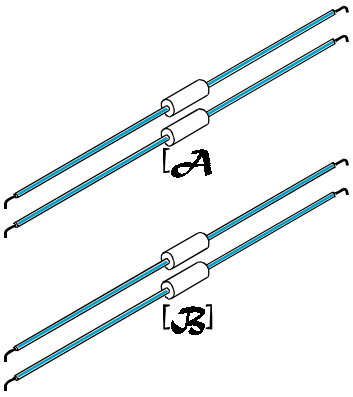
1. Turn OFF system and remove the printhead top cover.
2. Disconnect the prime switch from the float board at J2.
3. Using needle nose pliers, disconnect the prime switch from the back cover to allow full access to the float board.
4. Unplug connectors on the float board at J1, J3, J4 and J5.
5. Remove the caphead screws at **[A]** and **[B]** with a hex key. Note that each screw has <u>two</u> spacers: one above and one below the board.
6. Lift out the old float control board.

■ Installing the New Float Control Board

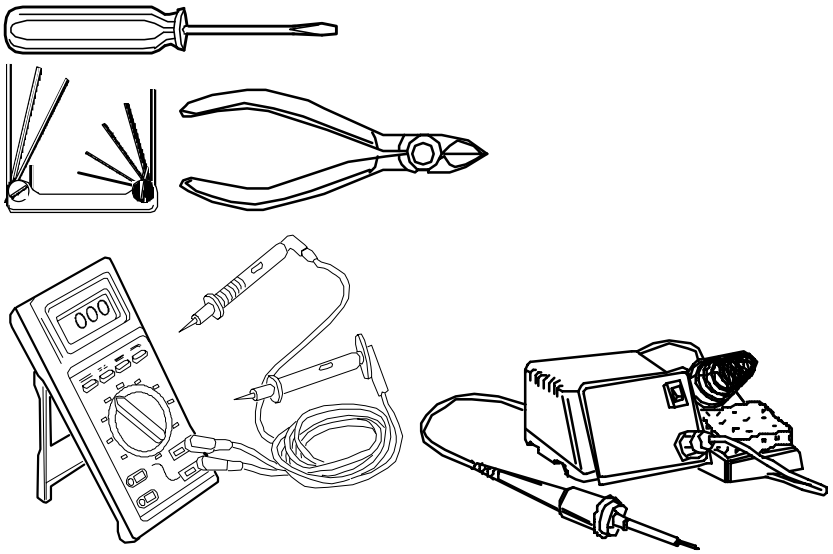
1. Remove the new float control board from its anti-static bubble wrap.
2. Position the board with the connectors to the middle of the printhead and secure in place with the caphead screws removed earlier (**[A]** and **[B]**). Make sure that spacers on the screws sandwich the new board.
3. Plug in connectors at J1, J3, J4 and J5.
4. Connect the prime switch to the back cover of the printhead and plug in at J2.
5. Switch ON power to the controller and take voltage readings on the float control board at GND and VCC (5 volts) and GND and 12V (12 volts). Successful readings mean a successful installation.
6. Switch power OFF and replace the printhead top cover.

Contents

[A] 1920/9600 Thermal Fuse (2) 6600-215
[B] 2560 Thermal Fuse (2) 6600-319
Installation Instructions 2460-609N



Tools Required

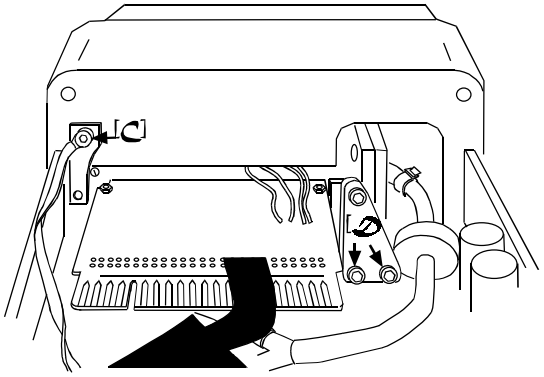


Avoid moving the print engine up and down.
Print engine movement can damage piezo crystals

■ Removing the Old Fuse

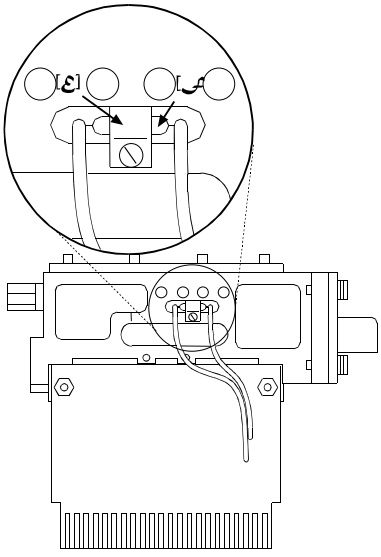
Keep ink line attached to the printhead during this procedure.

1. Ensure that power is turned OFF.
2. Remove top cover of printhead with a hex key.
3. Disconnect the signal cable from the print engine.
4. Remove the four screws from the front plate with a hex key.
5. Remove the caphead screw **[C]** that holds the ground wire. Set aside any shims behind **[C]**.
6. Remove the two caphead screws **[D]** to the right of the print engine.
7. Pivot the print engine out of the front plate as shown at right.

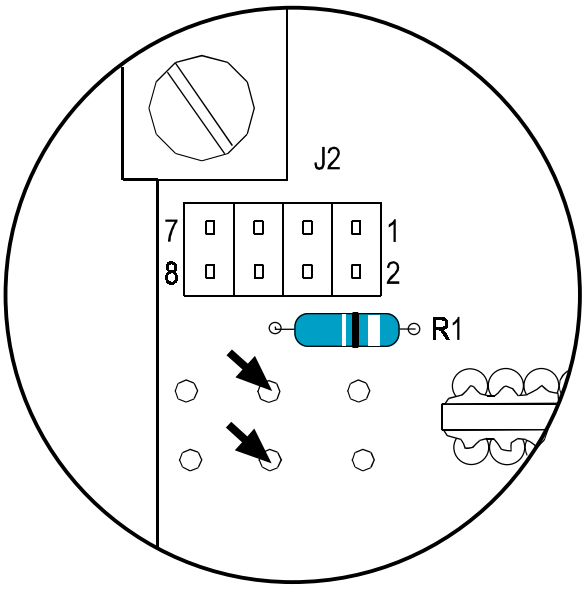


7a. Note how the old insulated fuse wires are flat against the surface of the print engine. Lead wires from a new fuse will need to positioned in a similar fashion. If the new fuse leads are not flat against the engine, they will prevent the print engine from returning to its slot in the face plate.

8. Remove fuse bracket **[E]** and set aside.
9. Lift out fuse **[F]**.



10. Turn over the print engine and identify the center pair of solder points below resistor R1. These are the fuse leads.
11. Melt the solder and release the fuse leads. Clean up solder around the holes.



■ Selecting the Correct Fuse

This fuse kit contains fuses for three models of PEL printheads. Select the appropriate fuse:

Printhead Model	Requires
96 / 32 (P / N 2460-190)	6600-215
192 / 32 (P / N 2460-192)	6600-215
256 / 32 (P / N 2460-196)	6600-319

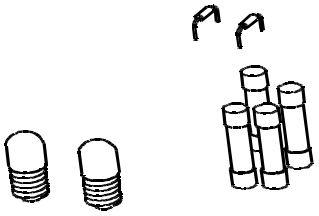
Printhead model labels are on the sides of printhead enclosures. Fuses ship in labeled bags.

■ Installing the New Fuse

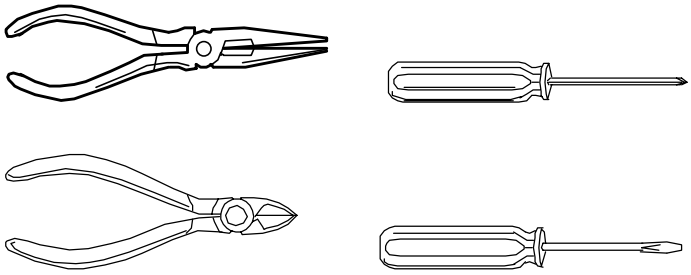
1. Solder the new fuse leads to the solder points of the old fuse.
2. Check the continuity of the fuse across the solder points to ensure good connections.
3. Turn the print engine over, place the fuse in the fuse slot and replace the fuse bracket **[E]**.
   Take care when replacing the fuse bracket to center the fuse in its slot and avoid a short to the print engine frame.
4. Check continuity from either side of the fuse to the print engine frame to ensure that there are no shorts.
5. Press fuse leads flat against the engine (see step 7a above).
6. Pivot the print engine back into the face plate.
7. Replace the two caphead screws removed earlier at **[D]**. Replace any shims removed earlier behind **[C]** and tighten with a hex key.
8. Screw down the faceplate the to the printhead enclosure.
9. Connect the signal cable to the print engine.
10. Replace the top of the printhead enclosure.

Contents

Fuses	2480-040
Instruction Sheet	2460-040N



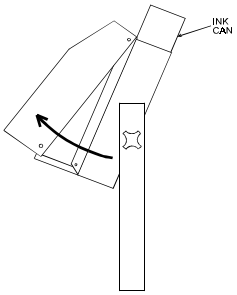
Tools



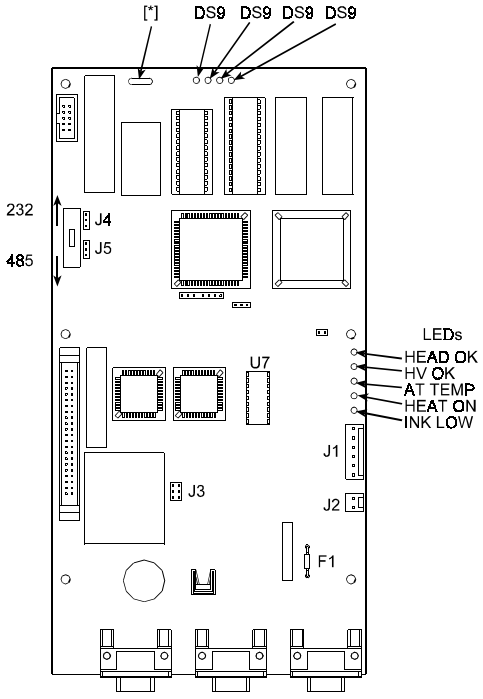
Precautions

- Make sure the heat sink on the power supply, attached to the top cover, does not damage or contact the crystal at the top of the CPU board attached to lower enclosure housing [*].
- Turn OFF power and unplug unit.

■ Removing the Controller Cover

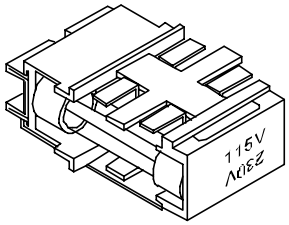


1. Remove the four cover screws.
2. Leave ink cartridge in place before removing the top cover. It will act as a pivot. Remove top cover by slowly lifting the bottom and allowing the top to pivot at its upper edge. **DO NOT** slide top cover forward. Continue holding cover with one hand. Disconnect internal cabling in sequence described below.
3. Disconnect the 6-pin MTA connector (J1) on the Main CPU Board.
4. Remove the ribbon cable which connects the display board (J2) to the main CPU board (J6).
5. Remove the 2-pin AC input cable from transformer to the power supply (J1).
6. Remove the 6-pin MTA connector to the power supply (J2). If wired with a separate ground, disconnect wire from the power supply.
7. Set aside top cover.



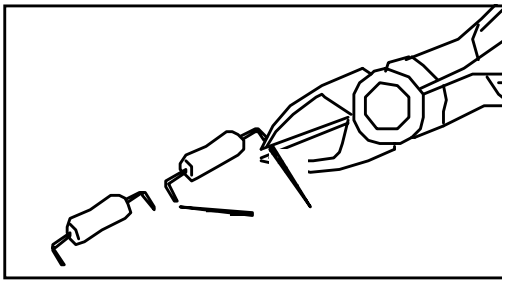
NOTE: The controller contains the CPU, transformer, ink low board, power entry module and ink canister assembly. The top cover holds the display and power supply.

■ Installing New Fuses in the Power Module



1. Release and pull down the top of the power entry module with a screwdriver.
2. Pull out the fuse holder module.
3. Replace blown fuses with 1.5 amp replacement fuse(s).
4. Make sure the door in the power module shows the correct voltage needed before powering ON.

■ Installing New Pico Fuse at F1



1. Disconnect power and open the front panel.
2. Remove fuse with needle nose pliers. DO NOT THROW AWAY THE OLD FUSE: You will need it as a pattern for the pins on the replacement fuse.
3. Use needle nose pliers and carefully bend the pins on the new fuse(s) to match the angles on the old fuse pins.
4. Use wire cutters and trim the new fuse pins to the same length as the old fuse pins.
5. Insert the new fuse into the driver board with the needle nose pliers.

■ Reassembling the Controller

1. Reconnect the 6-pin connector located on the power supply.
2. Reconnect the 2-pin connector from the transformer to the Main CPU board.
3. Reconnect the 2-pin connector to the ink low board.
4. Reconnect the 44-pin cable.
5. Holding the display to the left, connect the display and the AC connection.
6. Reconnect the 6-pin MTA connector.
7. Rotate cover into position. Make sure the top edge of the top cover is in contact with the top edge of the bottom enclosure. Use the ink cartridge as a pivot.
8. Replace the four cover screws.

Contents

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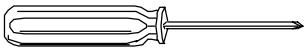
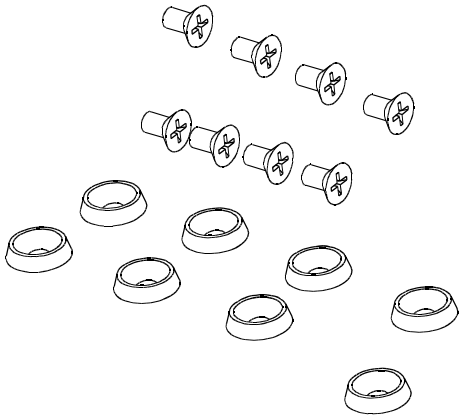
8 - Washers	
Instruction Sheet	2460-041N

Tools





2480-041 Vis Instructions d´installation

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8 rondelles	2460-041N

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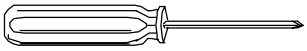

2480-041 Schrauben Einbauanweisungen

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8 Unterlegscheiben	
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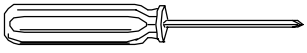
Werkzeuge



2480-041 Viti Instruzioni per l´installazione

Contiene

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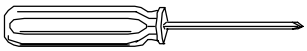
Foglio d'istruzioni	2460-041N

Attrezzi previsti



2480-041 Tornillos Instrucciones de instalación

Contenido

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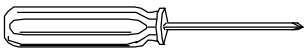
Hoja de instrucciones	2460-041N

Herramientas



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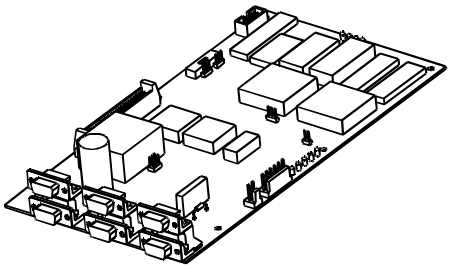
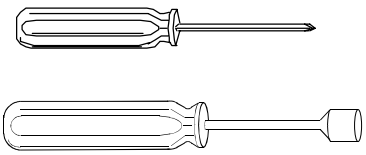
Service Part Kit 2480-041

Contents

CPU Board	2480-042
Instruction Sheet	2460-042N



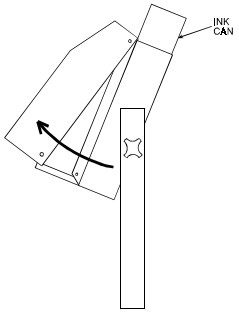
Tools



Precautions

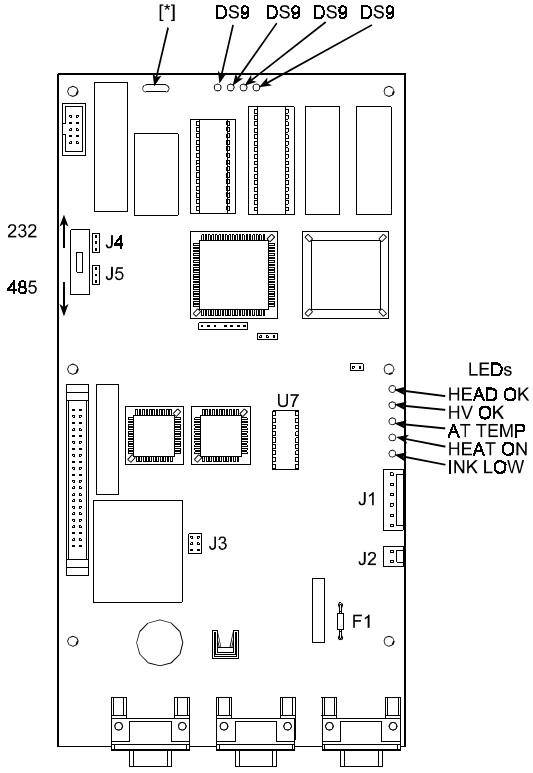
- Make sure the heat sink on the power supply, attached to the top cover, does not damage or contact the crystal at the top of the CPU board attached to lower enclosure housing [*].
- Turn OFF power and unplug unit.

■ Removing the Controller Cover



1. Remove the four cover screws.
2. Leave ink cartridge in place before removing the top cover. It will act as a pivot. Remove top cover by slowly lifting the bottom and allowing the top to pivot at its upper edge. **DO NOT** slide top cover forward. Continue holding cover with one hand. Disconnect internal cabling in sequence described below.
3. Disconnect the 6-pin MTA connector (J1) on the Main CPU Board.
4. Remove the ribbon cable which connects the display board (J2) to the main CPU board (J6).
5. Remove the 2-pin AC input cable from transformer to the power supply (J1).
6. Remove the 6-pin MTA connector to the power supply (J2). If wired with a separate ground, disconnect wire from the power supply.
7. Set aside top cover.

NOTE: The controller contains the CPU, transformer, ink low board, power entry module and ink canister assembly. The top cover holds the display and power supply.



■ Replacing the CPU Controller Board

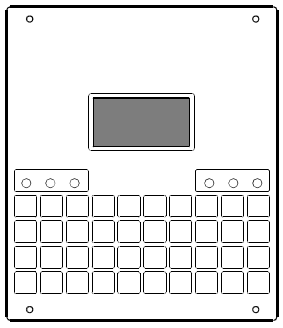
1. Remove J2 connector from the transformer.
2. Remove the 44-pin connector from the printhead and remove the six phillips screws.
3. Remove the twelve nuts which holds the six DB9 interface connectors to the base.
4. Gently lift out the board. Replace with new board.
5. Reconnect all cables, display board and power supply. The four housing screws do not need to be replaced to test the new board.
6. Reconnect the printhead.

Reassembling the Controller

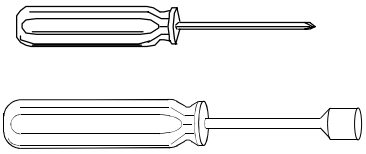
1. Reconnect the 6-pin connector located on the power supply.
2. Reconnect the 2-pin connector from the transformer to the Main CPU board.
3. Reconnect the 2-pin connector to the ink low board.
4. Reconnect the 44-pin cable and the six phillips screws.
5. Holding the display to the left, connect the display and the AC connection.
6. Reconnect the 6-pin MTA connector.
7. Rotate cover into position. Make sure the top edge of the top cover is in contact with the top edge of the bottom enclosure. Use the ink cartridge as a pivot.
8. Replace the four side screws.

Contents

Display Board	2480-043
Instruction Sheet	2460-043N

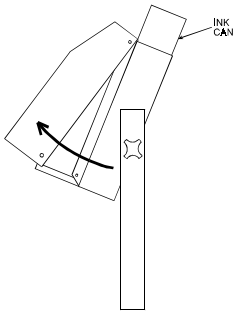


Tools



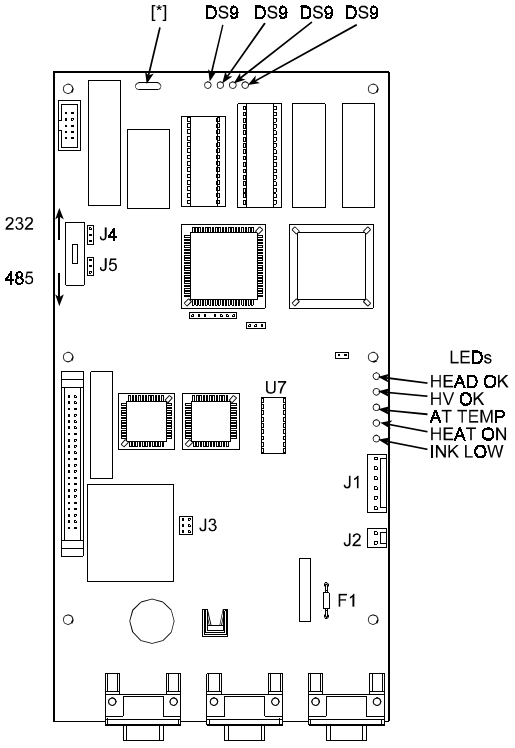
Precautions

- Make sure the heat sink on the power supply, attached to the top cover, does not damage or contact the crystal at the top of the CPU board attached to lower enclosure housing [*].
- Turn OFF power and unplug unit.



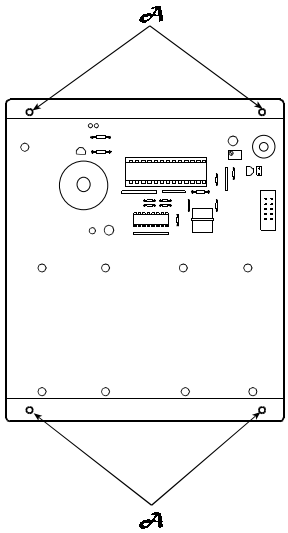
■ Removing the Controller Cover

1. Remove the four cover screws.
2. Leave ink cartridge in place before removing the top cover. It will act as a pivot. Remove top cover by slowly lifting the bottom and allowing the top to pivot at its upper edge. **DO NOT** slide top cover forward. Continue holding cover with one hand. Disconnect internal cabling in sequence described below.
3. Disconnect the 6-pin MTA connector (J1) on the Main CPU Board.
4. Remove the ribbon cable which connects the display board (J2) to the main CPU board (J6).
5. Remove the 2-pin AC input cable from transformer to the power supply (J1).
6. Remove the 6-pin MTA connector to the power supply (J2). If wired with a separate ground, disconnect wire from the power supply.
7. Set aside top cover.



NOTE: The controller contains the CPU, transformer, ink low board, power entry module and ink canister assembly. The top cover holds the display and power supply.

■ Replacing the Display Board



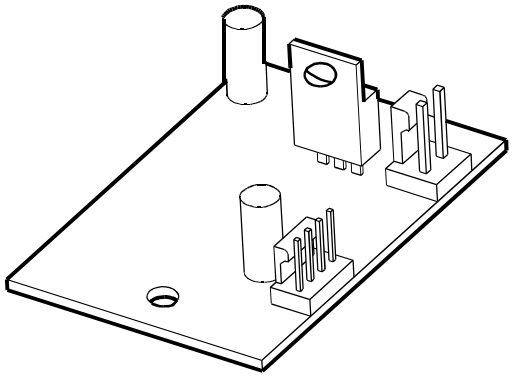
1. Remove the four nuts **[A]** to remove the display. NOTE: This is a two-part assembly.
2. To replace the plastic on the front of the display, remove the ten phillips screws. Separate the switch assembly from the plastic front.
3. Replace the four nuts.
4. Reconnect all cables, boards and power supply to test new board.

■ Reassembling the Controller

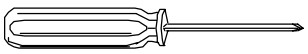
1. Reconnect the 6-pin connector located on the power supply.
2. Reconnect the 2-pin connector from the transformer to the Main CPU board.
3. Reconnect the 2-pin connector to the ink low board.
4. Reconnect the 44-pin cable.
5. Holding the display to the left, connect the display and the AC connection.
6. Reconnect the 6-pin MTA connector.
7. Rotate cover into position. Make sure the top edge of the top cover is in contact with the top edge of the bottom enclosure. Use the ink cartridge as a pivot.
8. Replace the four outside screws.

Contents

IDS Board	2480-044
Instruction Sheet	2460-044N



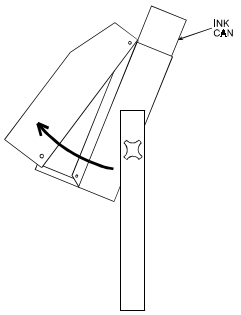
Tools



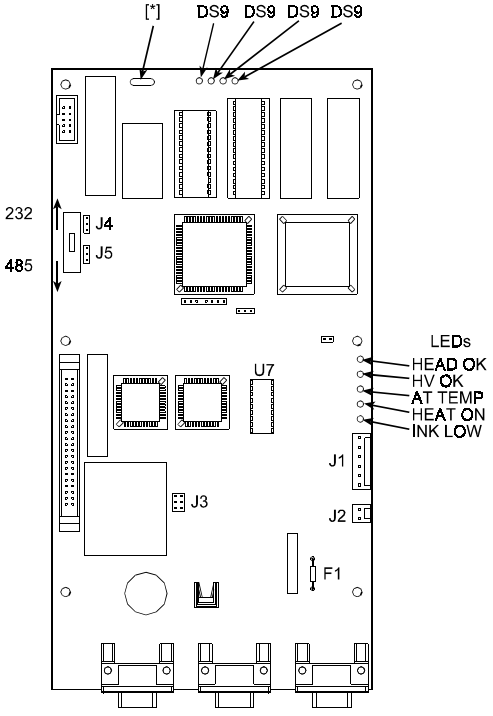
Precautions

- Make sure the heat sink on the power supply, attached to the top cover, does not damage or contact the crystal at the top of the CPU board attached to lower enclosure housing [*].
- Turn OFF power and unplug unit.

■ Removing the Controller Cover



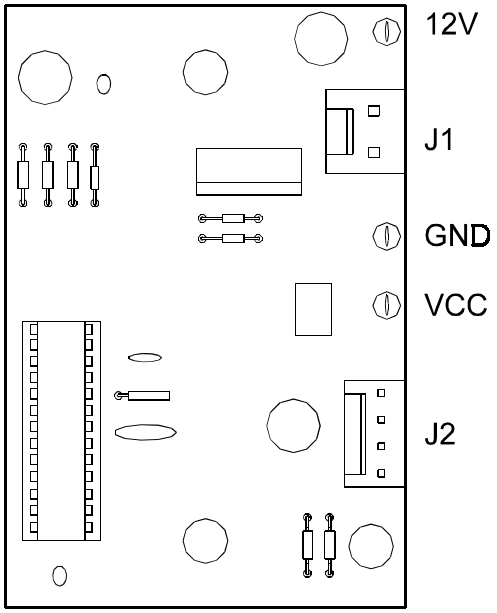
1. Remove the four cover screws.
2. Leave ink cartridge in place before removing the top cover. It will act as a pivot. Remove top cover by slowly lifting the bottom and allowing the top to pivot at its upper edge. **DO NOT** slide top cover forward. Continue holding cover with one hand. Disconnect internal cabling in sequence described below.
3. Disconnect the 6-pin MTA connector (J1) on the Main CPU Board.
4. Remove the ribbon cable which connects the display board (J2) to the main CPU board (J6).
5. Remove the 2-pin AC input cable from transformer to the power supply (J1).
6. Remove the 6-pin MTA connector to the power supply (J2). If wired with a separate ground, disconnect wire from the power supply.
7. Set aside top cover.



NOTE: The controller contains the CPU, transformer, ink low board, power entry module and ink canister assembly. The top cover holds the display and power supply.

■ Replacing the IDS Board

1. The IDS board is located to the left of the CPU Controller board.
2. Disconnect the 2-pin connector (J1) and the 4-pin connector (J2).
3. Remove the two phillips screws. Remove damaged board and insert new board.
4. Reconnect all cables, boards and power supply to test new board.

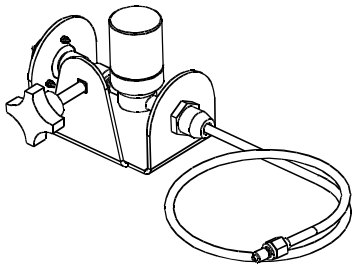


■ Reassembling the Controller

1. Reconnect the 6-pin connector located on the power supply.
2. Reconnect the 2-pin connector from the transformer to the Main CPU board.
3. Reconnect the 2-pin connector to the ink low board.
4. Reconnect the 44-pin cable.
5. Holding the display to the left, connect the display and the AC connection.
6. Reconnect the 6-pin MTA connector.
7. Rotate cover into position. Make sure the top edge of the top cover is in contact with the top edge of the bottom enclosure. Use the ink cartridge as a pivot.
8. Replace the four cover screws.

Contents

Ink Delivery System (IDS)	2480-045
Instruction Sheet	2460-045N



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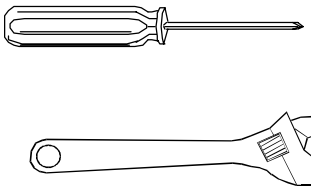
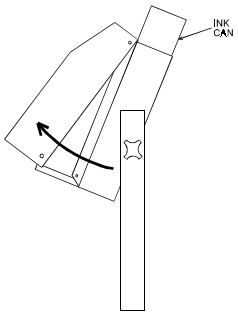


Precautions

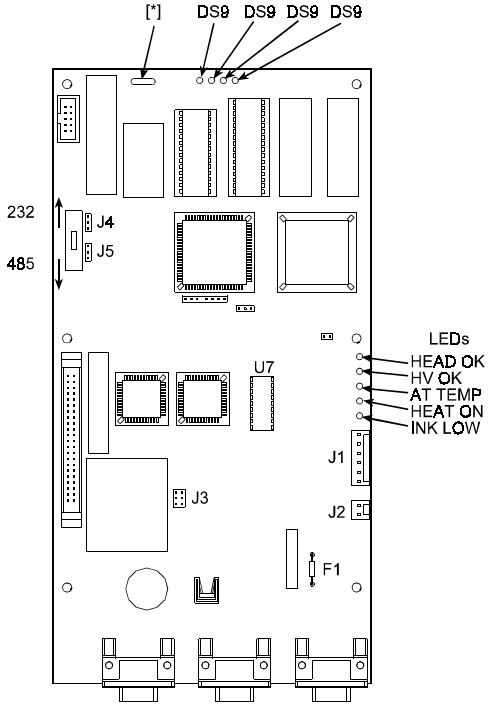
- Make sure the heat sink on the power supply, attached to the top cover, does not damage or contact the crystal at the top of the CPU board attached to lower enclosure housing [*].
- Turn OFF power and unplug unit.

■ Removing the Controller Cover

1. Remove the four cover screws.
2. Leave ink cartridge in place before removing the top cover. It will act as a pivot. Remove top cover by slowly lifting the bottom and allowing the top to pivot at its upper edge. **DO NOT** slide top cover forward. Continue holding cover with one hand. Disconnect internal cabling in sequence described below.
3. Disconnect the 6-pin MTA connector (J1) on the Main CPU Board.
4. Remove the ribbon cable which connects the display board (J2) to the main CPU board (J6).
5. Remove the 2-pin AC input cable from transformer to the power supply (J1).
6. Remove the 6-pin MTA connector to the power supply (J2). If wired with a separate ground, disconnect wire from the power supply.
7. Set aside top cover.



NOTE: The controller contains the CPU, transformer, ink low board, power entry module and ink canister assembly. The top cover holds the display and power supply.



■ Replacing the IDS

1. Remove the four screws on the back of the controller that fasten the cartridge shroud to the enclosure housing. The ink regulator, ink input and ink output lines are now exposed.
   A. Remove the ink cartridge and disconnect the ink line from the printhead. Depressurize the ink line.
   B. Disconnect the controller to printhead cable from the controller.
   C. Place the controller on a workbench.

2. Go through the inside of the controller to remove the #3 phillips screws that fasten the ink system bracket to the back of the controller.
3. Dispose of used parts as hazardous materials regulations dictate.
   A. Attach the new ink system to the enclosure but do not tighten the screws.
   B. Replace cartridge shroud and secure in place.
   C. Secure ink system in place.

NOTE: Some adjustment of the ink system bracket will be necessary.

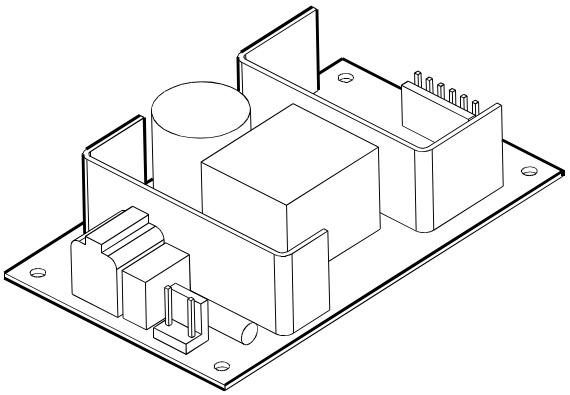
4. Reconnect all cables, boards and power supply to test.

■ Reassembling the Controller

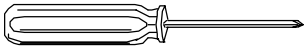
1. Reconnect the 6-pin connector located on the power supply.
2. Reconnect the 2-pin connector from the transformer to the Main CPU board.
3. Reconnect the 2-pin connector to the ink low board.
4. Reconnect the 44-pin cable.
5. Holding the display to the left, connect the display and the AC connection.
6. Reconnect the 6-pin MTA connector.
7. Rotate cover into position. Make sure the top edge of the top cover is in contact with the top edge of the bottom enclosure. Use the ink cartridge as a pivot.
8. Replace the four outside screws.

Contents

Power Supply	2480-046
Instruction Sheet	2460-046N



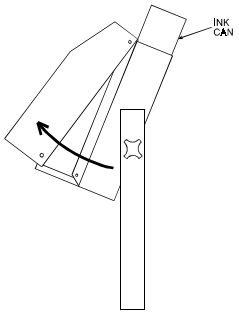
Tools



Precautions

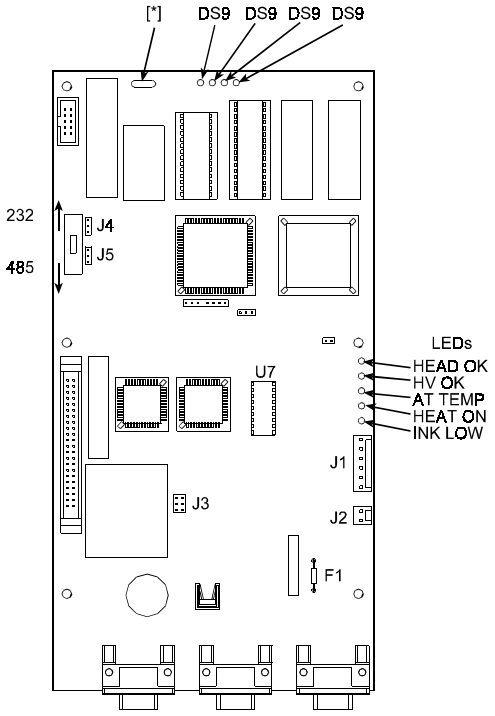
- Make sure the heat sink on the power supply, attached to the top cover, does not damage or contact the crystal at the top of the CPU board attached to lower enclosure housing [*].
- Turn OFF power and unplug unit.

■ Removing the Controller Cover



1. Remove the four cover screws.
2. Leave ink cartridge in place before removing the top cover. It will act as a pivot. Remove top cover by slowly lifting the bottom and allowing the top to pivot at its upper edge. **DO NOT** slide top cover forward. Continue holding cover with one hand. Disconnect internal cabling in sequence described below.
3. Disconnect the 6-pin MTA connector (J1) on the Main CPU Board.
4. Remove the ribbon cable which connects the display board (J2) to the main CPU board (J6).
5. Remove the 2-pin AC input cable from transformer to the power supply (J1).
6. Remove the 6-pin MTA connector to the power supply (J2). If wired with a separate ground, disconnect wire from the power supply.
7. Set aside top cover.

NOTE: The controller contains the CPU, transformer, ink low board, power entry module and ink canister assembly. The top cover holds the display and power supply.



■ Replacing the Power Supply

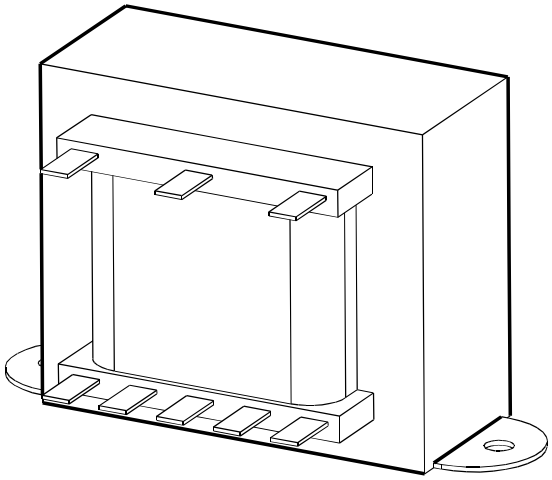
1. The power supply is located in the top section of the controller above the display. NOTE: Take note of the power supply orientation and be sure to replace new power supply in the same orientation.
2. Remove the phillips screws and remove the damaged power supply.
3. Insert the new power supply.
4. Looking at the upper portion, be sure the 6-pin connector is always to the left and the 2-pin connector is always to the right. If reversed, the display orientation will be incorrect.
5. Reconnect all cables, boards and power supply to test.

■ Reassembling the Controller

1. Reconnect the 6-pin connector located on the power supply.
2. Reconnect the 2-pin connector from the transformer to the Main CPU board.
3. Reconnect the 2-pin connector to the ink low board.
4. Reconnect the 44-pin cable.
5. Holding the display to the left, connect the display and the AC connection.
6. Reconnect the 6-pin MTA connector.
7. Rotate cover into position. Make sure the top edge of the top cover is in contact with the top edge of the bottom enclosure. Use the ink cartridge as a pivot.
8. Replace the four outside screws.

Contents

Transformer	2480-047
Instruction Sheet	2460-047N



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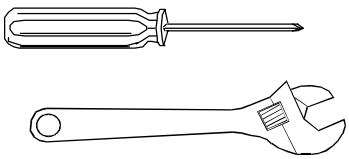
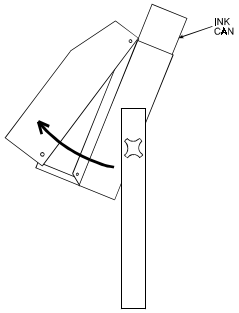


Precautions

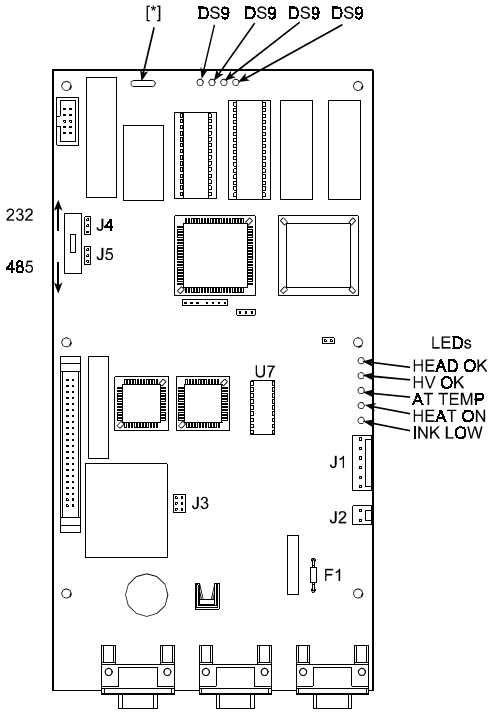
- Make sure the heat sink on the power supply, attached to the top cover, does not damage or contact the crystal at the top of the CPU board attached to lower enclosure housing [*].
- Turn OFF power and unplug unit.

■ Removing the Controller Cover



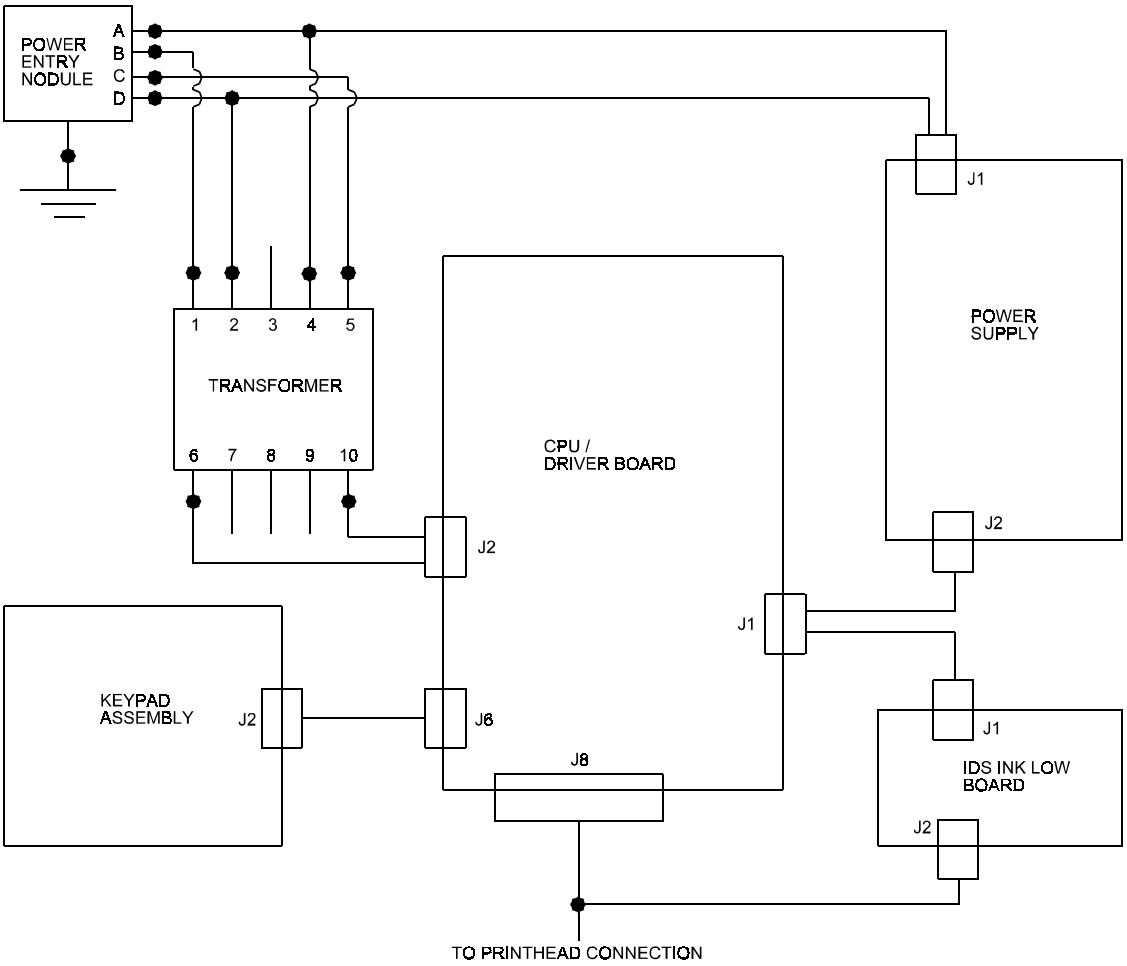
1. Remove the four cover screws.
2. Leave ink cartridge in place before removing the top cover. It will act as a pivot. Remove top cover by slowly lifting the bottom and allowing the top to pivot at its upper edge. **DO NOT** slide top cover forward. Continue holding cover with one hand. Disconnect internal cabling in sequence described below.
3. Disconnect the 6-pin MTA connector (J1) on the Main CPU Board.
4. Remove the ribbon cable which connects the display board (J2) to the main CPU board (J6).
5. Remove the 2-pin AC input cable from transformer to the power supply (J1).
6. Remove the 6-pin MTA connector to the power supply (J2). If wired with a separate ground, disconnect wire from the power supply.
7. Set aside top cover.

NOTE: The controller contains the CPU, transformer, ink low board, power entry module and ink canister assembly. The top cover holds the display and power supply.



■ Replacing the Transformer

1. Remove the two nuts fastening the transformer to the housing.
2. Review the following drawing of the connections before removing the transformer. The four lines on the left feeds from the power entry module at the base of the transformer. The two lines on the right connects to J2 on the CPU controller board. NOTE: all tabs on the transformer are identified numerically. All tabs on the power entry module are identified alphabetically.
3. Remove and replace damaged transformer.
4. Reconnect all cables, boards and power supply to test.



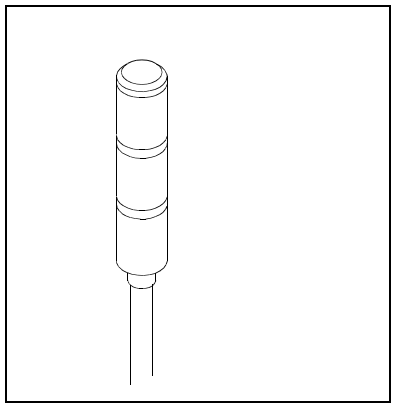
Reassembling the Controller

1. Reconnect the 6-pin connector located on the power supply.
2. Reconnect the 2-pin connector from the transformer to the Main CPU board.
3. Reconnect the 2-pin connector to the ink low board.
4. Reconnect the 44-pin cable.
5. Holding the display to the left, connect the display and the AC connection.
6. Reconnect the 6-pin MTA connector.
7. Rotate cover into position. Make sure the top edge of the top cover is in contact with the top edge of the bottom enclosure. Use the ink cartridge as a pivot.
8. Replace the four outside screws.

APPENDIX A • OPTIONAL EQUIPMENT

LOW INK BEACON

(Diagraph part #5100-605)



The External Alarm Beacon indicates an ink low situation and a system failure. The beacon can be mounted on top of the floor stand, or integrated into a conveyor system. The beacon has a DB9 connector that plugs directly into the Controller.

HOST COMPUTER

A host computer can control a VS/PEL printing system. Applications that use a computer will need the Diagraph Value Series computer bundle which includes: a disk with Value Series software, the user's manual and a sentinel.

Communication between the computer and the VS/PEL controller occurs over a serial line, either RS-232 or RS-485. For successful data transfer over distances greater than 50 feet, the computer requires an RS-485 connector and the controller requires internal configuration changes. Details of those configuration changes appear in the next section.

APPENDIX B • COMMUNICATION

You can communicate with the VS/PEL System Ink Jet printing system with the controller keyboard or with a host computer. If you are using the controller keyboard, there are no adjustments to make. With a host computer, you will need to make three configuration changes:

- Switch to a baud rate other than 9600
- Switch from RS-232 to RS-485
- Switch controllers to Network Mode

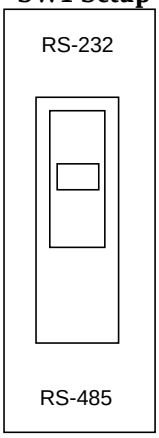
BAUD RATE CHANGE

The VS/PEL System controller ships configured for 9600 baud. To change this setting, use the "Baud Rate" command in the Value Series software. The VS/PEL System Controller supports 9600 baud, 19.2 and 38.4 kilobaud.

RS-232 to RS-485 or RS-485 to RS-232

Standard configurations use RS-232 serial communications for distances under 50 feet and RS-485 for distances greater than 50 feet and for network applications. The limitation is 1000 feet from the controller.

The VS/PEL System controller comes setup for RS-232. To change to RS-485, locate switch SW1 inside the controller.



RS-232 Setting
Push the switch up to the RS-232 notation.

RS-485 Setting
Push the switch down to the RS-485 notation.

Application Notes:

1. RS-232 is the default for serial communications.
2. RS-485 Serial Communications requires a RS-485 serial port on the Host Computer. Be sure that the host computer has an RS-485 serial connection before attempting to configure a Value Series system for host computer control over distances greater than 50 feet.

Connecting the RS-232 /RS-485 Rear Communications Port

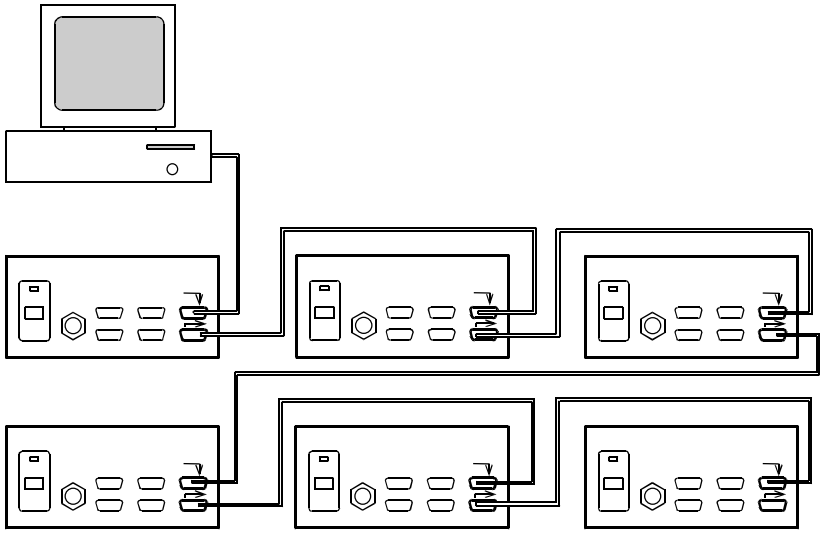
The RS-232/RS-485 Rear Communications Port is for applications that require host computer control for high speed downloading applications.

The rear communications port utilizes a female DB9 connector. The type of communications, RS-485 or RS-232 will dictate how to wire the cabling. Please note that the pin-outs of this DB9 match the conventional standard for RS-232 and RS-485. A straight-through DB9 male/female cable is acceptable.

NETWORK SETTINGS

The VS/PEL Controller also communicates via RS-485, which allows the hook-up of thirty-two controllers to one host computer. A Token Ring network connects the VS/PEL controllers to the host computer. This type of network allows a controller to communicate with the host computer, or vice versa, by passing a token from one controller to the next.

The network cable is a standard Level 5 cable with the connections as shown:



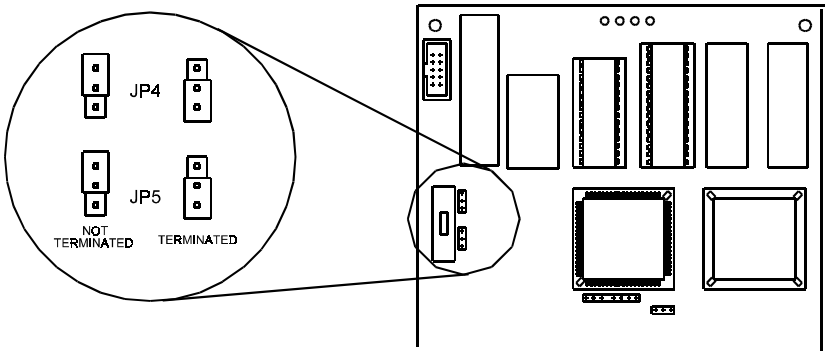
Example of a Six Station Network Configuration

The host computer connects to the first printer, the first printer is then connected to the second printer and so on, up to thirty-two printers.

These connections are made through the Network In and the Network Out Ports. Insert the host computer cabling into the Rear Port of the first controller, then run a cable from the Auxiliary Port of the first controller to the Rear Port of the second controller. Continue until reaching the last controller on the network.

To set-up a VS/PEL Controller for network communications:

1. Set SW1 to RS-485 mode.
2. Place termination jumpers on JP4 and JP5 of the last VS/PEL controller.
3. To terminate communications, open the controller and locate JP4 and JP5. Remove the jumper on each location and jumper the two pins together.



JP4 and JP5 Settings

4. Set appropriate network software commands, including Network and ID. Set Network = Yes. The ID command names the specific VS/PEL Controller (1-99) for access from the host computer. Each controller is given a specific identification for communication purposes.

CONNECTING THE RS-232/RS-485 REAR COMMUNICATION PORT

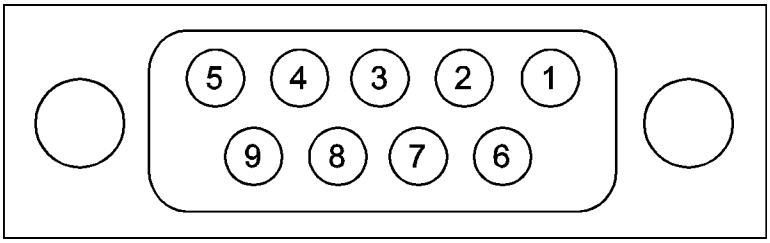
The RS-232/RS-485 Rear Communication Port is used primarily for applications that require host computer control for high speed downloading applications.

The Rear Communication Port uses a female DB9 connector. Wire the cable according to the type of communications, RS-232 or RS-485.

NOTE: The pin-outs for the DB9 connector match the conventional standard for RS-232 and RS-485. A straight through DB9 male/female type cable is acceptable.

Running cable for a network requires Network Level 5 cabling with a preference for the DB style connector.

RS-232			RS-485		
Pin	Signal Name	Type	Pin	Signal Name	Type
2	RS-232 TX	Output	1	RS-485 TX-	Output
3	RS-232 RX	Input	2	RS-485 RX+	Input
5	DC Ground	Ground	3	RS-485 RX-	Input
			5	DC Ground	Ground
			9	RS-485 TX+	Output



NOTE: To eliminate additional hardware expense, use the Auxiliary Port to run cable to and from the controller.

APPENDIX C • BAR CODE DIMENSIONS AND MAGNIFICATIONS

Tolerances for Code 39 Bar Code

Nominal Width of Narrow Bars and Spaces		Nominal Width of Wide Bars and Spaces		Nominal Ratio of Wide and Narrow Elements	Bar and Space Width Tolerance		Character Density Per Inch
IN	**MM**	**IN**	**MM**		**IN**	**MM**	
0.0200	0.50	0.0600	1.50	3.00	0.0069	0.18	3.00
0.0400	1.01	0.1000	2.51	2.50	0.0110	0.30	1.70
0.0800	2.01	0.2000	5.11	2.50	0.0220	0.61	0.85

Tolerances for I 2 of 5 Bar Code

Magnification Factor		Narrow Bar or Space Width		Wide Bar or Space Width		Bar or Space Width Tolerance		Minimum Clear Area Width		Minimum Bar Height**	
IN	**MM**	**IN**	**MM**	**IN**	**MM**	**IN**	**MM**	**IN**	**MM**	**IN**	**MM**
1.00	1.0	0.040	1.016	0.100	2.540	0.012	0.305	0.40	10.2	1.25	31.80
0.90	0.90	0.036	0.914	0.090	2.286	0.011	0.274	0.36	9.1	1.13	28.70
0.80	0.80	0.032	0.813	0.080	2.032	0.010	0.244	0.32	8.1	1.00	25.40
0.70	0.70	0.028	0.711	0.070	1.778	0.008*	0.203	0.28	7.1	0.88	22.35
0.625	0.625	0.025	0.635	0.063	1.588	0.005*	0.127	0.25	6.4	0.78	19.81

* All elements must be at least 0.020 inches wide.

** Minimum bar height for 14 digit symbols. For six digit symbols the minimum bar height is 0.78 inches

PRINTHEAD PRIMING/FLUSHING PROCEDURES

■ Flushing The Printhead

Flushing the printhead is necessary for the first time start-up and recommended as a last resort when attempting to fix a printhead with ingested air.

First Time Start-Up: The factory flushes and primes the PEL printhead before shipping. Since shock and vibration during shipment can introduce air into a printhead, it is good practice to flush and then prime in all new installations.

Last Resort after Priming: Priming should be a last resort procedure before requesting a service call. A flush should only be necessary if a printhead has sustained a hard blow or suffered mistreatment that will cause air ingestion. Otherwise, standard priming should be sufficient to eliminate air from the system.

In rare instances, large amounts of air can enter the ink channels and not dispel through the orifices during flushing. The air will remain in the chamber plate manifold and cause periodic depriming of channels. Ingestion of this amount of air can take place as the result of extreme shock to the printhead, or removal of the vent cap. Take the following steps to flush the system of excessive air:

■ Flushing

1. Allow the printhead to heat to its proper operating temperature.
2. Place an absorbent wipe by the vent tube and directly under— but not touching—the orifice plate.

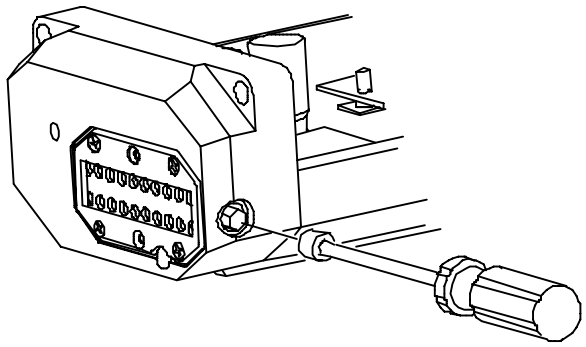
   The material should be lint-free and not liable to contaminate surfaces near the fluid path.

WARNING: Do NOT touch under side wiring especially the hot heater resistor under the printhead.

3. Push the prime button to apply pressure to the printhead. This pressure forces ink and air trapped in the manifold and in the fluid path out of the orifices. Maintain pressure until no more bubbles

are seen coming out of the orifices. This will take approximately 10 seconds.

4. Remove the vent cap to eliminate bubbles trapped between the highest channel and the end of the vent tube. Maintain pressure until a good, steady flow of ink pours from the vent with no evident bubbles. This should take about 10 to 15 seconds.



5. While maintaining this flow, replace the vent cap. Maintaining the flow of ink is very important; otherwise, an air bubble will be left in the fluid path.

Hand-tighten the vent cap only.

Note: Do not overtighten or breakage may occur.

6. Carefully wipe off the outside of the printhead and the contacts at the base of the PC Board with an absorbent cloth. Be careful not to damage wires, then carefully wipe the orifice plate.

7. Check for prime by firing all channels. Any channels that do not fire will not be recoverable through the use of the priming procedure. If all channels do not fire, cover the printhead with the face plate and let heat for approximately 10 minutes. **Repeat flushing procedures eight or more times to completely purge air bubbles from the printhead**. If all channels still do not fire, contact Diagraph Service.

Priming The Printhead

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

On rare occasions, debris enters through an orifice or an air bubble may be ingested. Both circumstances produce a gap in the print but you can expel either by taking the following steps.

Wear suitable eye and skin protection whenever handling ink.

1. Place a wipe over the orifices to absorb the ink.
2. Push the Prime button until ink is seen coming from the nozzles.
3. Gently wipe upward to absorb any ink on the surface. Repeat with a clean wipe.

APPENDIX E • CODE PAGES

Diagraph Value Series Code Pages

Code Pages

1	1 +ALT	2	3	4	5	6	7	8
0	)	ア	リ	ｪ	右	株	赤	和
1	!	イ	ル	ｫ	前	式	青	取
2	@	ウ	レ	ｬ	後	会	黄	扱
3	#	エ	ロ	ｭ	大	社	白	意
4	$	オ	ヤ	ｮ	小	工	灰	許
5	%	カ	ユ	平	高	業	色	
6	^	キ	ヨ	成	低	消	匹	
7	&	ク	ワ	年	側	費	正	
8	*	ケ	ン	月	底	税	反	
9	(	コ	ガ	日	面	存	御	
A	▼	サ	ギ	時	天	法	様	
B	<	シ	グ	分	地	型	出	
C	,	ス	ゲ	秒	無	番	荷	
D	-	セ	ゴ	週	用	号	回	
E	、	ソ	ザ	迄	製	数	受	
F	+	タ	ジ	旬	造	在	付	
G	=	チ	ズ	間	賞	庫	共	
H	／	ツ	ゼ	単	味	場	通	
I	{	テ	ゾ	位	期	部	両	
J	＼	ト	ダ	円	限	品	物	
K	[	ナ	ヂ	個	保	料	段	
L	]	ニ	ヅ	本	証	金	市	
M	?	ヌ	デ	箱	有	販	県	
N	>	ネ	ド	枚	効	売	第	
O	}	ノ	バ	冊	以	者	温	
P	|	ハ	ビ	台	内	現	度	
Q	▲	ヒ	ブ	袋	使	見	口	
R	:	フ	ベ	包	承	本	入	
S	◀	ヘ	ボ	装	認	務	板	
T	;	ホ	パ	巻	定	原	先	
U	‘	マ	ピ	方	可	材	半	
V	.	ミ	プ	向	質	名	殿	
W	▶	ム	ペ	上	量	標	作	
X	¢	メ	ポ	中	特	準	明	
Y	“	モ	ｧ	下	注	容	治	
Z	DEL	ラ	ｨ	左	文	黒	昭	

FONT CHART

HR stands for "Human Readable" text.

Font	Description	Output
1	Micro-Spacing, only allows spaces (no characters)	Spaces
5	5x5 Dot Matrix, Block Character	5 Lines
7	7x5 Dot Matrix, Block Character	4 Lines
9	9x7 Dot Matrix, Block Character	3 Lines
16	14x8 Dot Matrix, Block Character	2 Lines
17	16x8 Dot Matrix, Block Character	2 Lines
31	32x30 Dot Matrix, Block Character	1 Line
32	32x30 Dot Matrix, Block Character	1 Line
40	EAN 13 Bar Code	Bar code
41	EAN 8 Bar code	Bar code
42	Code 39 Bar code (w / HR)	Bar code
43	Code 128 Bar code (w / HR)	Bar code
46	UCC / EAN Code 128 Bar code, Application Identifiers (w / HR)	Bar code
53-58	EPROM logo space	Graphic
50	Diagraph Logo	Graphic
51	Diagraph Logo	Graphic
52	Outlined Recycle Logo	Graphic
59	Custom Graphic	Graphic
60	Custom Graphic	Graphic
61	Custom Graphic	Graphic
90	Postnet Bar code	Bar code
91	Alphanumeric Mixed Font	Up to 4 Lines
92	Interleaved 2 of 5 Bar code	Bar code
93	Code 39 Bar code (without HR)	Bar code
94	UPC Shipping Container Bar code 62.5% (with bearer bars)	Bar code
96	UPC Shipping Container Bar code 70% (with bearer bars)	Bar code
97	Code 128 Bar code (without HR)	Bar code
98	UPC A Bar code	Bar code
99	UPC E Bar code	Bar code

Note: If you select a font that is not current, the font number will return to the last valid font number.

Setting the Bold Level

After selecting a font or logo, set the bold level by adding a numeric value to the font or logo value. Logos are custom order items and are inserted between fonts 50 and 75 on demand. Use the following chart to set the bold level for a font or a logo:

Bold Level	Add	Bold Level	Add
1	100	2	200
3	300	4	400
5	500	6	600
7	700	8	800
9	900		

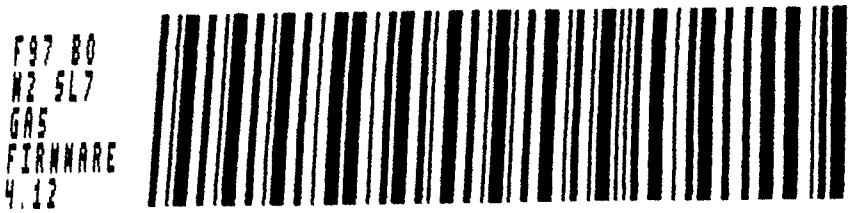
Example: Font 7 with a bold level of 3 - Enter 307.

VS/PEL Font & Bar Code Samples

This section contains samples from the fonts and bar codes present in firmware version 4.12.

Description	Sample
Font 99 UPC E Bar Code	

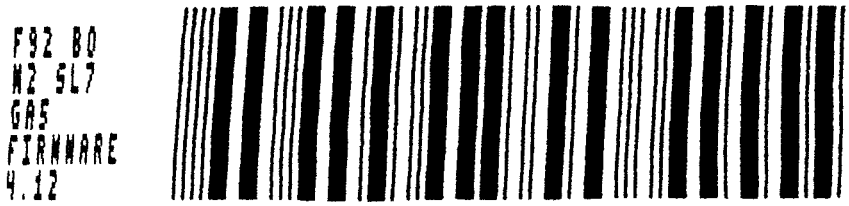
Description	Sample
Font 98 UPC A Bar Code	

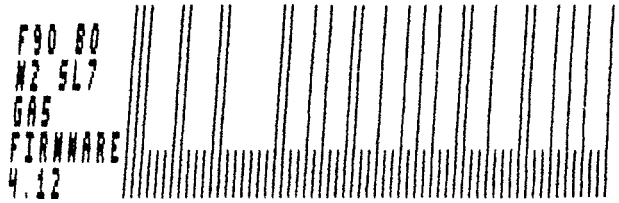
Description	Sample
Font 97 (without HR) Code 128 Bar Code	

Description	Sample
Font 96 UPC Shipping Container Bar Code	

Description	Sample
Font 94 UPC Shipping Container Bar Code	

Description	Sample
Font 93 Code 39 (without HR)	

Description	Sample
Font 92 Interleaved 2 of 5 Bar Code	

Description	Sample
Font 90 Postnet Bar Code	

Description	Sample
Font 46 UCC/EAN Code 128	

Description	Sample
Font 43 Code 128 (with HR)	

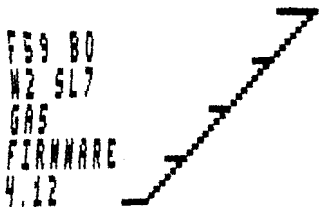
Description	Sample
Font 42 Code 39 (with HR)	

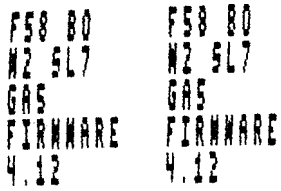
Description	Sample
Font 41 EAN 8	

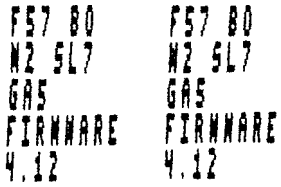
Description	Sample
Font 40 EAN 13	

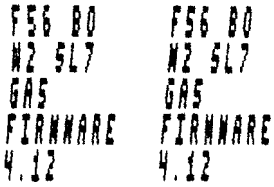
Description	Sample
Font 60 Block	

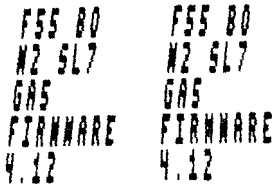
Description	Sample
Font 61 Block	

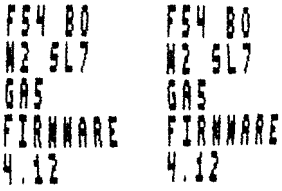
Description	Sample
Font 59	

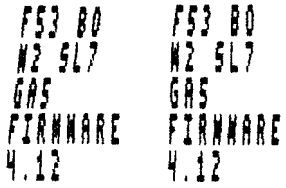
Description	Sample
Font 58	

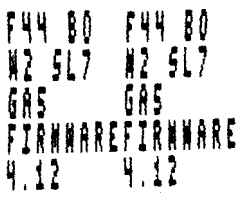
Description	Sample
Font 57	

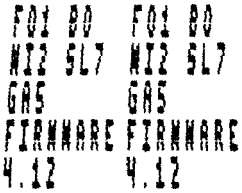
Description	Sample
Font 56	

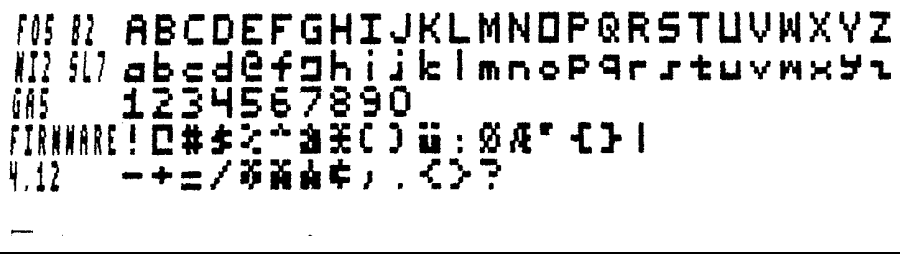
Description	Sample
Font 55	

Description	Sample
Font 54	

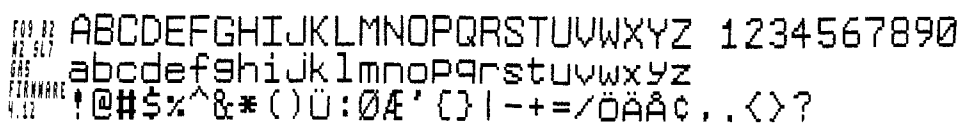
Description	Sample
Font 53	

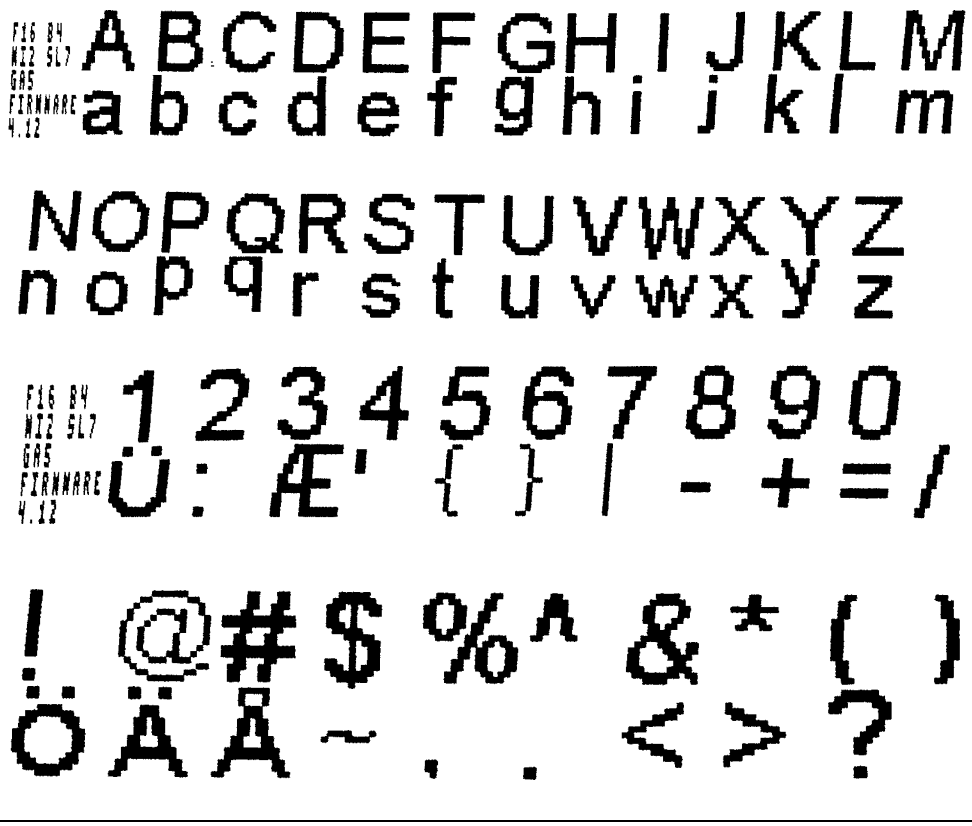
Description	Sample
Font 44	

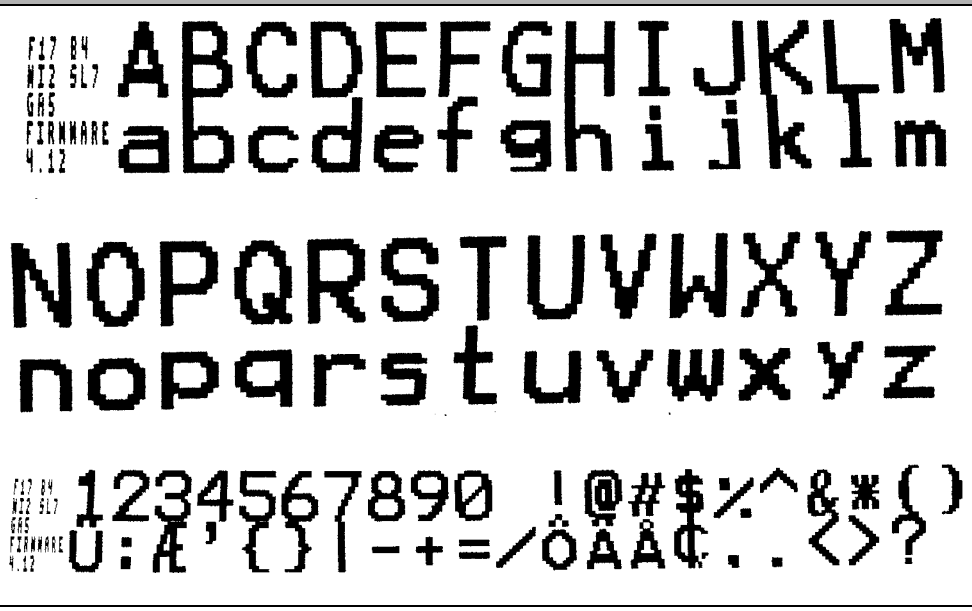
Description	Sample
Font 01 Microspace	

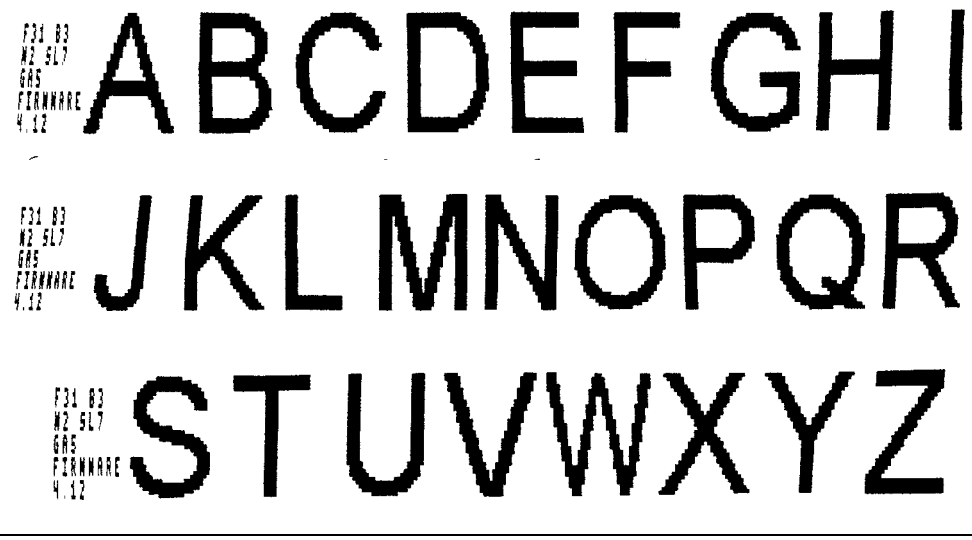
Description	Sample
Font 05 5 Lines, 5 x 5 Dot Matrix, Block Character	

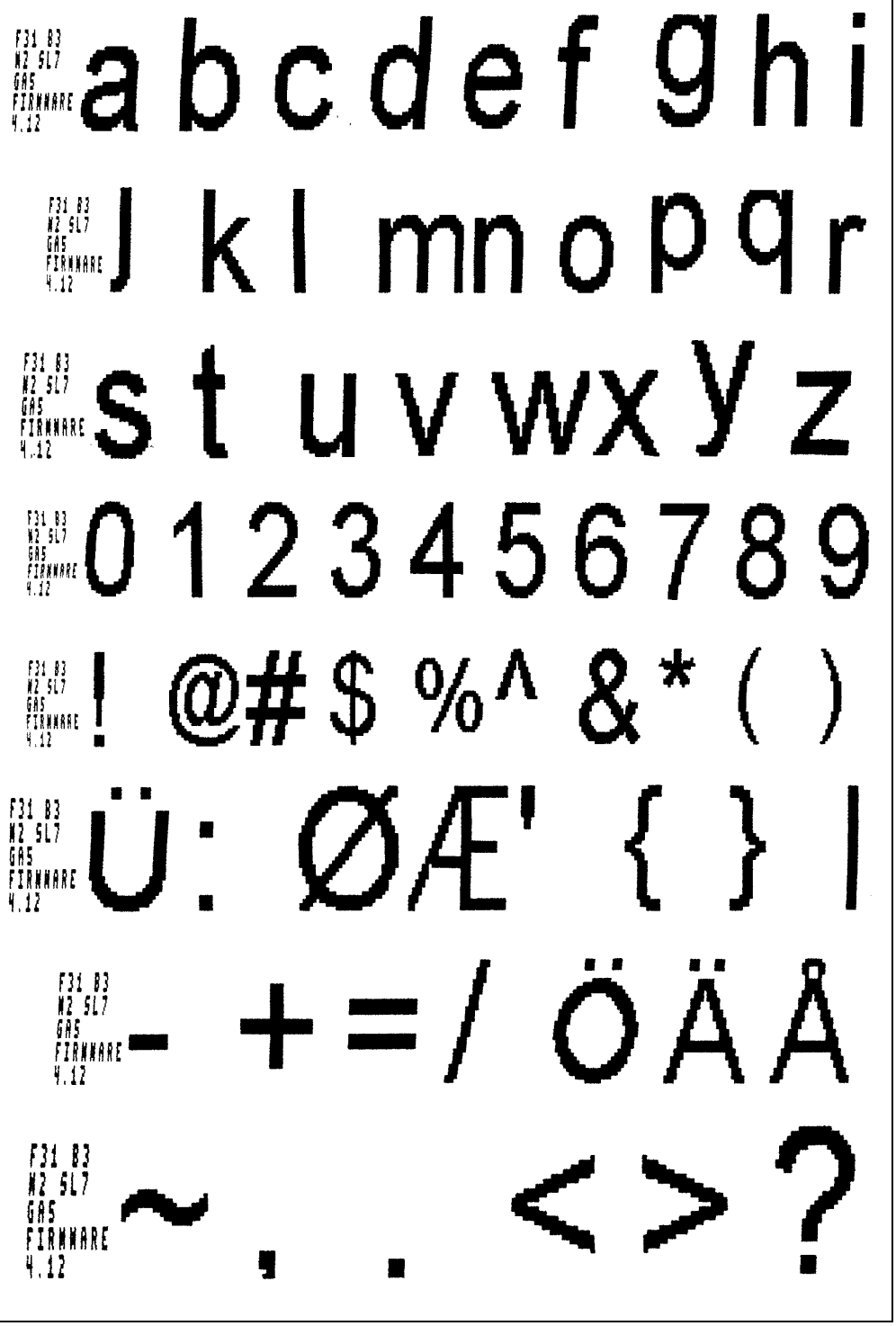
Description	Sample
Font 07 4 Lines, 7 x 5 Dot Matrix, Block Character	

Description	Sample
Font 09 3 Lines, 9 x 7 Dot Matrix, Block Character	

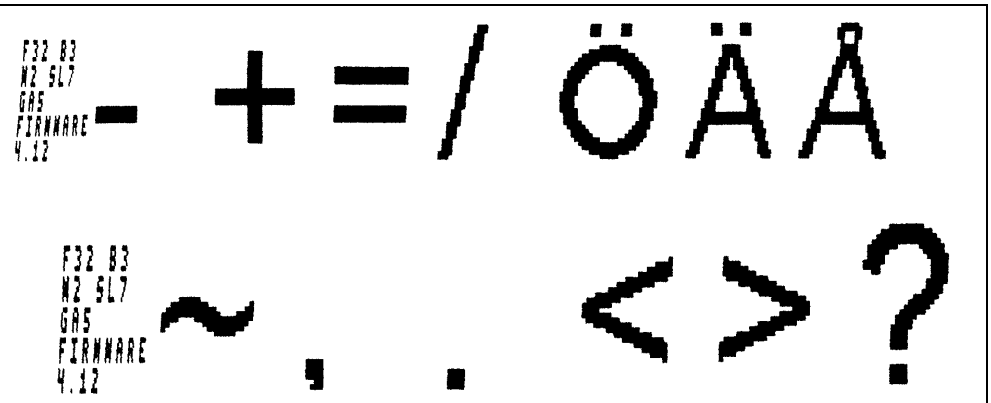
Description	Sample
Font 16 2 Lines, 14 x 8 Dot Matrix, Block Character	

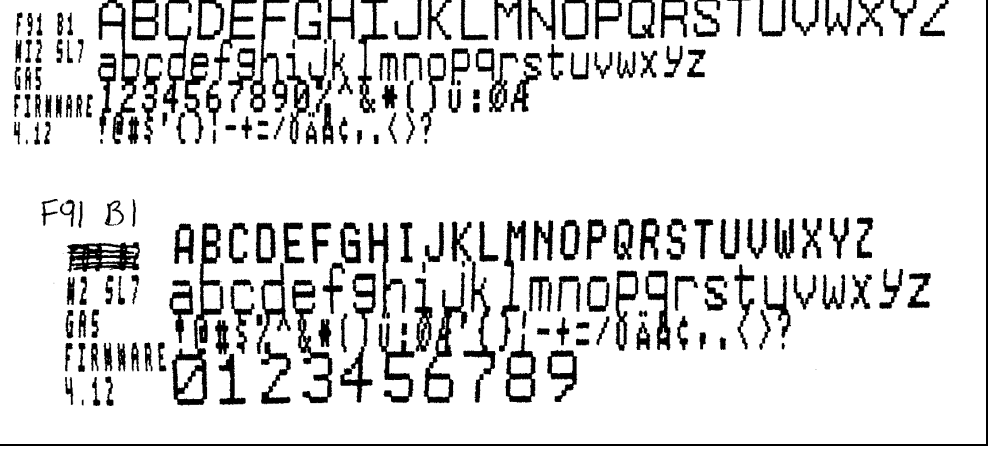
Description	Sample
Font 17 2 Line, 16 x 8 Dot Matrix, Block Character	

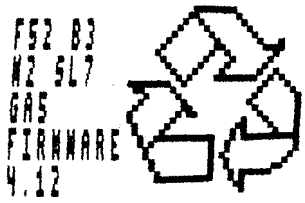
Description	Sample
Font 31 1 Line, 32 x 30 Dot Matrix, Block Character	

Description	Sample
	

Description	Sample
Font 32 1 Line, 32 x 30 Dot Matrix Block Character	

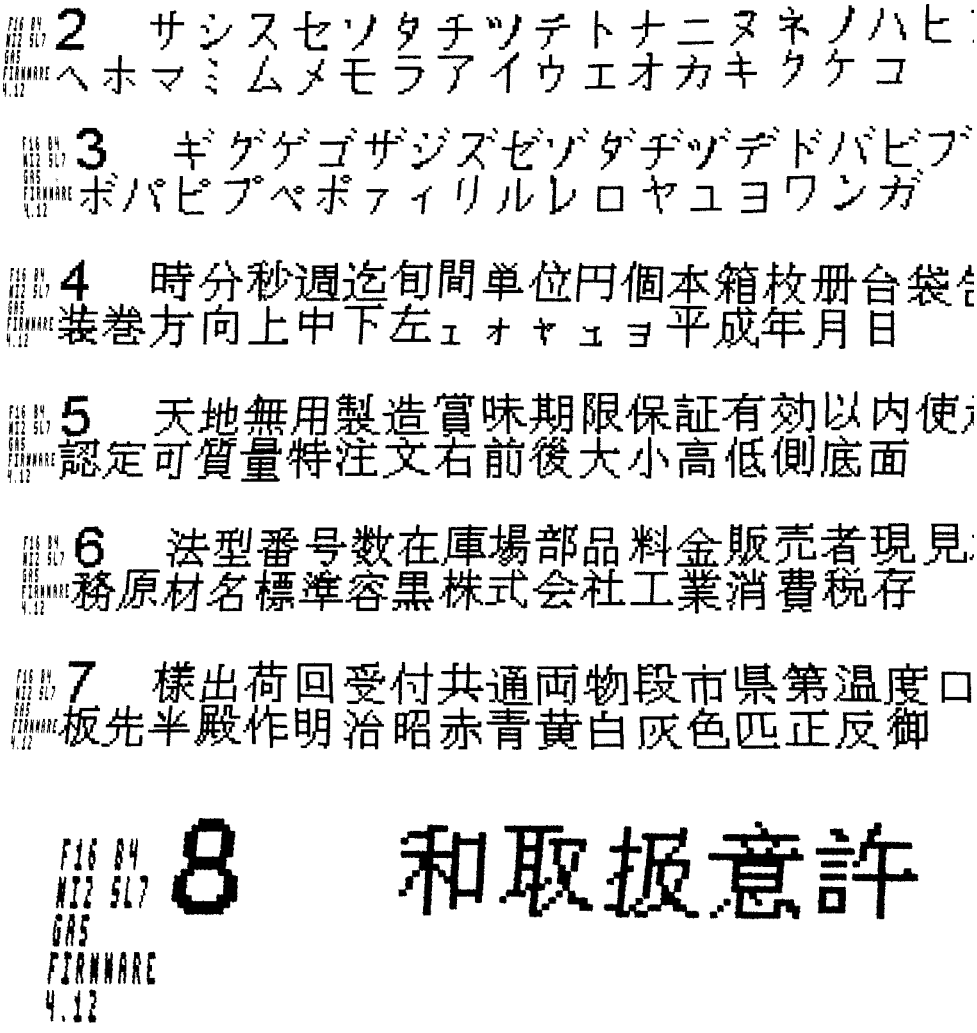
	

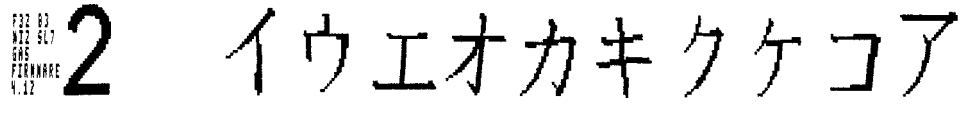
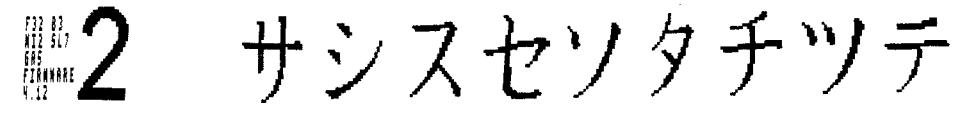
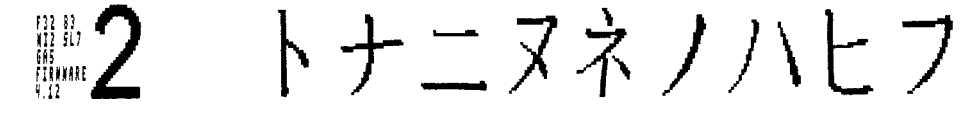
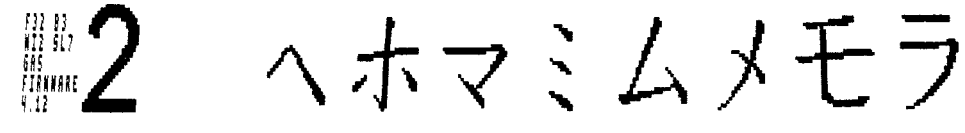
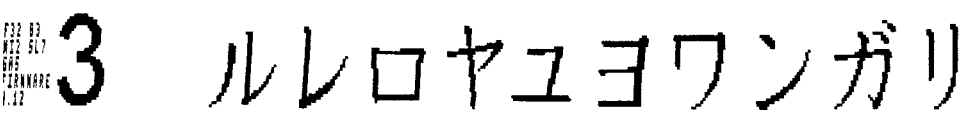
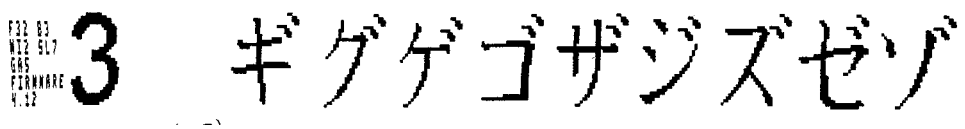
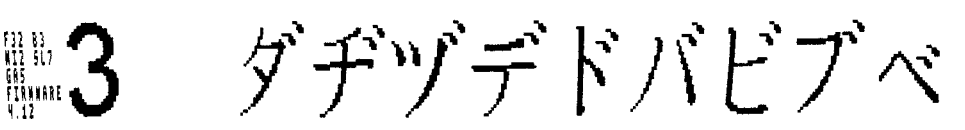
Description	Sample
Font 91 Mixed Font, Four Lines, Combinations chosen from 7, 9, 16, 17, 31, 32 combination total cannot exceed 32	

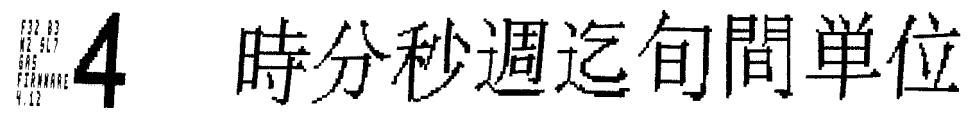
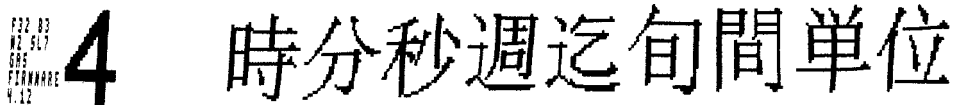
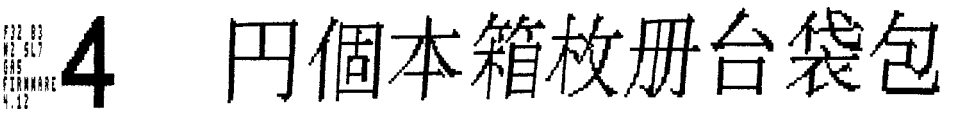
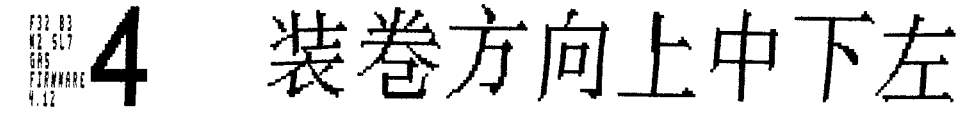
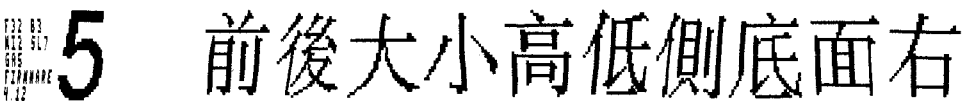
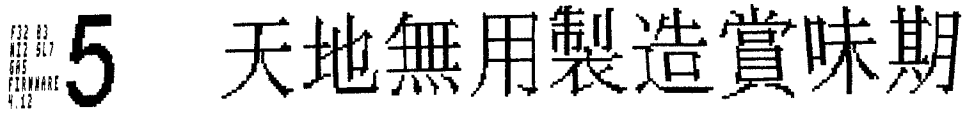
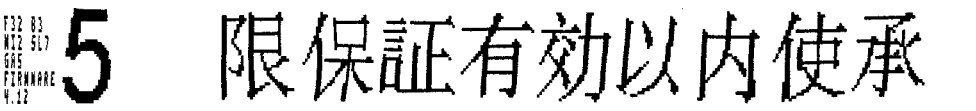
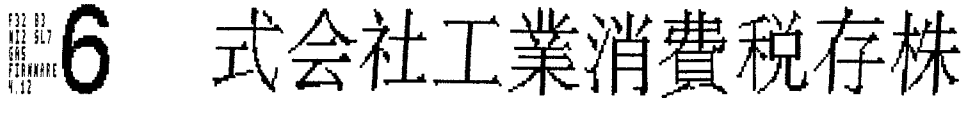
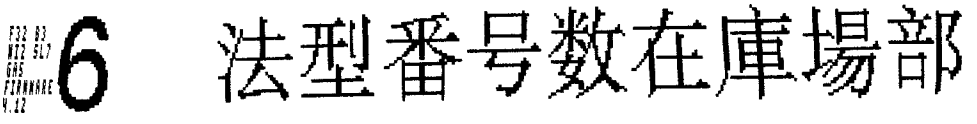
Description	Sample
Font 52 Recycle Logo	

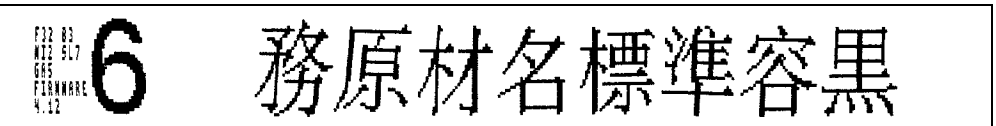
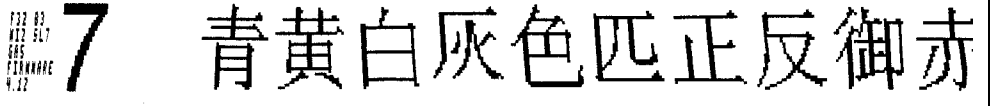
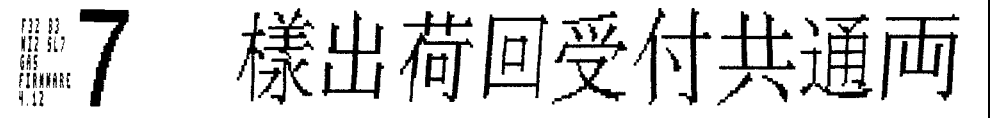
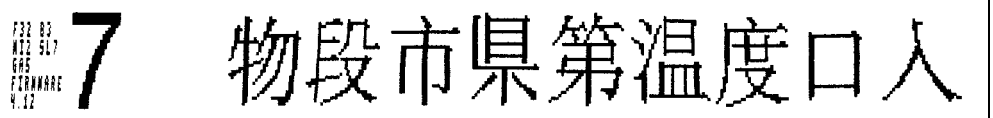
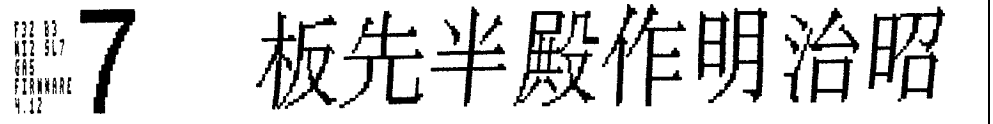
Description	Sample
Font 51	

Description	Sample
Font 50	

Description	Sample
Font 16 2 Lines, 14 x 8 Dot Matrix, Block Character, Code Page 2 (A-R) (S-Z, 0-9) Code Page 3 Code Page 4 Code Page 5 Code Page 6 Code Page 7 Code Page 8	

Description	Sample
Font 32 1 Line, 28 x 20 Dot Matrix, Block Character, Code Page 2, (1-0) Code Page 2 (A-I)	
Code Page 2 (J-R)	
Code Page 2 (S-Z)	
Code Page 3 (1-0)	
Code Page 3 (A-I)	
Code Page 3 (J-R)	
Code Page 3 (S-Z)	

Code Page 4 (0-9)	
Code Page 4 (A-I)	
Code Page 4 (J-R)	
Code Page 4 (S-Z)	
Code Page 5 (1-0)	
Code Page 5 (A-I)	
Code Page 5 (J-R)	
Code Page 5 (S-Z)	
Code Page 6 (1-0)	
Code Page 6 (A-I)	
Code Page 6 (J-R)	
	

Code Page 6 (S-Z)	
Code Page 7 (1-0)	
Code Page 7 (A-I)	
Code Page 7 (J-R)	
Code Page 7 (S-Z)	
Code Page 8 (0-4)	

LONG BAR EXAMPLES USING A 1920 PRINTHEAD

FONT 294

I 2 of 5 62.5% 14 DIGIT	GAP 5	LO1
		

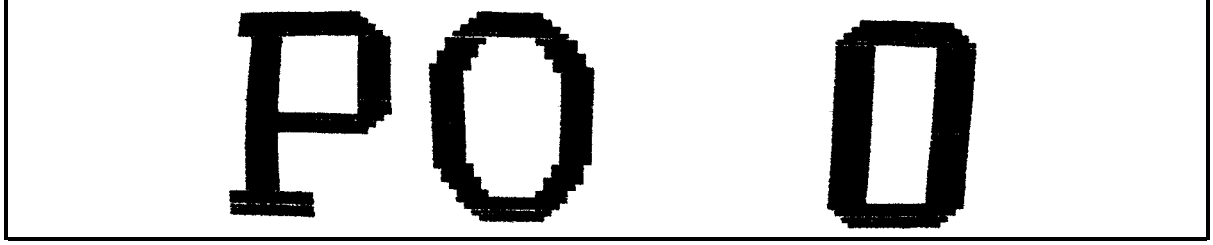
I 2 of 5 62.5% 14 DIGIT	GAP 5	LO16
		

I 2 of 5 62.5% 14 DIGIT	GAP 5	LO32
		

POSITION EXAMPLES USING A 1920 PRINTHEAD

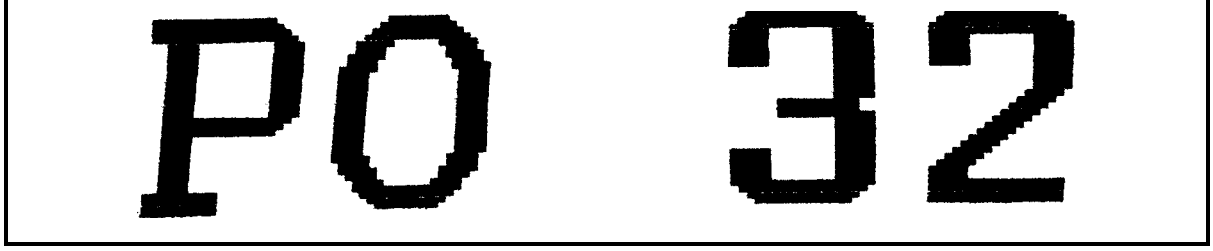
FONT 31

BOLD 5	GAP 5	PO 0



BOLD 5	GAP 5	PO 16

BOLD 5	GAP 5	PO 32



BOLD EXAMPLES USING A 1920 PRINTHEAD

The Bold command darkens and enlarges the print. It will also increase the message length and can affect the repeat distance.

FONT 31

	GAP 5	B 0
		

	GAP 5	B 5
		

	GAP 5	B 9
		

GAP EXAMPLES USING A 1920 PRINTHEAD

FONT 31

	GAP 0	BOLD 5

	GAP 50	BOLD 5

	GAP 99	BOLD 5